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From: Thatcher, Lucy <Lucy.Thatcher@richmondandwandsworth.gov.uk>
Sent: 28 August 2019 14:33
To: Suzanne Robson <SRobson@geraldeve.com>
Cc: Neil Henderson <NHenderson@geraldeve.com>; Anna Gargan <AGargan@geraldeve.com>
Subject: RE: Addendum of D&A and Environmental Health (Noise and Light)

Official

Suzanne – I have sent your comments for 1 and 2 below to the relevant officer. With respect to 3 , I asked in my original email I want these matters resolved prior to any recommendation. (this is also supported by Sports England). We need to demonstrate that any lighting will not cause a nuisance.

Please provide to prevent any delay.

Lucy

From: Suzanne Robson <SRobson@geraldeve.com>
Sent: 28 August 2019 08:21
To: Thatcher, Lucy <Lucy.Thatcher@richmondandwandsworth.gov.uk>
Cc: Neil Henderson <NHenderson@geraldeve.com>; Anna Gargan <AGargan@geraldeve.com>
Subject: RE: Addendum of D&A and Environmental Health (Noise and Light)

Lucy,

Thank you for sending us across the draft conditions from your EHO. We have reviewed the conditions with the client and the technical team and have the following response for each condition:

1. **Chalkers Corner** – **condition not agreed; not considered necessary.**

   The noise assessment (2018 ES and subsequent Noise Technical Notes (WIE10667-103-TN-1.1.3-Noise Summary Note dated August 2018 - appended to the May 2019 ES Addendum) predicts an **insignificant** change to existing receptors at Chertsey Court, Lower Richmond Road and Clifford Ave with all predicted change in noise level being less than 1dB. A scheme for further mitigation in respect of noise is not required to mitigate any impact from the proposed development itself (applications A, B and C) in terms of noise and the proposed condition is not necessary (including the requirement for this mitigation to be retained as approved).

Please note:

a. Low noise road surface: This is more applicable to motorways as where traffic speeds are lower than 50 km/h, traffic noise is mainly attributable to engine, transmission and exhaust noise, especially from lorries and buses. Where speeds are higher, the major component of traffic noise comes from the tyre/road interaction. A low noise surface may therefore have limited effect at this location.
b. Mechanical ventilation and glazing systems for existing properties: This can be discounted for noise as in order to qualify under the Noise Insulation Regulations, the following must apply for a duty to carry out insulation work or to make grants:
    i. The traffic noise level at one or more facades will increase by at least 1dB(A) and will be not less than the specified level of 68 dB(A) L10 (18 hour).
    ii. Noise caused or expected to be caused by traffic using the new or altered section of road will contribute at least 1dB(A) to the noise level.
    iii. The property must be within 300m of a carriageway forming part of the scheme.

2. **MUGA – <u>condition not agreed in its current form; suggested amendments proposed.</u>**

A condition to prepare a scheme to protect noise sensitive premises against noise generated from the use of the Sports Pitches and Multi Games Use Area (MUGA) is acceptable. However, compliance with a noise limit of 50dB LAeq is too prescriptive given the existing measured noise levels at Williams Lane (60dB during the day and 58dB during the evening) and Lower Richmond Road (71dB during the day and 69dB during the evening).

Additionally, the Sports England 2015 Design Guidance Note on AGPs [MUGA] states that *"Where noise from the new source (the AGP) does not exceed the existing noise climate the increase in noise will be no more than 3 decibels. This is the minimum that can normally be perceived."* On this basis, it would be reasonable to have a higher noise emission from the MUGA than 50dB LAeq at the existing receptor and for it still to be acceptable. Furthermore, the level of 50dB LAeq has been adopted by Sports England from WHO Guidelines for Community Noise –*" to avoid 'moderate annoyance' during the daytime and evening the noise level should not exceed 50 dB LAeq(T)."*

On the above, we suggest the planning condition is revised as follows:

"A scheme to protect noise sensitive premises against noise generated from the use of the Sports Pitches and Multi Games Use Area (MUGA) shall be submitted to and approved by the LPA. The scheme shall refer to the guidance contained within Artificial Grass Pitch (AGP) Acoustics - Planning Implications 2015, produced by Sports England. Where the equivalent continuous sound Level LAeq,1 hour emitted from the use of the Sports Pitches and Multi Games Use Area (MUGA) to which the application refers, as measured or predicted (1 metre from the façade adjusted to a free-field value) at a representative noise sensitive premises (residential, hospital or school) to include;

- ***Williams lane***
- ***Lower Richmond Rd***
- ***New residential dwellings within the development***

shall seek to achieve 50dB(A) LAeq,1hour and no more than the prevailing noise levels at the receptor when measured or predicted over a 1 hour period, whichever is greater. An acoustic report shall be submitted and approved in writing by the LPA before the first use of the development in order to demonstrate compliance with the condition. Hours of use for the sports facilities will be agreed in writing with the LPA."

3. **Sports lighting control scheme – <u>condition agreed.</u>**

Please could you review points 1 and 2 with your EHO and come back to us. Thank you.

Kind regards

Suzanne

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From: Thatcher, Lucy <Lucy.Thatcher@richmondandwandsworth.gov.uk>
Sent: 20 August 2019 17:34
To: Neil Henderson <NHenderson@geraldeve.com>; Suzanne Robson <SRobson@geraldeve.com>
Subject: Addendum of D&A and Environmental Health (Noise and Light)

Official

Neil / Suzanne

Following on from our meeting this afternoon, please find attached a copy of my initial notes on the D&A addendum. The issues are identified in yellow.

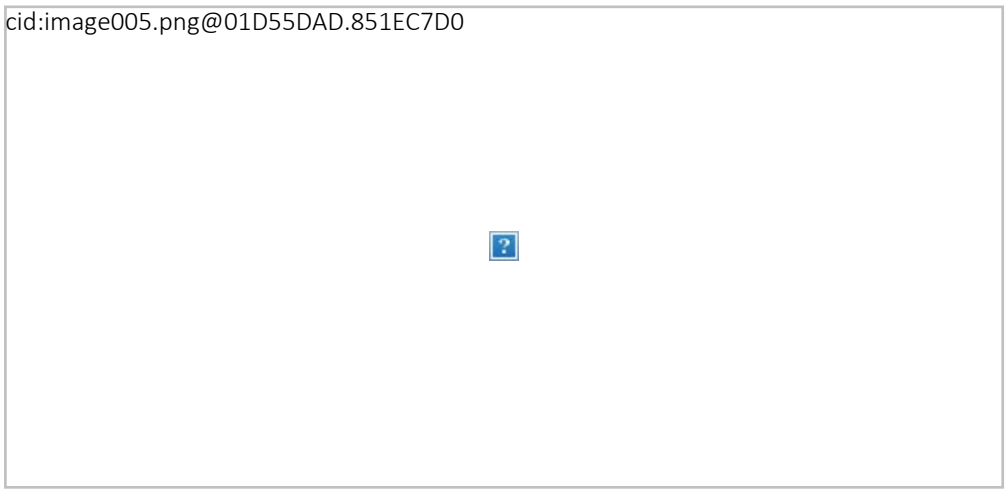
Regarding Environmental Health comments, a couple of conditions are recommended, however, these cannot be imposed because they either concern land outside your ownership and control (with no feasibility to achieving such), or the necessary requirements may not be achievable.

Therefore they all need to be addressed prior to a recommendation being made. Please provide the necessary information ASAP.

1. Reconfiguration of Chalkers Corner

Before construction of the reconfiguration of Chalkers Corners, a noise and ventilation mitigation scheme shall be submitted to and approved in writing by the local planning authority which protects residential properties on Chertsey Court and Lower Richmond Road, identified in red on the aerial photograph below, from any increase in LA10,18hr or LAMax noise levels due to road traffic noise associated with the reconfiguration of Chalkers Corner. Mitigation should include measures such as increased height to the proposed barrier, low noise road surface and the provision of mechanical ventilation and enhanced gazing

systems for qualifying properties. The scheme shall thereafter be retained as approved.



2. Sports Playing Facilities and Multi Games Use Area (MUGA) Noise Control Condition

A scheme to protect noise sensitive premises against noise generated from the use of the Sports Pitches and Multi Games Use Area (MUGA) shall be submitted to and approved by the LPA. The scheme shall refer to the guidance contained Artificial Grass Pitch (AGP) Acoustics - Planning Implications 2015, produced by Sports England and demonstrate compliance with the requirements below. Any works which form part of the scheme shall be completed in accordance with the approved details before the first use of the proposed development.

The equivalent continuous sound Level LAeq,T emitted from the use of the Sports Pitches and Multi Games Use Area (MUGA) to which the application refers, as measured (1 metre from the façade) (on the boundary of) representative noise sensitive premises (residential, hospital or school) to include;

- Williams lane
- Lower Richmond Rd
- New residential dwellings within the development

or when measured elsewhere and calculated to said locations, shall not exceed 50dB(A) LAeq,1hour at all times that the Sports Pitches and MUGA's are in use;

A commissioning acoustic test and report shall be undertaken before the first use of the development in order to demonstrate that condition above has been achieved. The results of the test shall be submitted to and approved in writing by the LPA.

Hours of use for the sports facilities will be agreed in writing with the LPA.

3. Sports Lighting Control Scheme

Artificial lighting shall not be installed until full and precise details have been submitted to and approved by the Local Planning Authority. The approved scheme shall be constructed and installed in full accordance with the approved details and shall thereafter be maintained in full accordance with the approved details.

To enable the scheme to be assessed the following information must be supplied to the LPA.

- A statement setting out why a lighting scheme is required, and the frequency and length of use in terms of hours of illumination during the summer and winter.
- Demonstration that recommended illuminance (the quantity of light falling on the court surface) and uniformity (minimum lighting level/average lighting level) and environmental lighting impact complies with the Sport England Design Guidance Note- Artificial Sports Lighting Updated guidance for 2012
- A site survey showing the area to be lit relative to the surrounding area, the existing landscape features together with proposed landscaping features to mitigate the impacts of the proposed lighting.
- Details of the make and catalogue number of any luminaires/floodlights.
- Size, type and number of lamps fitted within any luminaire or floodlight.
- The mounting height of the luminaires/floodlights specified.
- The location and orientation of the luminaires/floodlights.
- A technical report prepared by a qualified Lighting Engineer or the lighting company setting out the type of lights, performance, height and spacing of lighting columns. The light levels to be achieved over the intended area, at the site boundary and for 25 metres outside it.

Regards

Lucy Thatcher
Strategic Applications Manager (Richmond)
Serving Richmond and Wandsworth Councils

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Email: Lucy.Thatcher@richmondandwandsworth.gov.uk
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MICHAEL GRUBB STUDIO

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 lll 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 lll 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 ll 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.

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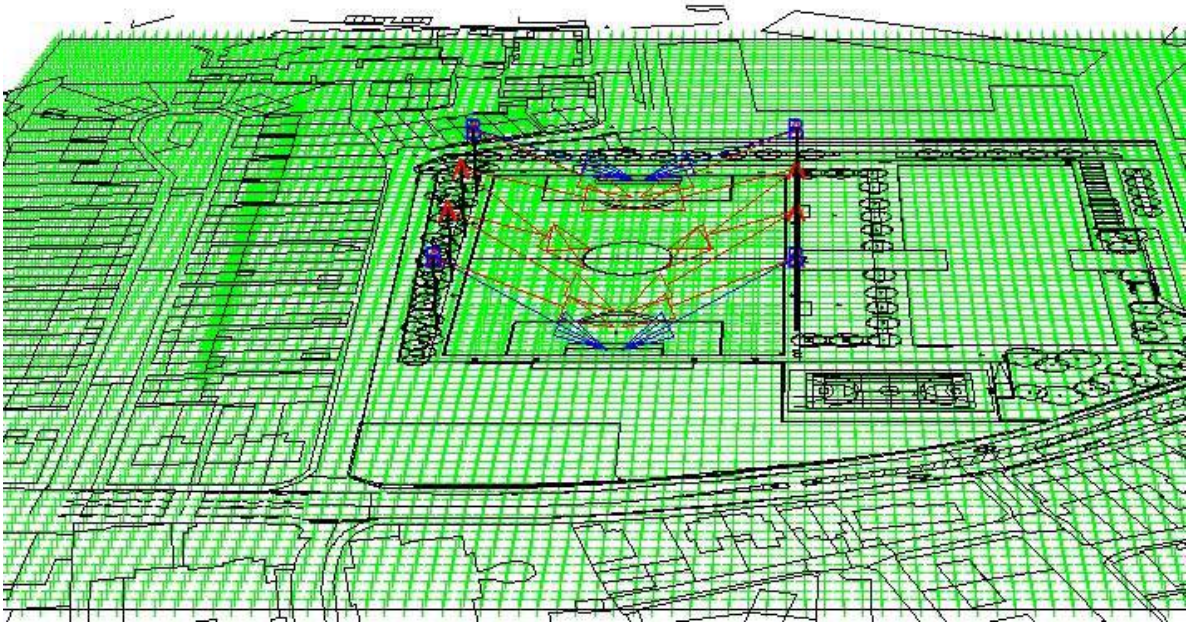
t: +44 (0)1202 511 005 e: info@michaelgrubbstudio.com

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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The Philips Centre
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Surrey
GU2 8XG
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E-Mail: steve.johnston@philips.com

Table of Contents

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.

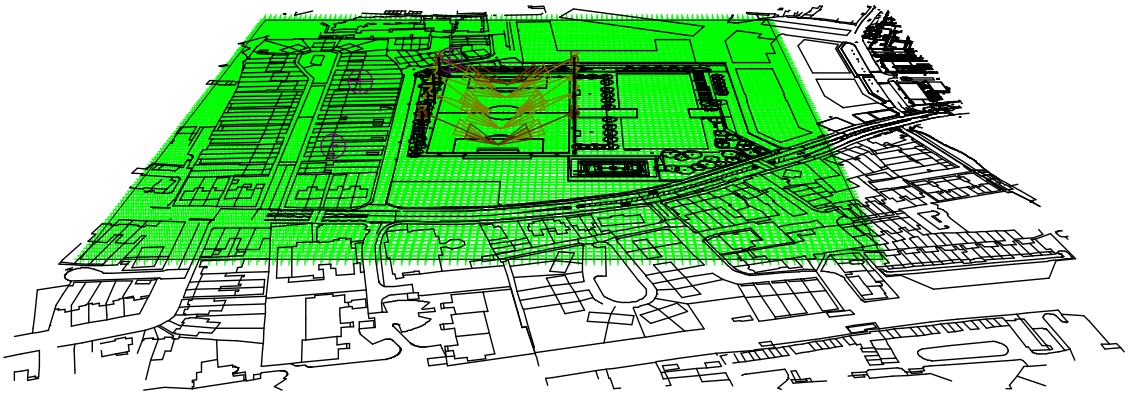
Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light levels shown in Sport England Document and ILP Guidance Notes for Obtrusive Light 2011. These are 2,5,10 & 25 lux levels.
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst case when newley installed.

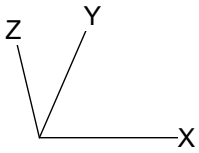
Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux, calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4 Zones. Observers at houses added @ 1.5m for Lighting Intensity Calc

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



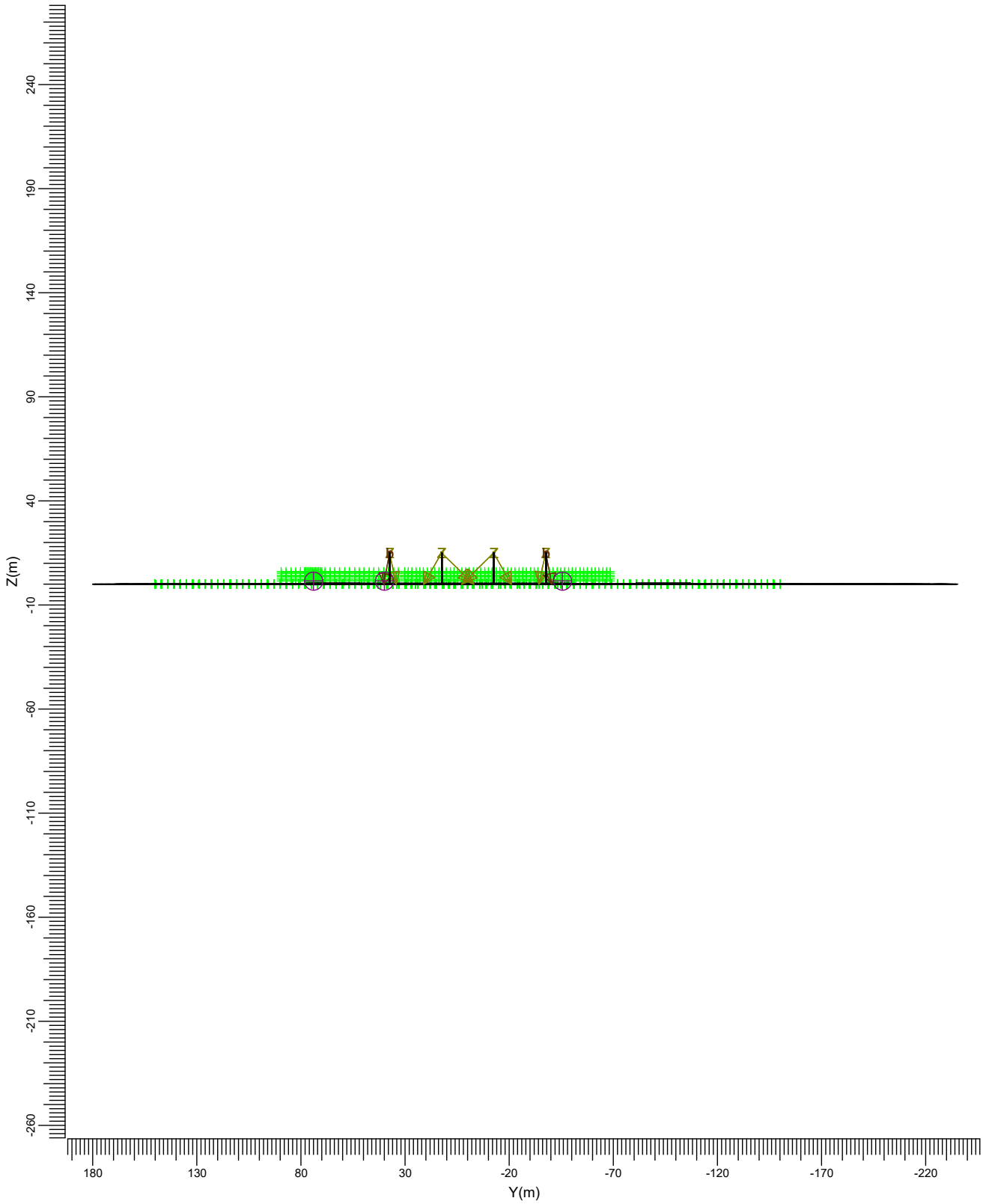


G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

1.3 Top Project Overview

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

(Il)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

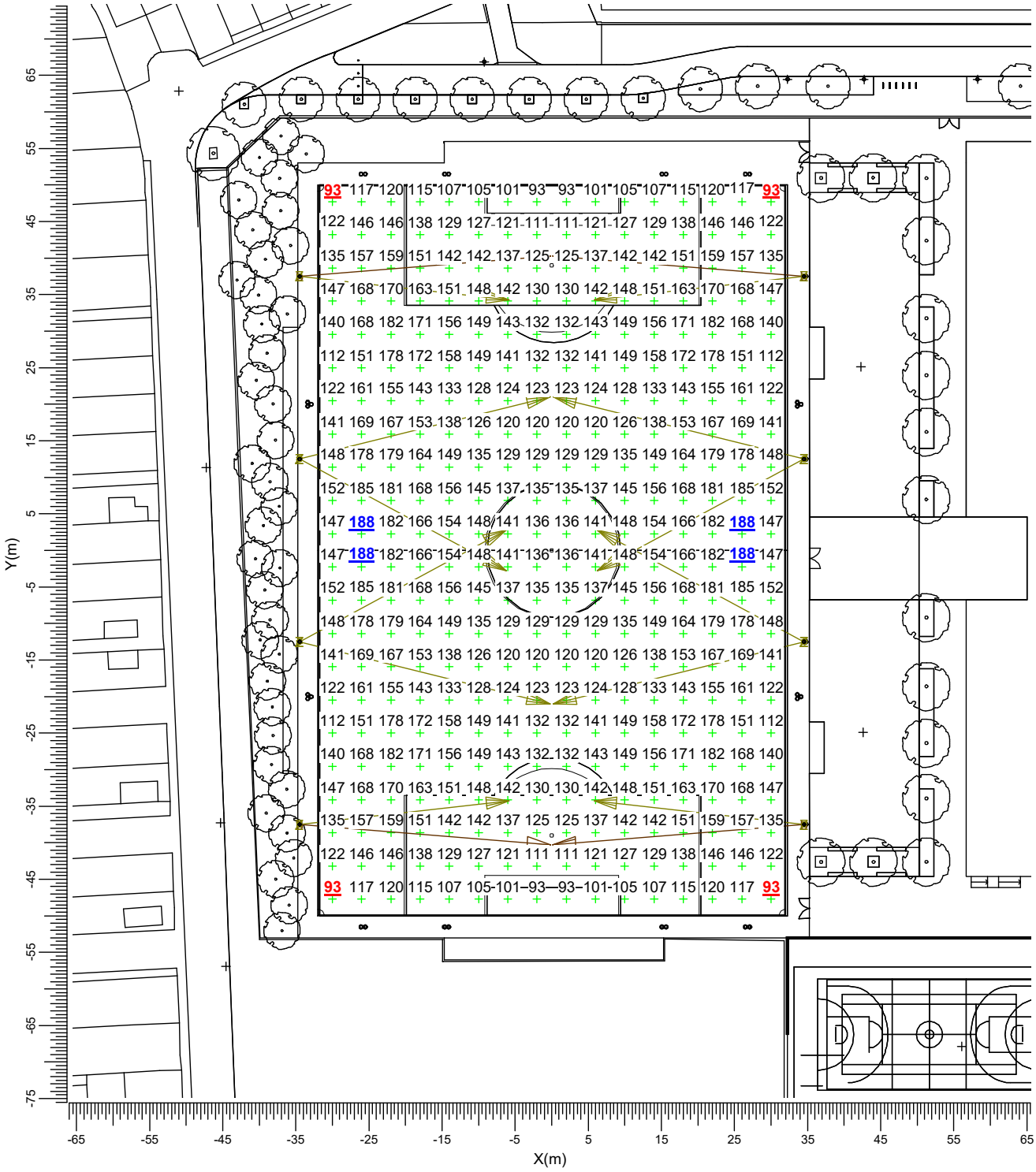
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



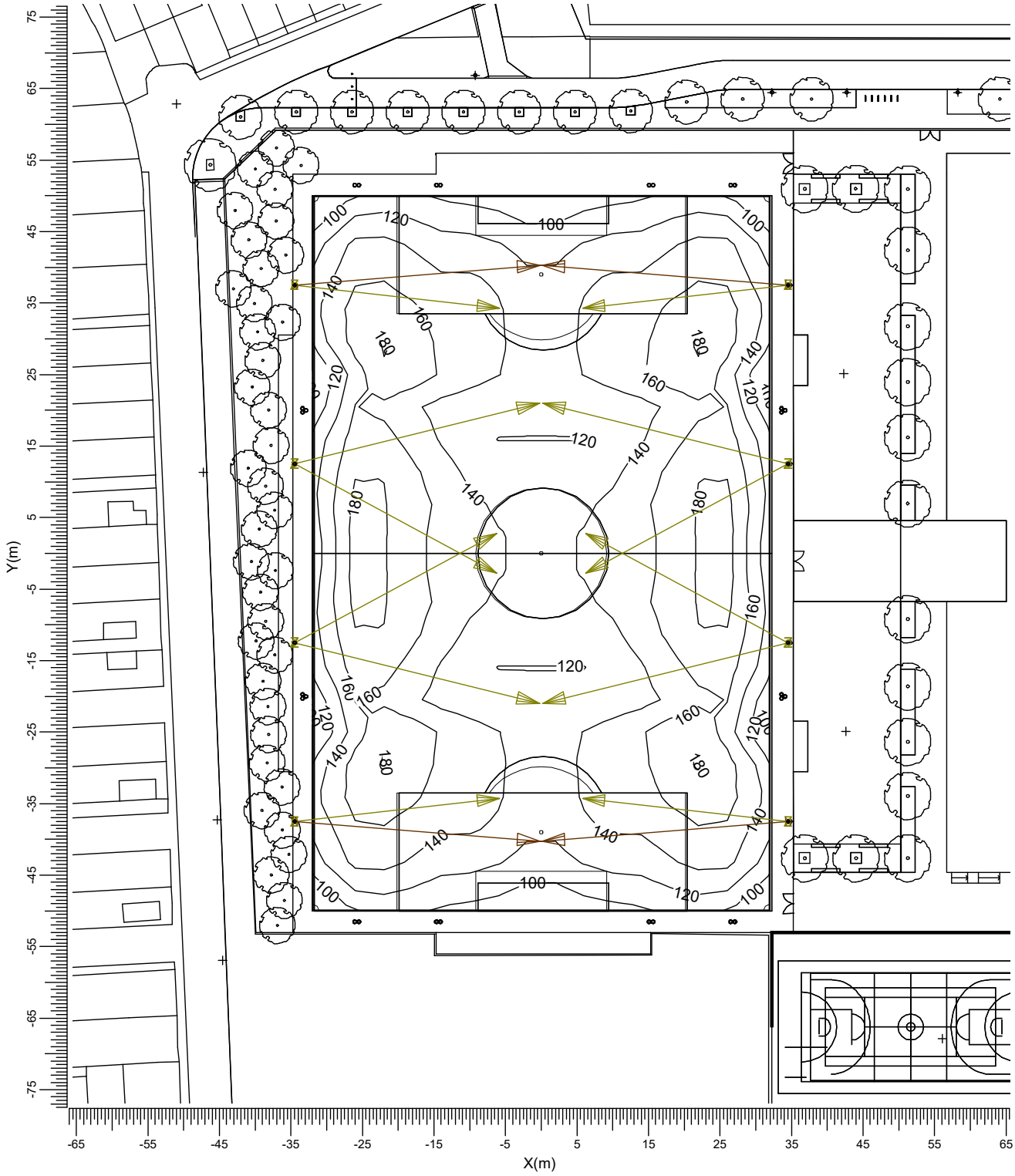
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	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)



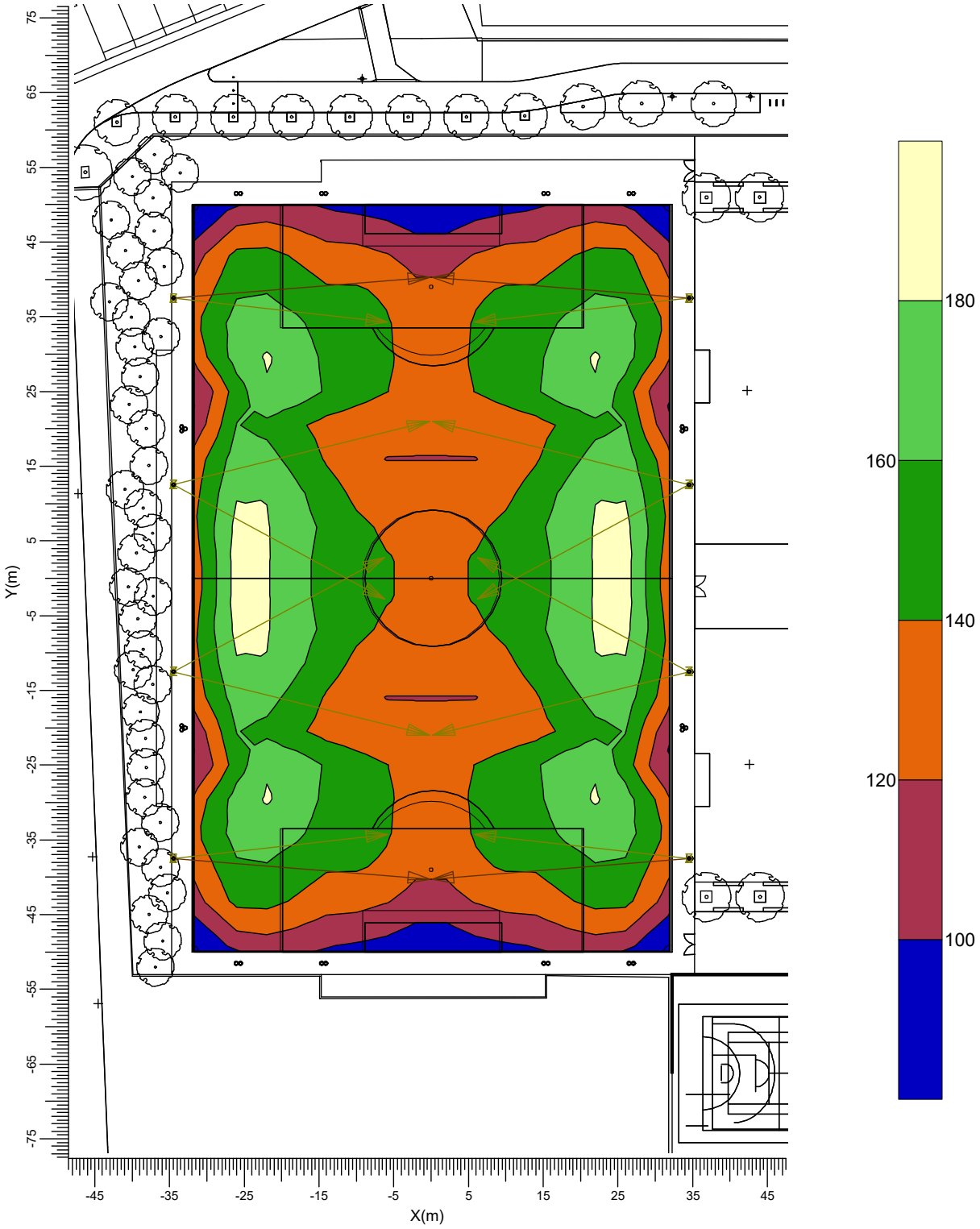
G → BVP525 OUT T15 100K A-VWB/ N → BVP651 T25 DW10 BL1
Z → BVP515 OUT T15 100K A-WB/3 b → BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	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)



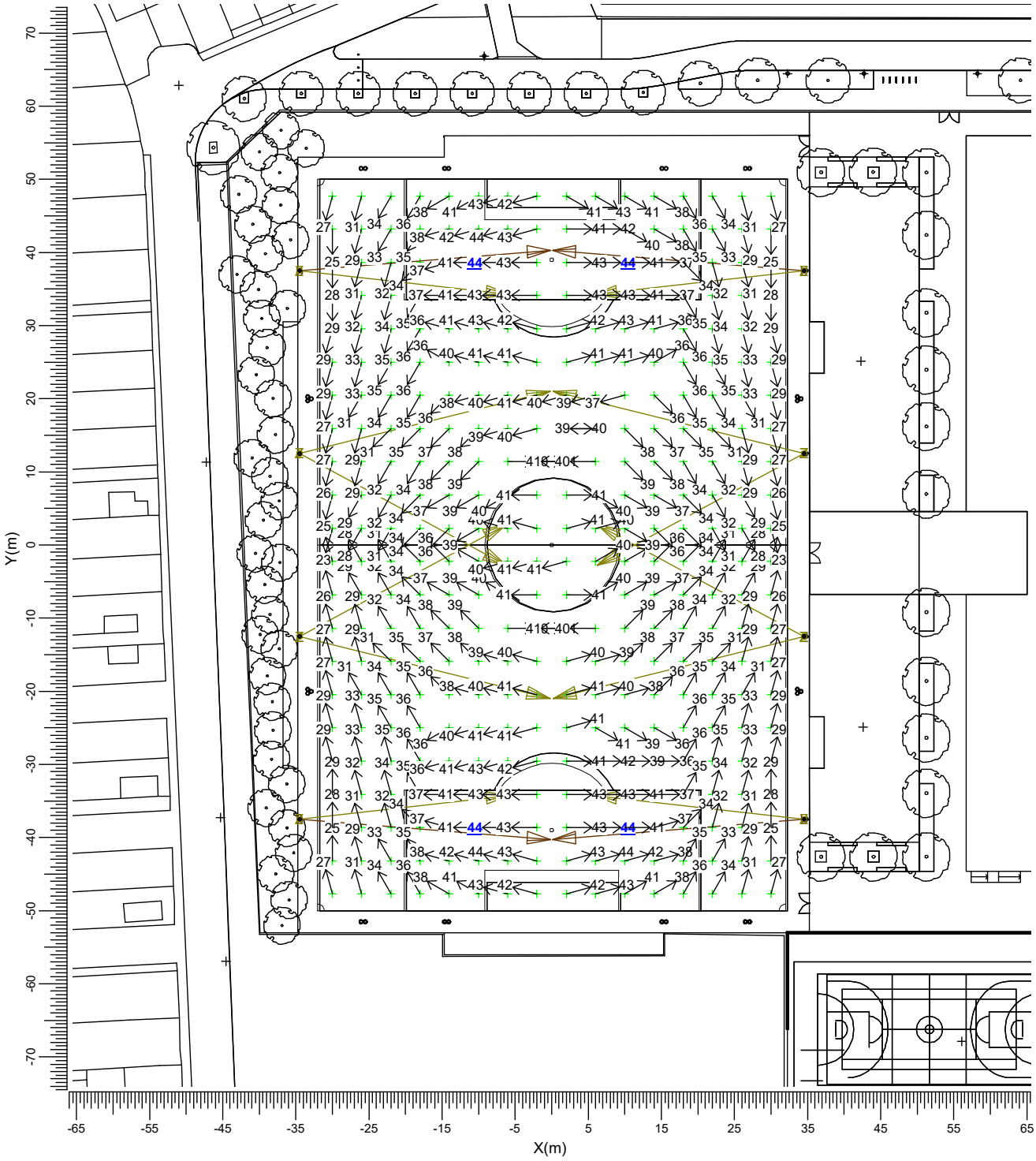
G	BVP525 OUT T15 100K A-VWB/	N	BVP651 T25 DW10 BL1		
Z	BVP515 OUT T15 100K A-WB/3	b	BVP515 OUT T15 100K A-NB/30		

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



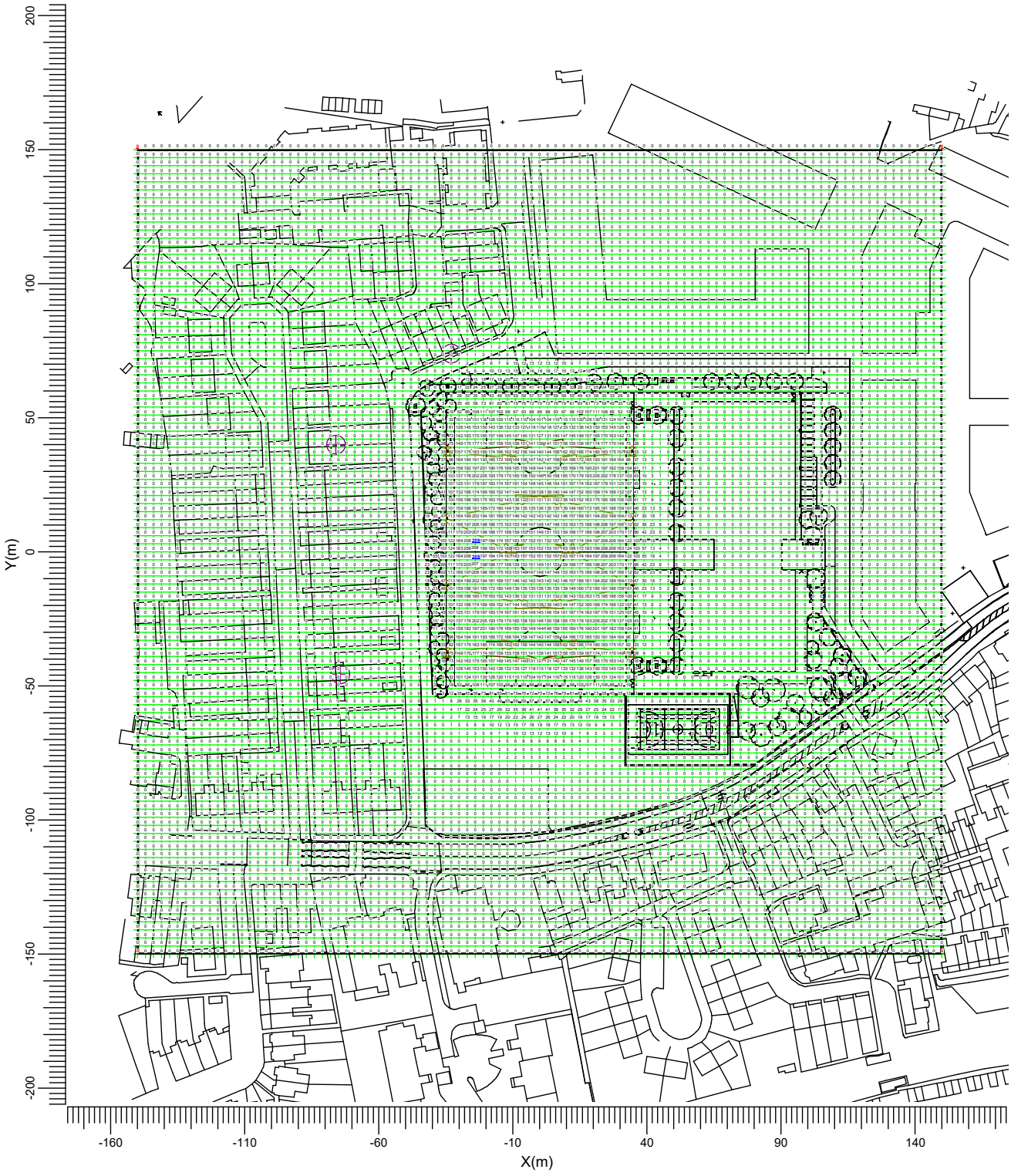
G BVP525 OUT T15 100K A-VWB/ N
Z BVP515 OUT T15 100K A-WB/3 b
BVP651 T25 DW10 BL1
BVP515 OUT T15 100K A-NB/30

Maximum	Project maintenance factor	Scale
43.9	0.90	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	b	BVP515 OUT T15 100K A-NB/30

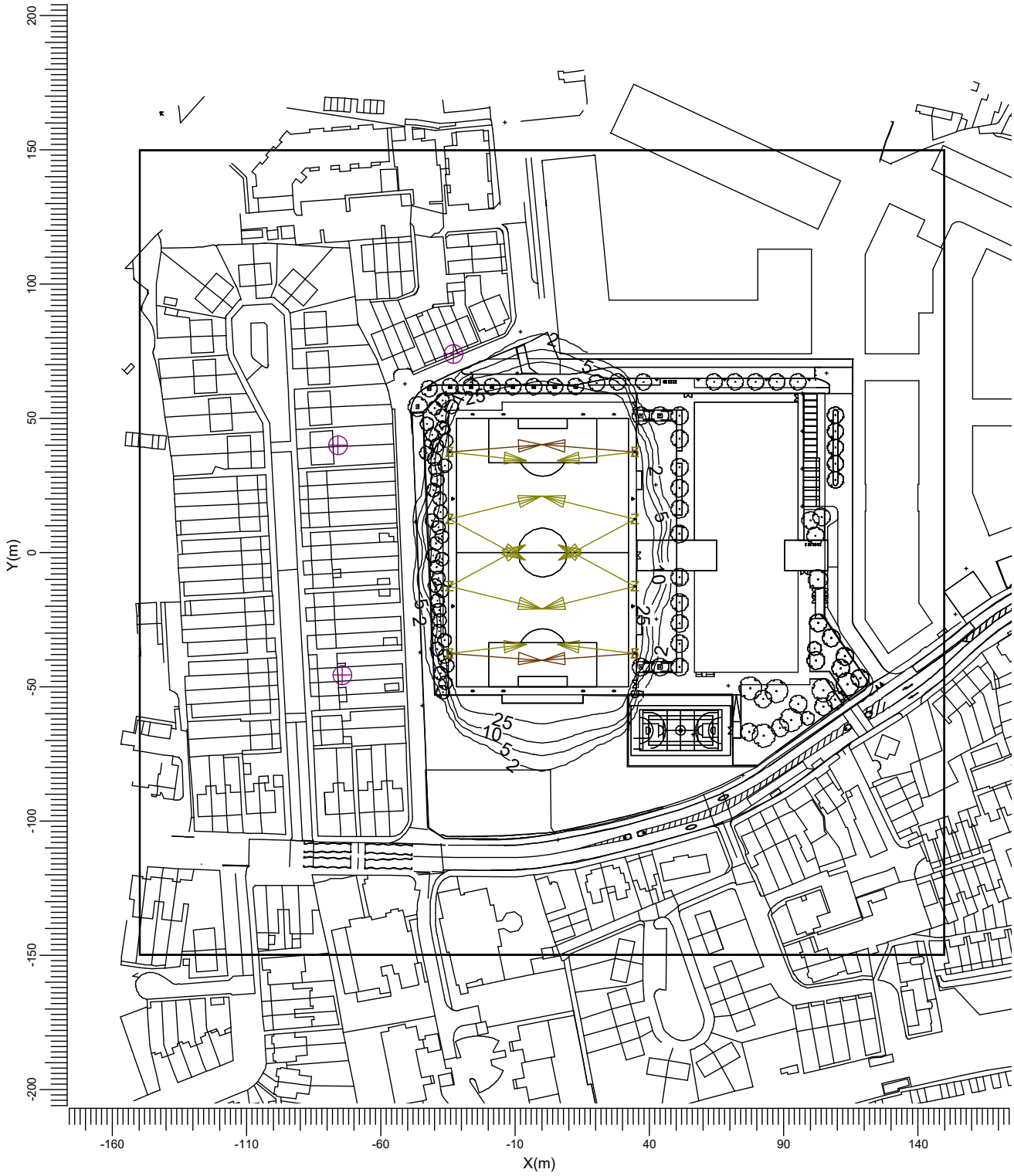
Project maintenance factor
1.00

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

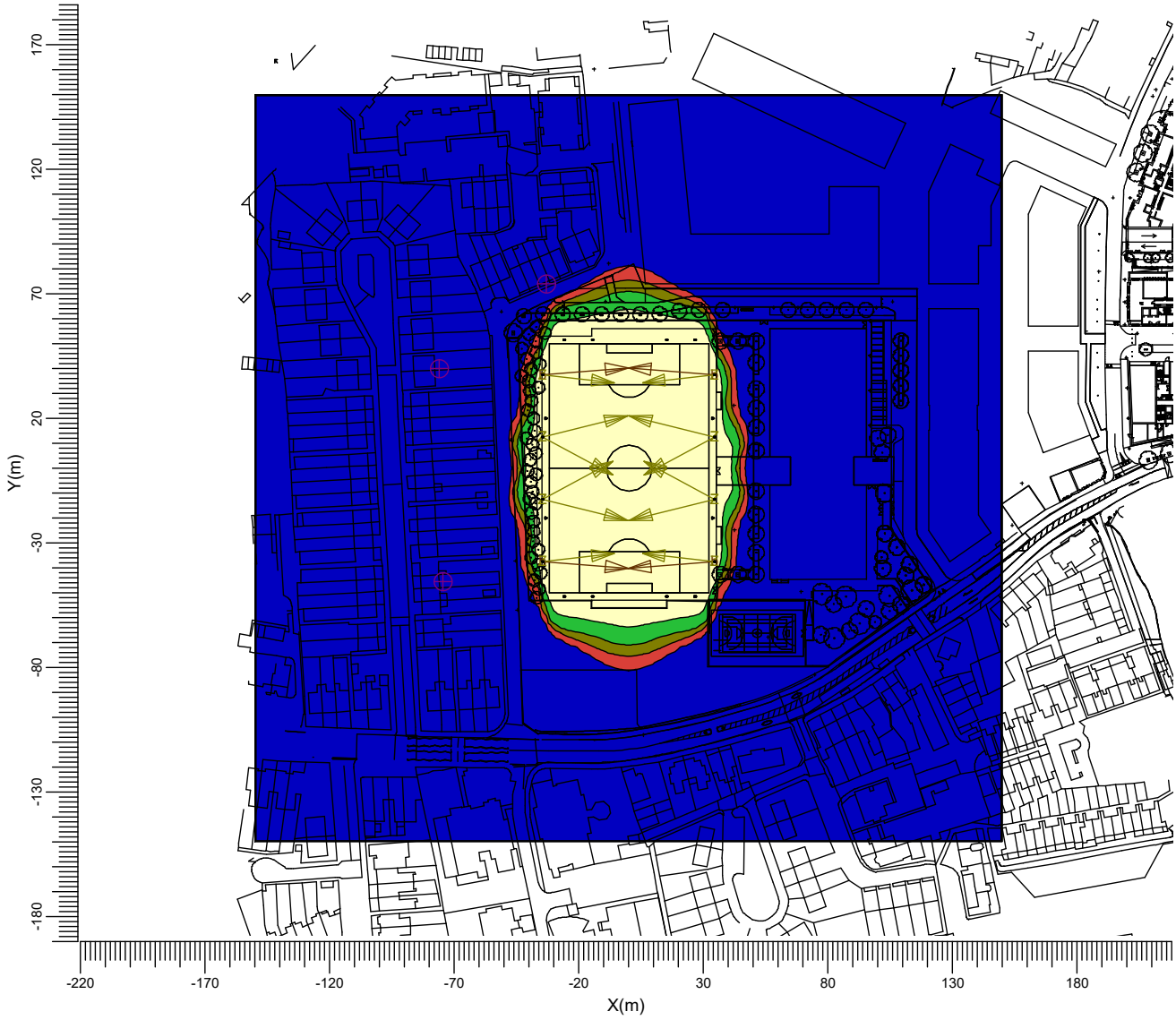
Project maintenance factor
1.00

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)



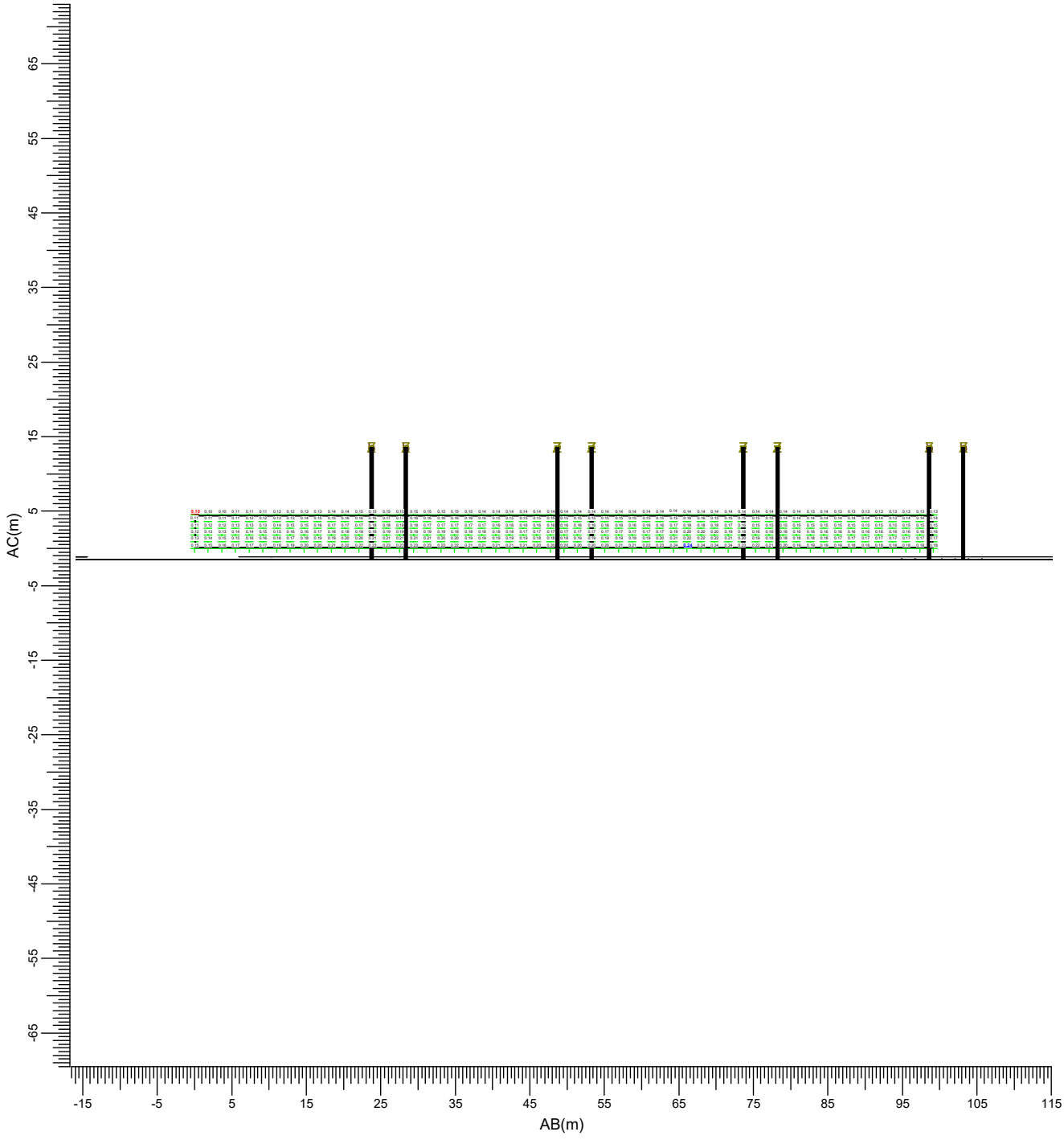
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

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)

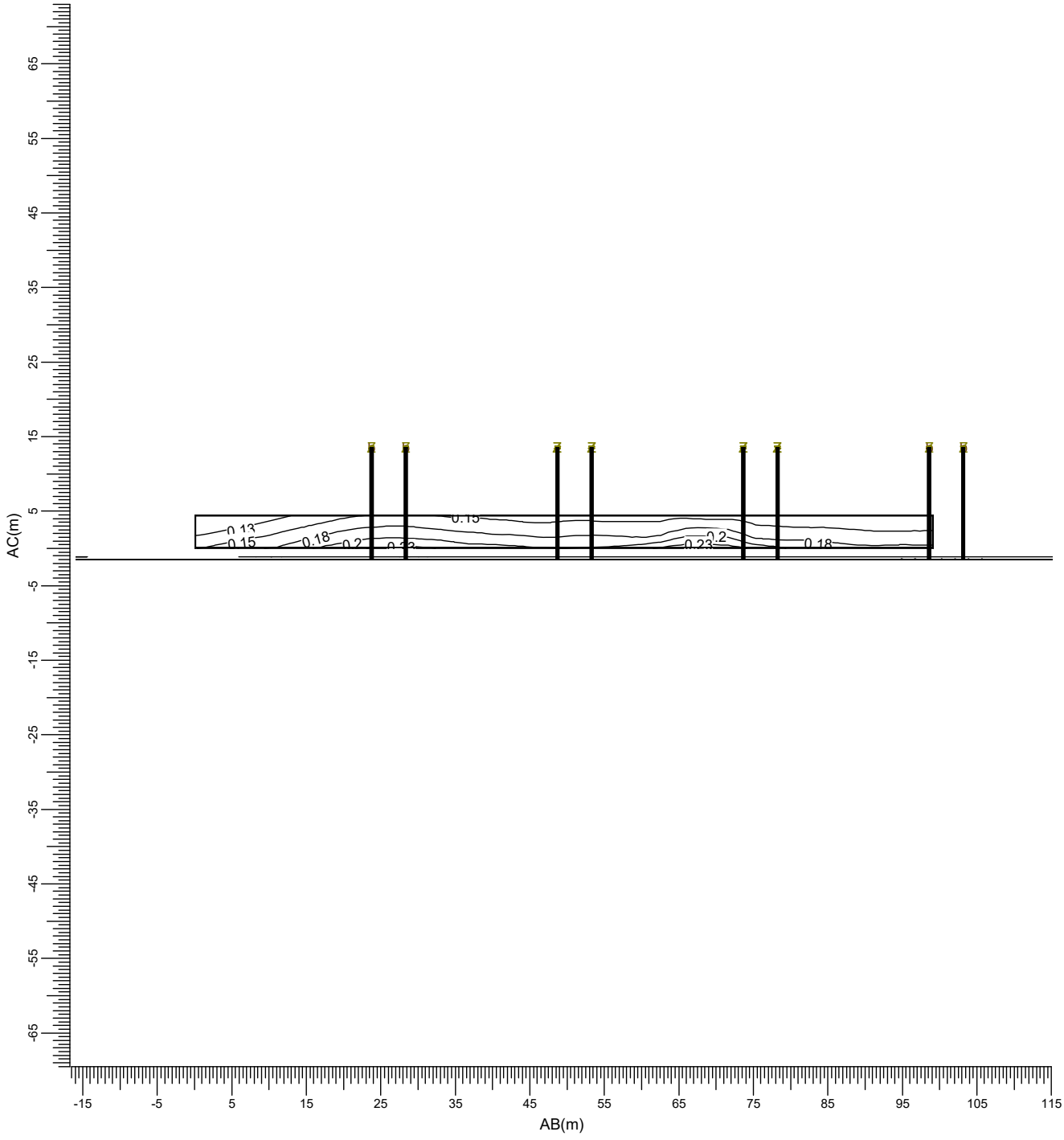
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1
Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

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)

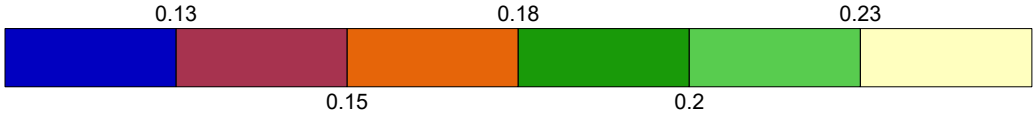
G : BVP525 OUT T15 100K A-VWB/30
Z : BVP515 OUT T15 100K A-WB/30 +LO
N : BVP651 T25 DW10 BL1
b : BVP515 OUT T15 100K A-NB/30 +LO

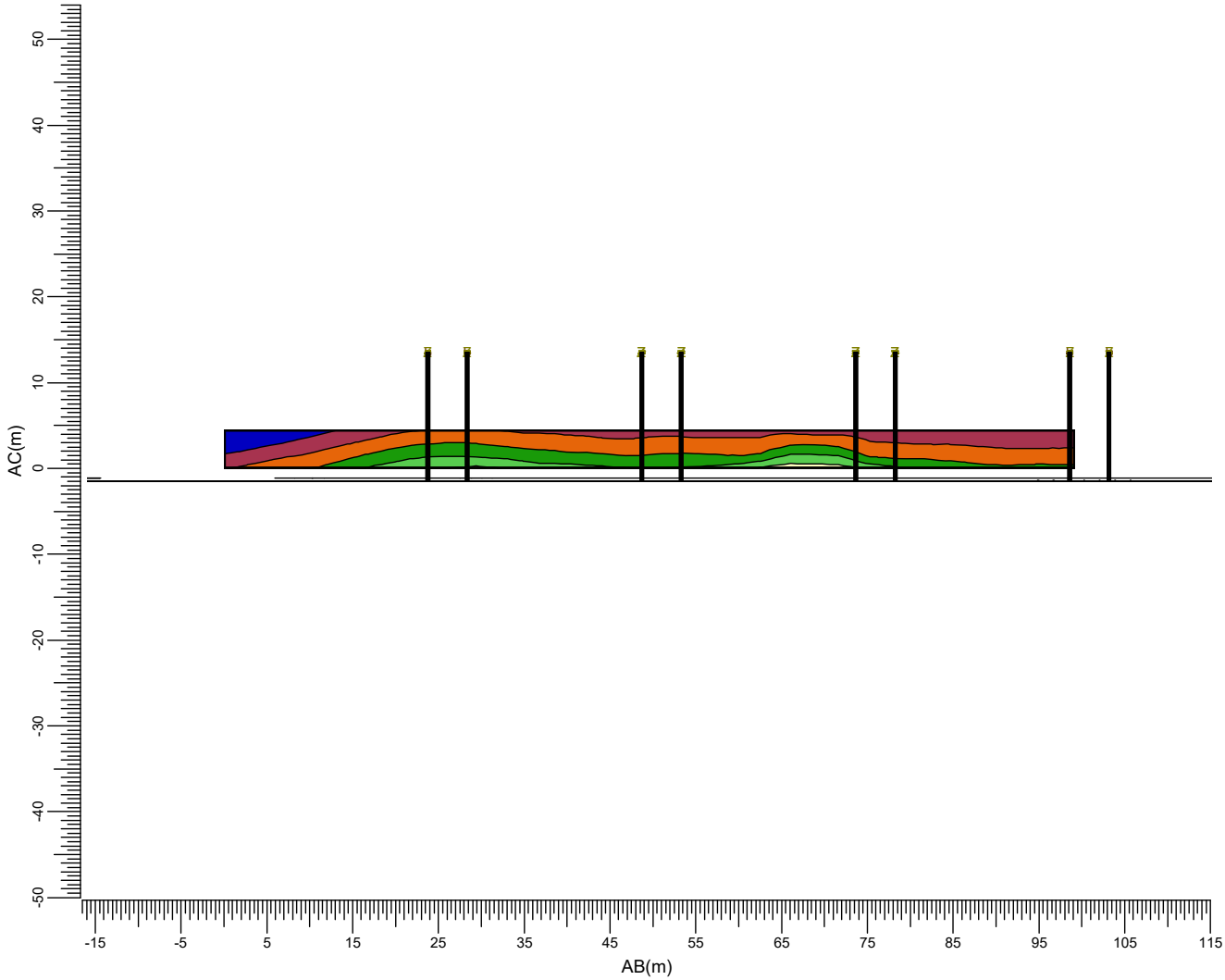
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

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)

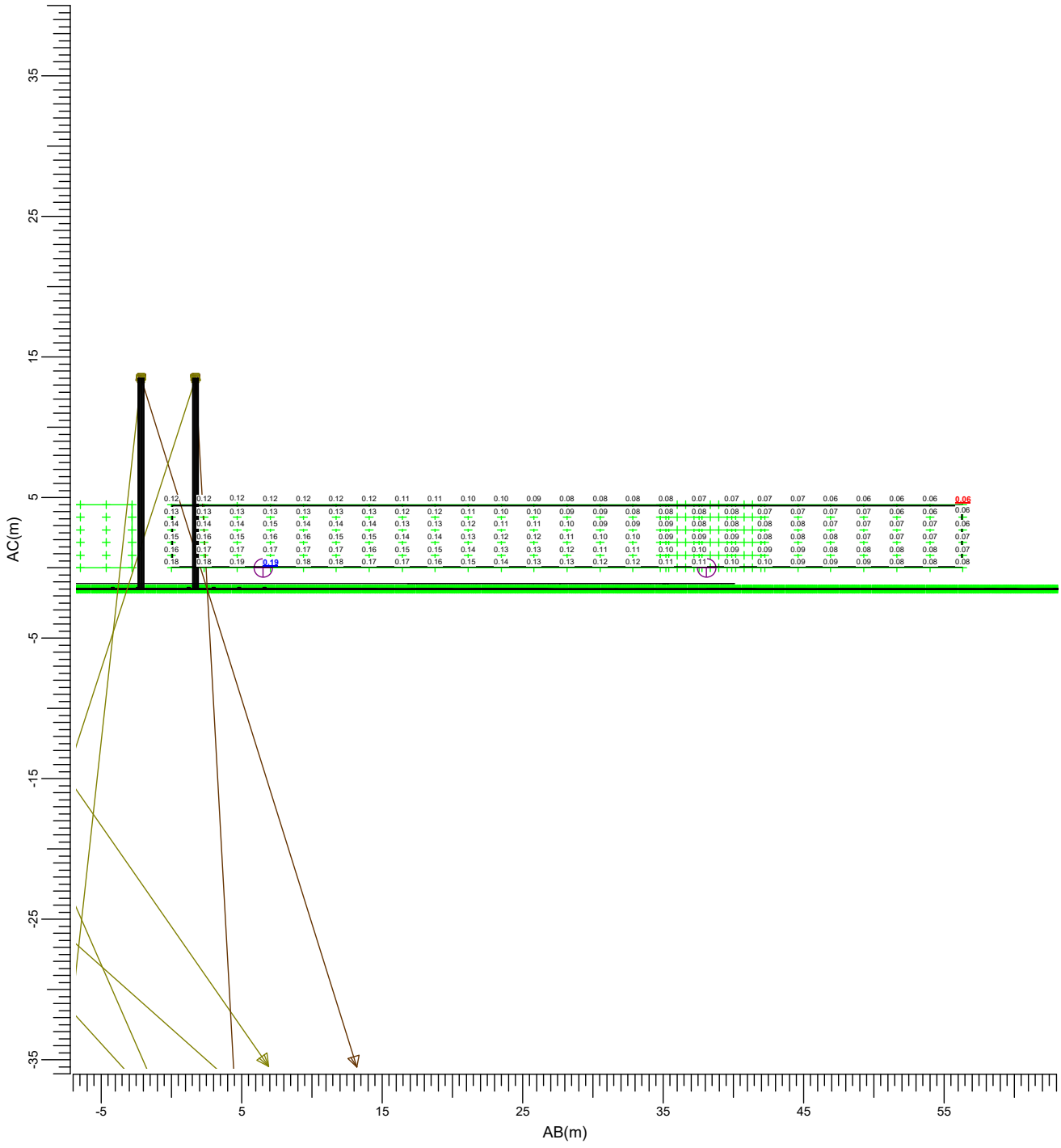
G : BVP525 OUT T15 100K A-VWB/30
Z : BVP515 OUT T15 100K A-WB/30 +LO
N : BVP651 T25 DW10 BL1
b : BVP515 OUT T15 100K A-NB/30 +LO

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)

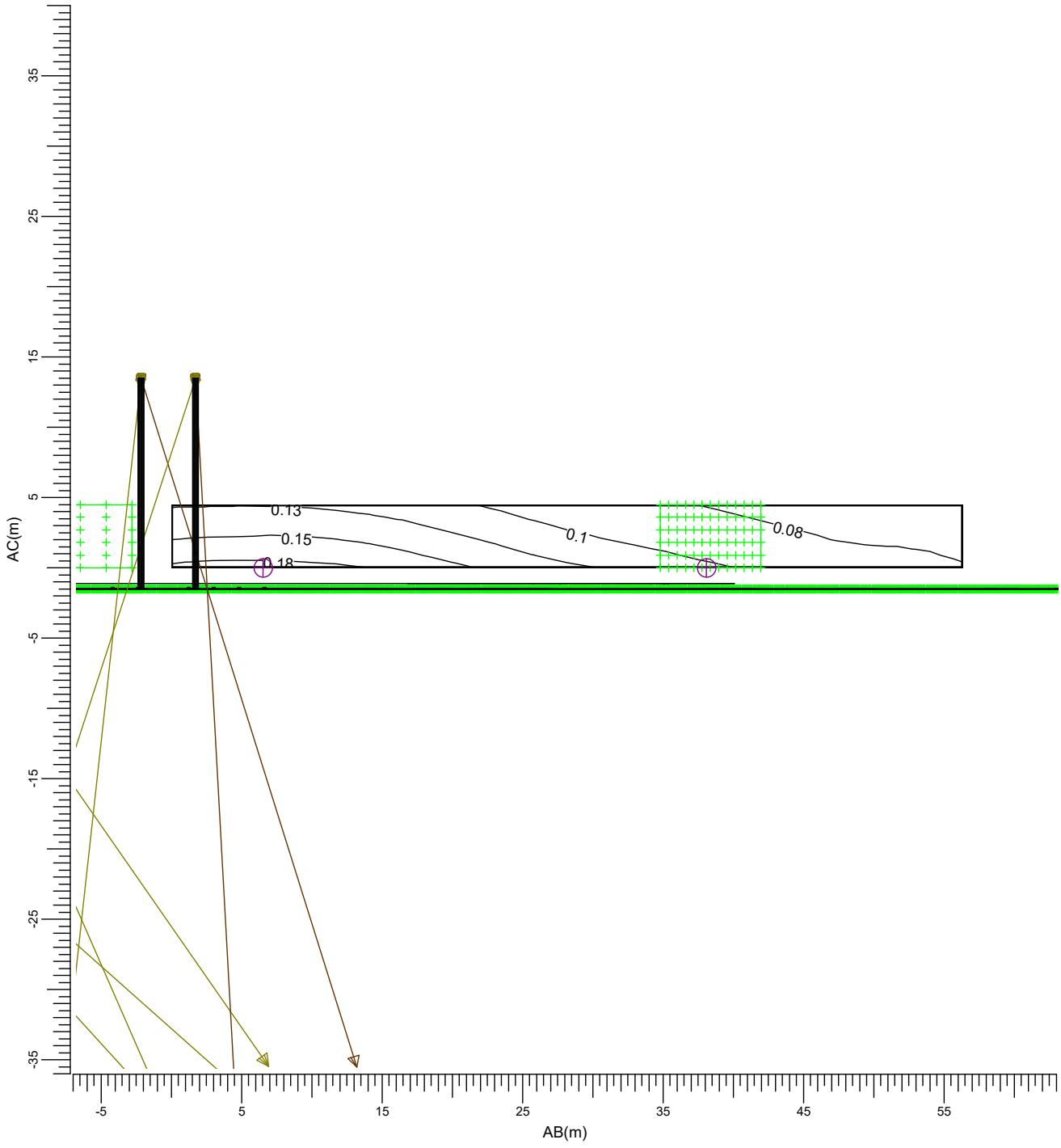
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	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)

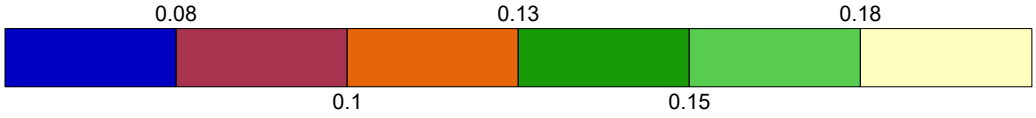
G	BVP525 OUT T15 100K A-VWB/	N	BVP651 T25 DW10 BL1
Z	BVP515 OUT T15 100K A-WB/3	b	BVP515 OUT T15 100K A-NB/30

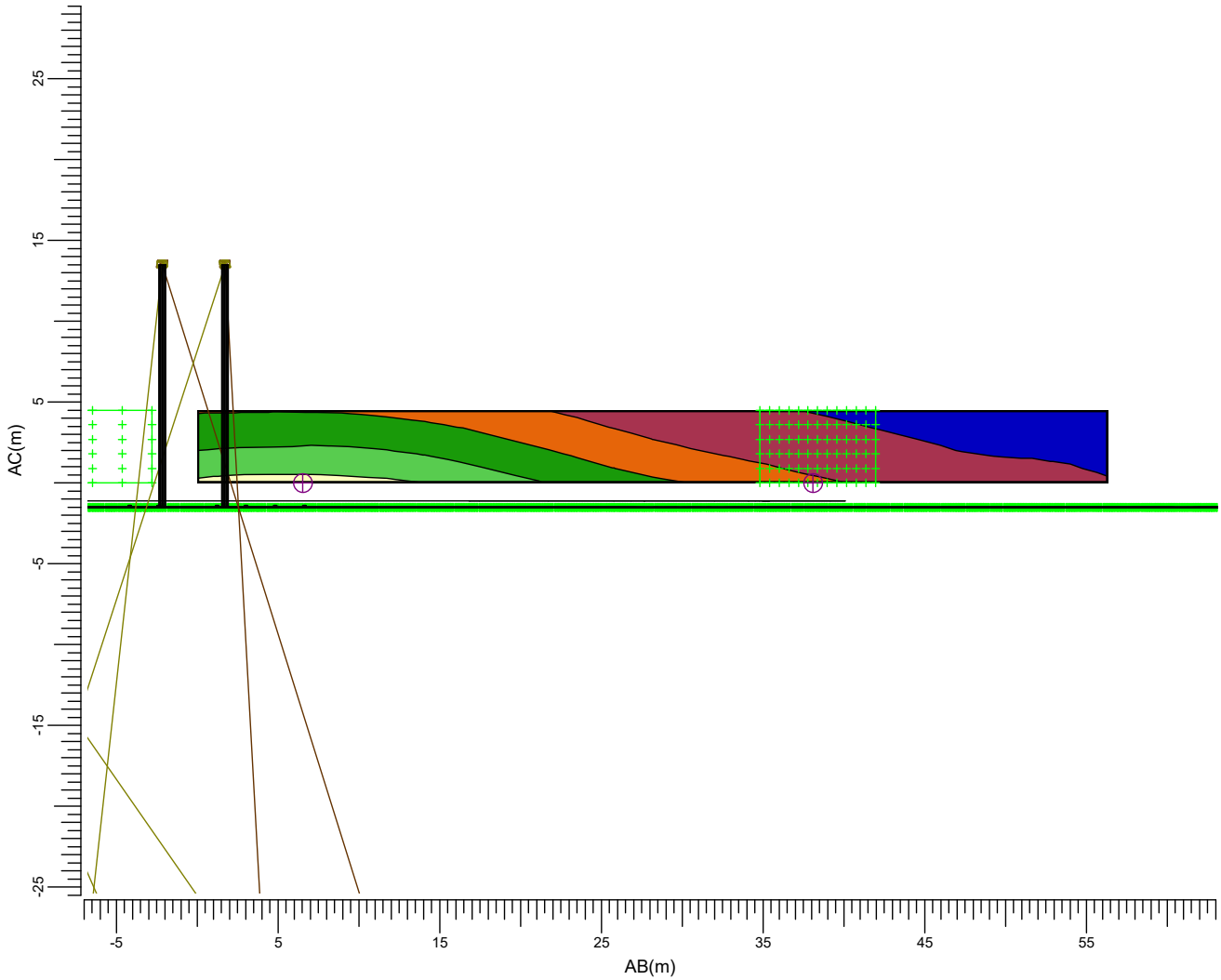
Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.13 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)

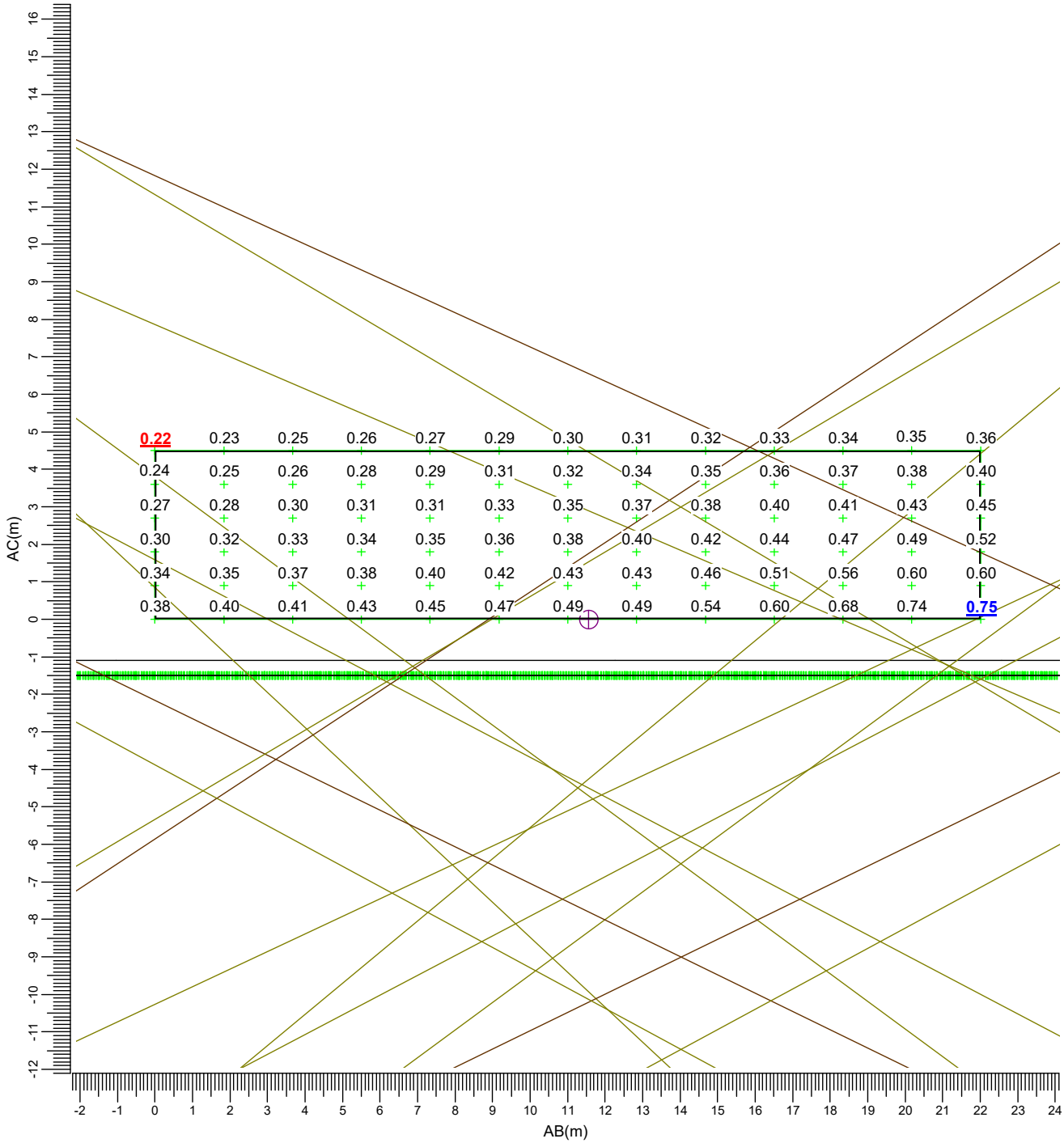
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	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)

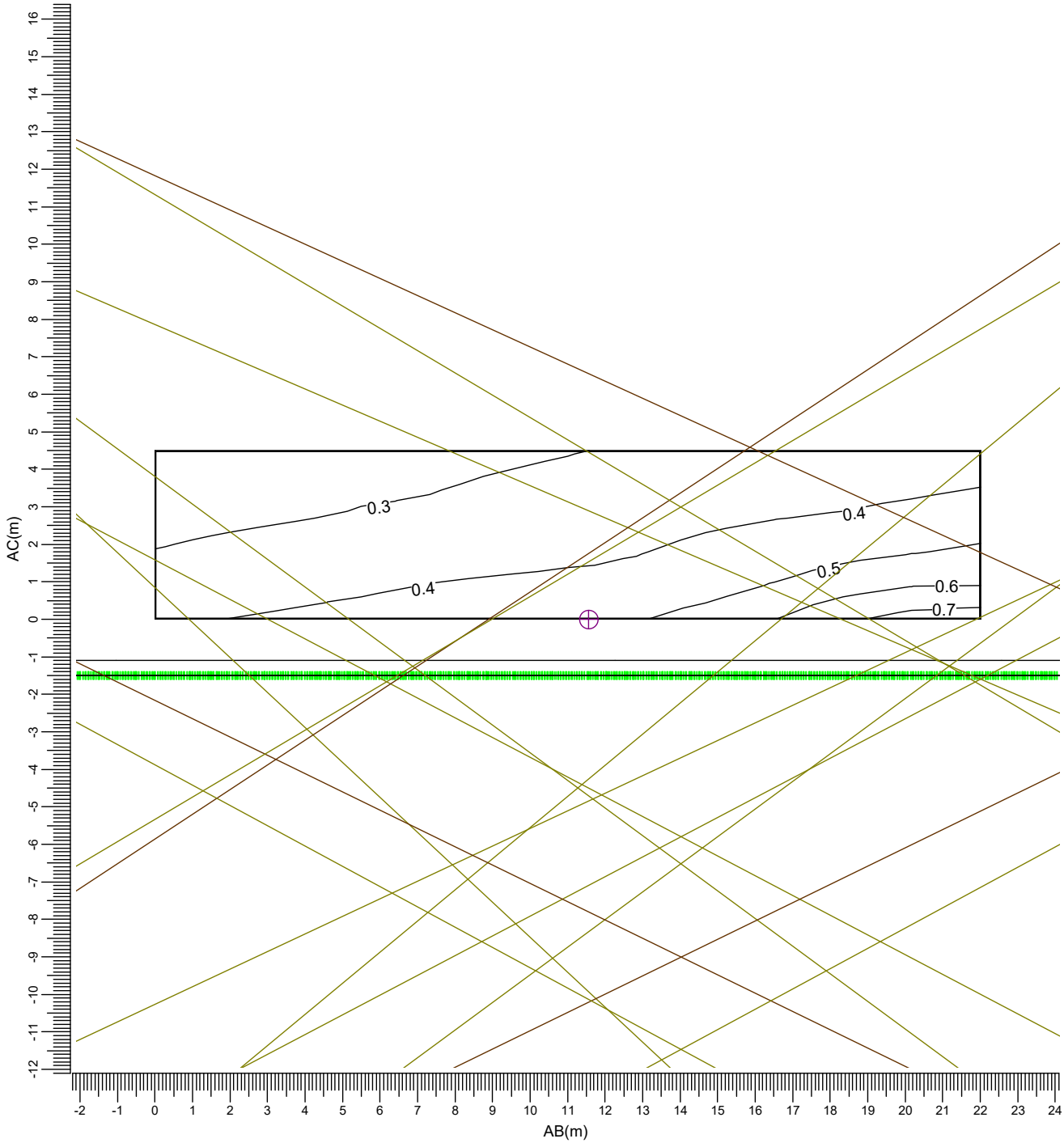
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

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

3.15 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)

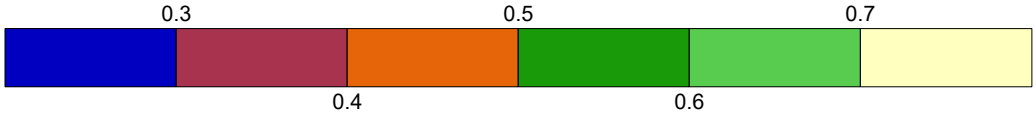
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

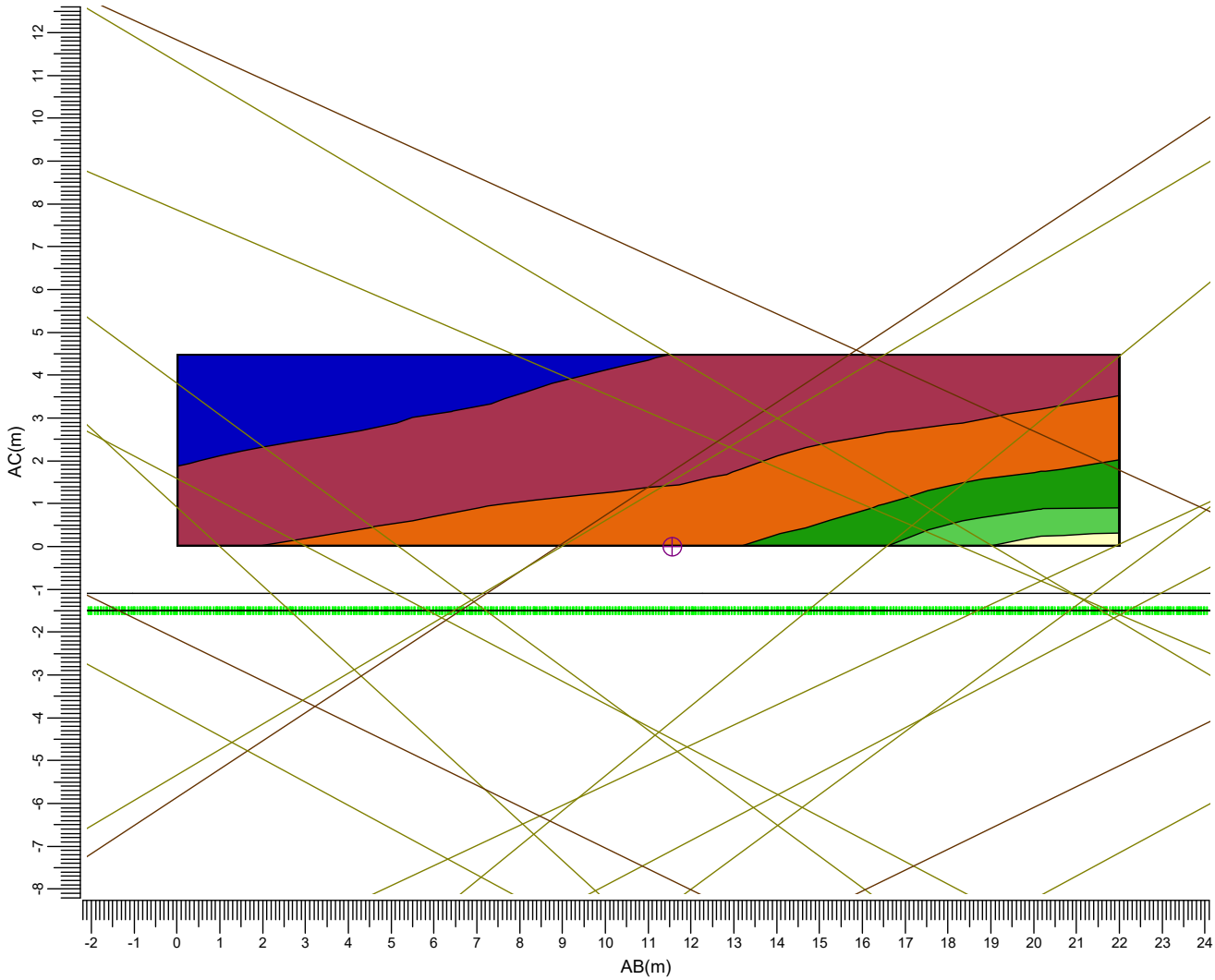
Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150

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

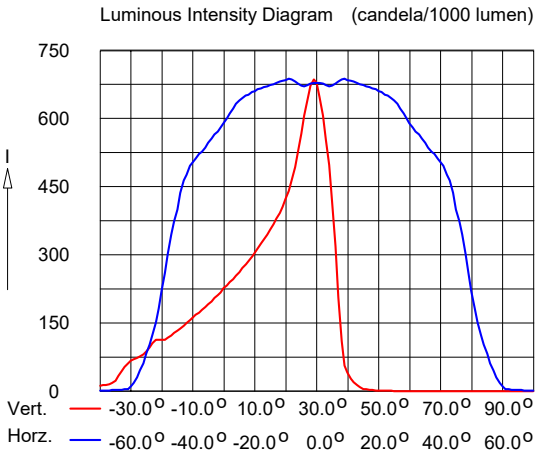
4.1 Project Luminaires

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.

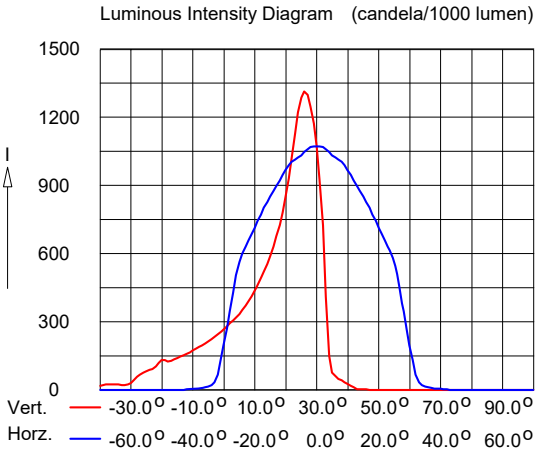


OptiVision LED
BVP515 OUT T15 100K 1xLED1290/740 A-NB/30 +LO

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:

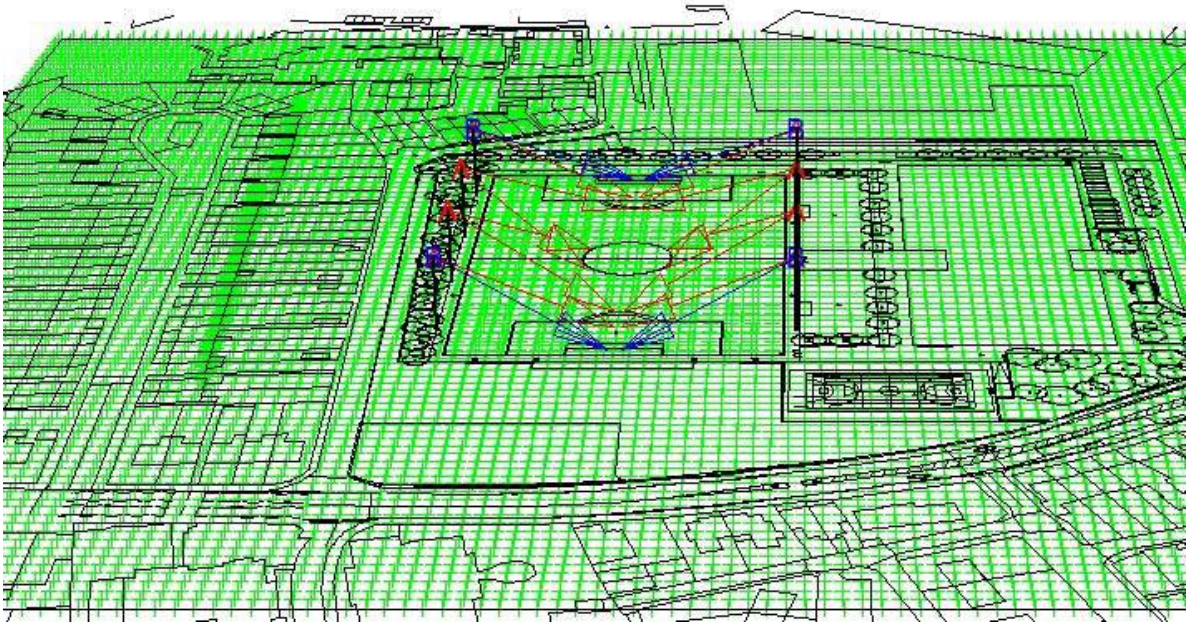
Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * Z	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+

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.

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Table of Contents

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.

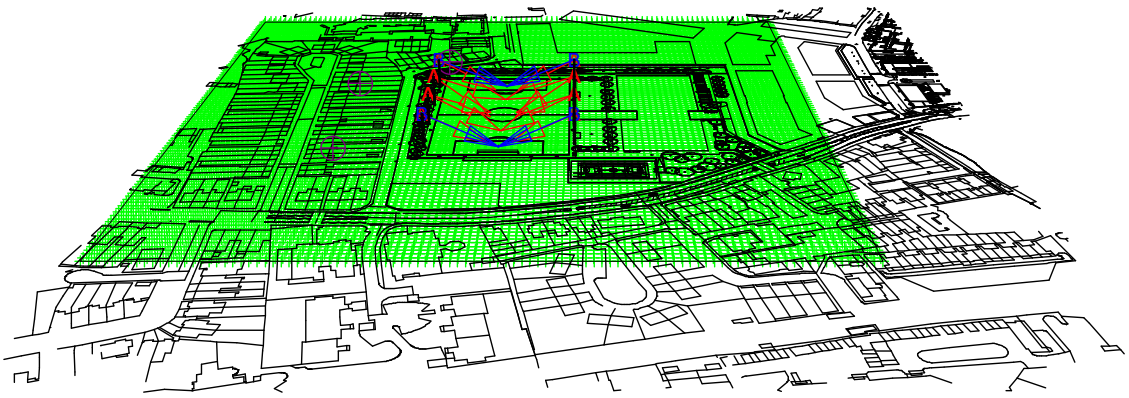
Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light levels shown in Sport England Document and ILP Guidance Notes for Obtrusive Light 2011. These are 2,5,10 & 25 lux levels.
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst case when newly installed. Observers at houses added @ 1.5m for Ltg Intensity

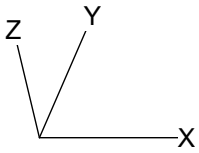
Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux, calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4 Zones

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.

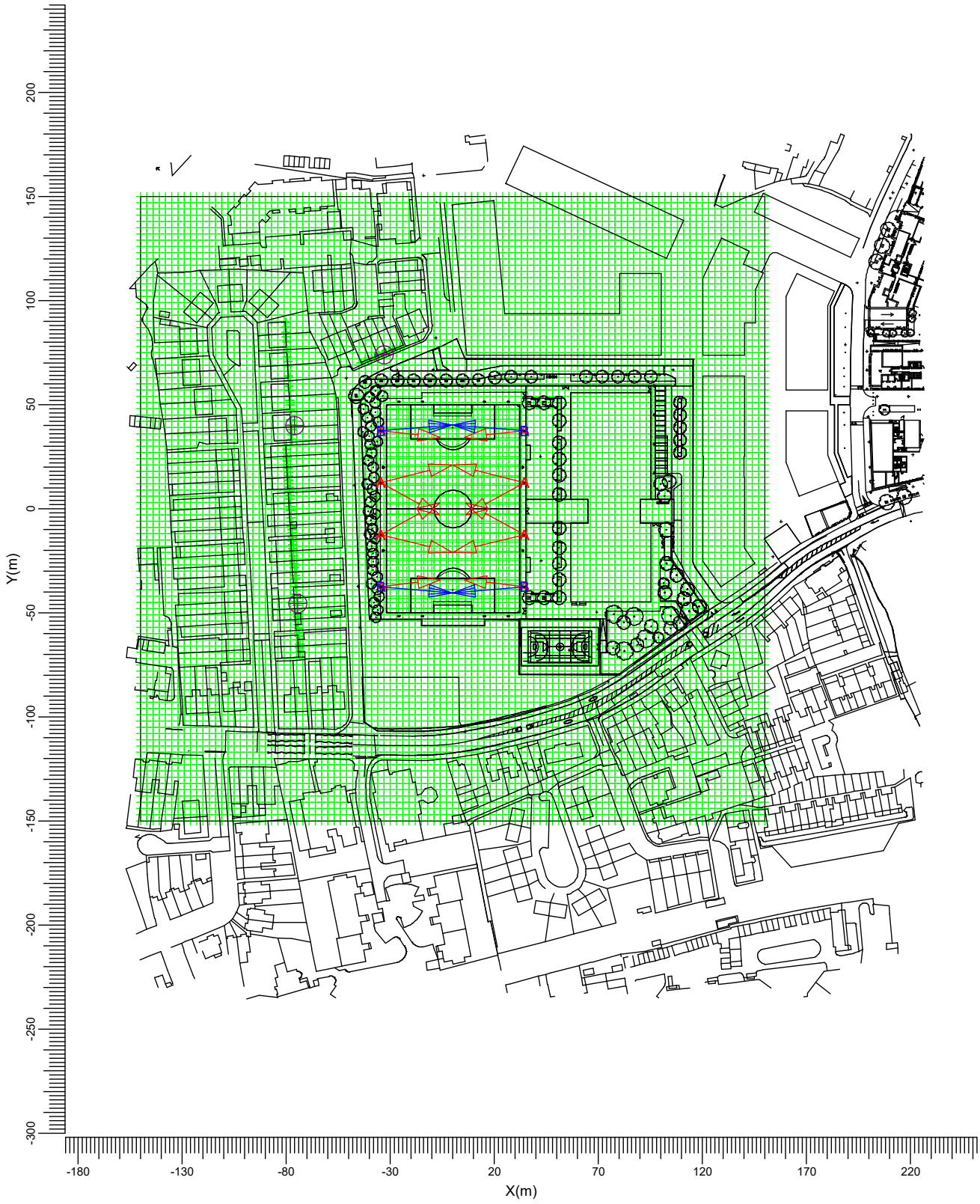
1.2 3-D Project Overview





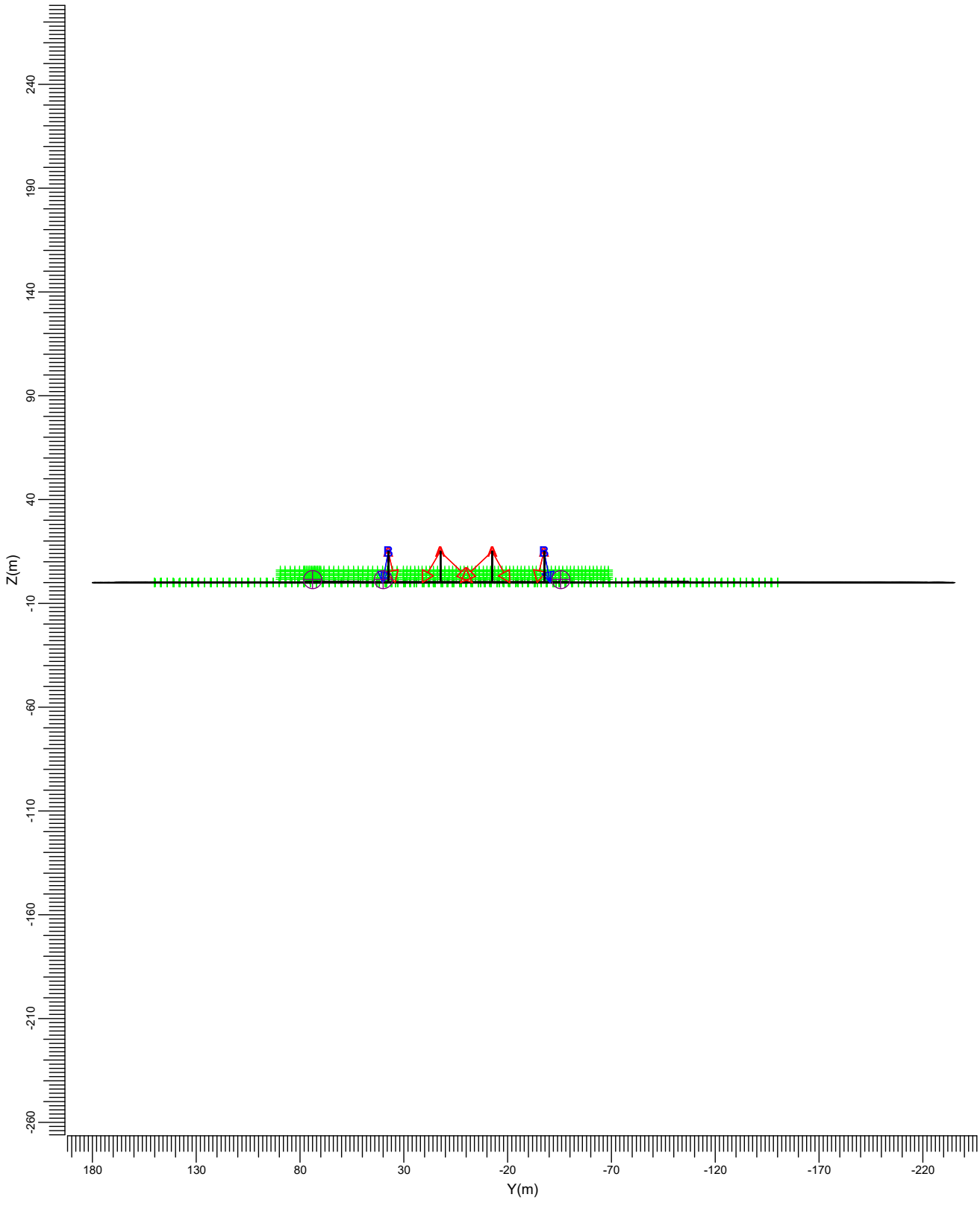
A	BVP525 OUT T15 100K A-WB/3	B	BVP525 OUT T15 100K A-NB/30
H	BVP525 OUT T15 100K A-VWB/	O	BVP651 T25 DW10 BL1

1.3 Top Project Overview



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)
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

(Il)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

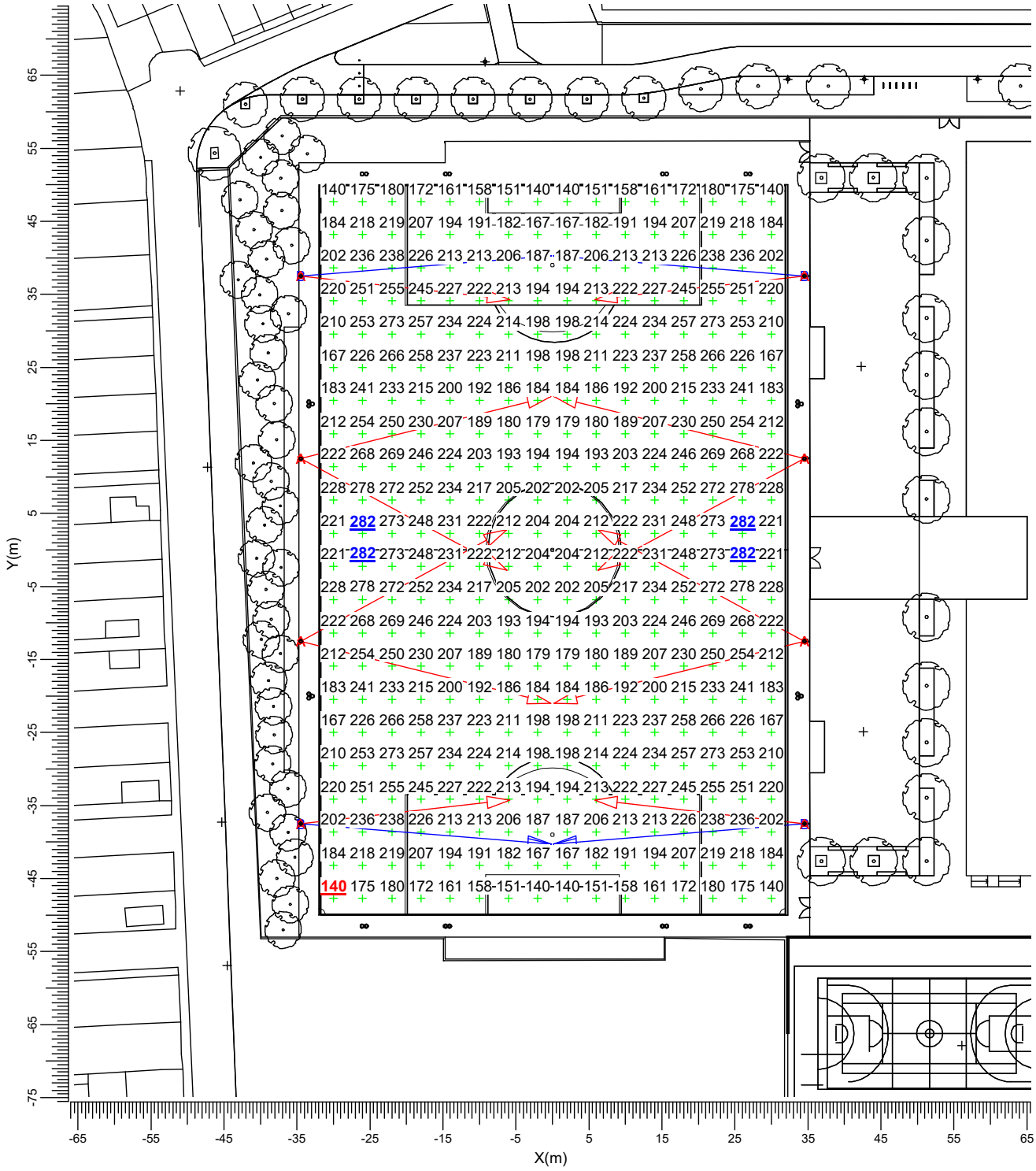
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



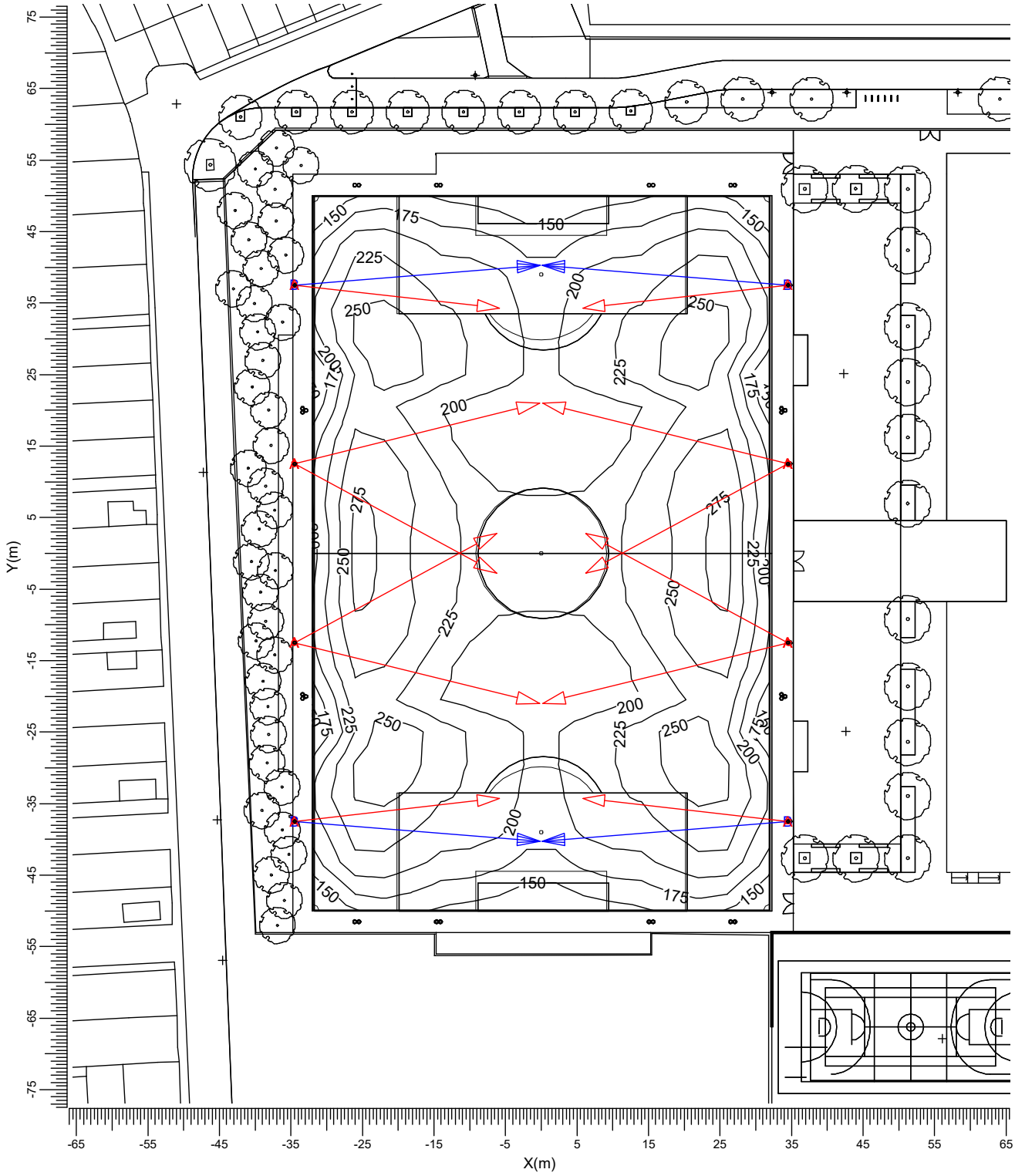
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)



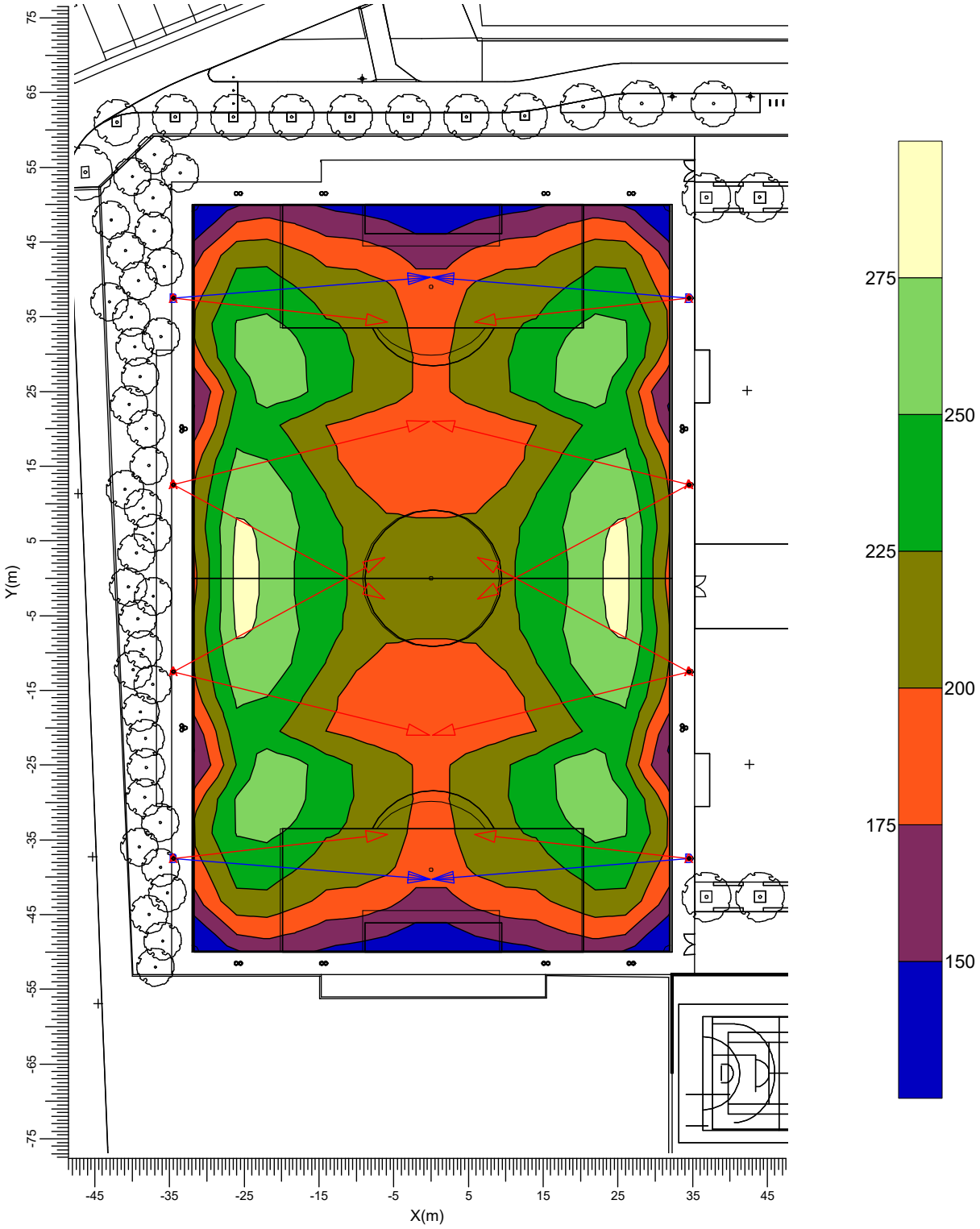
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)



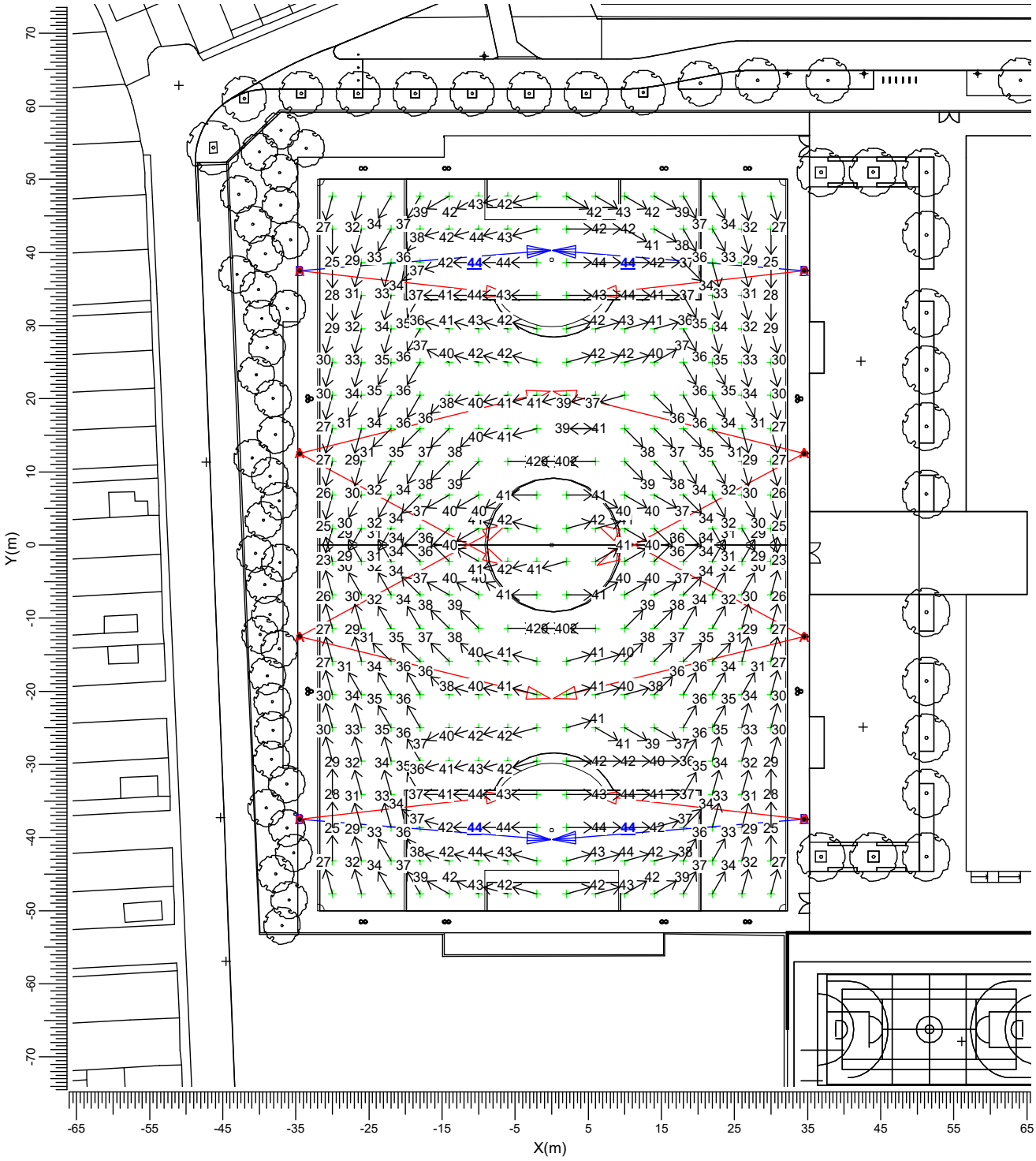
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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



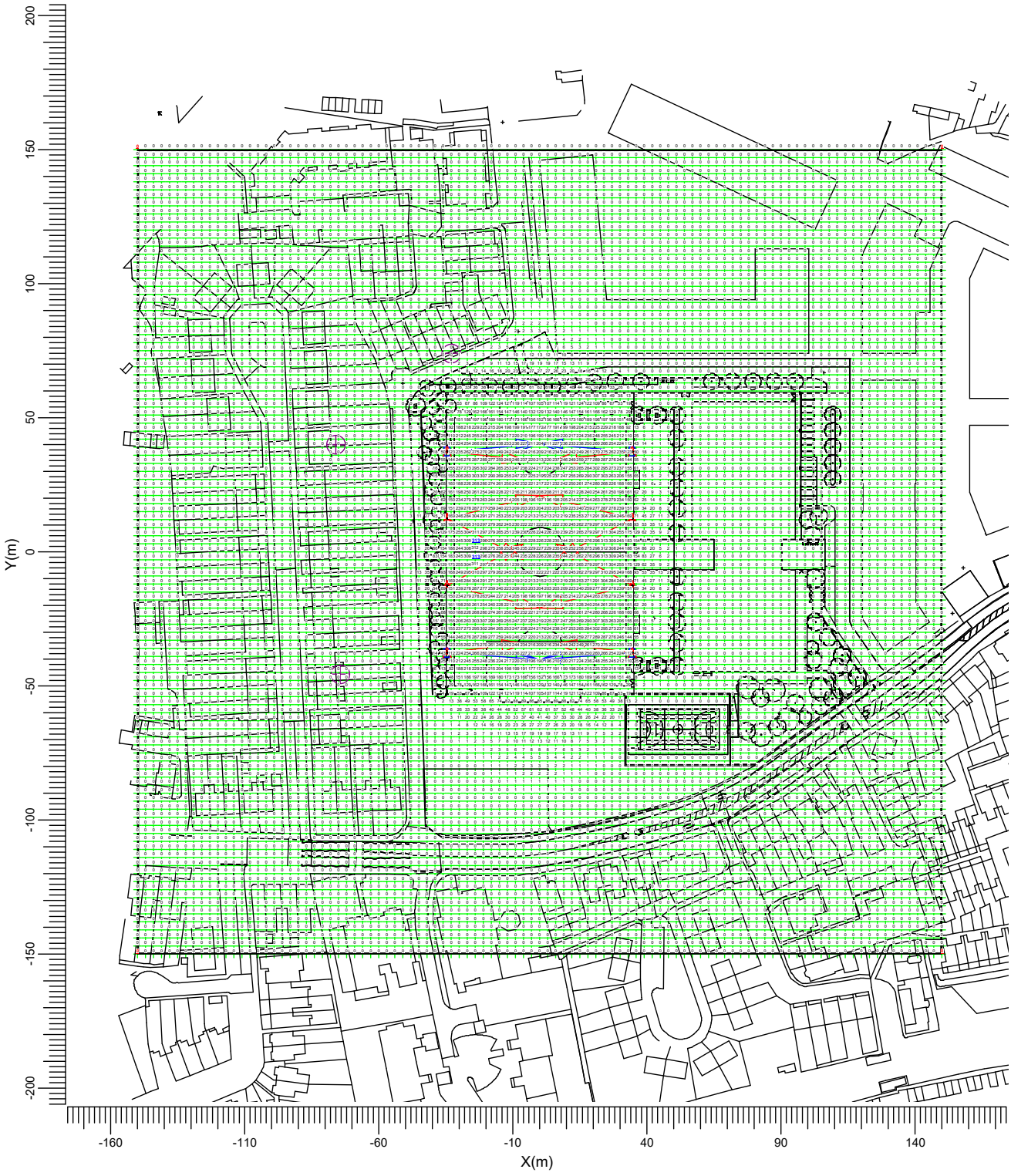
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Maximum	Project maintenance factor	Scale
44.3	0.90	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

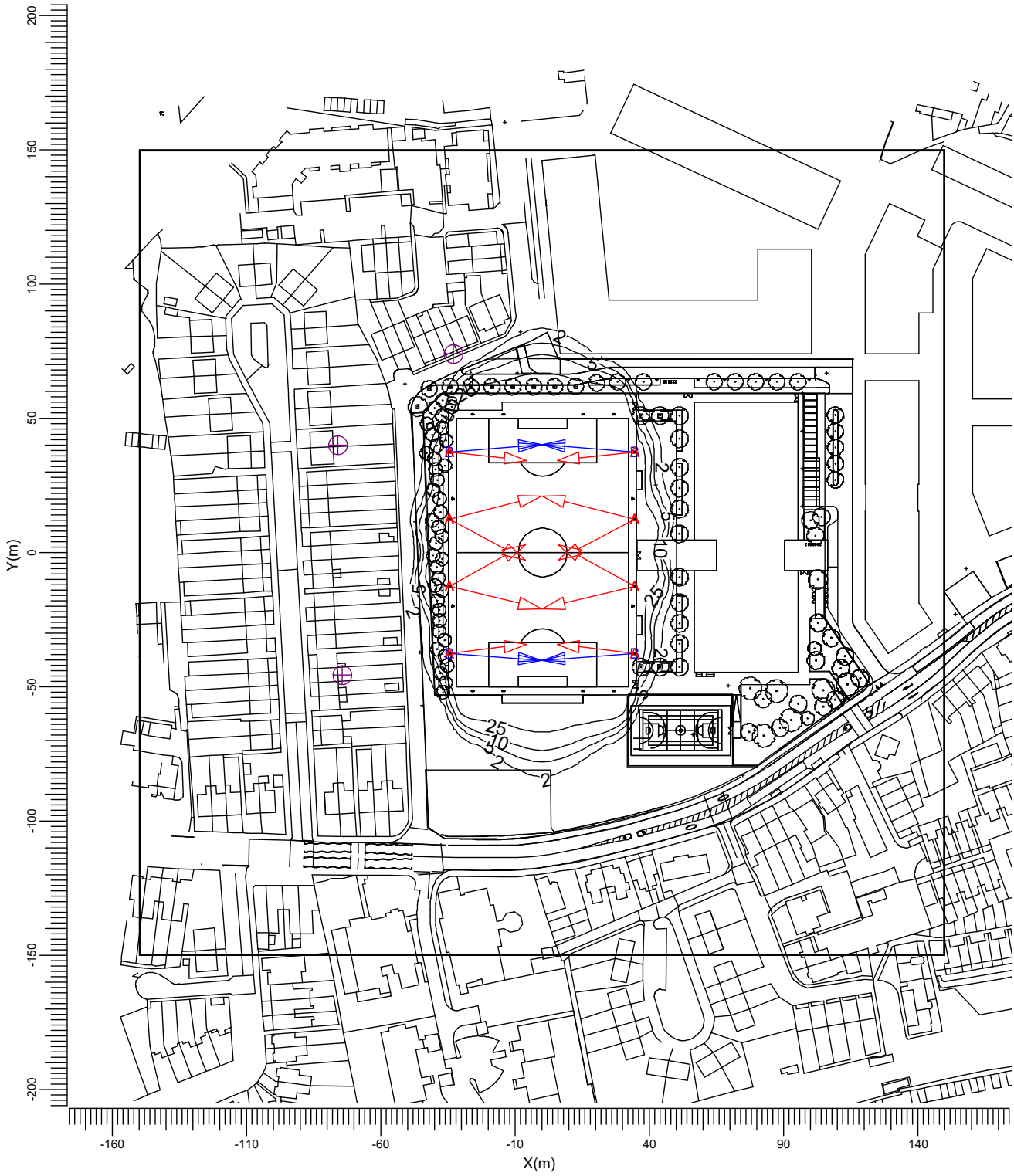
Project maintenance factor
1.00

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

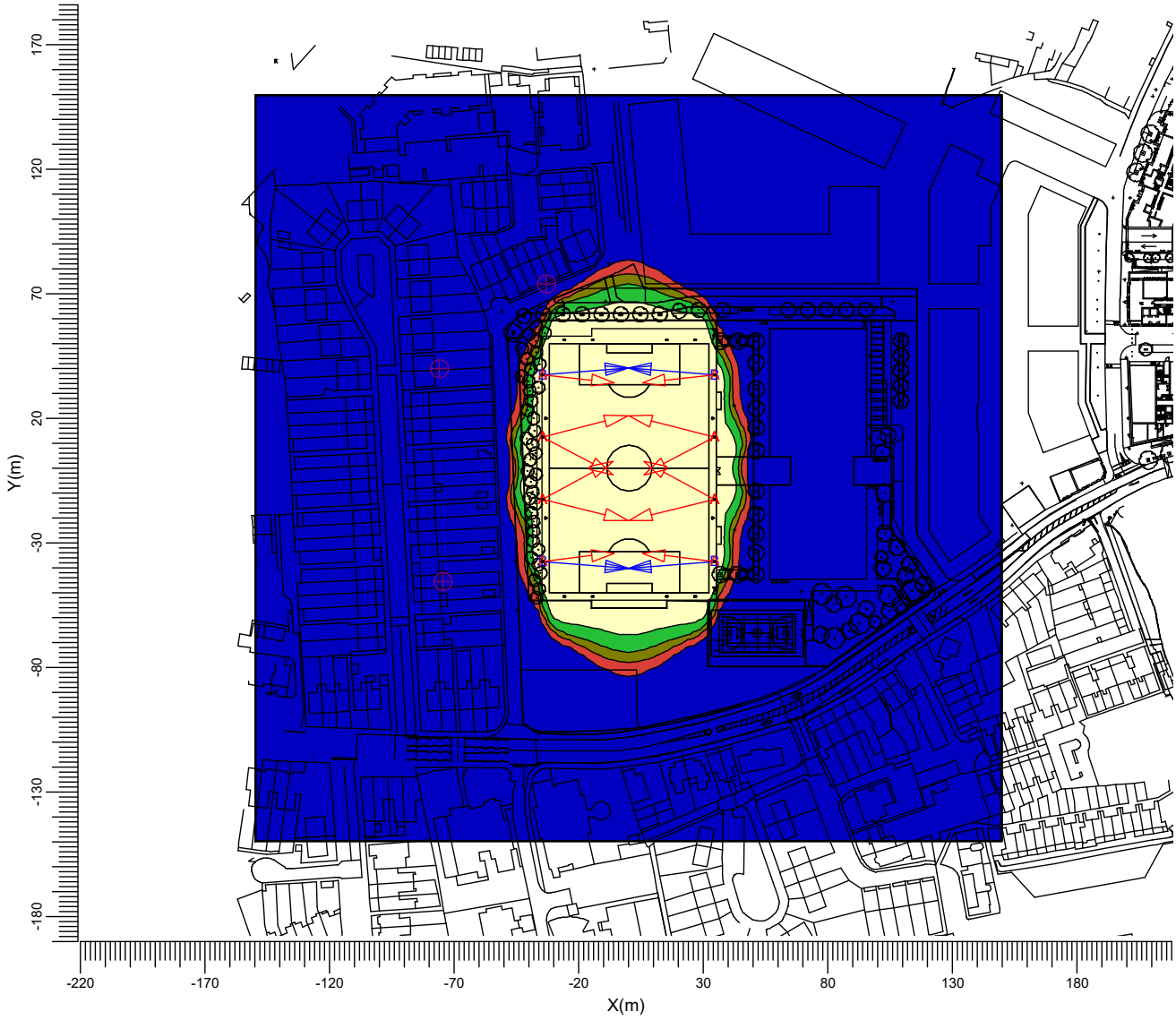
Project maintenance factor
1.00

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

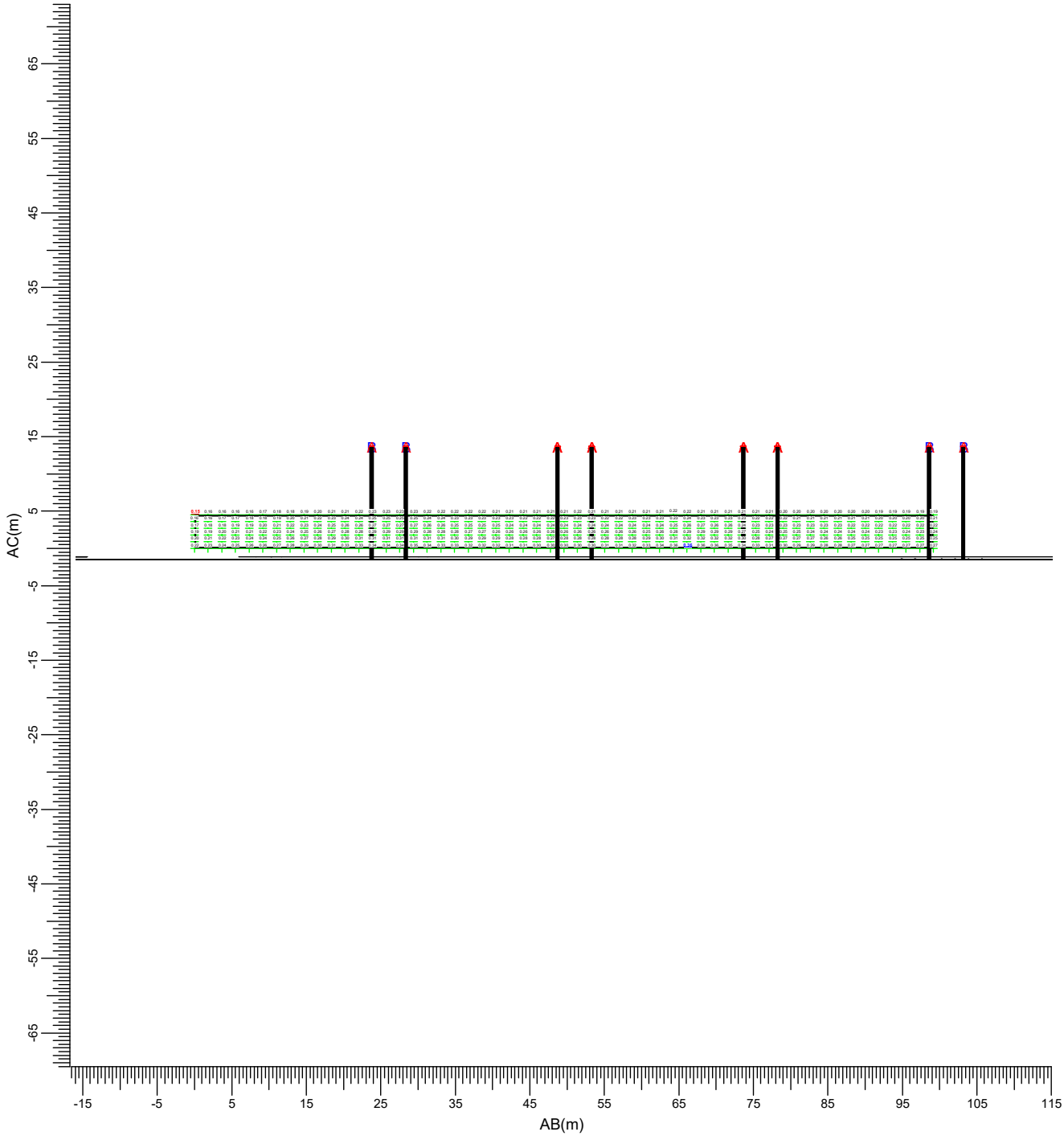
Project maintenance factor
1.00

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)

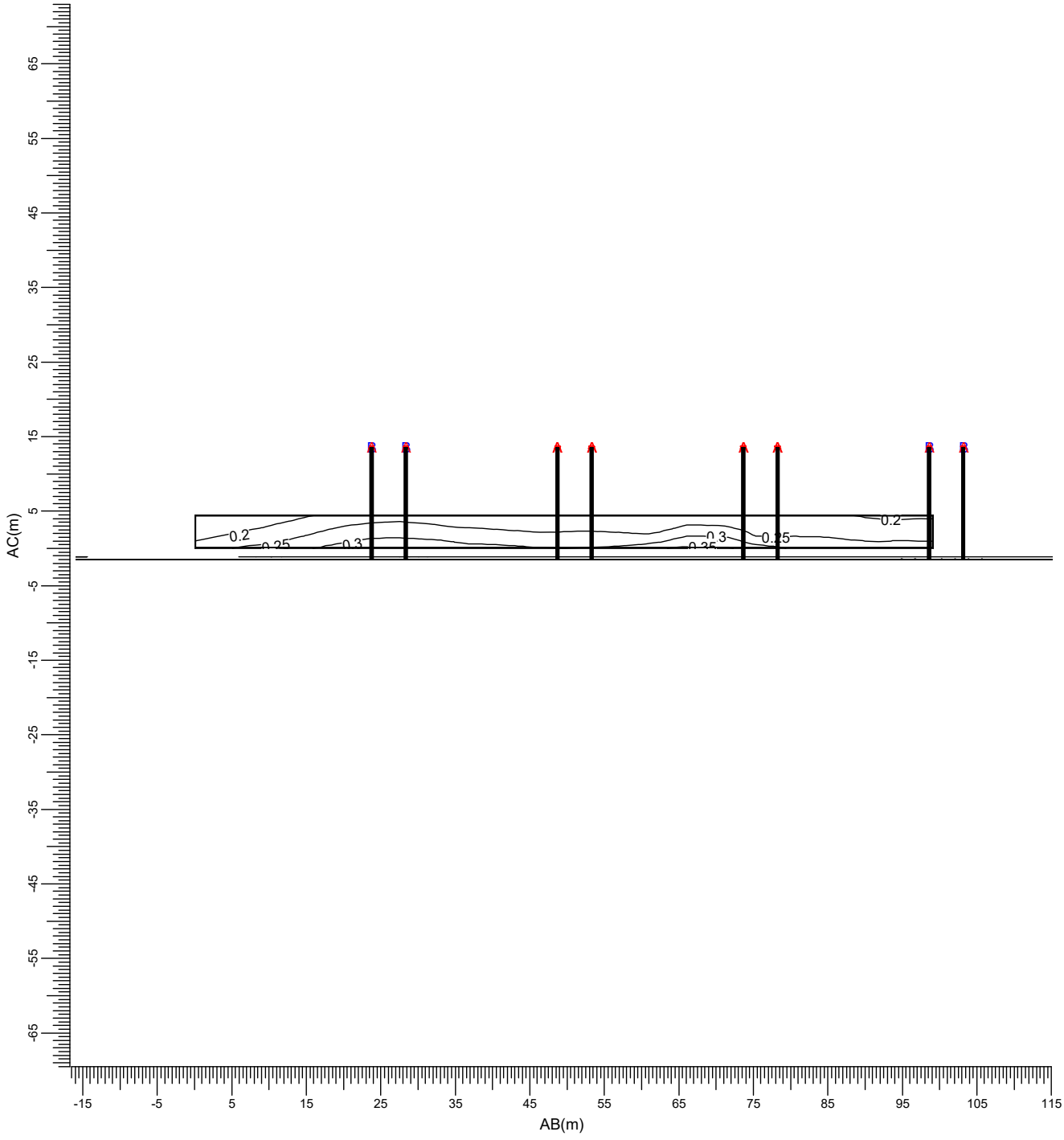
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

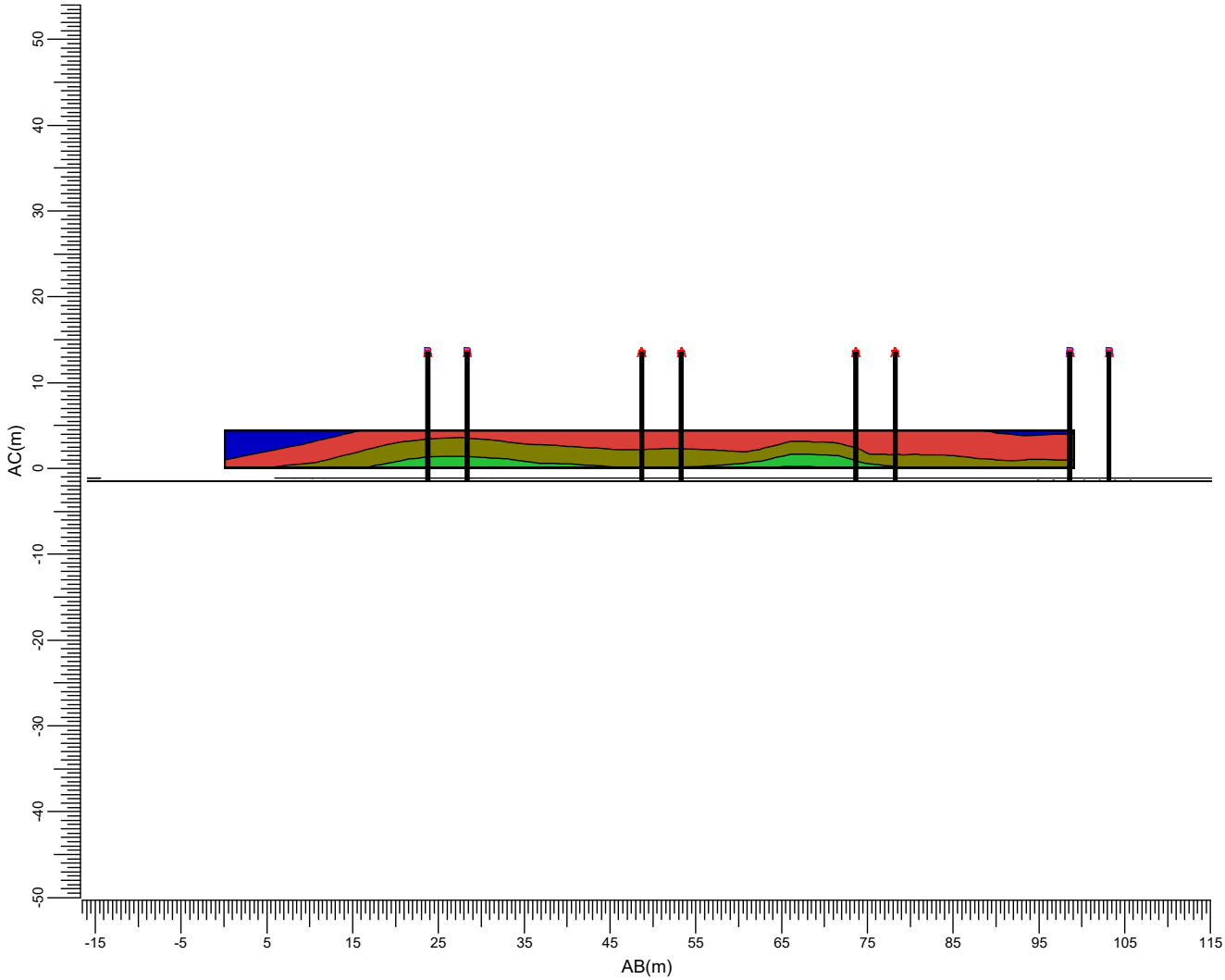
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

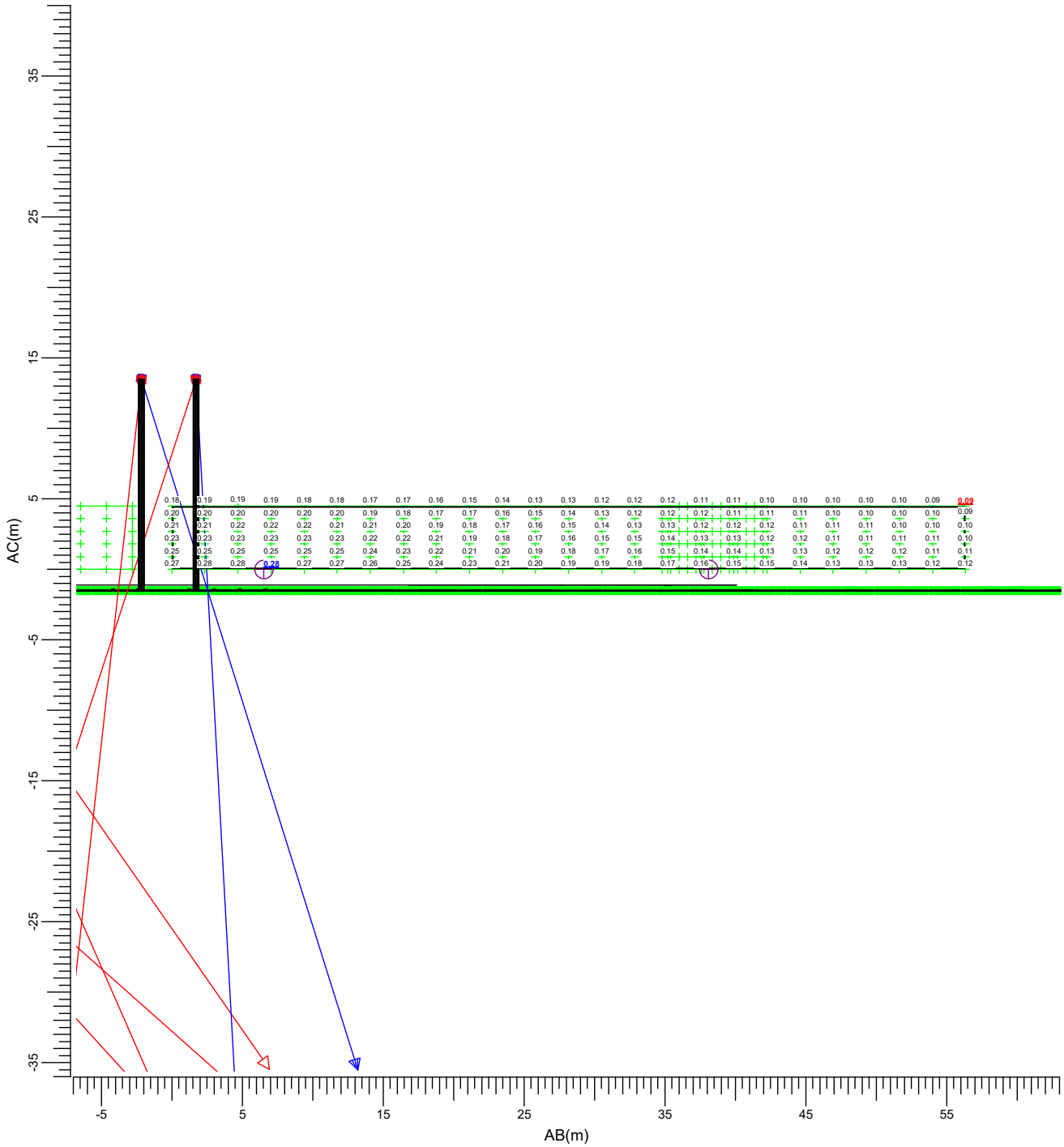
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

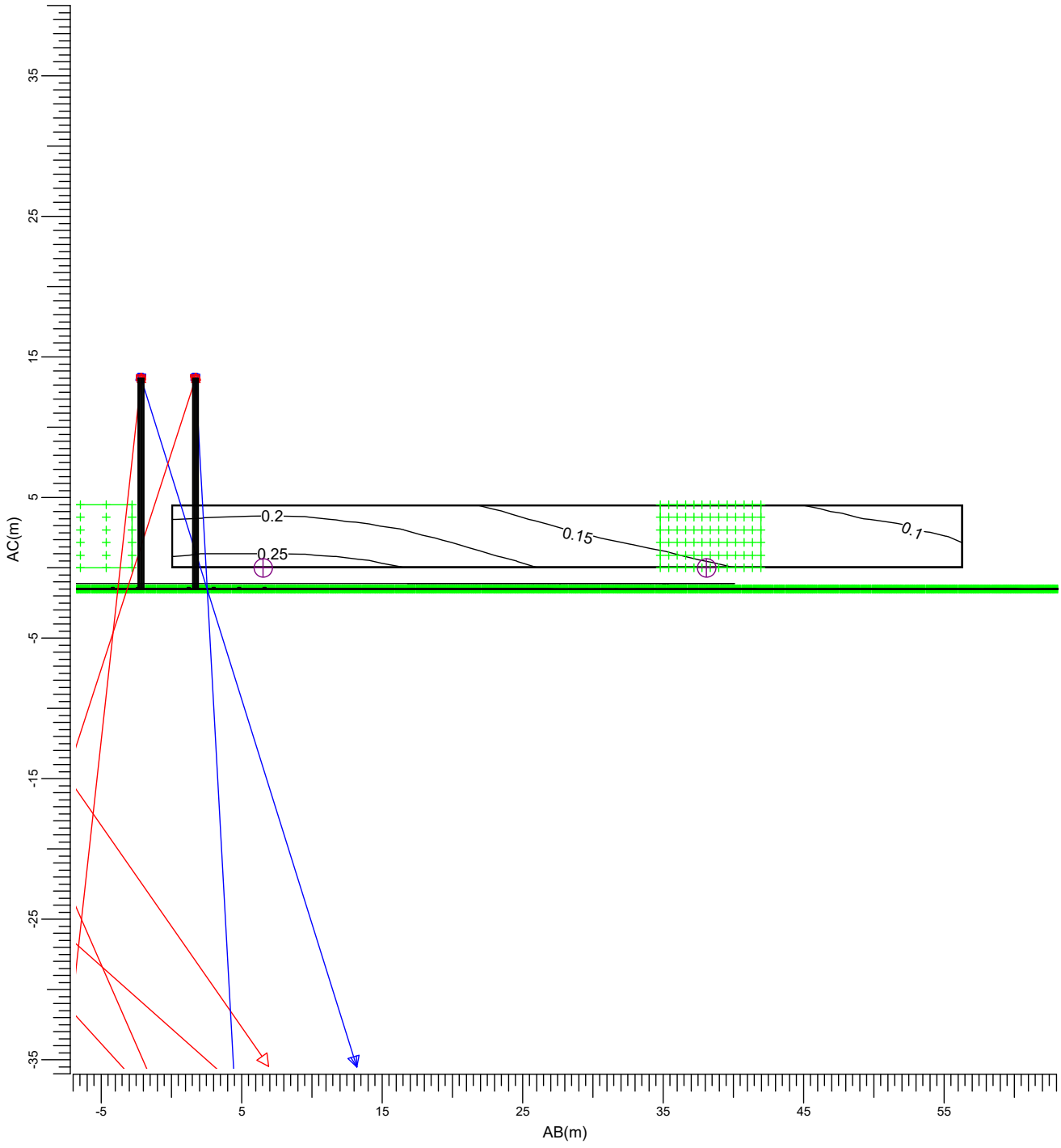
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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

3.12 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)

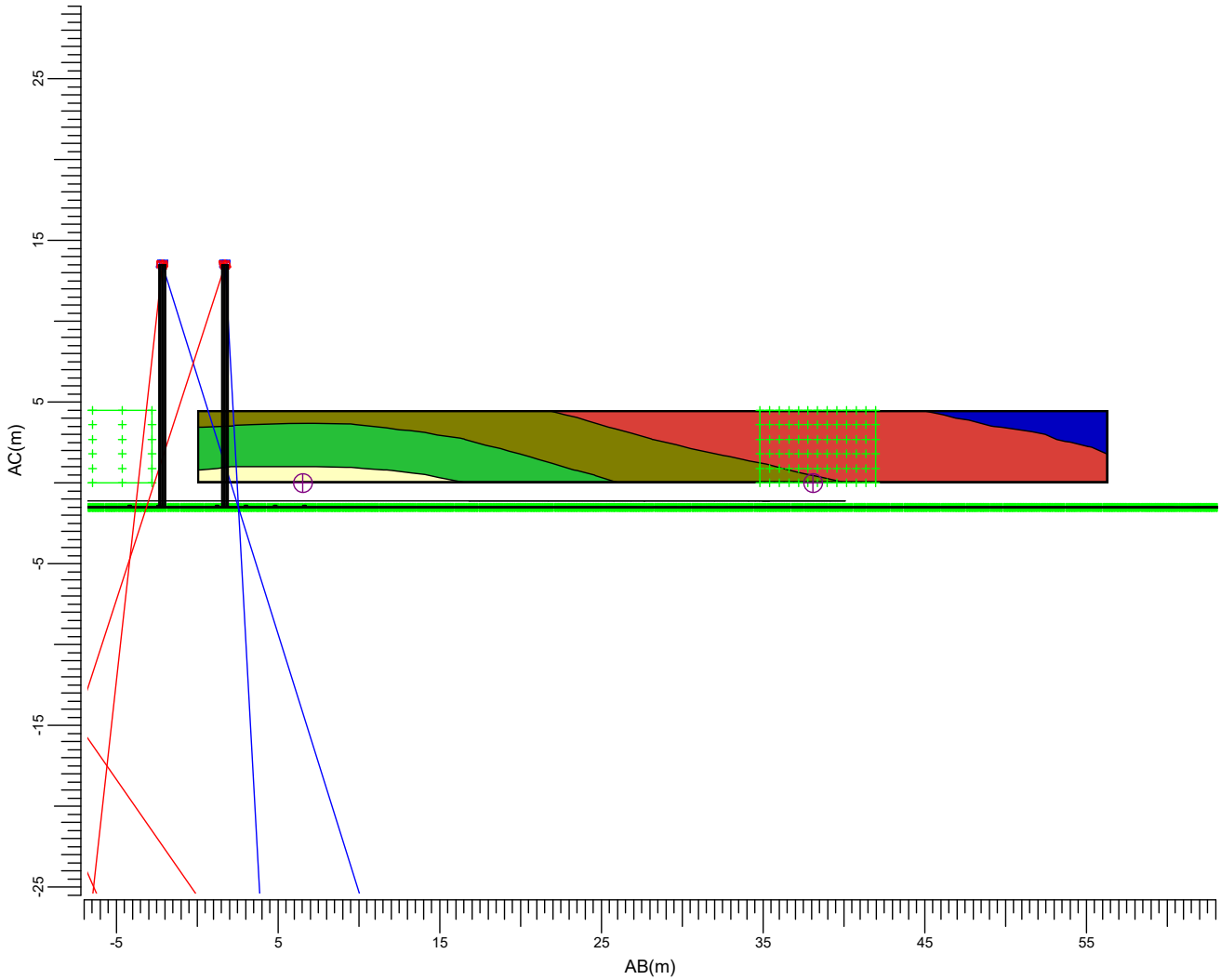
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)

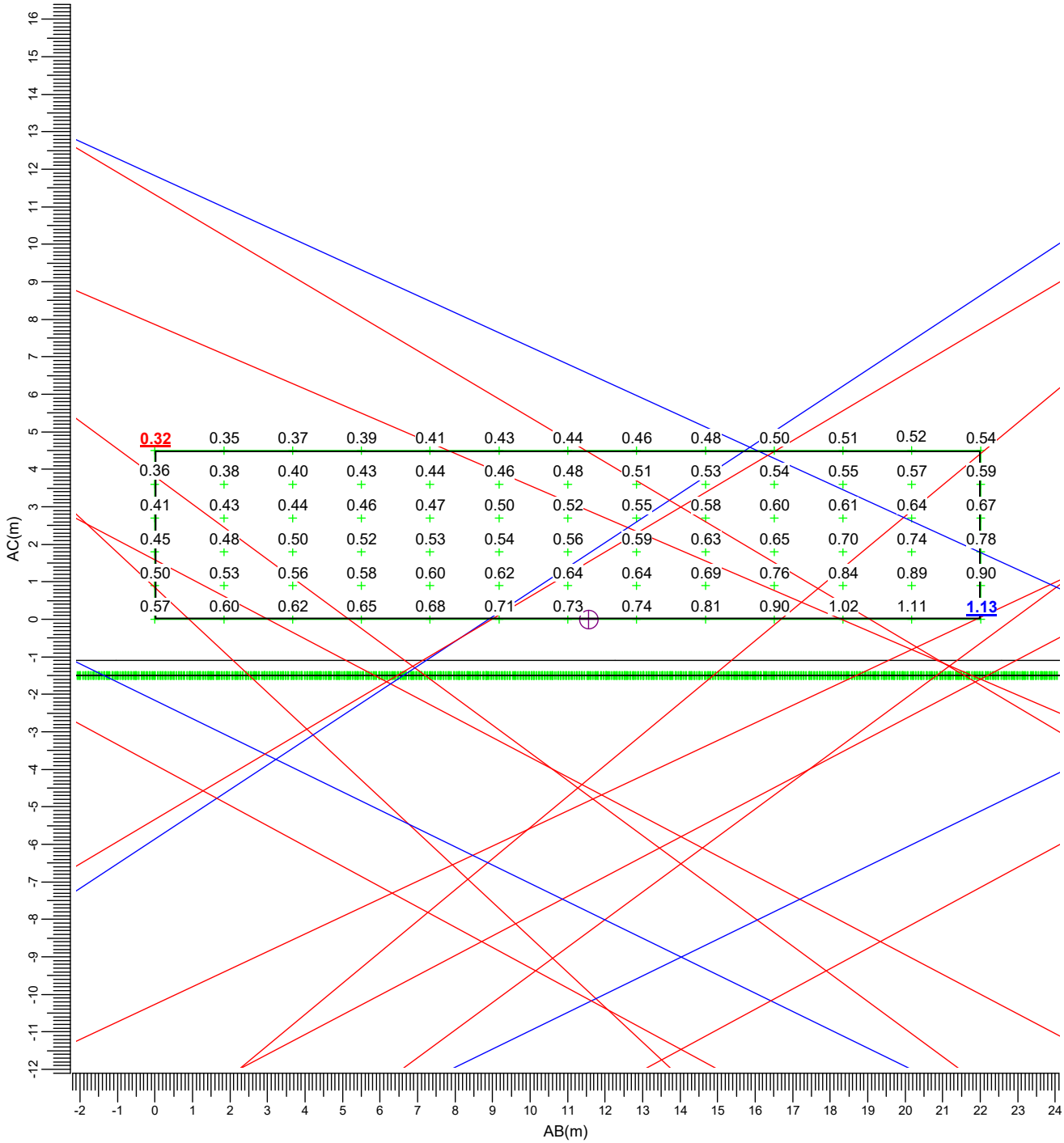
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)

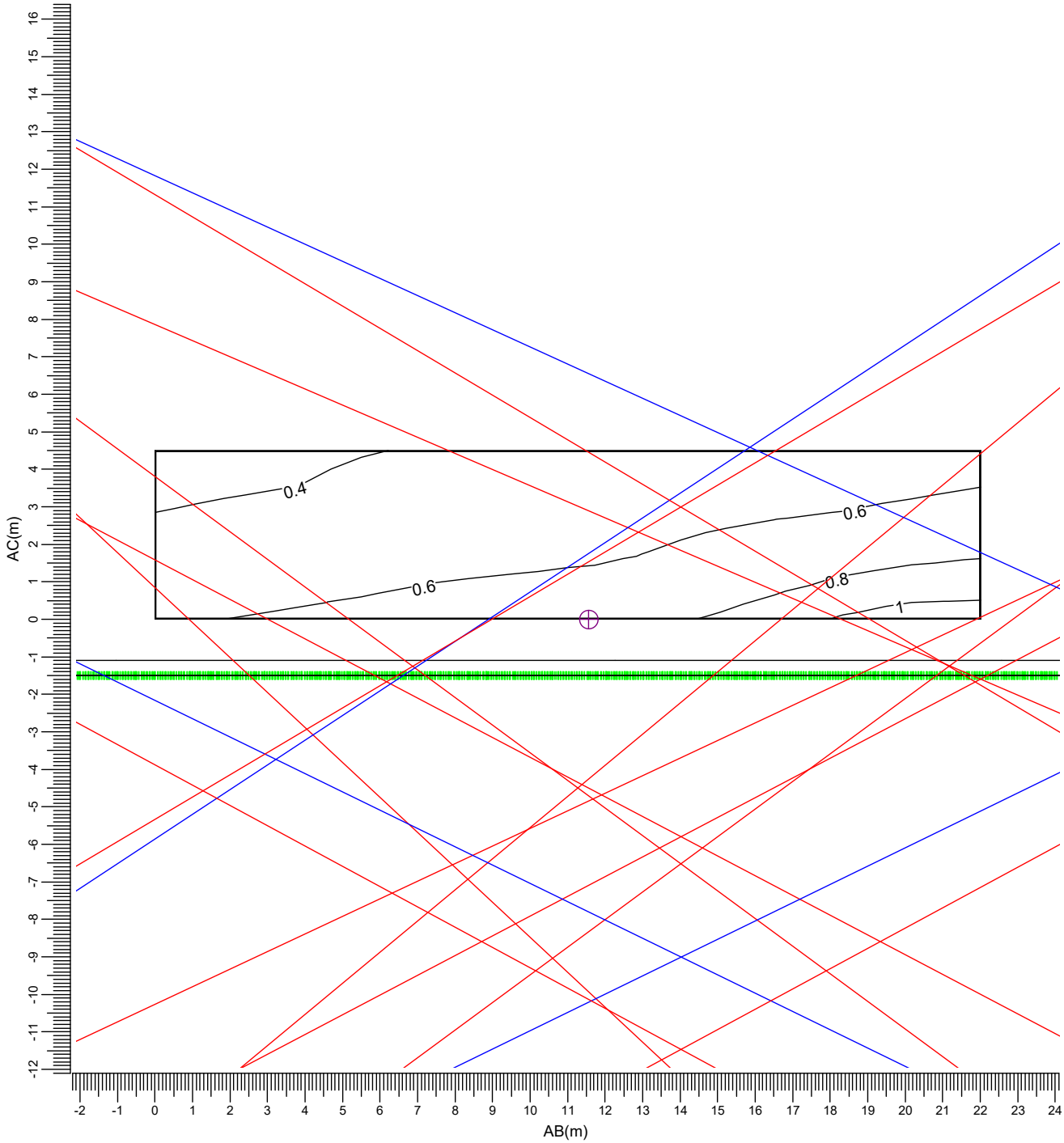
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Average	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

3.15 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)

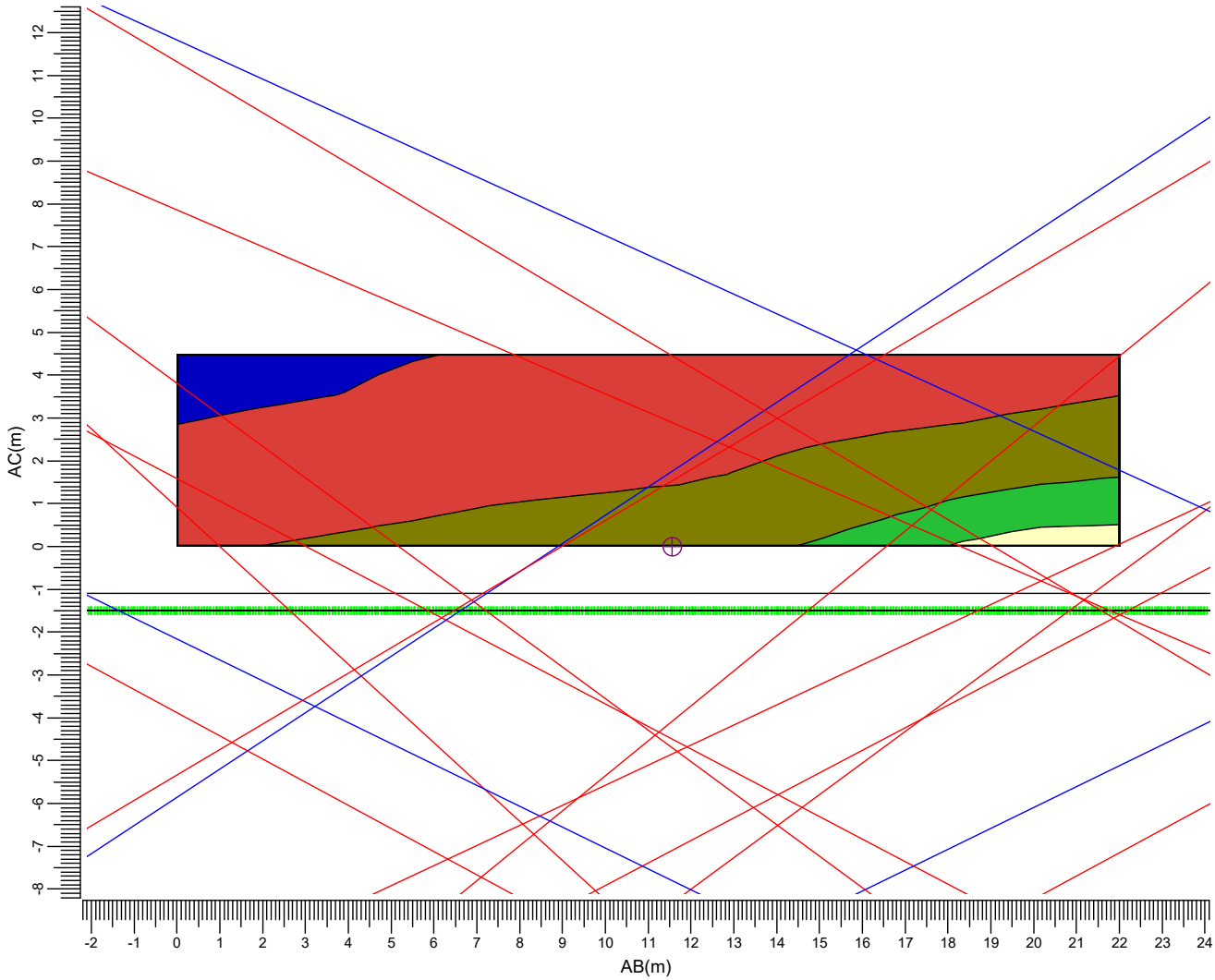
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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

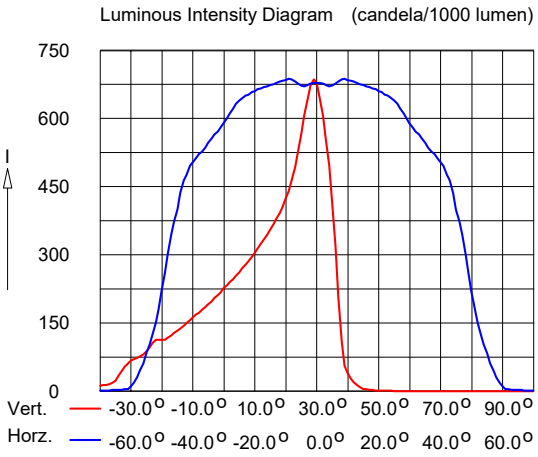
4.1 Project Luminaires

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.

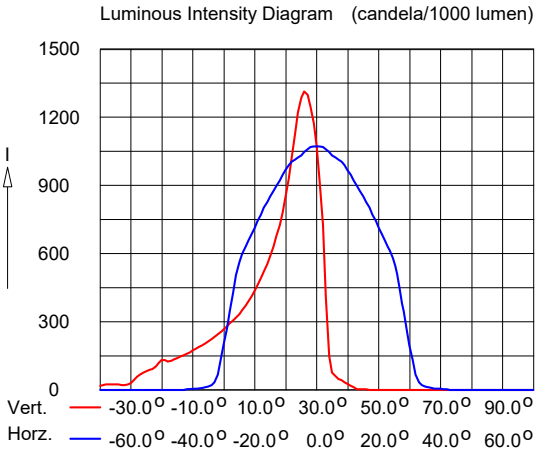


OptiVision LED
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO

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	+	+

Appendix B

Appendix 9

MICHAEL GRUBB STUDIO

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 lll 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 lll 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 ll 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.

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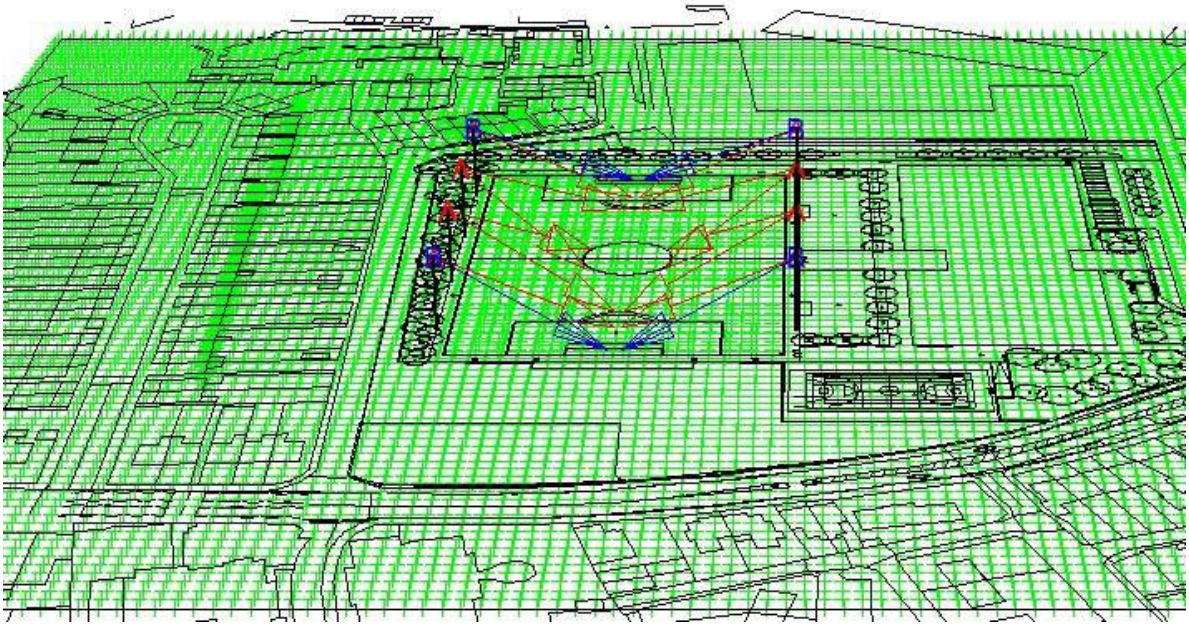
Mortlake Stage Brewery Development

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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Table of Contents

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.

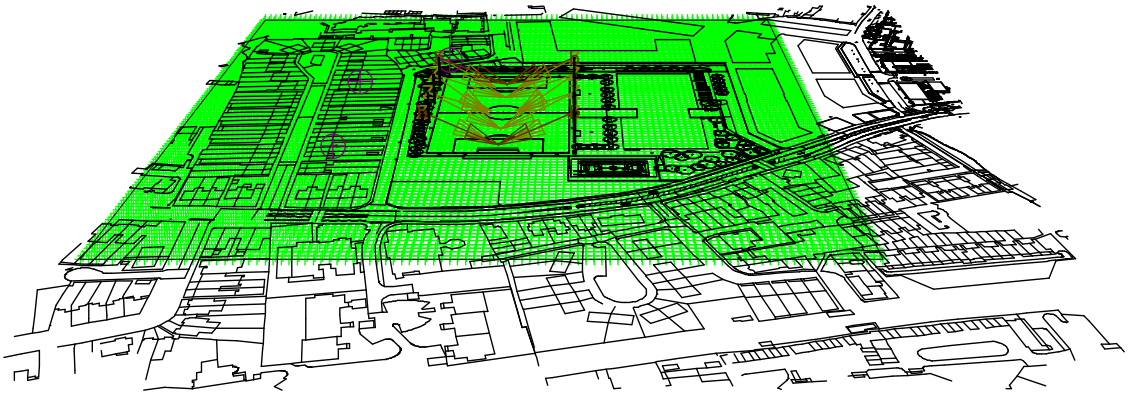
Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light levels shown in Sport England Document and ILP Guidance Notes for Obtrusive Light 2011. These are 2,5,10 & 25 lux levels.
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst case when newley installed.

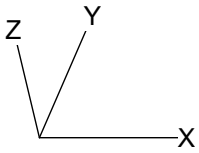
Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux, calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4 Zones. Observers at houses added @ 1.5m for Lighting Intensity Calc

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



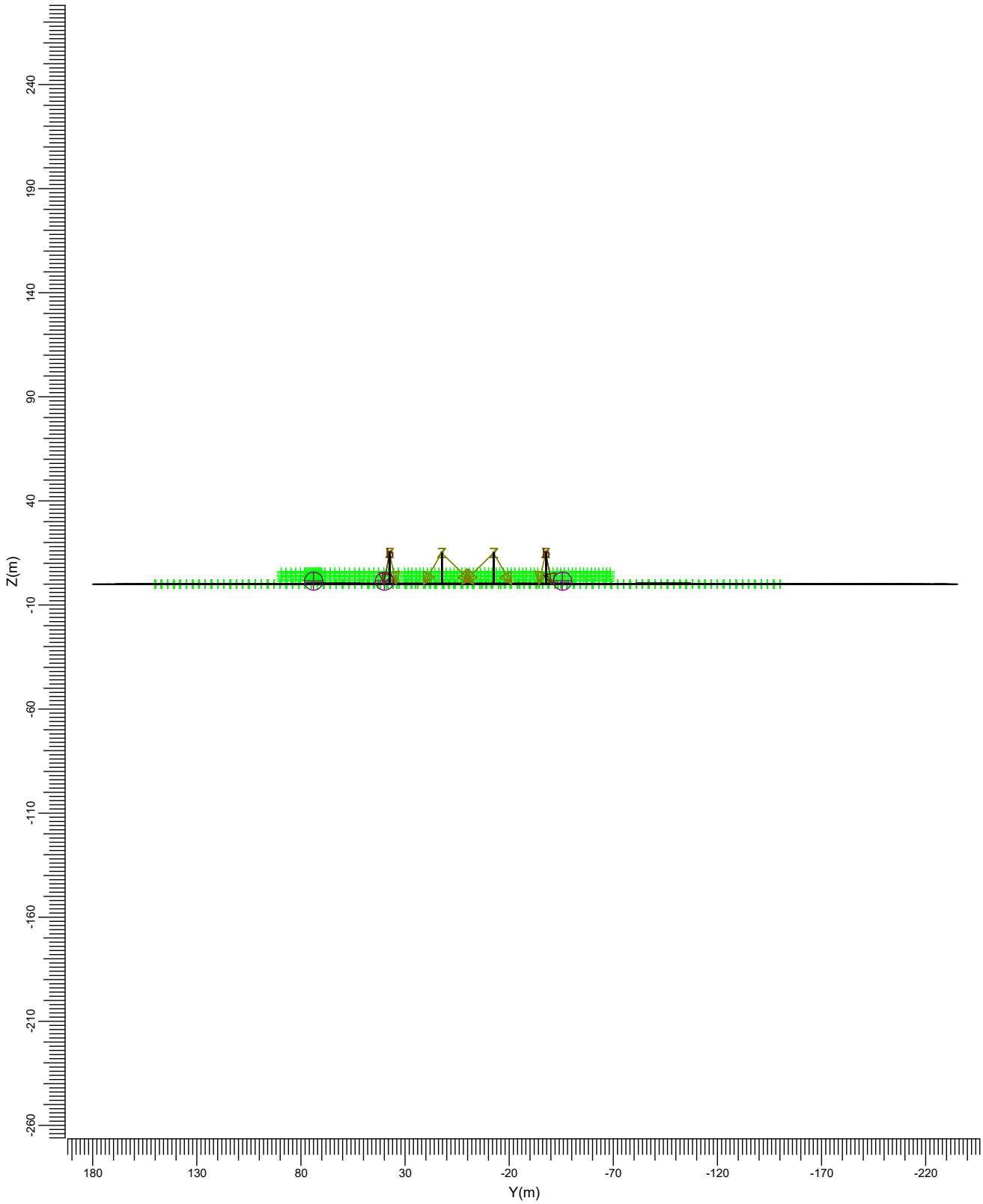


G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

1.3 Top Project Overview

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

(Il)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

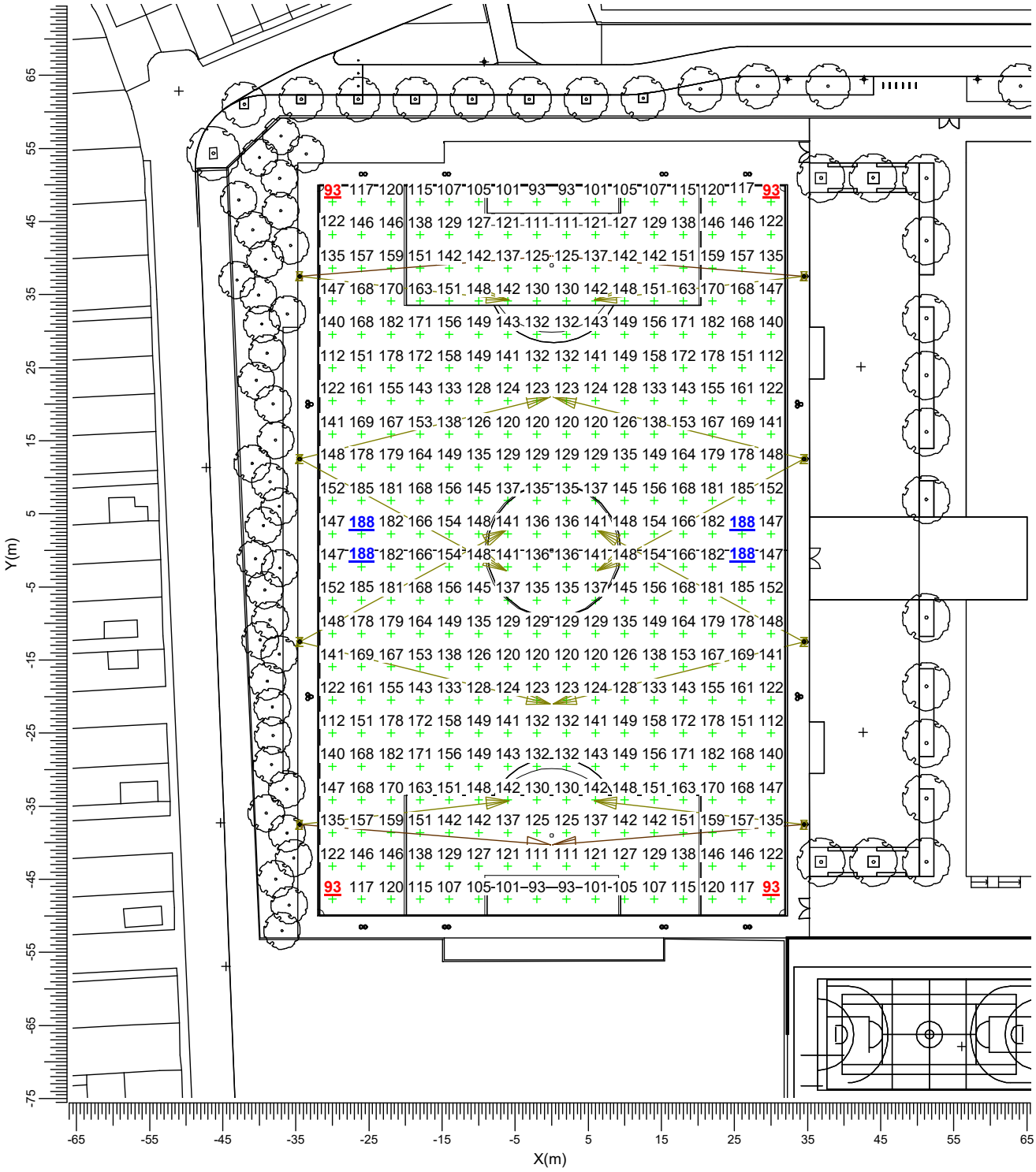
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



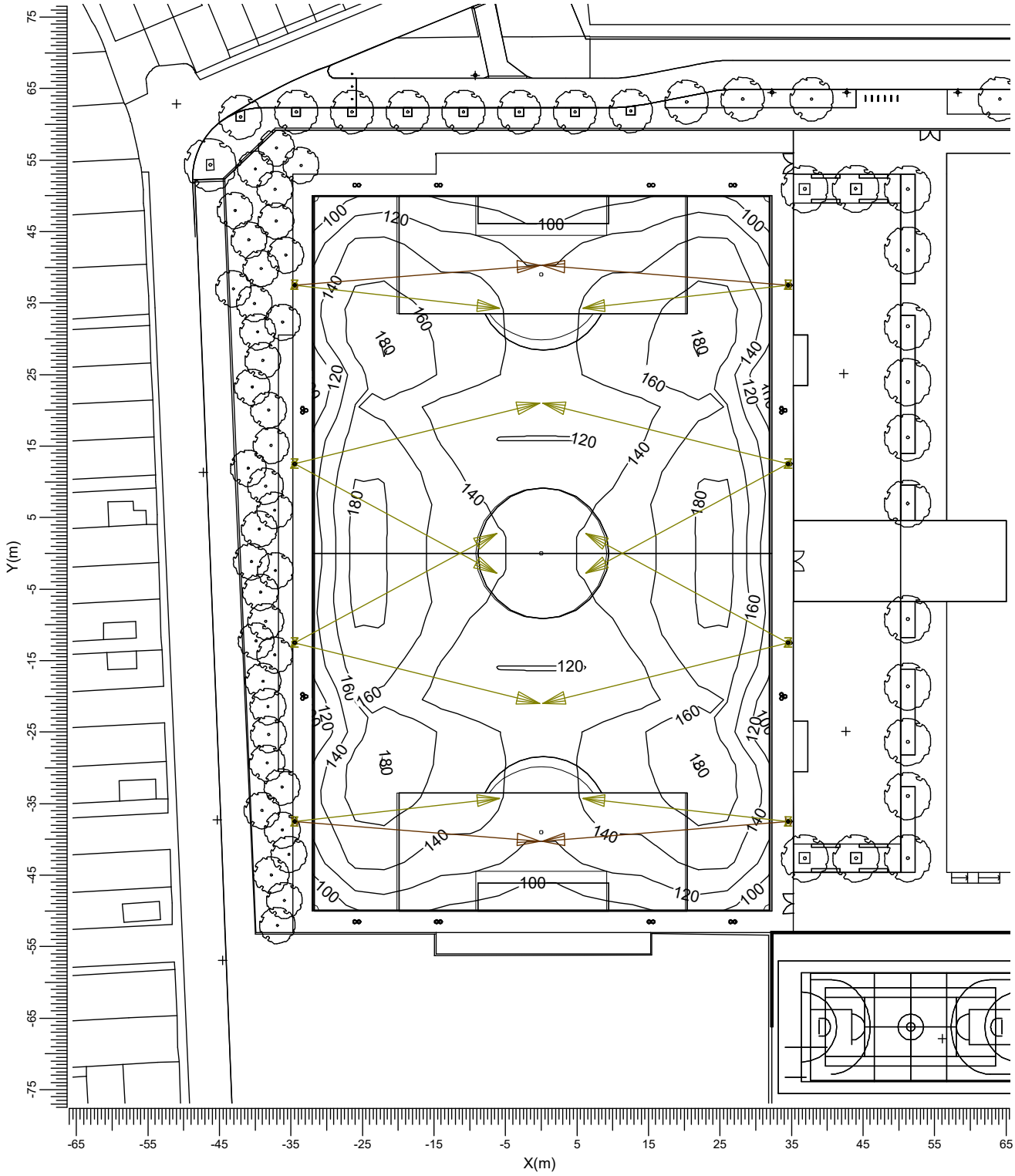
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
144	93	188	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)



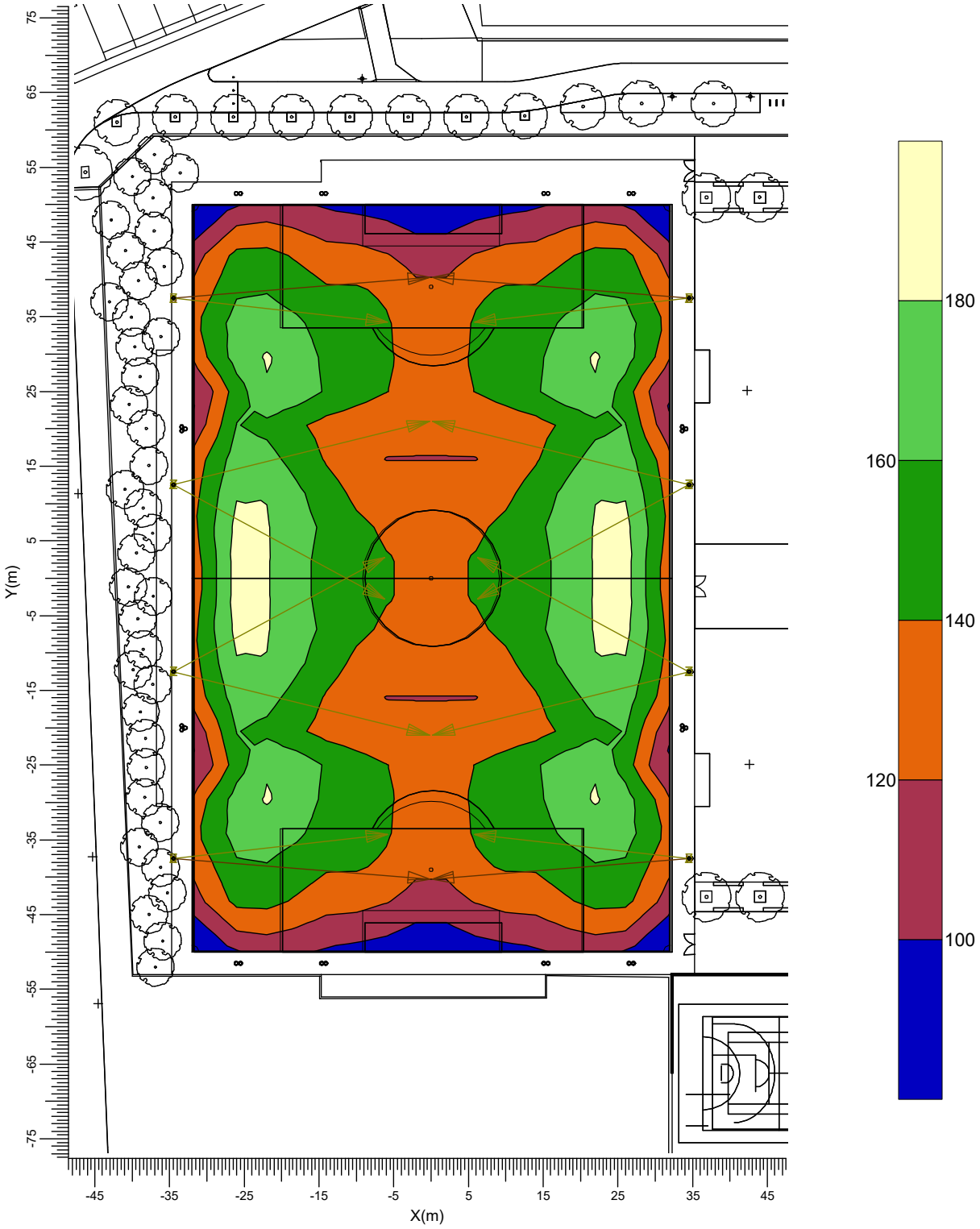
G → BVP525 OUT T15 100K A-VWB/ N → BVP651 T25 DW10 BL1
Z → BVP515 OUT T15 100K A-WB/3 b → BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	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)



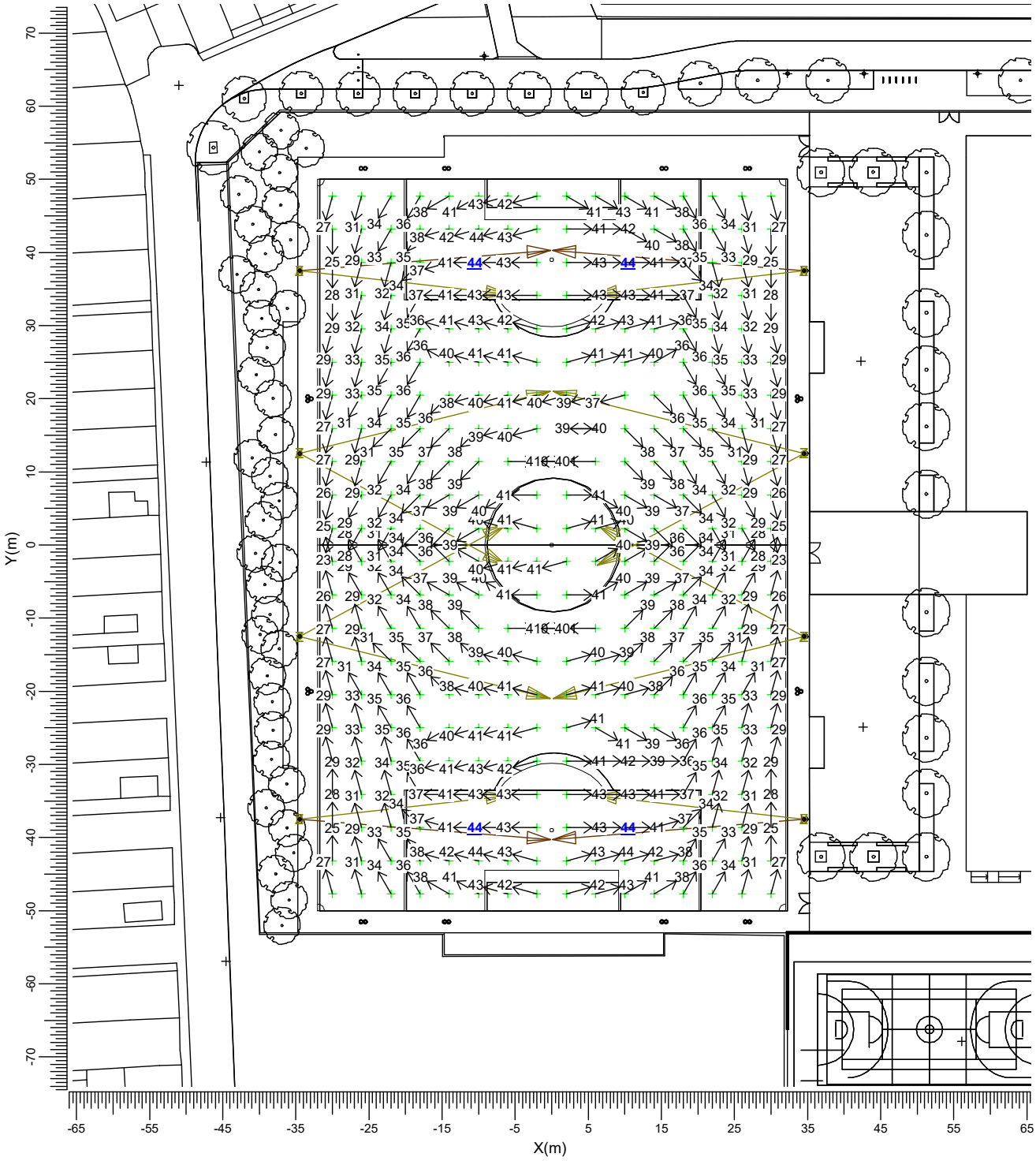
G	BVP525 OUT T15 100K A-VWB/	N	BVP651 T25 DW10 BL1		
Z	BVP515 OUT T15 100K A-WB/3	b	BVP515 OUT T15 100K A-NB/30		

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



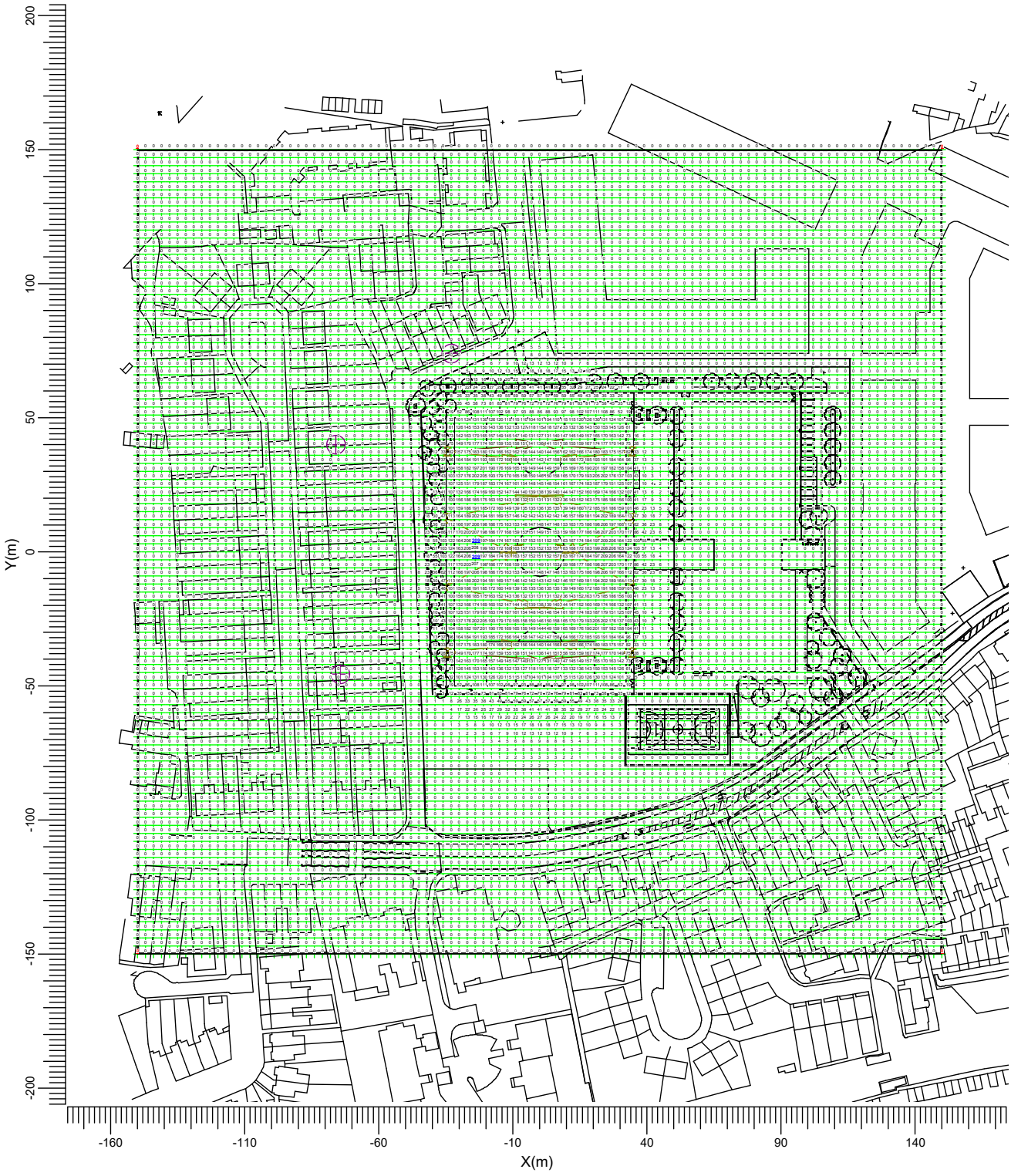
G BVP525 OUT T15 100K A-VWB/ N
Z BVP515 OUT T15 100K A-WB/3 b
BVP651 T25 DW10 BL1
BVP515 OUT T15 100K A-NB/30

Maximum	Project maintenance factor	Scale
43.9	0.90	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	b	BVP515 OUT T15 100K A-NB/30

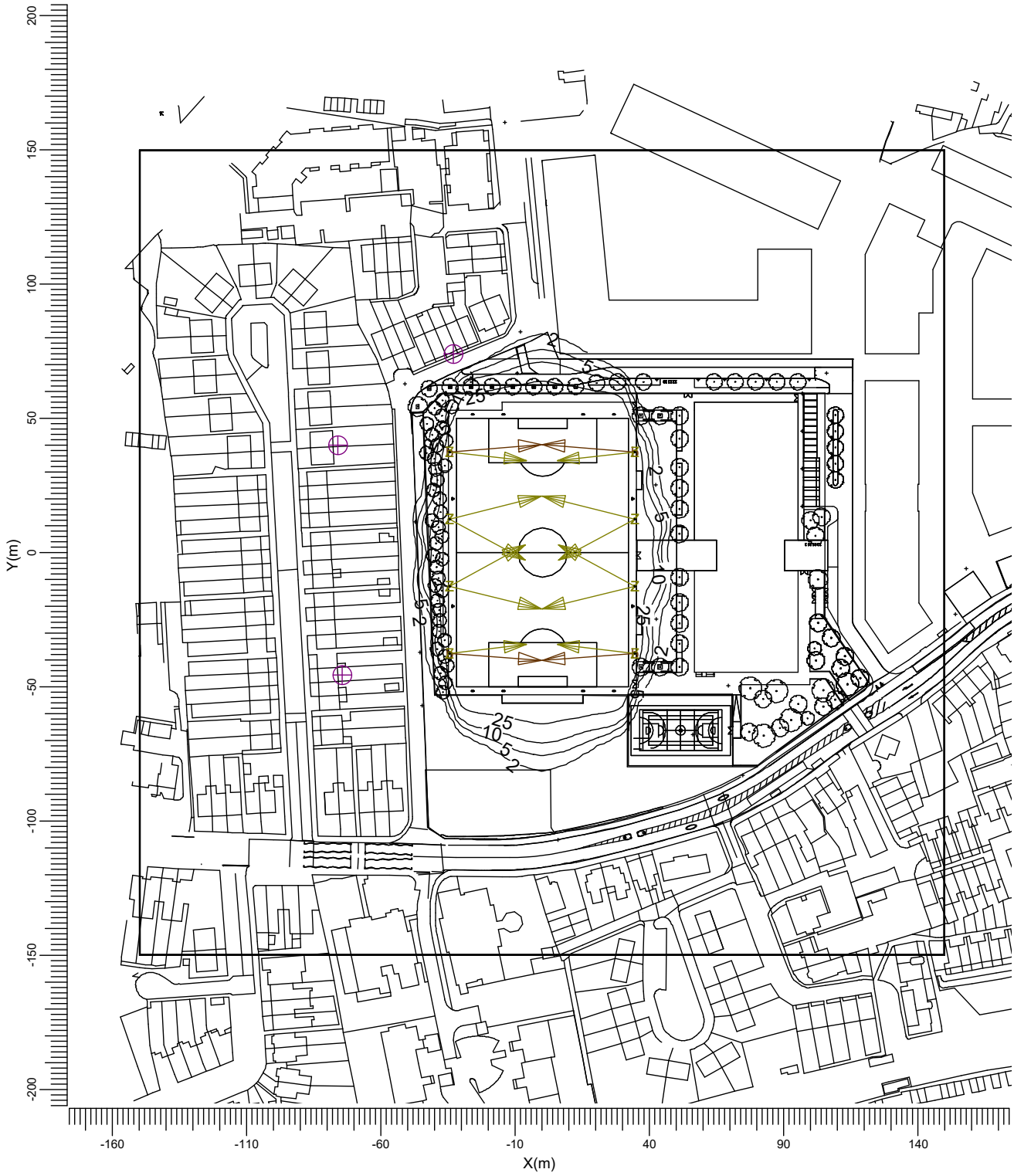
Project maintenance factor
1.00

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

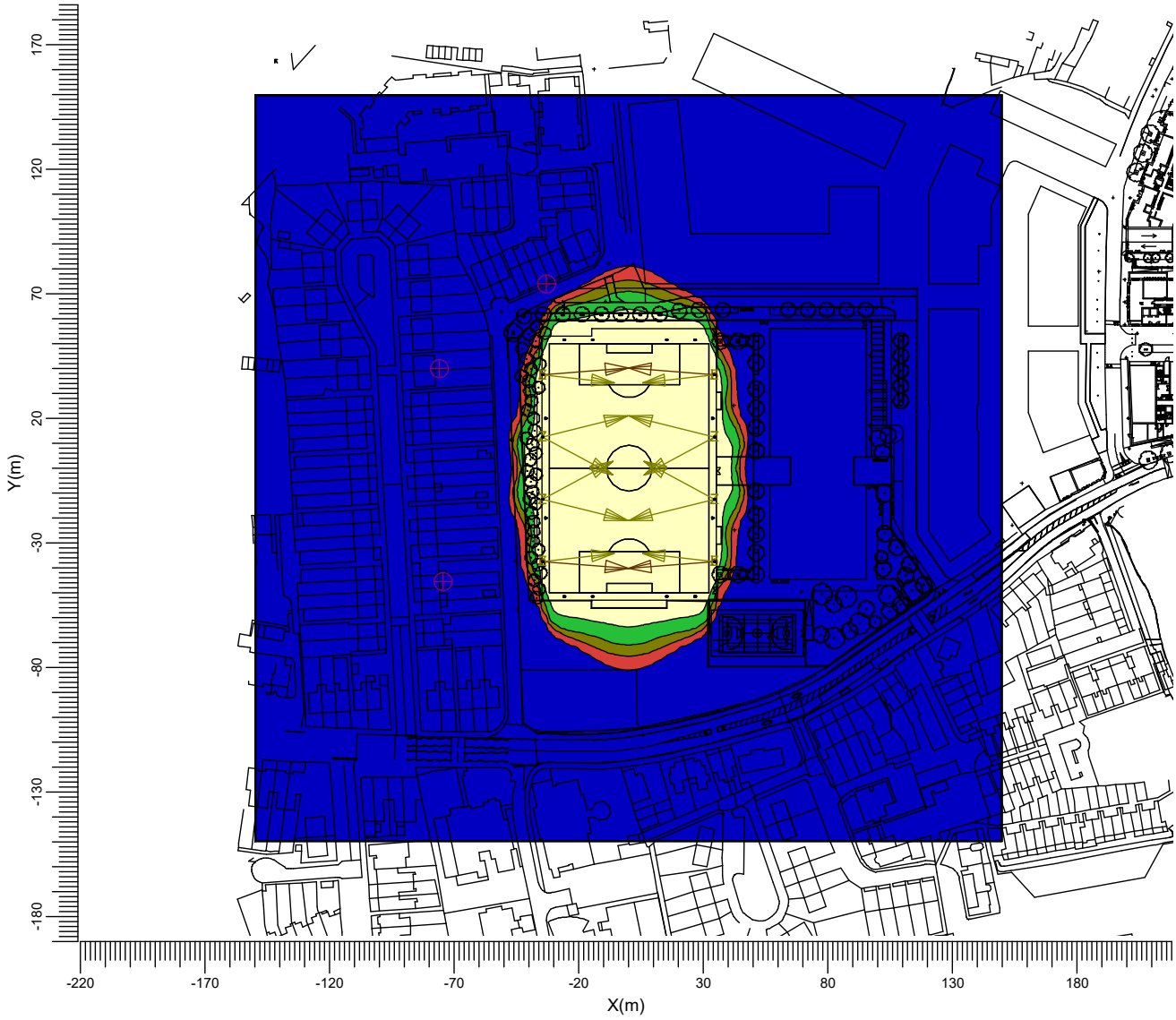
Project maintenance factor
1.00

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)



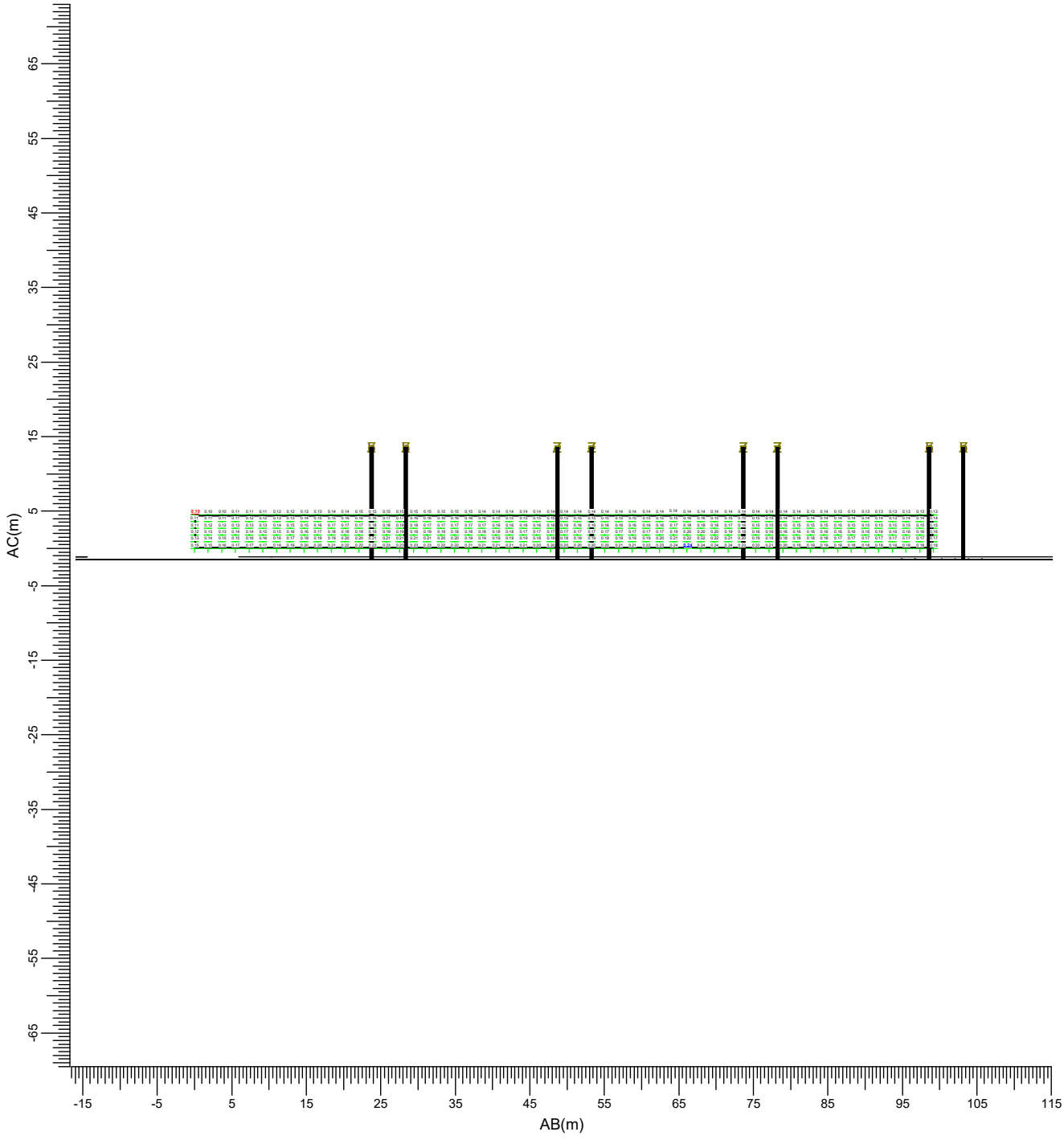
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

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)

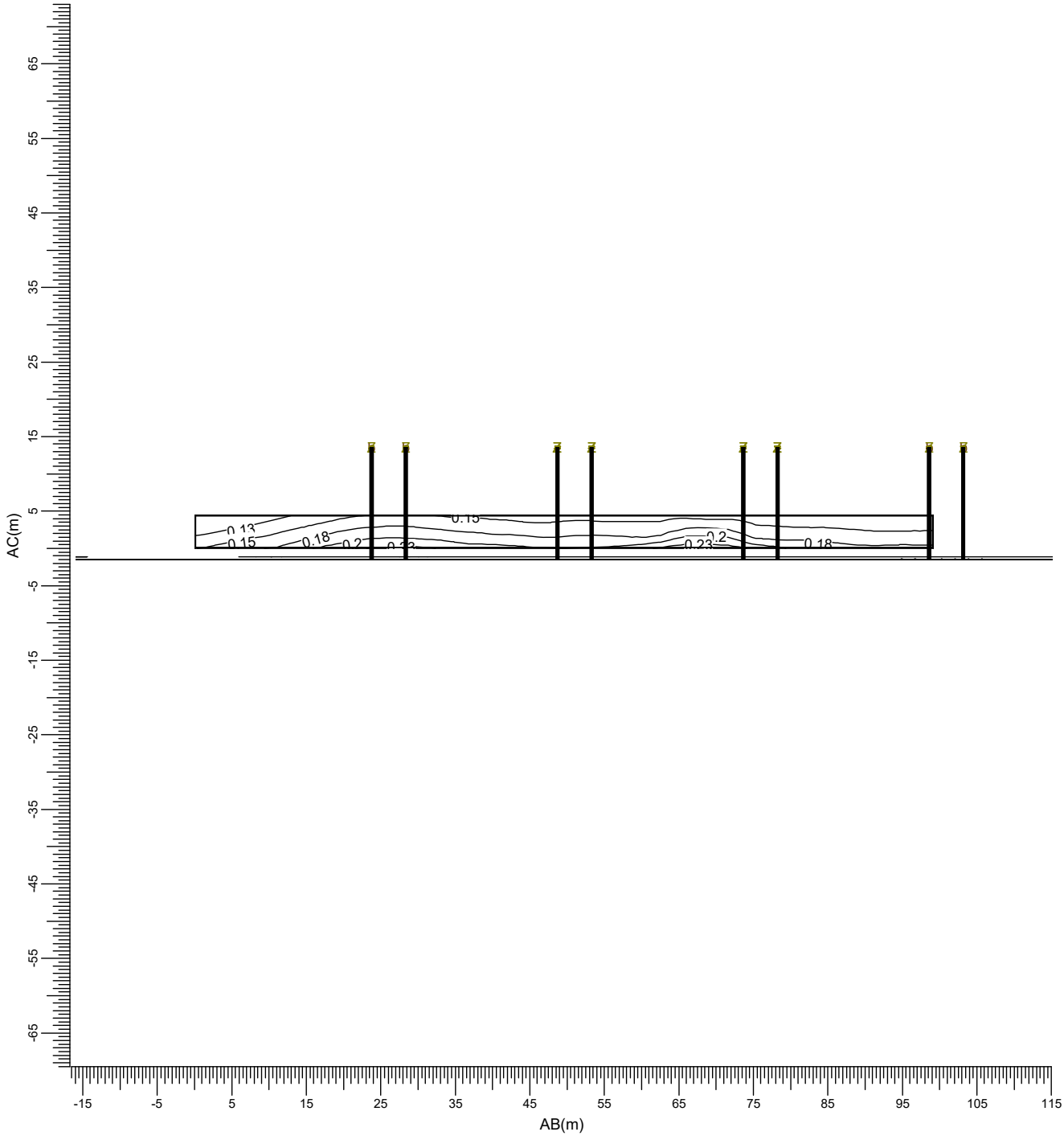
G : BVP525 OUT T15 100K A-VWB/30 N : BVP651 T25 DW10 BL1
Z : BVP515 OUT T15 100K A-WB/30 +LO b : BVP515 OUT T15 100K A-NB/30 +LO

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)

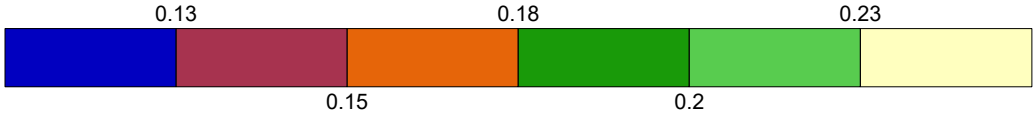
G : BVP525 OUT T15 100K A-VWB/30
Z : BVP515 OUT T15 100K A-WB/30 +LO
N : BVP651 T25 DW10 BL1
b : BVP515 OUT T15 100K A-NB/30 +LO

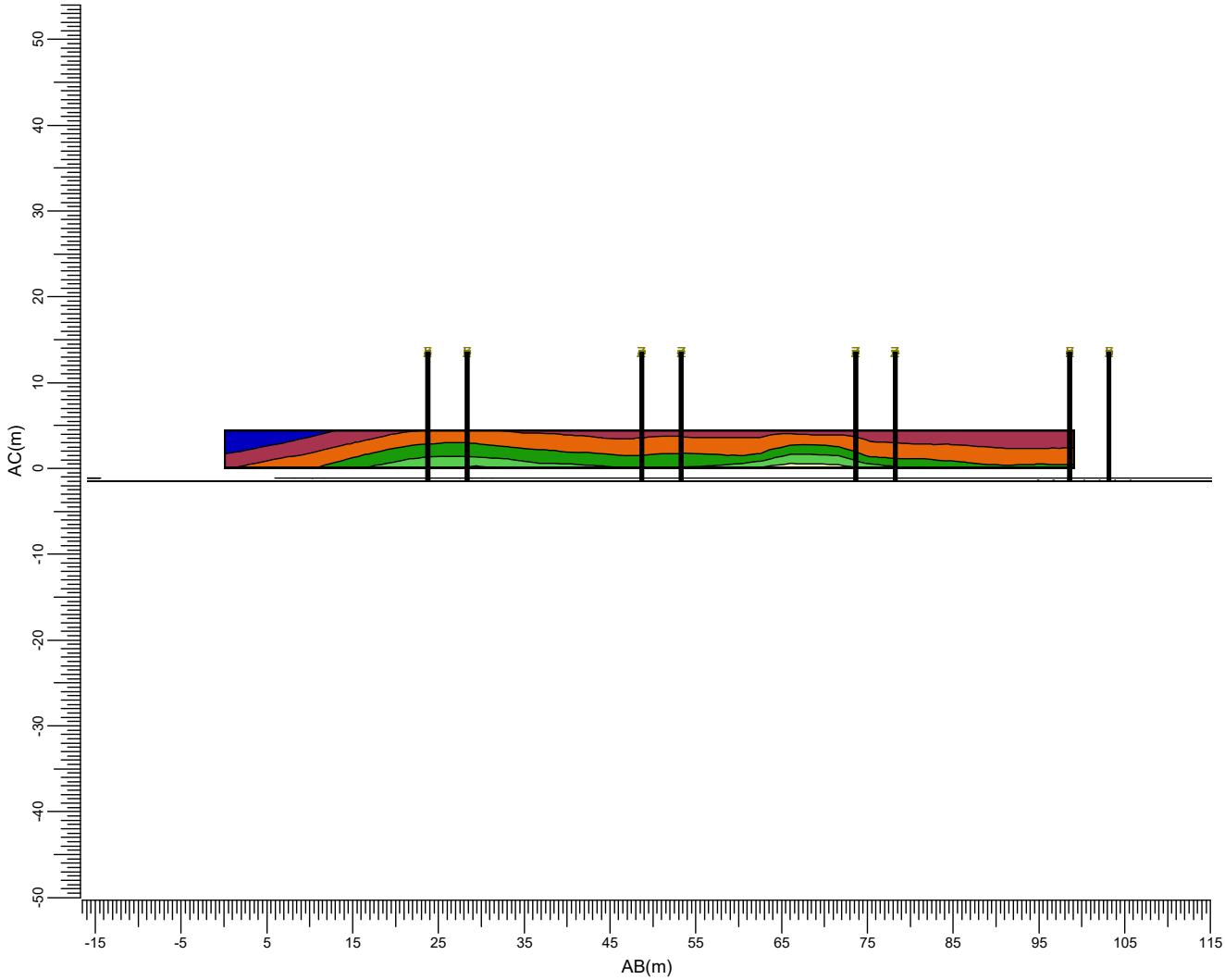
Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
0.17	0.10	0.24	0.61	0.43	1.00	1:750

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)

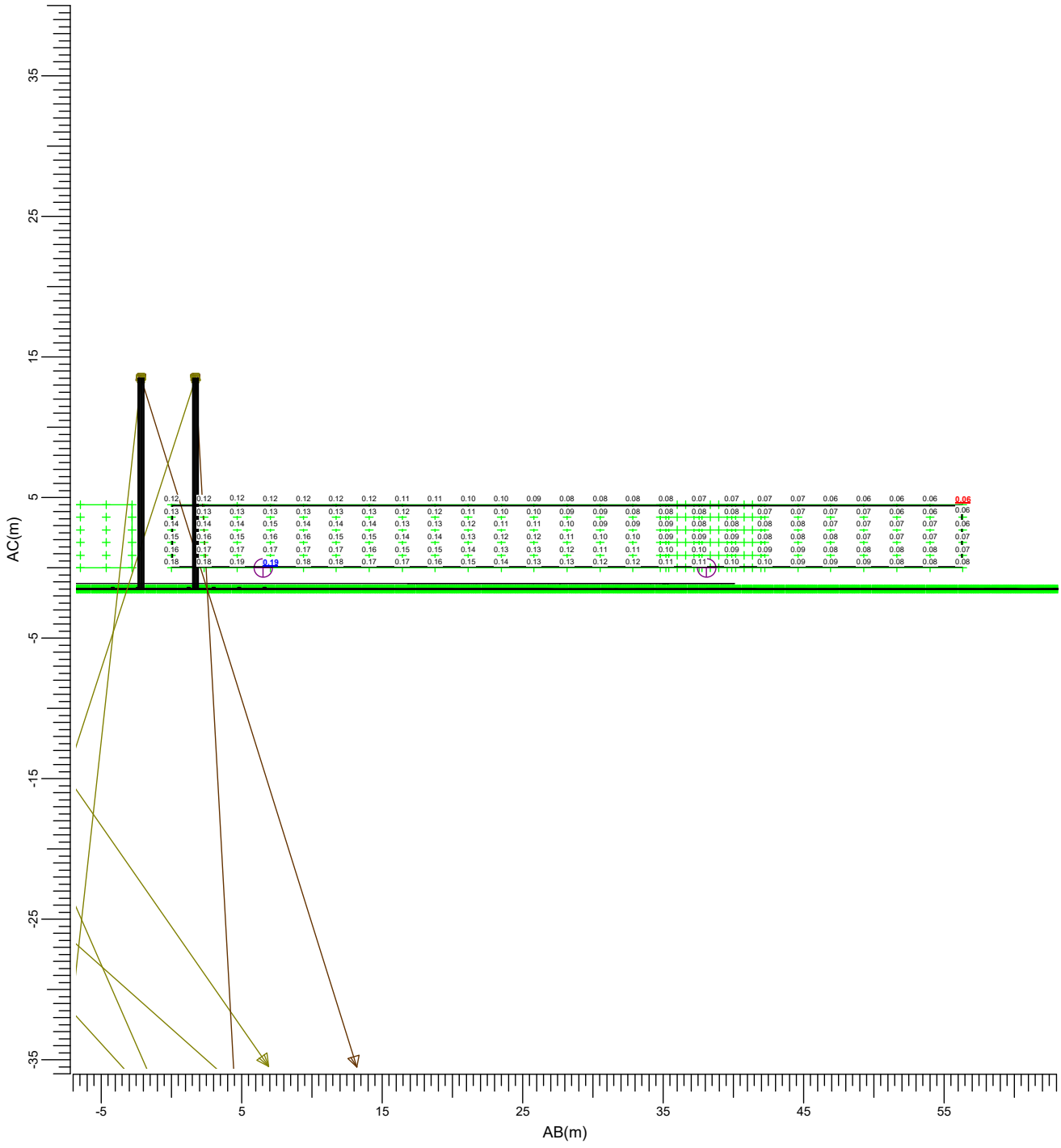
G : BVP525 OUT T15 100K A-VWB/30
Z : BVP515 OUT T15 100K A-WB/30 +LO
N : BVP651 T25 DW10 BL1
b : BVP515 OUT T15 100K A-NB/30 +LO

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)

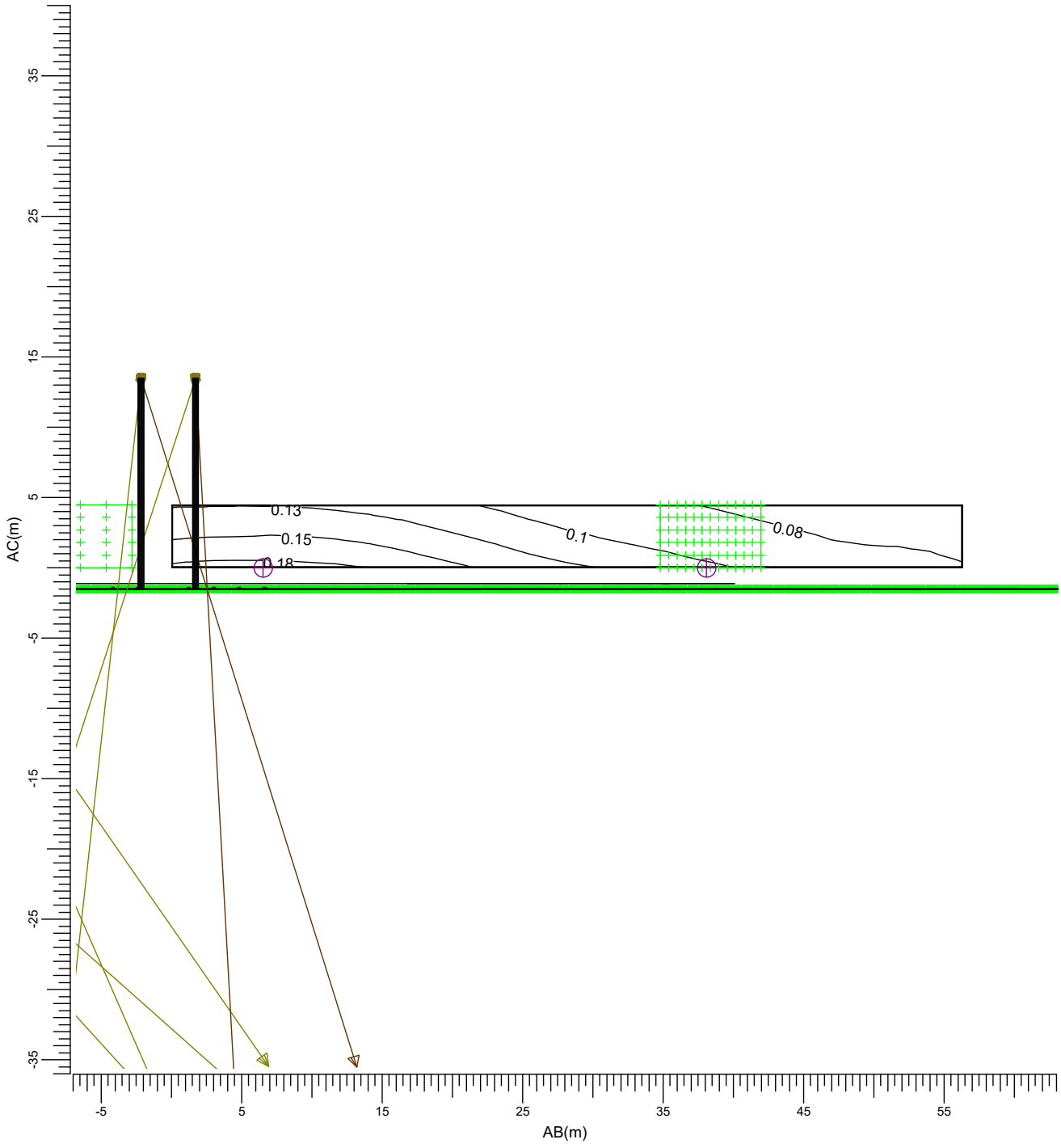
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	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)

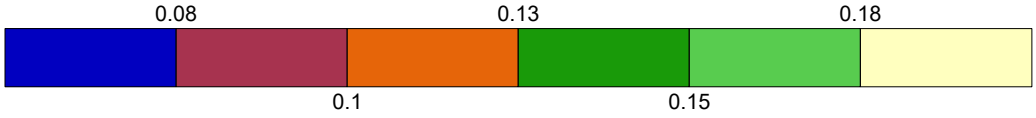
G	BVP525 OUT T15 100K A-VWB/	N	BVP651 T25 DW10 BL1
Z	BVP515 OUT T15 100K A-WB/3	b	BVP515 OUT T15 100K A-NB/30

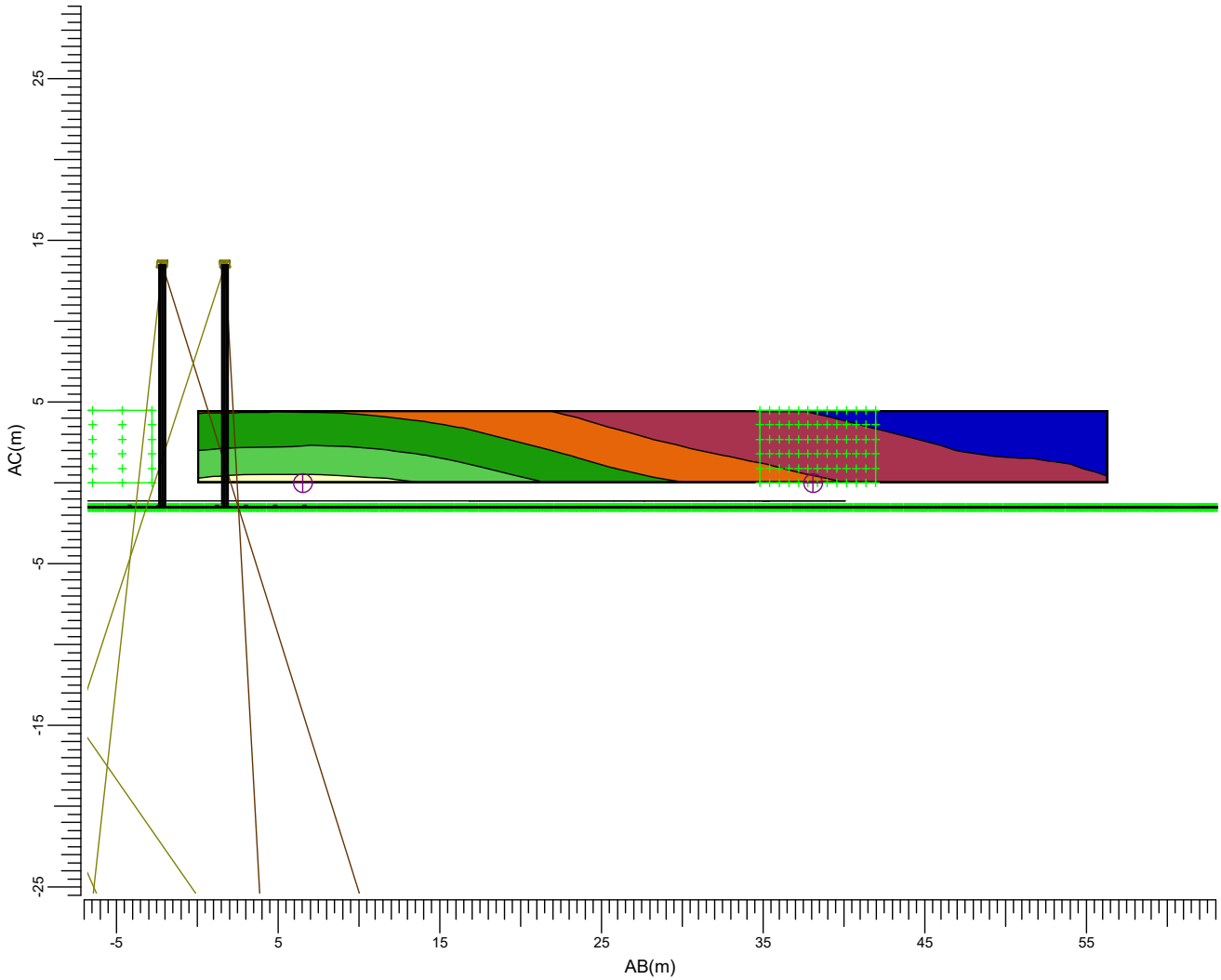
Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	0.06	0.19	0.55	0.33	0.311	0.90	1:400

3.13 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)

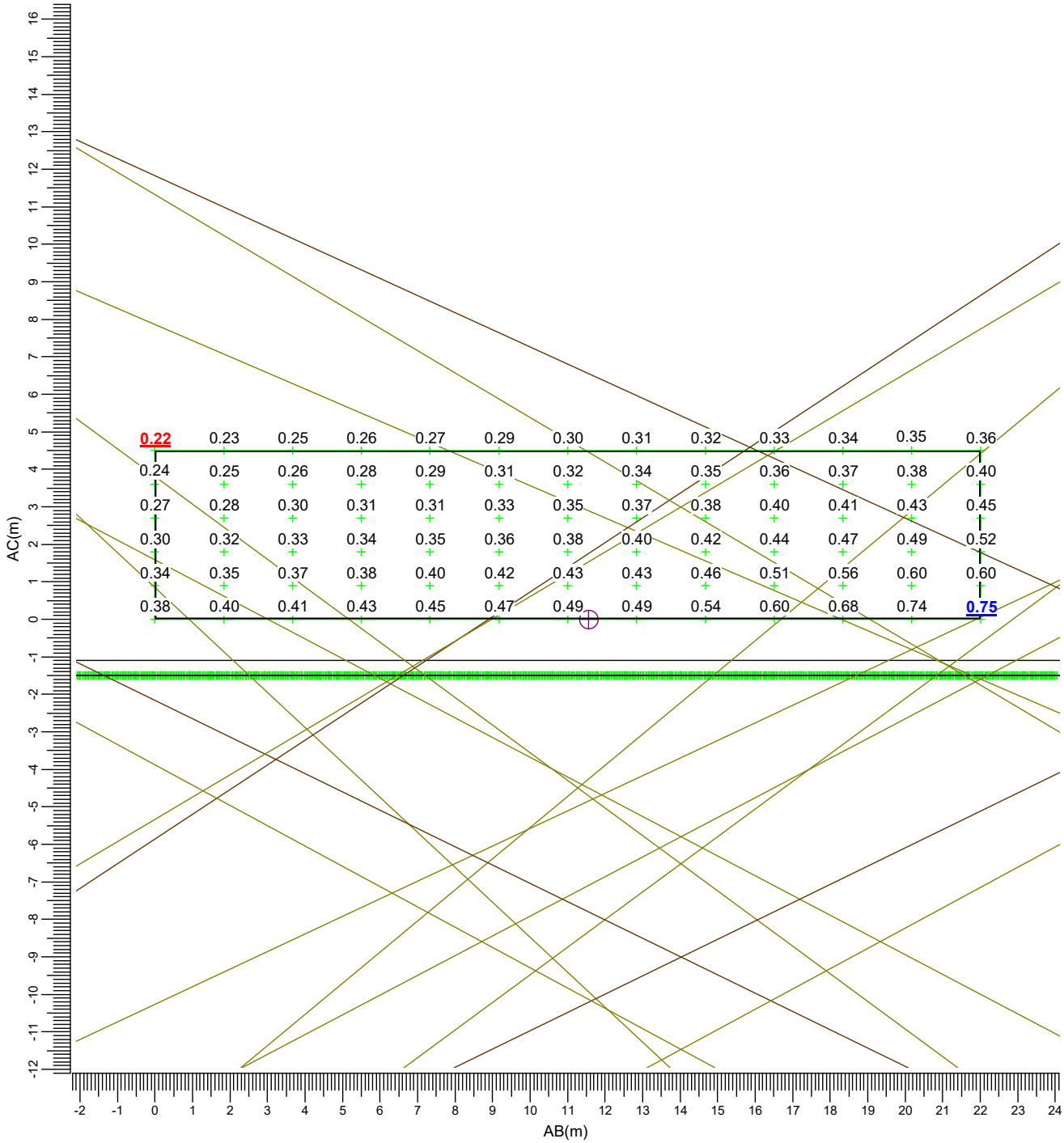
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.11	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)

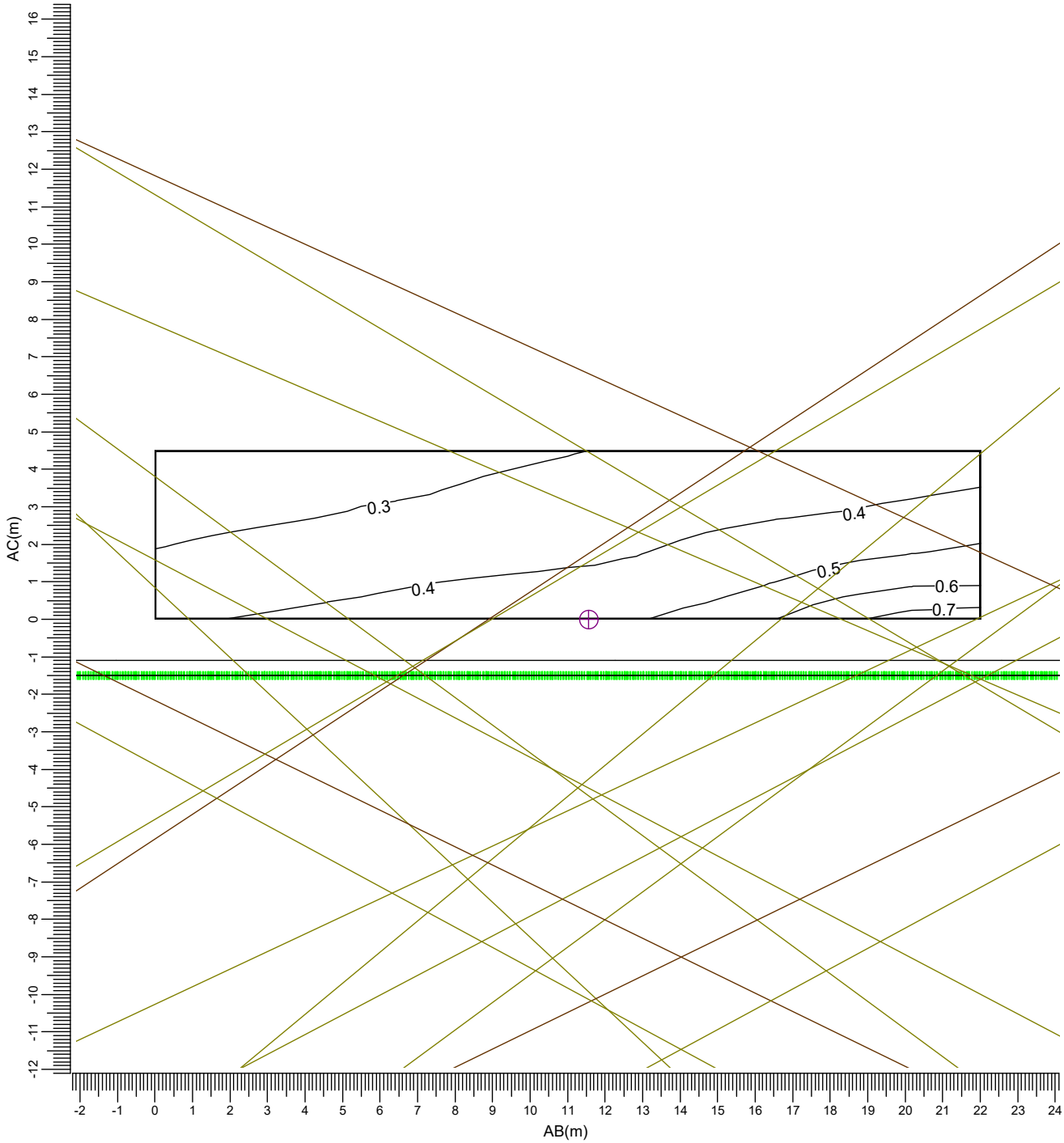
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

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

3.15 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)

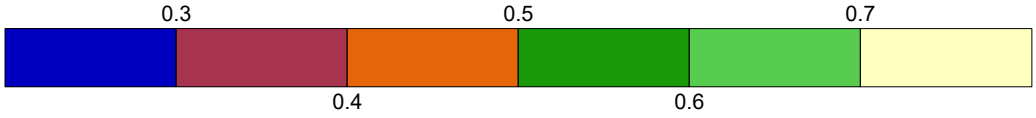
G BVP525 OUT T15 100K A-VWB/ N BVP651 T25 DW10 BL1
Z BVP515 OUT T15 100K A-WB/3 b BVP515 OUT T15 100K A-NB/30

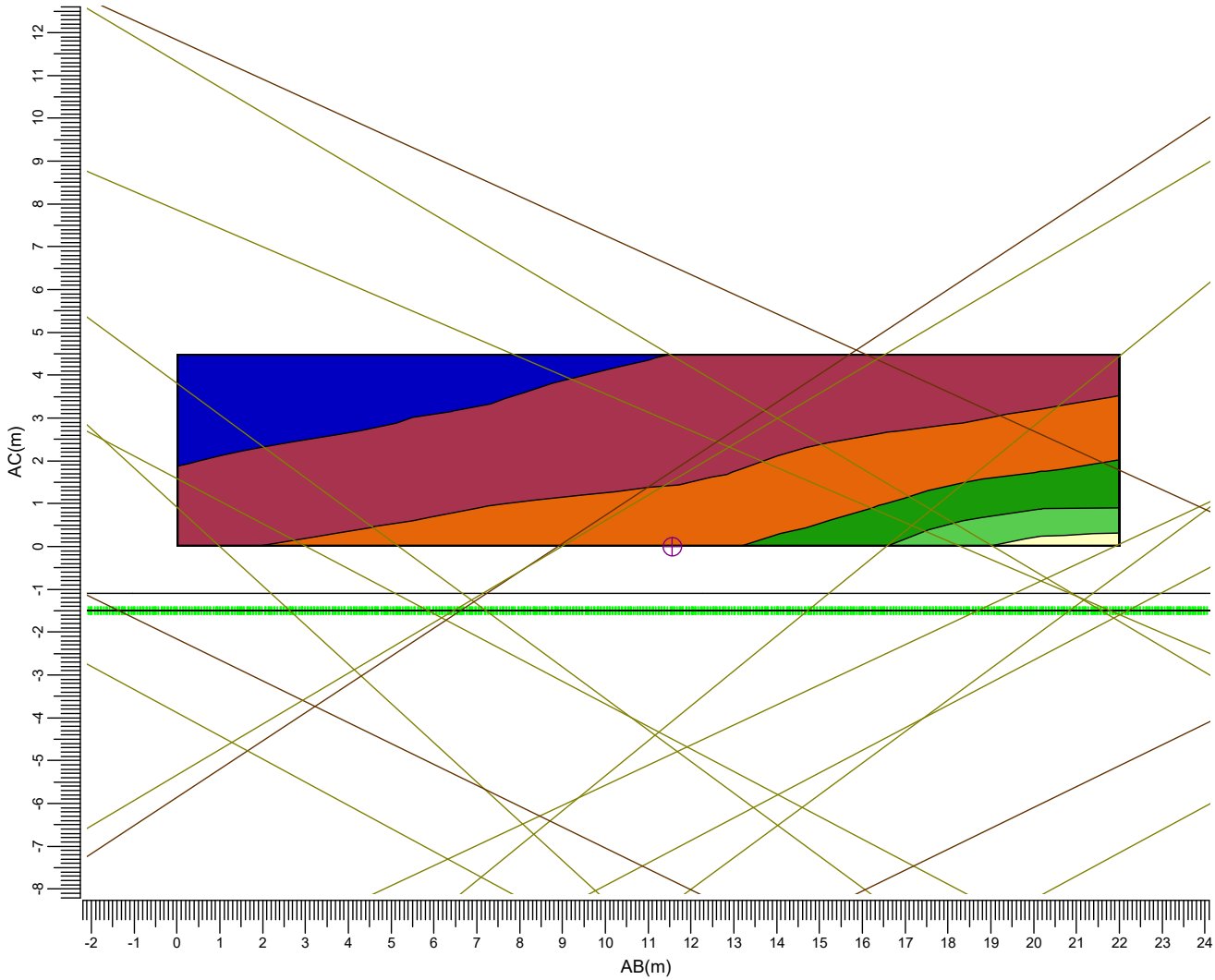
Average	Minimum	Maximum	Min/Ave	Min/Max	CV	Project maintenance factor	Scale
0.39	0.22	0.75	0.55	0.29	0.281	0.90	1:150

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

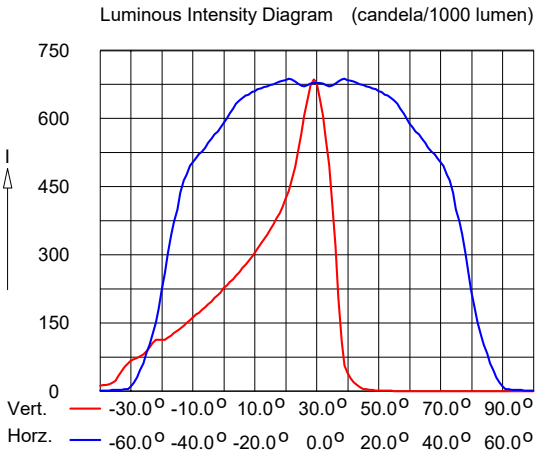
4.1 Project Luminaires

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.

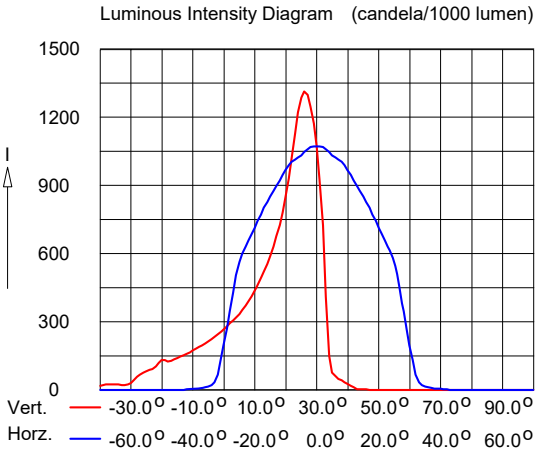


OptiVision LED
BVP515 OUT T15 100K 1xLED1290/740 A-NB/30 +LO

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:

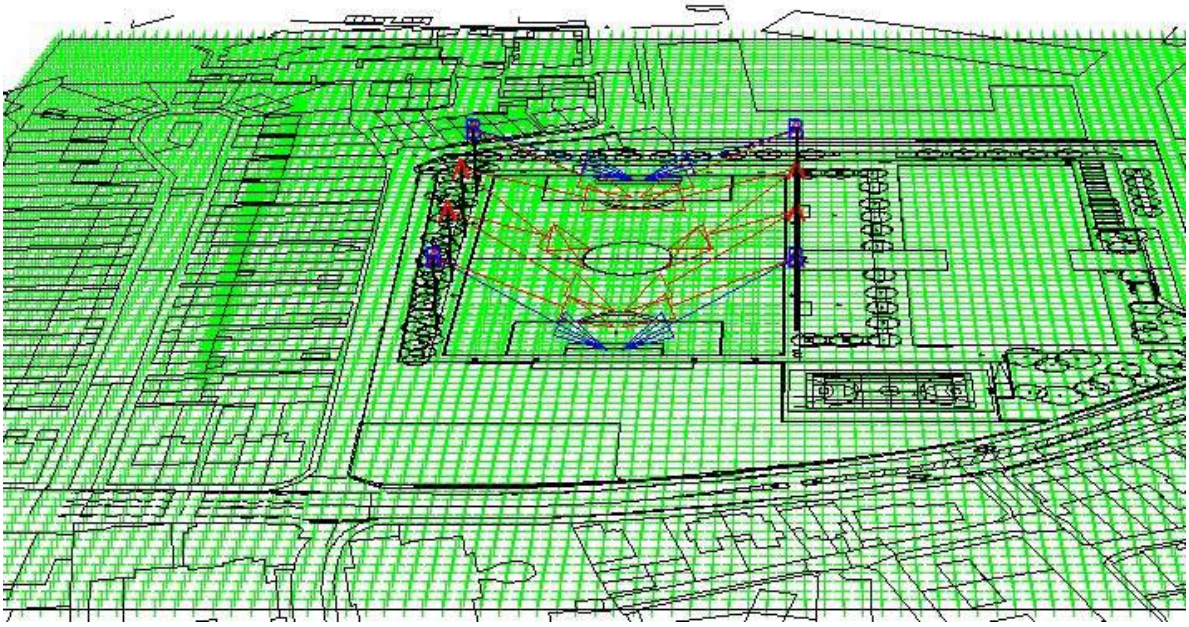
Qty and Code	Position			Aiming Angles			ULR	Arr.	Switching Modes	
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0			1	2
1 * Z	-34.50	-37.50	15.00	6.5	62.5	0.0	0.00	1	+	+

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.

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Table of Contents

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.

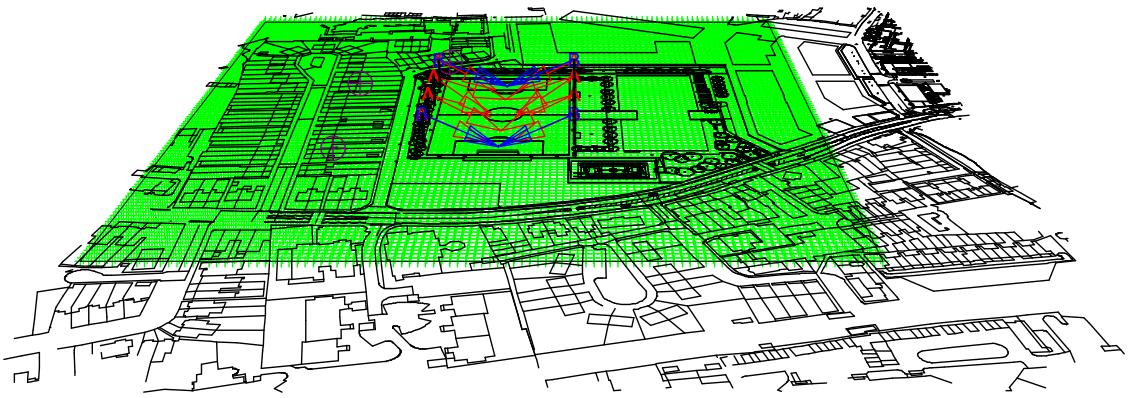
Spill Light Isocontours are shown outside Pitch Area based upon the Spill Light levels shown in Sport England Document and ILP Guidance Notes for Obtrusive Light 2011. These are 2,5,10 & 25 lux levels.
Spill lighting iso-contour results are shown with an MF of 1.0 which is worst case when newly installed. Observers at houses added @ 1.5m for Ltg Intensity

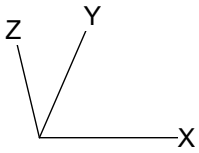
Pre Curfew Spill light through windows are E1 = 2 lux, E2 = 5 lux, E3 = 10 lux, calculation with internal louvre fitted is below 5 lux so conforms wit E2-E4 Zones

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.

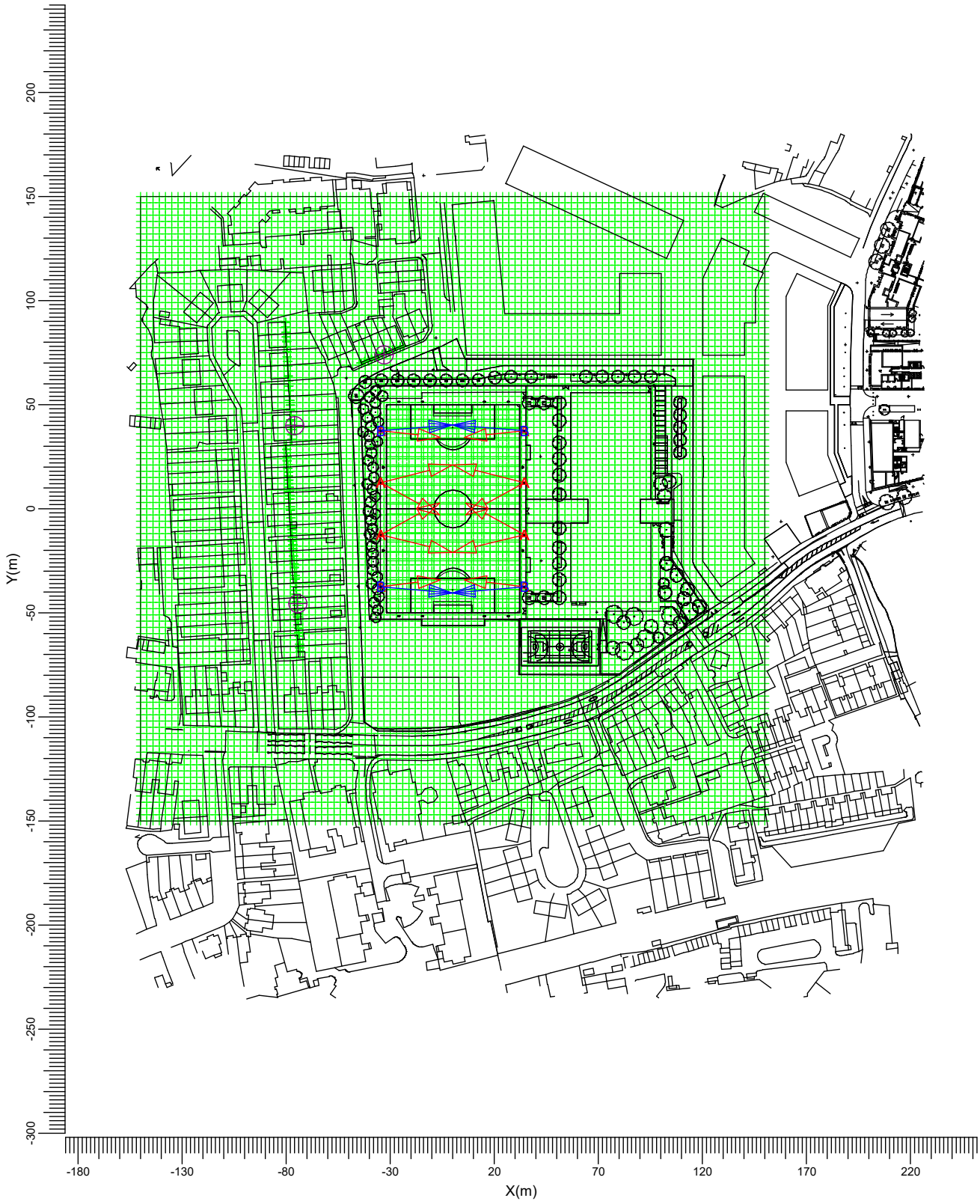
1.2 3-D Project Overview





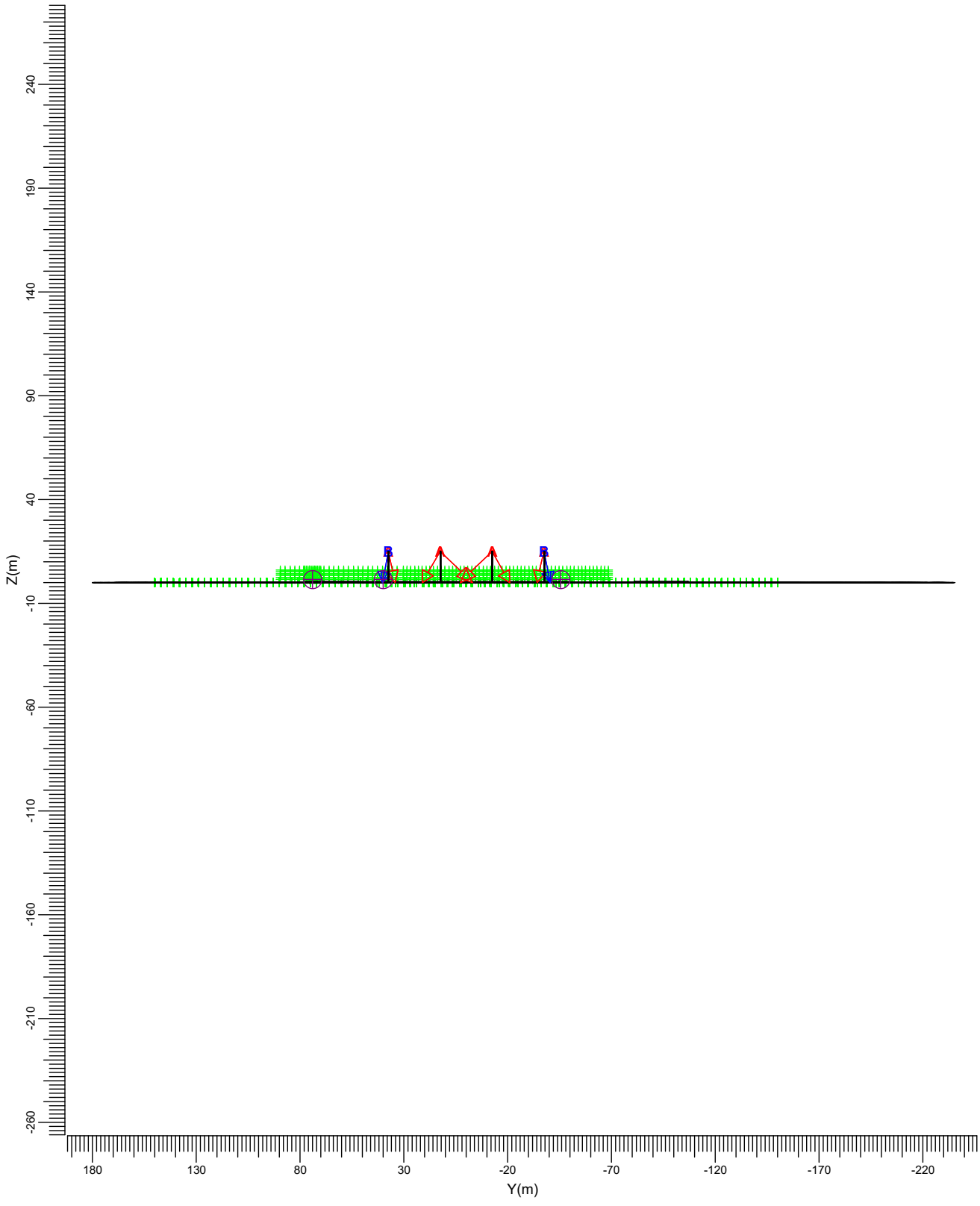
A	BVP525 OUT T15 100K A-WB/3	B	BVP525 OUT T15 100K A-NB/30
H	BVP525 OUT T15 100K A-VWB/	O	BVP651 T25 DW10 BL1

1.3 Top Project Overview



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)
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

(Il)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

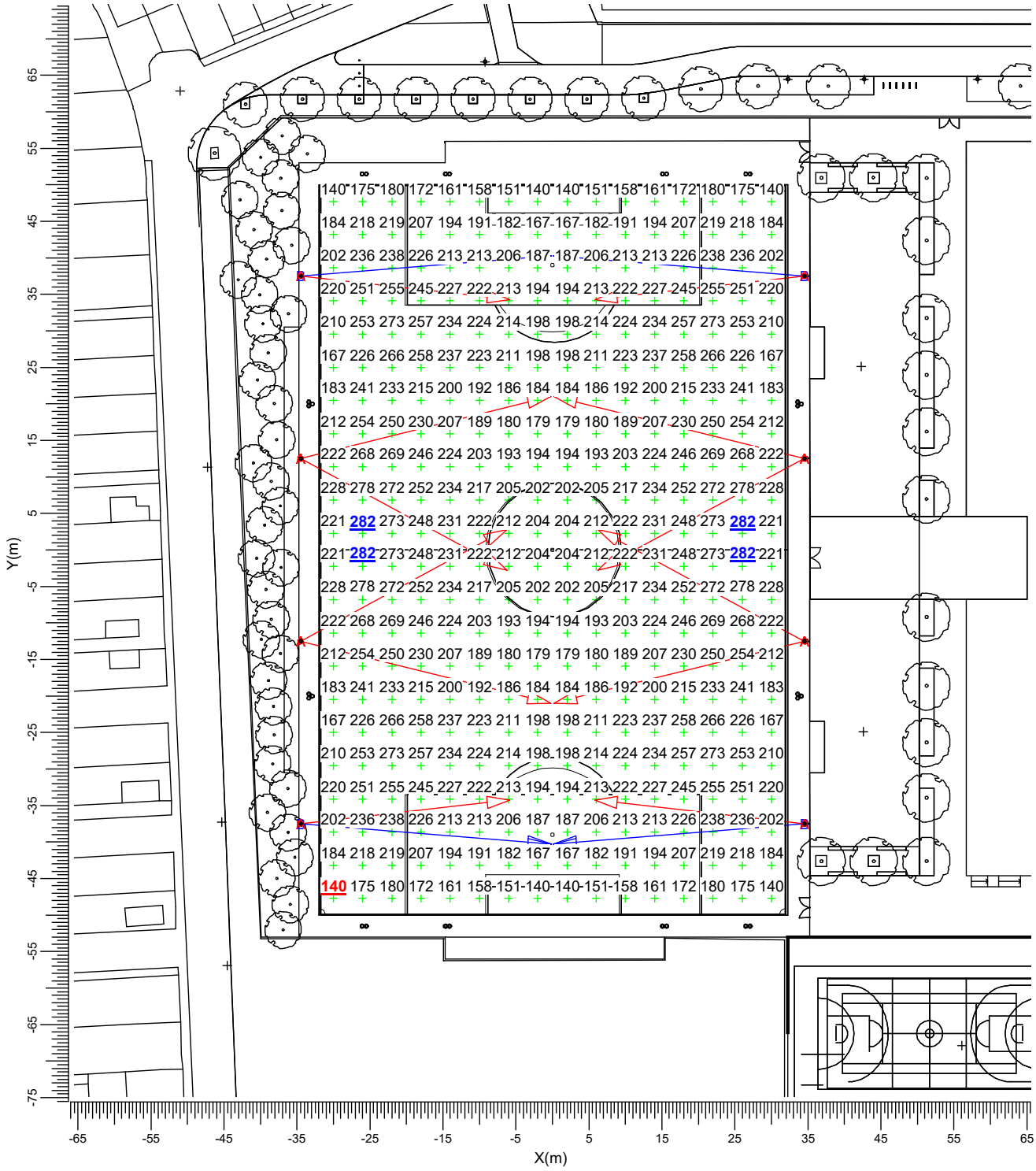
Switching Mode	ULR
1	0.00
2	0.00

3. Calculation Results

3.1 Football: Graphical Table

Performance

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



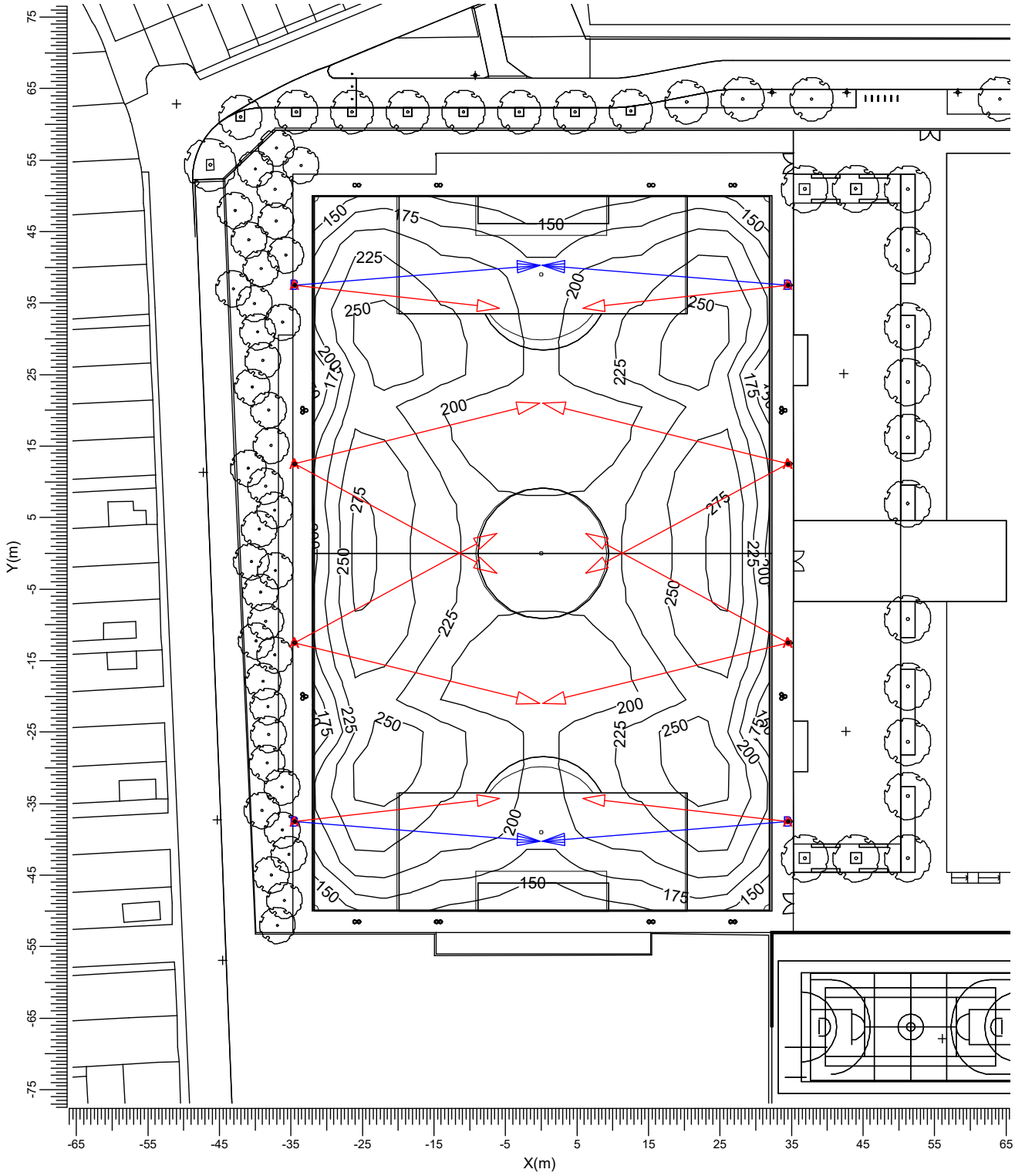
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)



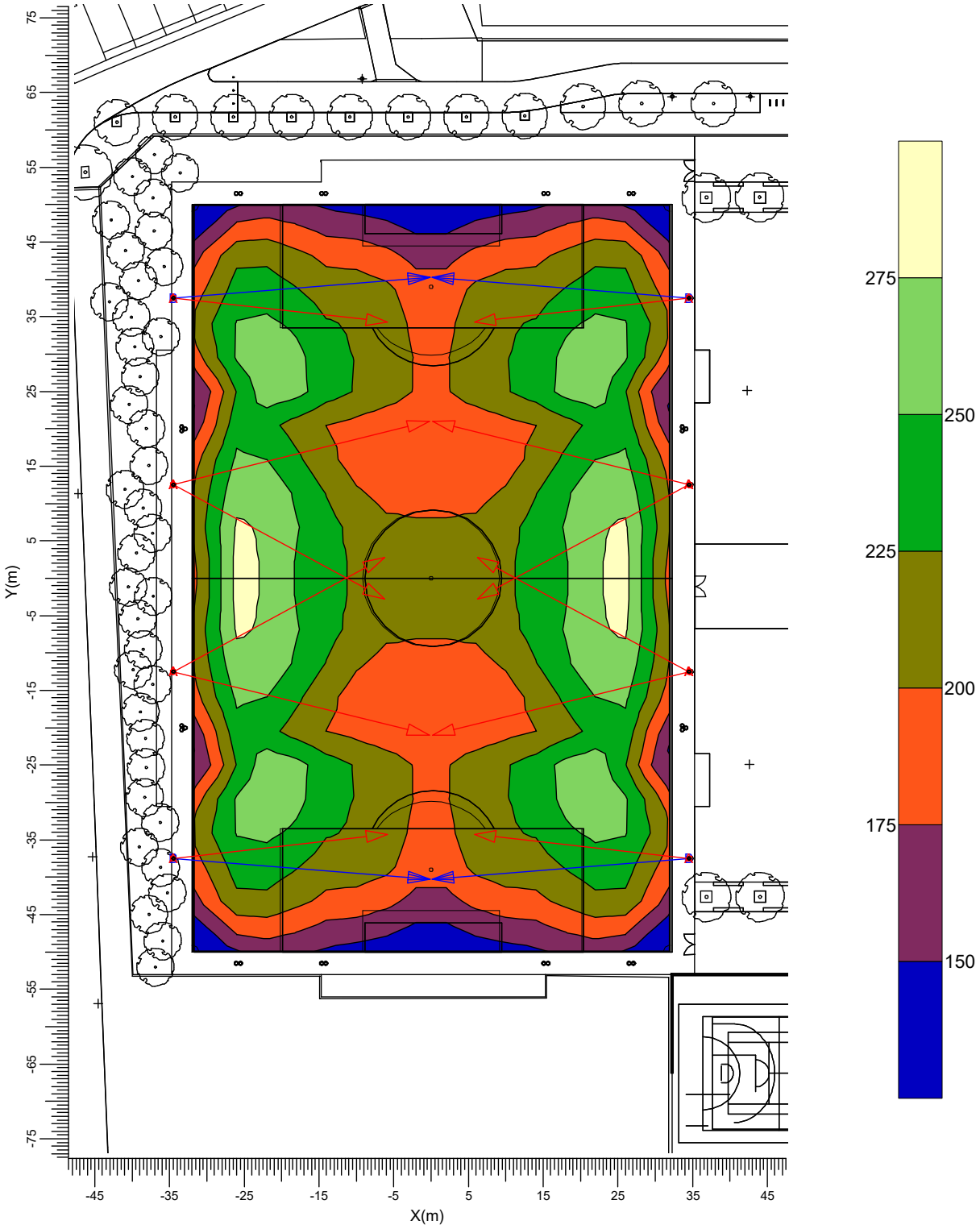
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)



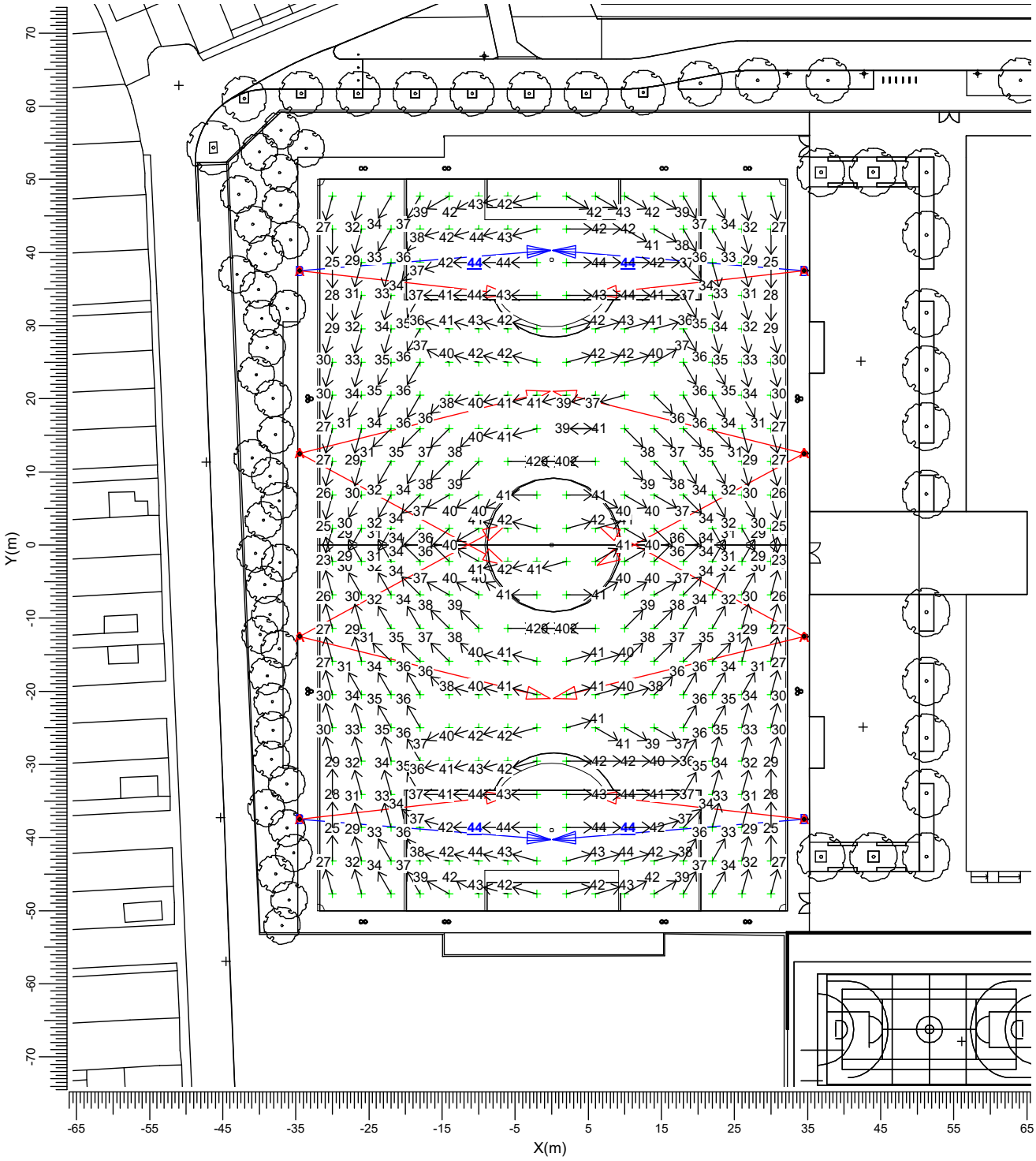
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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



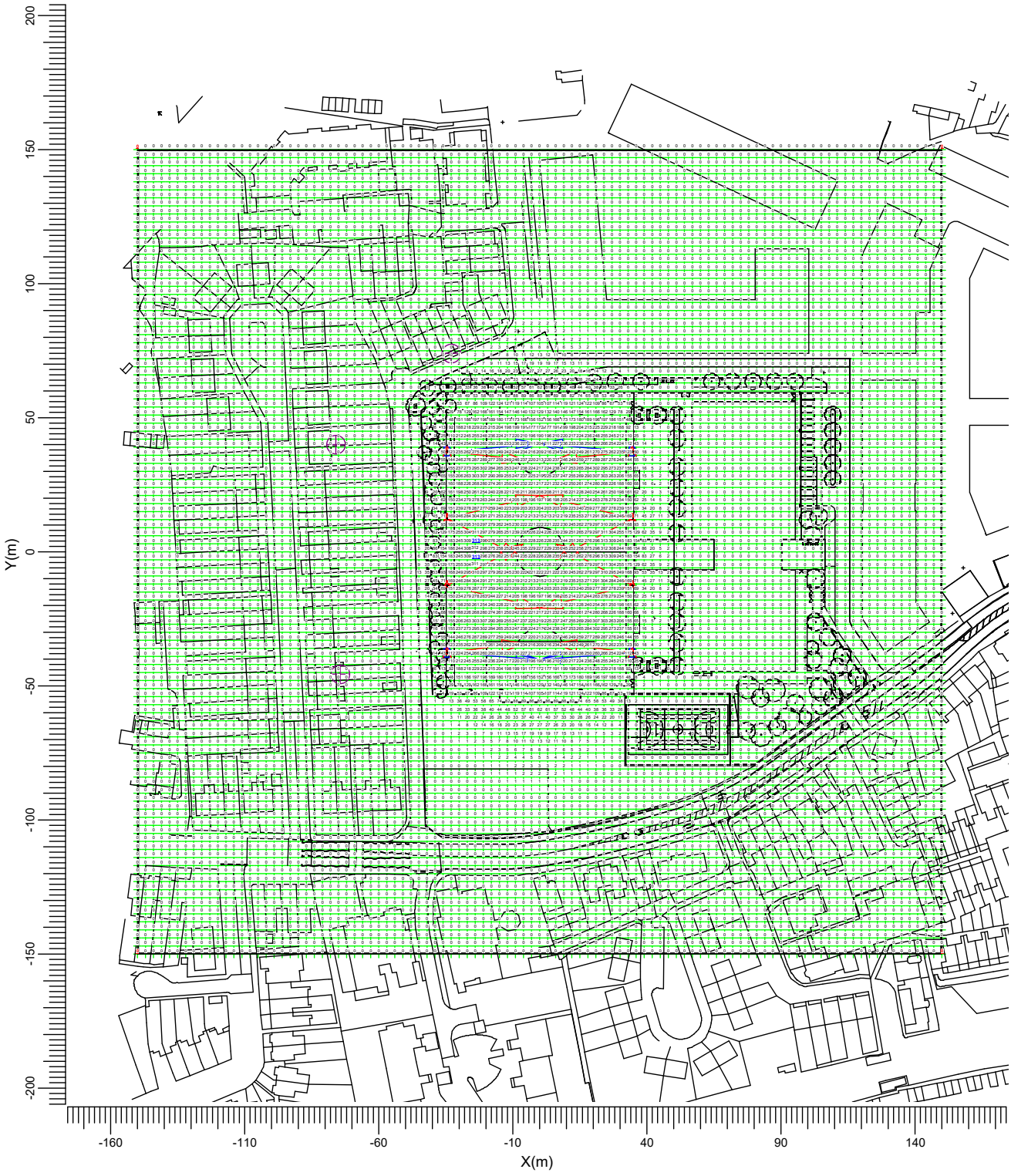
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Maximum	Project maintenance factor	Scale
44.3	0.90	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

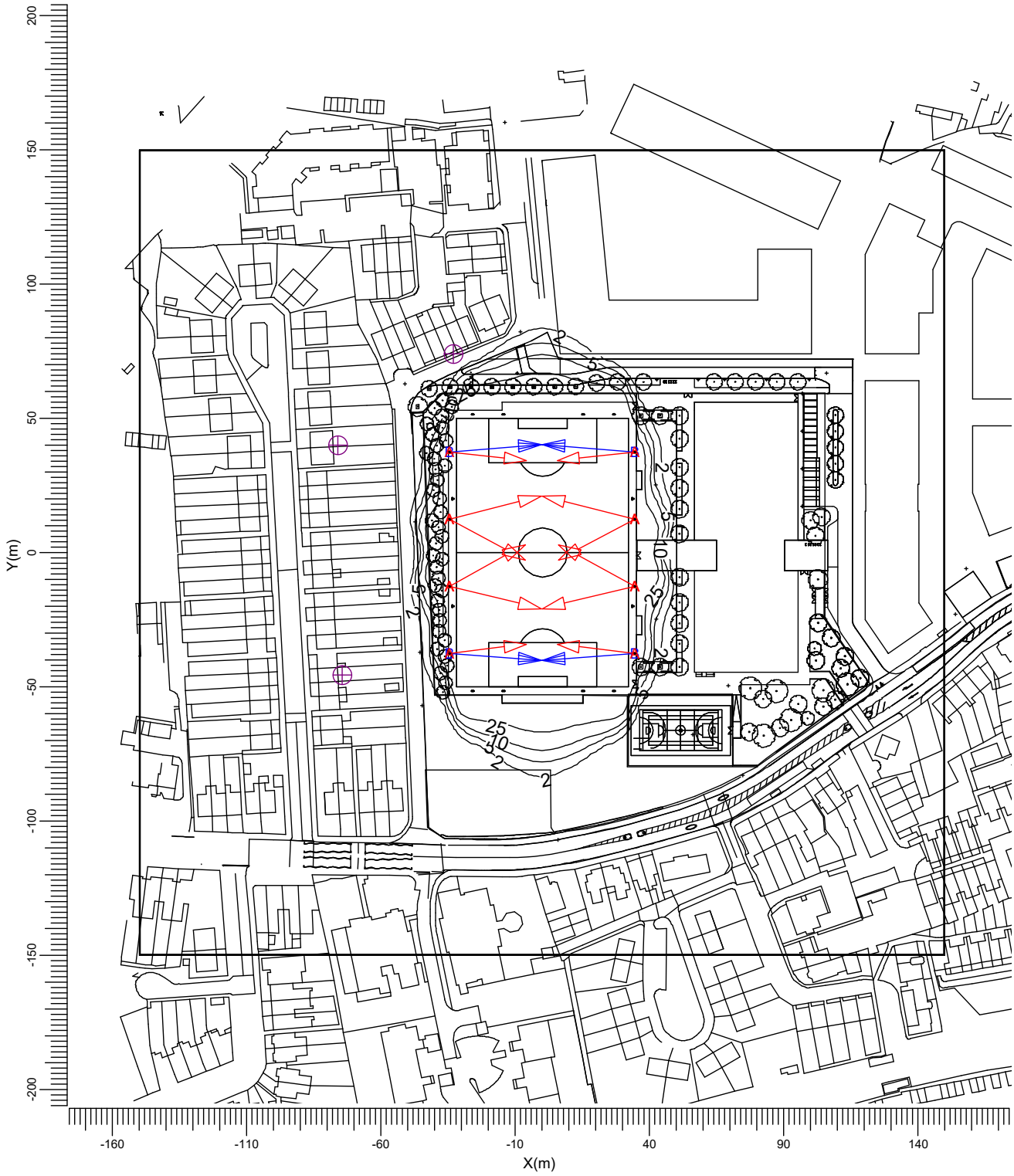
Project maintenance factor
1.00

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

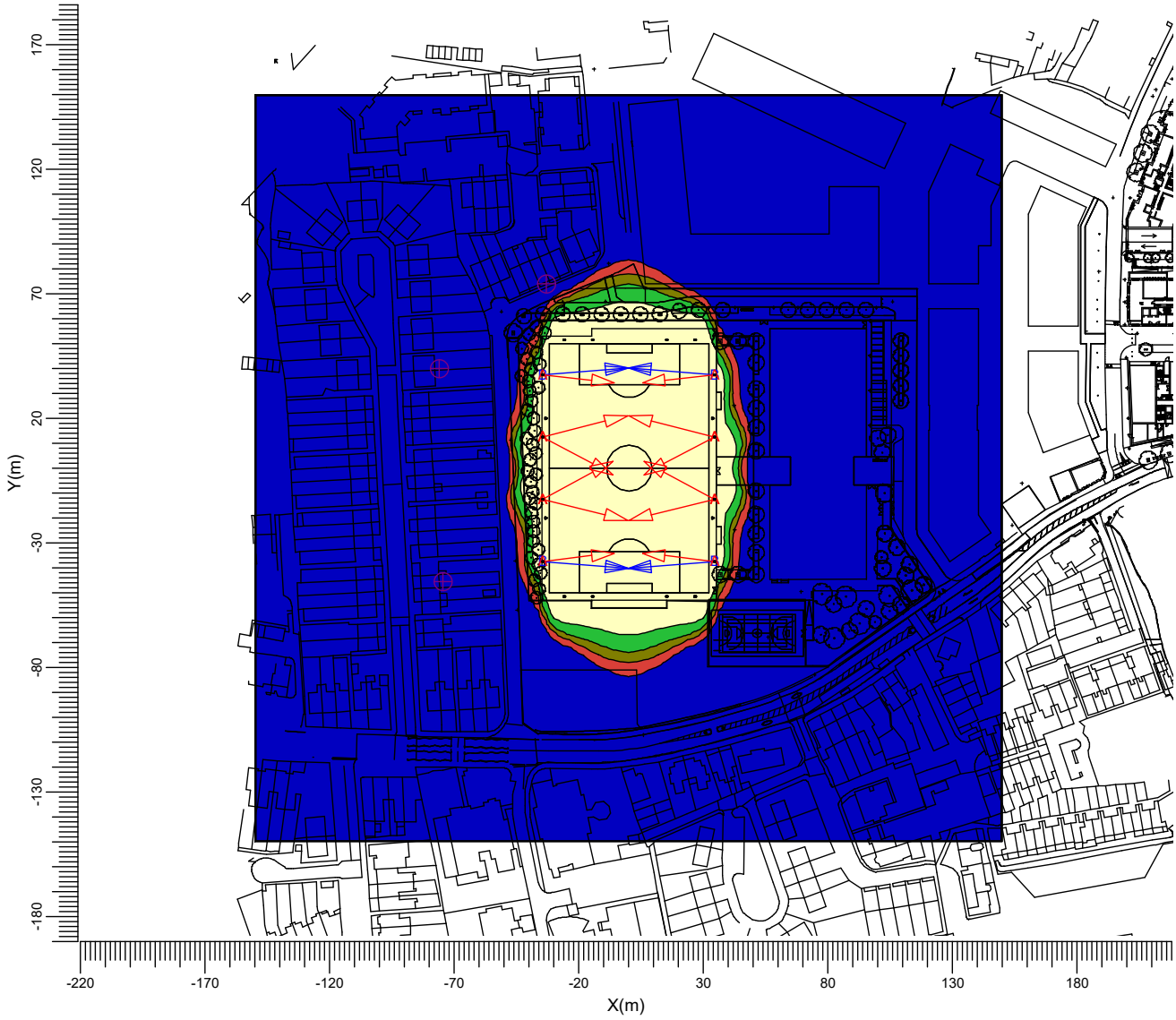
Project maintenance factor
1.00

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

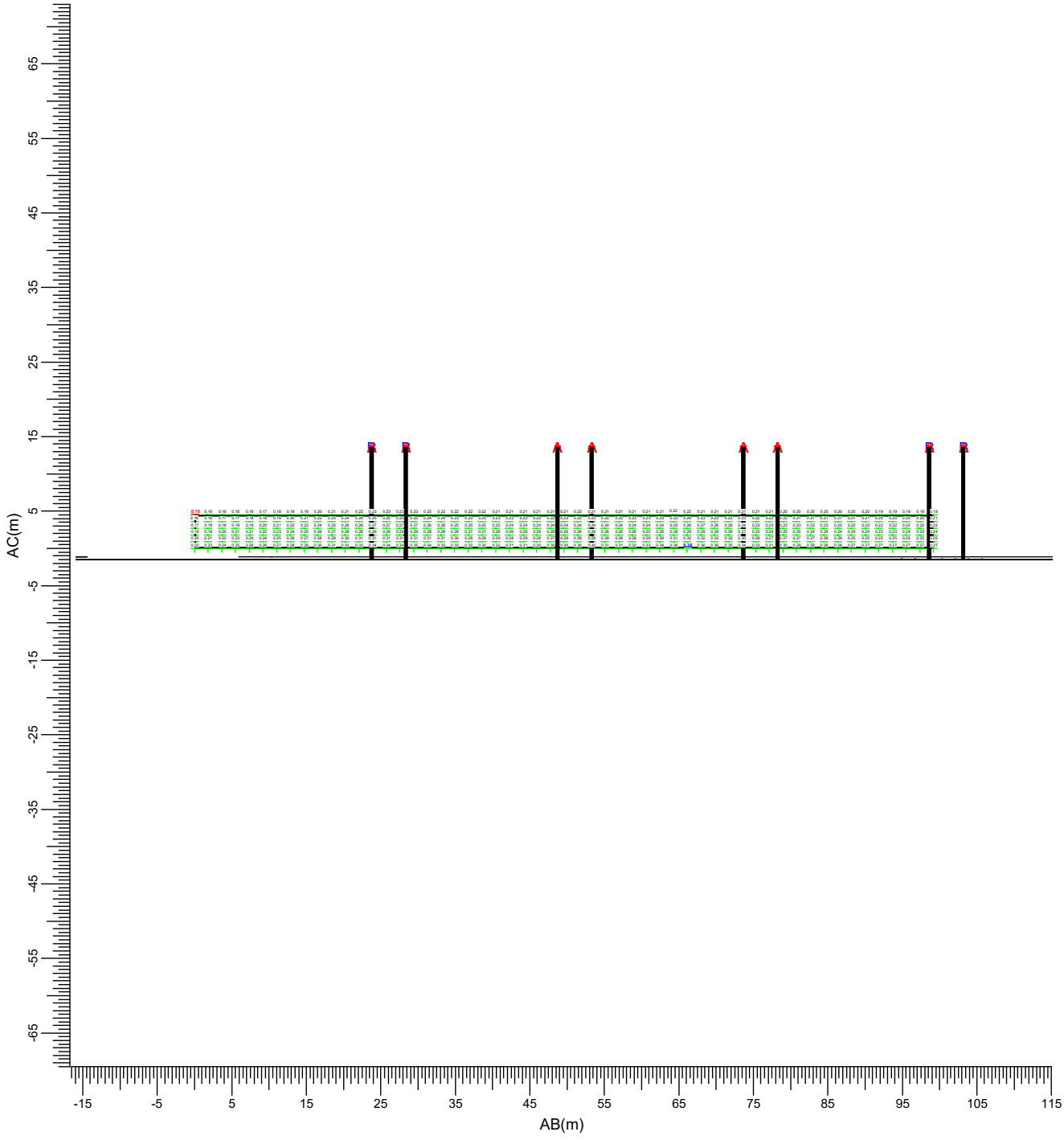
Project maintenance factor
1.00

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)

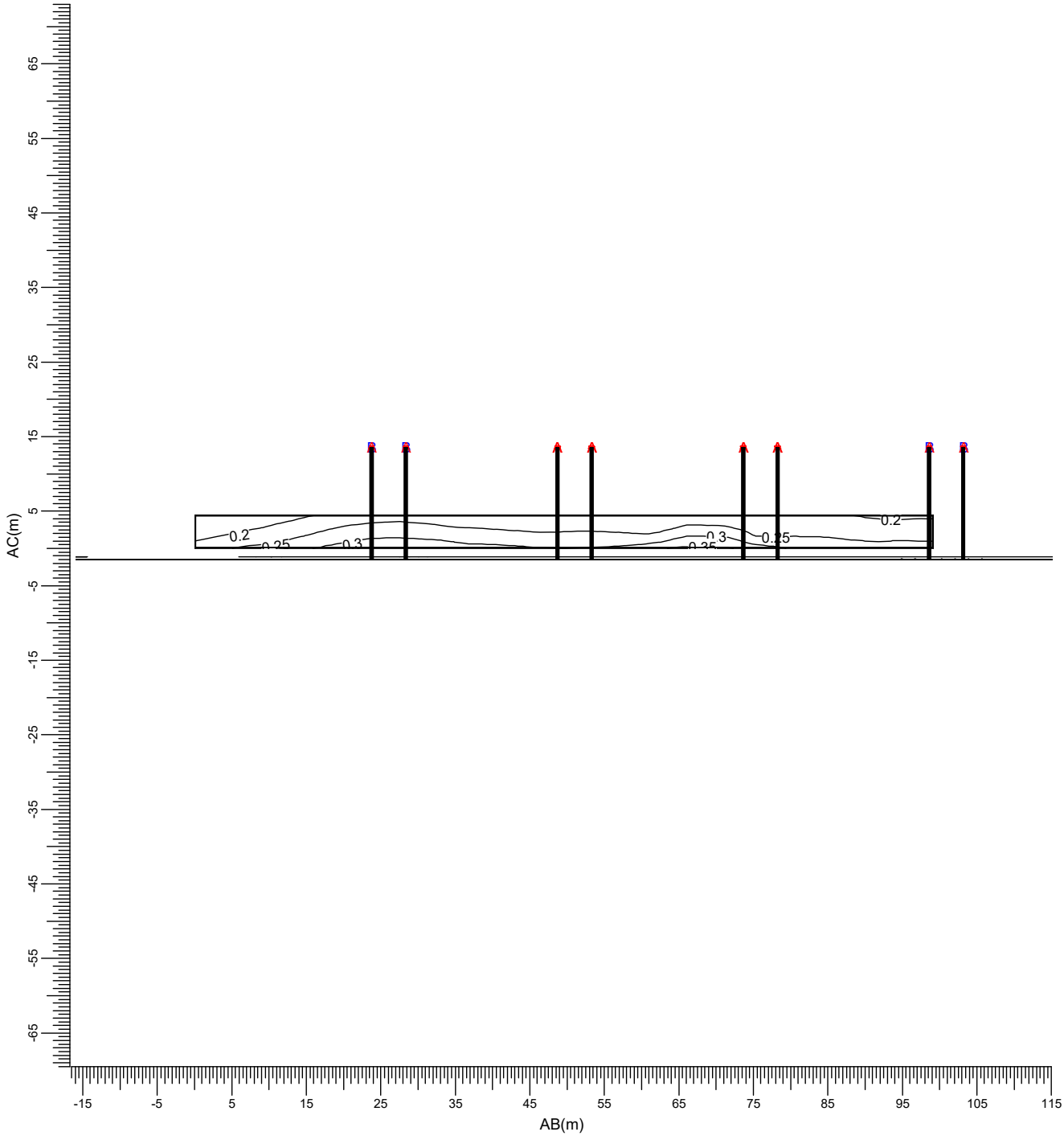
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

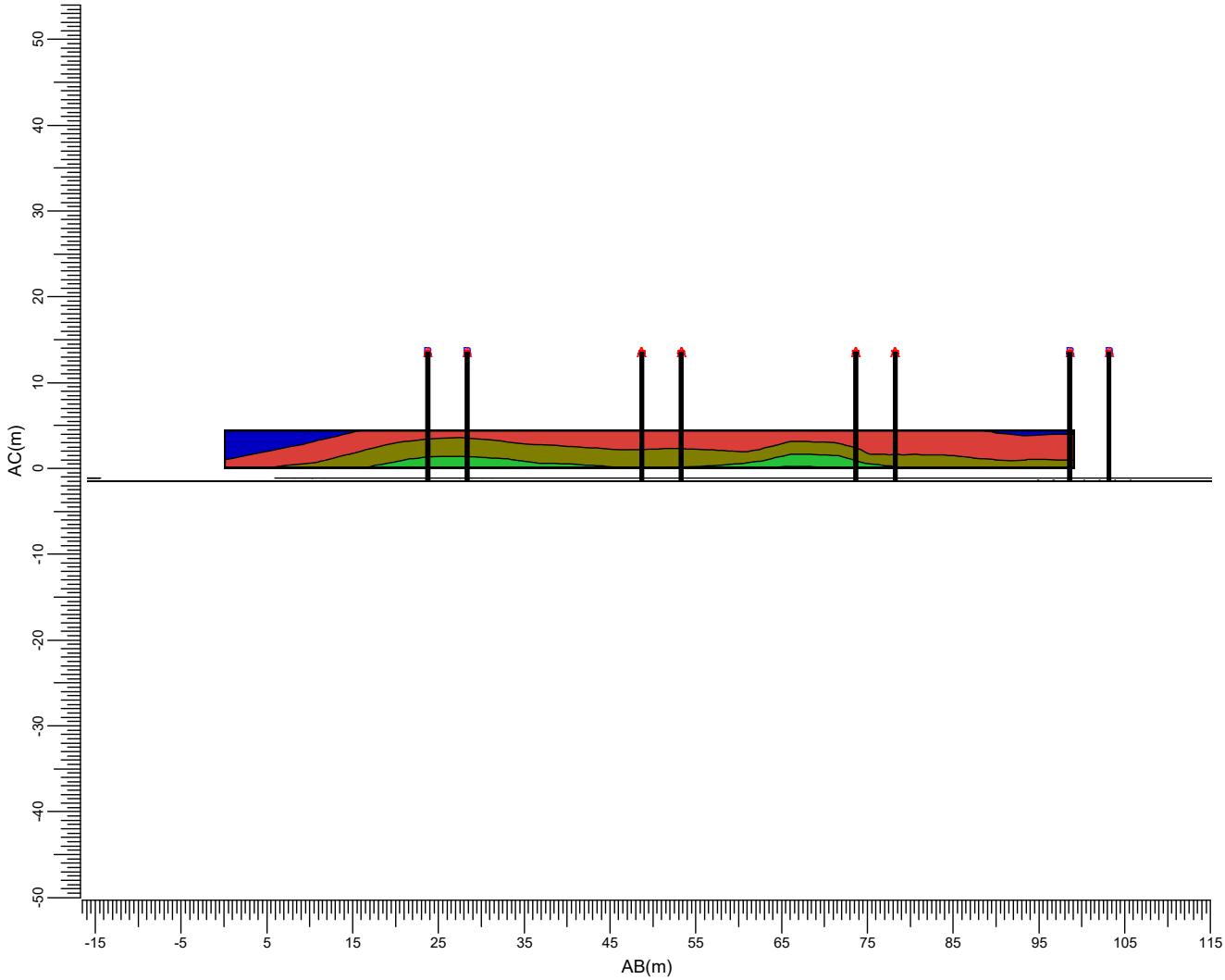
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

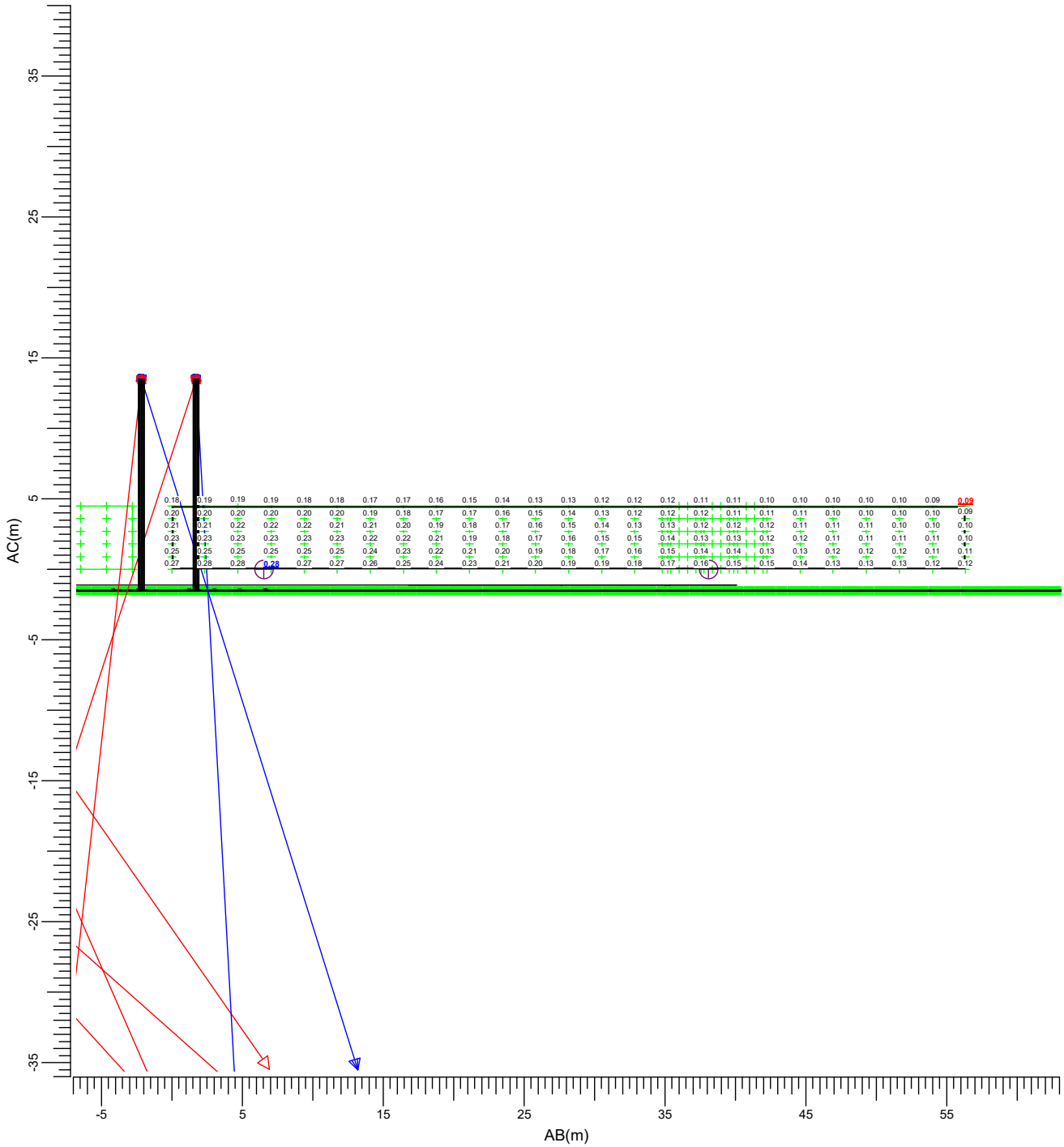
A : BVP525 OUT T15 100K A-WB/30 +LO
B : BVP525 OUT T15 100K A-NB/30 +LO
H : BVP525 OUT T15 100K A-VWB/30
O : BVP651 T25 DW10 BL1

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)

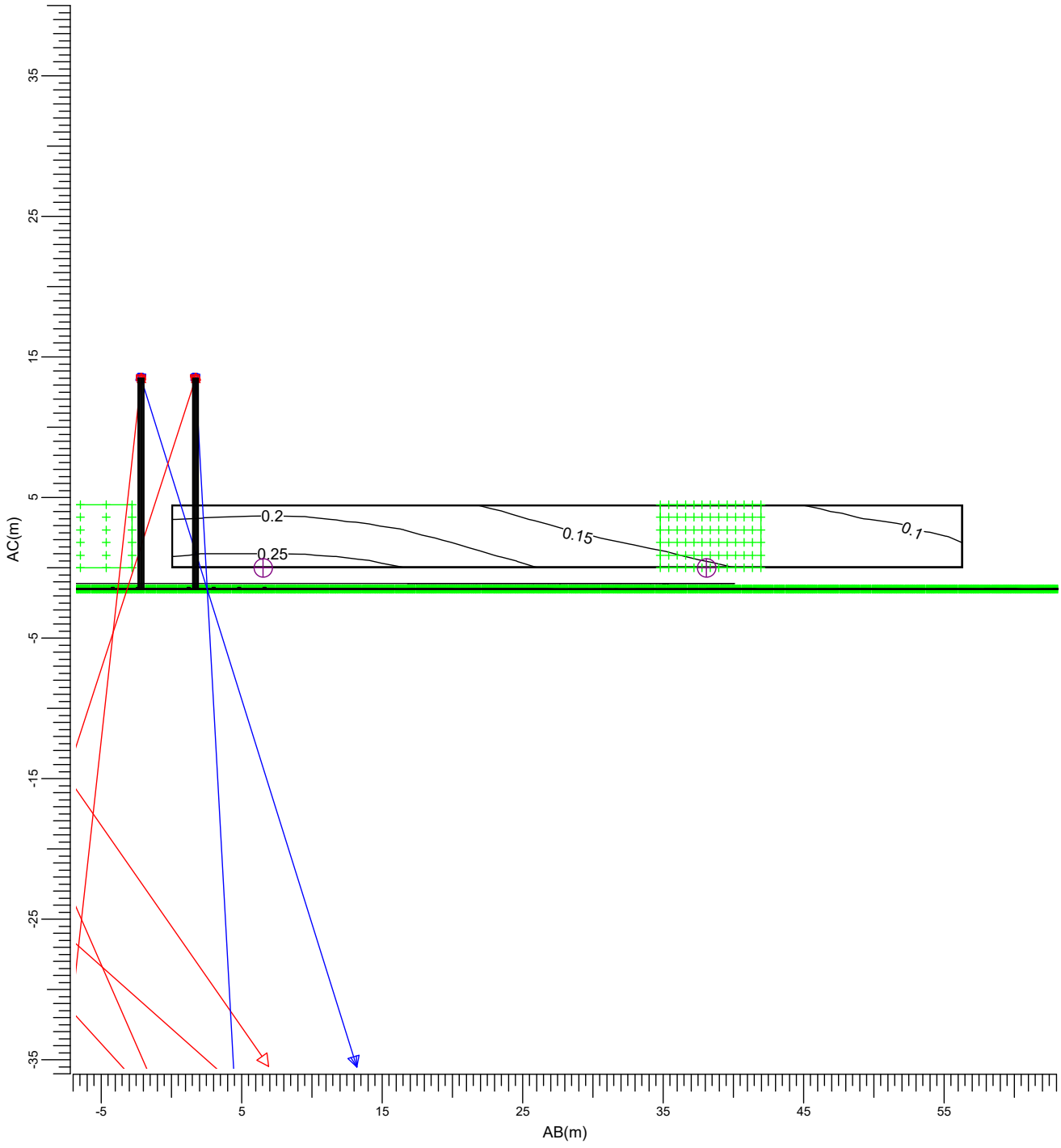
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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

3.12 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)

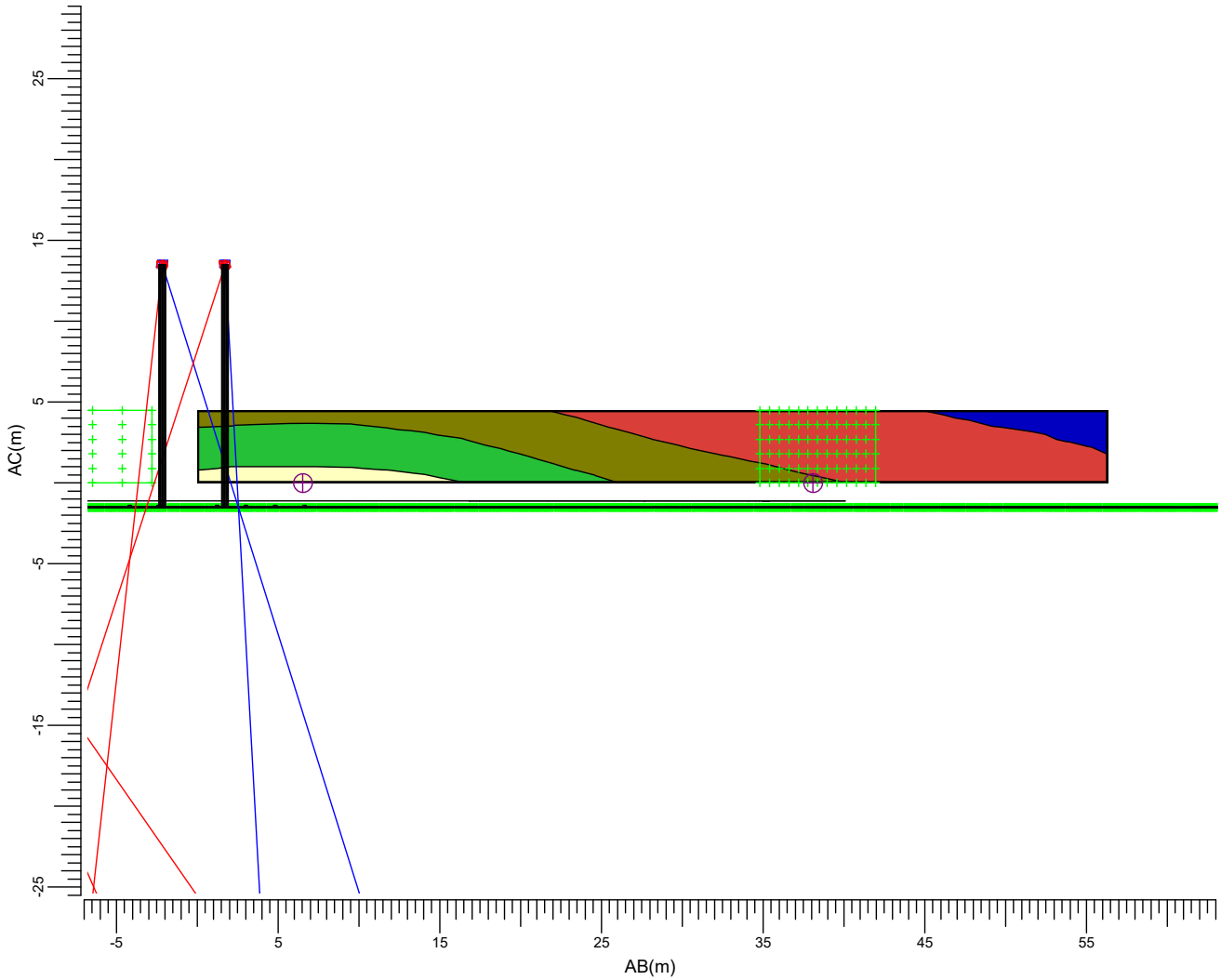
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)

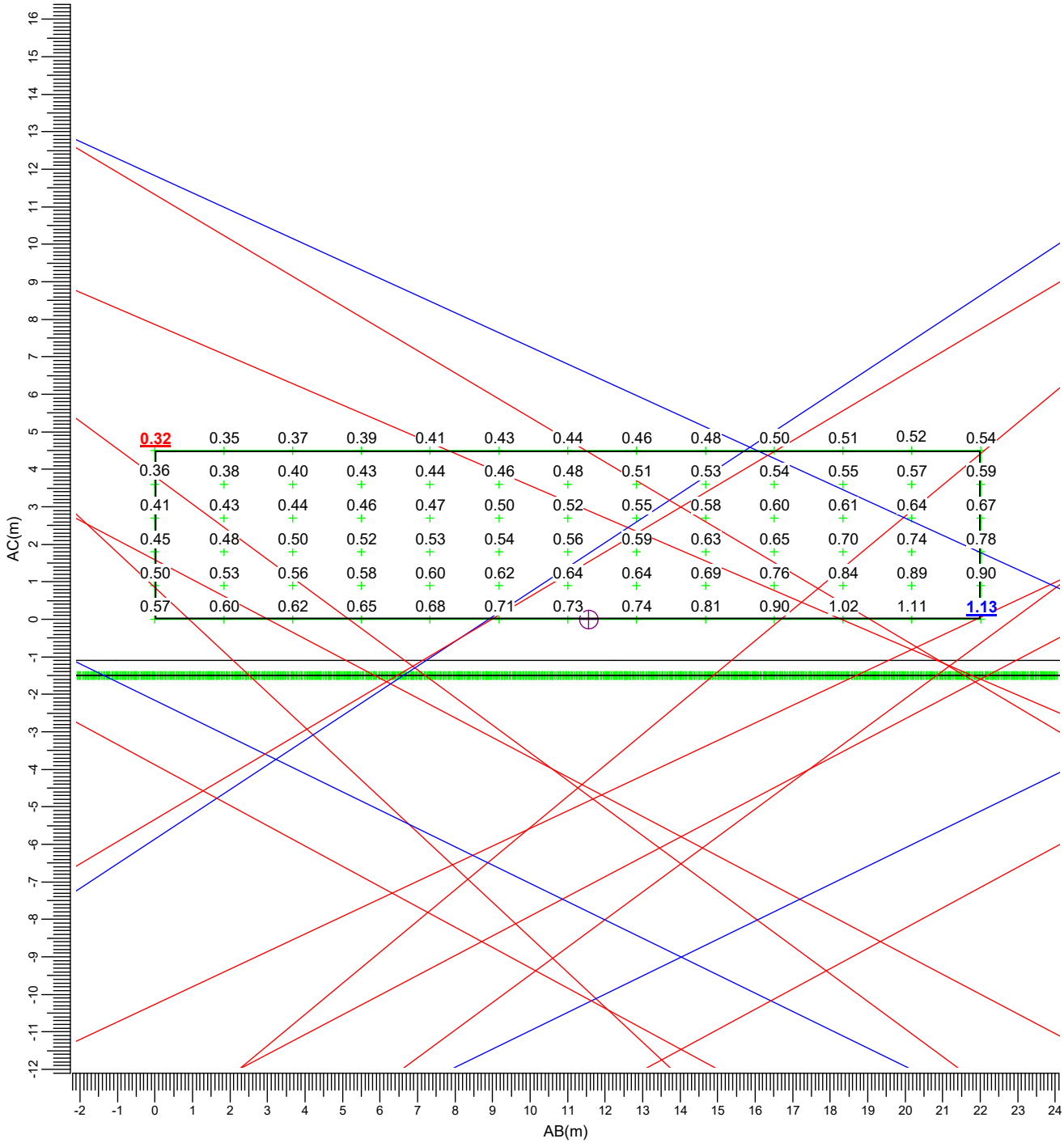
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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)

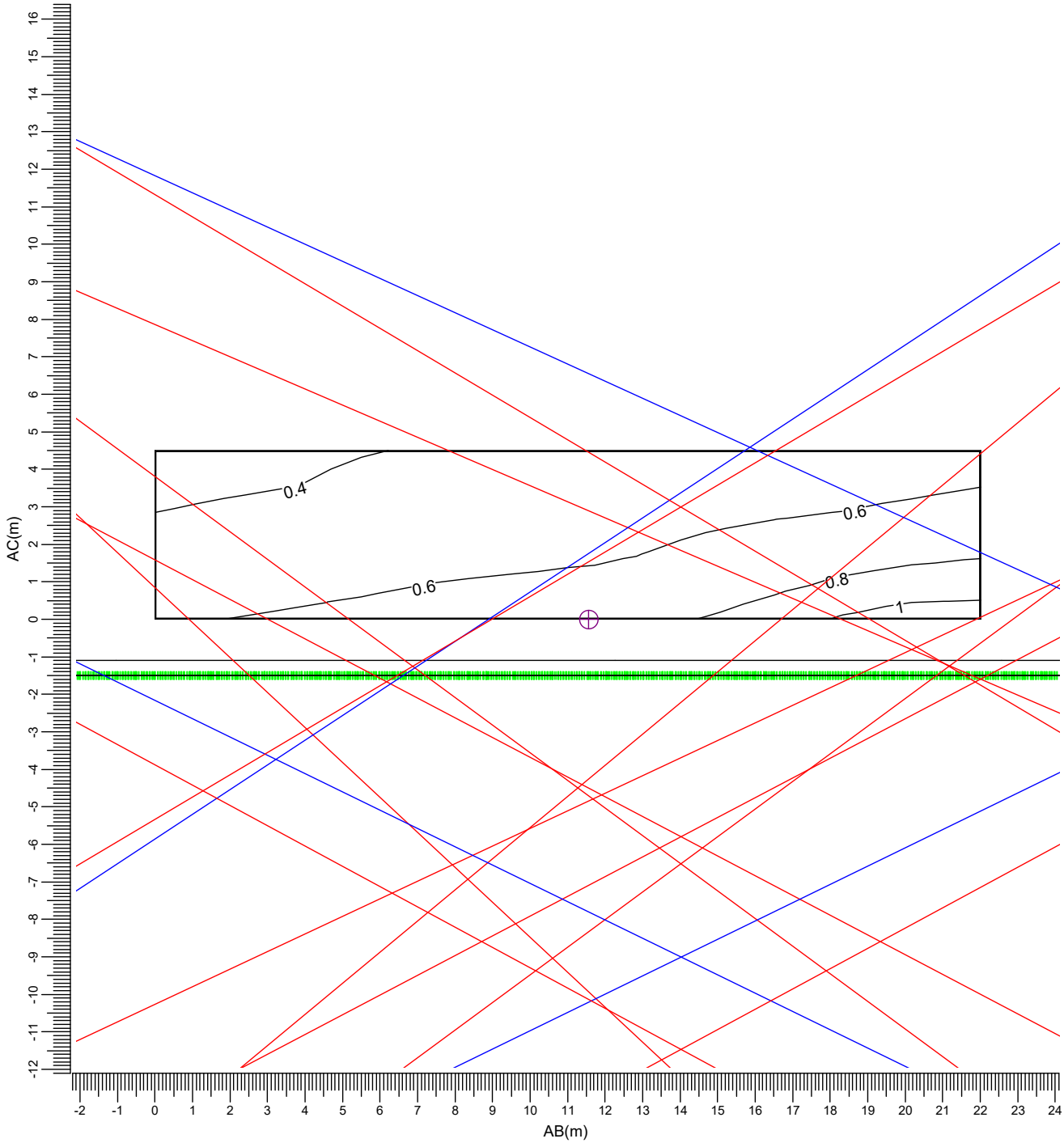
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

Average	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

3.15 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)

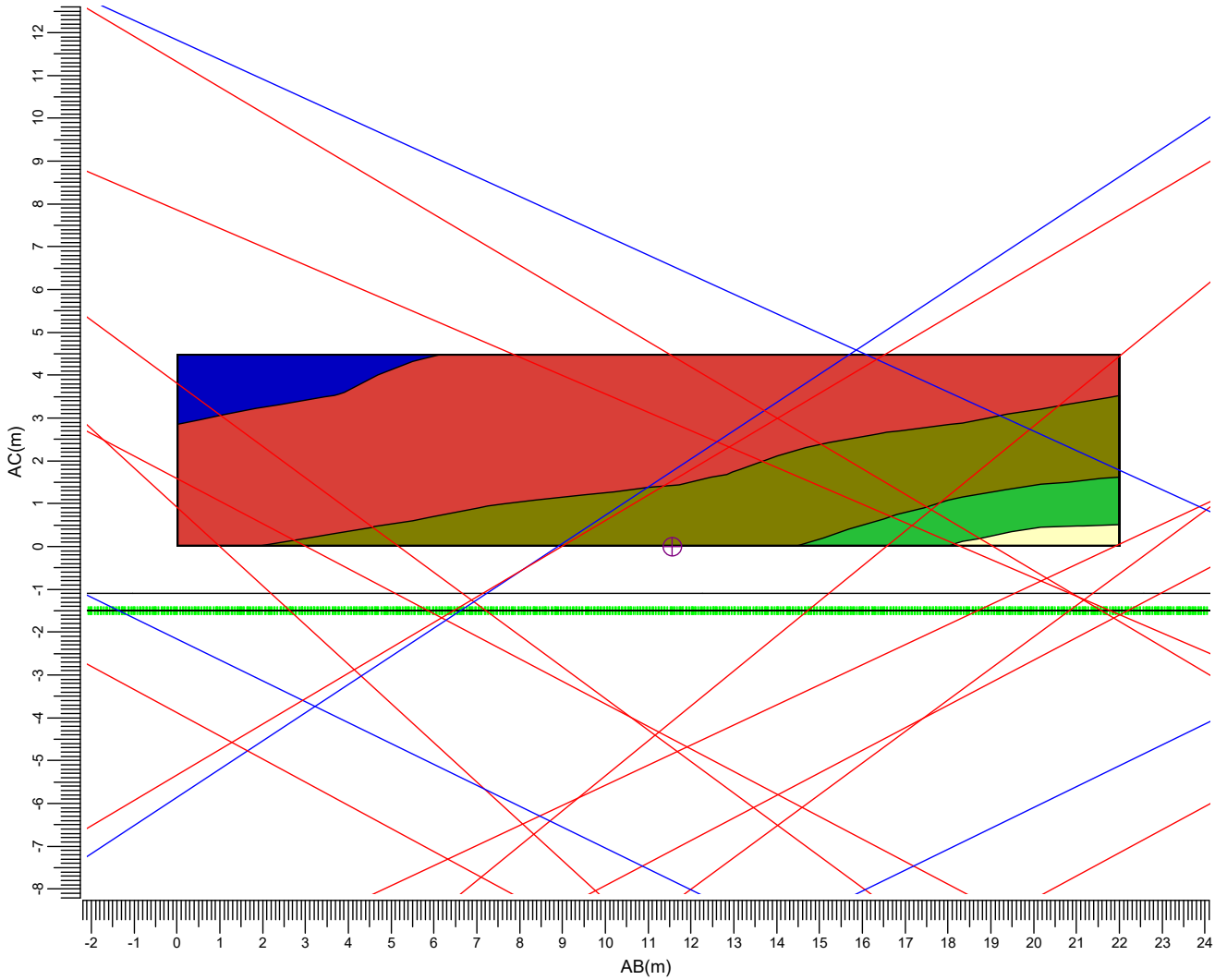
A BVP525 OUT T15 100K A-WB/3 B BVP525 OUT T15 100K A-NB/30
H BVP525 OUT T15 100K A-VWB/ O BVP651 T25 DW10 BL1

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

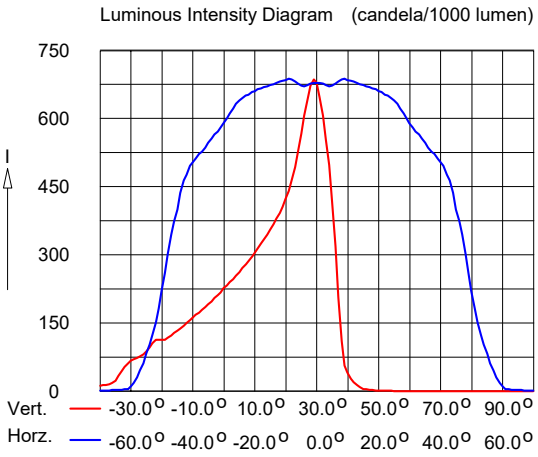
4.1 Project Luminaires

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.

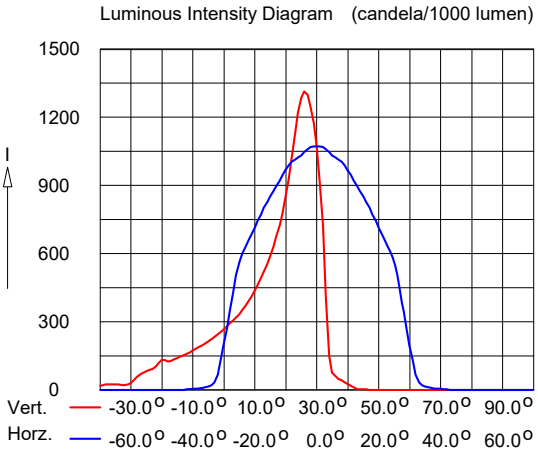


OptiVision LED
BVP525 OUT T15 100K 1xLED1940/740 A-NB/30 +LO

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	+	+

Appendix B

Appendix 10

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Stag Brewery – Sport England Response

Noise Summary Note - Additional Information

Date: 3 October 2019

Client Name: Reselton Properties Ltd

Document Reference: WIE10667-106-BN-1.5.1-SE_Acoustics

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015 and BS OHSAS 18001:2007)

Issue	Prepared by	Checked & Approved by
	Ellen Smith	Innes Urbanski
001	Senior Consultant	Associate Director

1. Introduction

The Briefing Note is in response to Sport England queries on noise impacts from the new sports facilities on both the existing surrounding residents and the new residents to the north of the proposed sports pitch.

2. Likely Effects

The predicted noise impact from usage of the Multi-Use Games Area (MUGA) and 3G Football Pitch reported in the 2018 ES ranged from insignificant to intermittent moderate adverse.

For those receptors introduced as part of the Development which have no prior knowledge of the existing noise climate assessment against the absolute criteria of 50dB L_{Aeq} as recommended by Sport England has been undertaken for assessment of effects in the 2018 ES. The assessment results are presented as **Table 9.14** of the 2018 ES and provided below (amended to provide distances of the sensitive receptors – to the 3G Football Pitch and MUGA, as illustrated on plan *16019_16019-SQP-ZZ-SK-033* in **Appendix A**).

Table 9.14: Assessment of Noise Effects Associated with Sports Facilities

SR (Figure 9.1)	Distance of Receptor to 3G Football Pitch & MUGA	Existing Ambient Noise Level (dB(A))	Predicted Noise Level from Sports Pitches (3G Football Pitch & MUGA) (dB (A))	Combined Ambient and Predicted 3G Football Pitch & MUGA Noise Level (dB (A))	Change in Noise Level (dB (A))
SR A – Watney Road	3G Football Pitch: 47m MUGA: 121m	60 day	61	64	4
		58 evening	61	63	5
SR B – Williams Lane	3G Football Pitch: 24m MUGA: 147m	60 day	63	65	5
		58 evening	63	64	6
SR C – Lower Richmond Road	3G Football Pitch: 98m MUGA: 56m	71 day	63	72	1
		69 evening	63	70	1
Closest Future SR (Block 18)	3G Football Pitch: 24m MUGA: 127m	n/a	63	n/a	n/a

Note: Daytime period 07:00-19:00; evening period 19:00-23:00, although this does not necessarily reflect operational (usage) times of 3G Football Pitch and MUGA.

With reference to the assessment in **Table 9.14** it can be seen that there would be a maximum increase in noise levels of 4dB for SR A – Watney Road and 5dB for SR B – Williams Lane, as a result of noise from use of 3G football pitch and MUGA sports facilities. A 1dB increase is predicted for SR C – Lower Richmond Road. These temporary increases in noise levels, during usage of the facilities, would give rise to **insignificant** effects at receptors on Lower Richmond Road. This is in part due to the relatively high prevailing noise levels at this location due to road traffic on Lower Richmond Road. At SR A the effect is considered to be **long-term, local, intermittent adverse** of **minor** to **moderate adverse** significance and at SR B **long-term, local, intermittent adverse** of **moderate adverse** significance, based on predicted change in prevailing noise levels. It should be noted however that a noise level of 63dB(A) is within the noise level range for normal conversations, which ranges from 55 to 65dB(A). Furthermore, the existing ambient noise level does not take into account the intermittent noise from the existing sports on the fields (two existing pitches), which residents already experience. The intermittent noise levels of the proposed 3G Football Pitch and MUGA is not expected to be any higher than the existing intermittent noise levels of play on the two existing sports pitch which currently do not have any fencing or noise mitigation in place.

With regards to future noise sensitive receptors (i.e. the new residential use proposed), noise levels associated with the 3G Football Pitch and MUGA would be in the region of 63 dB at the nearest future SRs, thereby above the recommendations set out by Sport England, however consideration should be given to the future prevailing noise climate when assessing the significance of this. Based on measured prevailing noise levels, it is likely that an increase in noise level would be experienced by the nearest future SRs which are distant from Lower Richmond Road. The increase is likely to be comparable to that predicted from SRs A and B. On this basis, the effect during usage of 3G Football Pitch and MUGA facilities is anticipated to be **long-term, local, intermittent adverse** of **minor** to **moderate adverse** significance. As above, it should be noted that the future residents will be aware of this anticipated intermittent noise, given the school and sports facilities will be operational prior to first residential occupation.

Mitigation measures were not considered necessary in the 2018 ES given the intermittent use of the sports facilities and overall predicted noise levels being within the range of normal conservation, as such temporary increases in the prevailing noise levels should be acceptable.

As noted in the noise technical note submitted to LBRuT (ref: *WIE10667-103-TN-1.1.1-Noise Summary Note*) dated 30 August 2018, the assessment assumed both the MUGA and 3G Football Pitch would be used continuously and simultaneously with no account taken of screening provided by intervening structures or topography. Further to this, the noise assessment was based on higher source noise levels than those stated by Sport England. Waterman have based the assessment on measured noise levels of 66dB(A) at the half way line and 69dB(A) behind the goal compared to the “free-field noise level of 58 dB $L_{Aeq(1\ hour)}$ at a distance of 10 metres (m) from the side line halfway marking” which Sport England regard as being representative for noise from an AGP. On this basis the predicted noise levels and potential impacts are expected be lower than reported within the 2018 ES. For example, the predicted noise level at the nearest receptor on Williams Lane located at approximately 24m from the 3G Football Pitch is 63dB $L_{Aeq,T}$ as presented within Table 9.14 of the 2018 ES, whereas when based on Sport England representative noise level of 58dB $L_{Aeq,1h}$ at 10m, the noise level at the nearest receptor on Williams Lane would be lower than 58dB $L_{Aeq,1h}$. This is lower than what is presented within the 2018 ES, which used a conservative approach based on Waterman measurement data. Furthermore, noise impacts would be controlled through careful management of their use together with restriction in operational hours, as described in Section 3 below.