

Queen Elizabeth Grammar School

Artificial Turf Pitch

Project code: SC104
Date: 10-08-2023

Designer: Michael Eastman

Description: Proposed Lighting Scheme

Football Match Play:
Maintained average illuminance >200 lux
Uniformity Ratio (Ev.min/Ev.ave) >0.60

All luminaires have a zero upward light ratio without the use of additional accessories.

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.

Surfacing Standards LTD

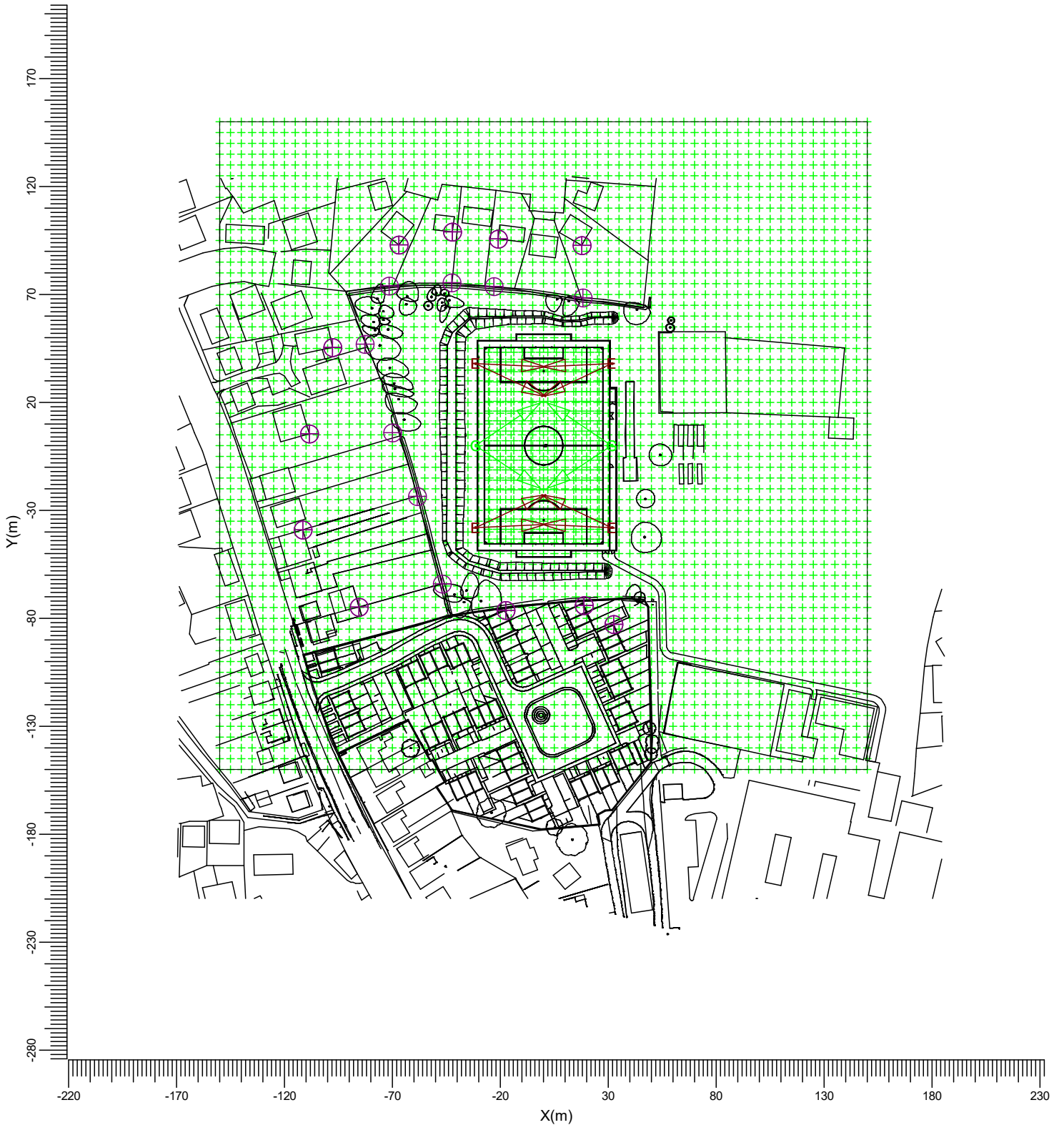
Office 2
Empingham House
Ayston Road
Uppingham
LE15 9NY

Table of Contents

1.	Project Description	3
1.1	Top Project Overview	3
2.	Summary	4
2.1	Observer Information	4
2.2	Project Luminaires	4
2.3	Calculation Results	5
3.	Calculation Results	7
3.1	Football 200 Lux: Graphical Table	7
3.2	Football 120 Lux: Graphical Table	8
3.3	Spillage Grid 0m: Filled Iso Contour	9
3.4	Spillage Grid 0m Zoomed: Filled Iso Contour	10
3.5	Spillage Grid 3m: Filled Iso Contour	11
3.6	Spillage Grid 3m Zoomed: Filled Iso Contour	12
4.	Luminaire Details	13
4.1	Project Luminaires	13
5.	Installation Data	14
5.1	Legends	14
5.2	Luminaire Positioning and Orientation	14

1. Project Description

1.1 Top Project Overview



E  BVP518 OUT T35 A35-NB LO G  BVP528 OUT T35 A35-NB LO

Scale
1:2500

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	House 1 - Garden	18.08	68.43	1.80
Bb	House 1 - 1.8m	17.64	92.78	1.80
Cc	House 1 - 3.6m	17.64	92.78	3.60
Dd	House 2 - Garden	-23.24	73.62	1.80
Ee	House 2 - 1.8m	-21.09	95.66	1.80
Ff	House 2 - 3.6m	-21.09	95.66	3.60
Gg	House 3 - Garden	-42.52	75.58	1.80
Hh	House 3 - 1.8m	-42.32	98.91	1.80
Ii	House 3 - 3.6m	-42.32	98.91	3.60
Jj	House 4 - Garden	-71.51	74.05	1.80
Kk	House 4 - 1.8m	-67.17	93.07	1.80
Ll	House 4 - 3.6m	-67.17	93.07	3.60
Mm	House 5 - Garden	-82.90	46.90	1.80
Nn	House 5 - 1.8m	-97.91	45.53	1.80
Oo	House 5 - 3.6m	-97.91	45.53	3.60
Pp	House 6 - Garden	-70.13	5.88	1.80
Qq	House 6 - 1.8m	-108.73	5.41	1.80
Rr	House 6 - 3.6m	-108.73	5.41	3.60
Ss	House 7 - Garden	-58.73	-23.42	1.80
Tt	House 7 - 1.8m	-111.63	-38.92	1.80
Uu	House 7 - 3.6m	-111.63	-38.92	3.60
Vv	House 8 - Garden	-47.06	-64.05	1.80
Ww	House 8 - 1.8m	-85.50	-74.66	1.80
Xx	House 8 - 3.6m	-85.50	-74.66	3.60
Yy	House 9 - 1.8m	-17.50	-76.32	1.80
Zz	House 9 - 3.6m	-17.50	-76.32	3.60
[[House 10 - 1.8m	18.60	-74.07	1.80
\\	House 10 - 3.6m	18.60	-74.07	3.60
]]	House 11 - 1.8m	32.31	-82.72	1.80
^^	House 11 - 3.6m	32.31	-82.72	3.60

2.2 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
E	8	BVP518 OUT T35 A35-NB LO	1 * LED1720-4S/740	1006.0	1 * 172000
G	4	BVP528 OUT T35 A35-NB LO	1 * LED2590-4S/740	1505.9	1 * 259000

The total installed power: 14.07 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	E	G	
200 Lux Switching	8	4	14.07
120 Lux Switching	8	4	14.07
Spillage Switching	8	4	14.07

Number of Luminaires Per Arrangement:

Arrangement	Luminaire Code		Power (kWatt)
	E	G	
Centre East	0	0	0.00
Centre West	0	4	6.02
North Masts	0	0	0.00
South Masts	8	0	8.05

2.3 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	200 Lux Switching	0.90
2	120 Lux Switching	0.60
3	Spillage Switching	1.00

(II)luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave Min/AveMin/Max		
Football 200 Lux	1	Surface Illuminance	lux	223	0.61	0.40
Football 120 Lux	2	Surface Illuminance	lux	149	0.61	0.40
Spillage Grid 0m	3	Surface Illuminance	lux	15.2	0.00	0.00
Spillage Grid 0m Zoomed	3	Horizontal Illuminance	lux	15.2	0.00	0.00
Spillage Grid 3m	3	Horizontal Illuminance	lux	15.0	0.00	0.00
Spillage Grid 3m Zoomed	3	Horizontal Illuminance	lux	15.0	0.00	0.00

Obtrusive Light Calculations:

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
3	Aa	G	-31.50	0.00	13.00	33.40	70.00	-0.00	454
3	Bb	G	-31.50	0.00	13.00	33.40	70.00	-0.00	263
3	Cc	G	-31.50	0.00	13.00	33.40	70.00	-0.00	200
3	Dd	G	31.50	0.00	13.00	146.60	70.00	0.00	445
3	Ee	G	31.50	0.00	13.00	146.60	70.00	0.00	264
3	Ff	G	31.50	0.00	13.00	146.60	70.00	0.00	204
3	Gg	G	31.50	0.00	13.00	146.60	70.00	0.00	628
3	Hh	G	31.50	0.00	13.00	146.60	70.00	0.00	406
3	li	G	31.50	0.00	13.00	146.60	70.00	0.00	387
3	Jj	G	31.50	0.00	13.00	146.60	70.00	0.00	680
3	Kk	G	31.50	0.00	13.00	146.60	70.00	0.00	655
3	Ll	G	31.50	0.00	13.00	146.60	70.00	0.00	629
3	Mm	G	31.50	0.00	13.00	146.60	70.00	0.00	658
3	Nn	G	31.50	0.00	13.00	146.60	70.00	0.00	616
3	Oo	G	31.50	0.00	13.00	146.60	70.00	0.00	595
3	Pp	E	31.50	-38.00	13.00	154.91	70.00	0.00	469
3	Qq	E	31.50	38.00	13.00	-154.91	70.00	-0.00	425
3	Rr	E	31.50	-38.00	13.00	154.91	70.00	0.00	421
3	Ss	G	31.50	0.00	13.00	-146.60	70.00	-0.00	462
3	Tt	G	31.50	0.00	13.00	-146.60	70.00	-0.00	474

Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
3	Uu	G	31.50	0.00	13.00	-146.60	70.00	-0.00	443
3	Vv	G	31.50	0.00	13.00	-146.60	70.00	-0.00	694
3	Ww	G	31.50	0.00	13.00	-146.60	70.00	-0.00	655
3	Xx	G	31.50	0.00	13.00	-146.60	70.00	-0.00	634
3	Yy	G	31.50	0.00	13.00	-146.60	70.00	-0.00	434
3	Zz	G	31.50	0.00	13.00	-146.60	70.00	-0.00	341
3	{	G	-31.50	0.00	13.00	-33.40	70.00	0.00	449
3	\	G	-31.50	0.00	13.00	-33.40	70.00	0.00	373
3	}	G	-31.50	0.00	13.00	-33.40	70.00	0.00	451
3	^~	G	-31.50	0.00	13.00	-33.40	70.00	0.00	443

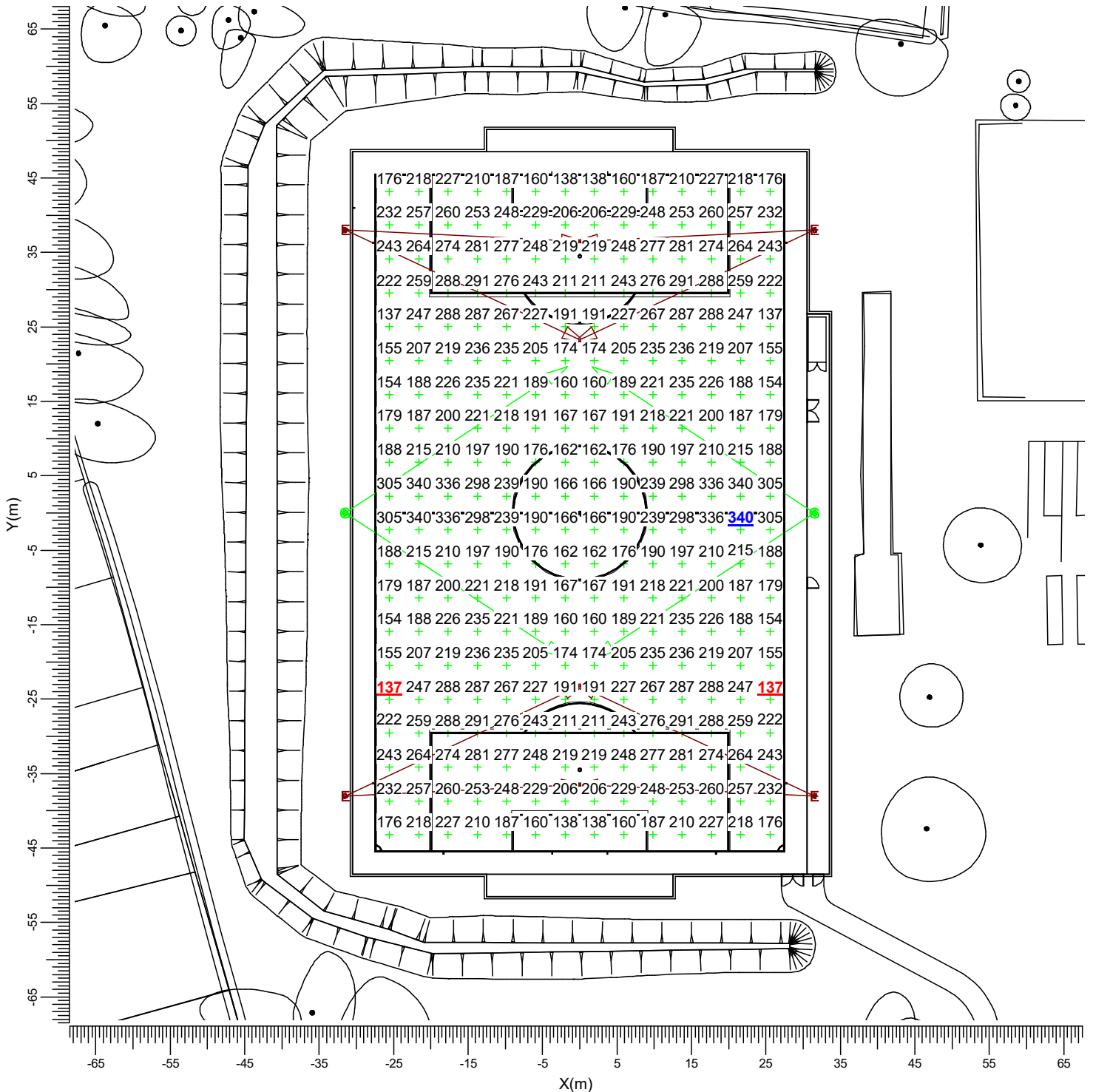
Switching Mode	ULR
1	0.00
2	0.00
3	0.00

3. Calculation Results

3.1 Football 200 Lux: Graphical Table

200 Lux Switching

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



E → BVP518 OUT T35 A35-NB LO G → BVP528 OUT T35 A35-NB LO

Average
223

Min/Ave
0.61

Min/Max
0.40

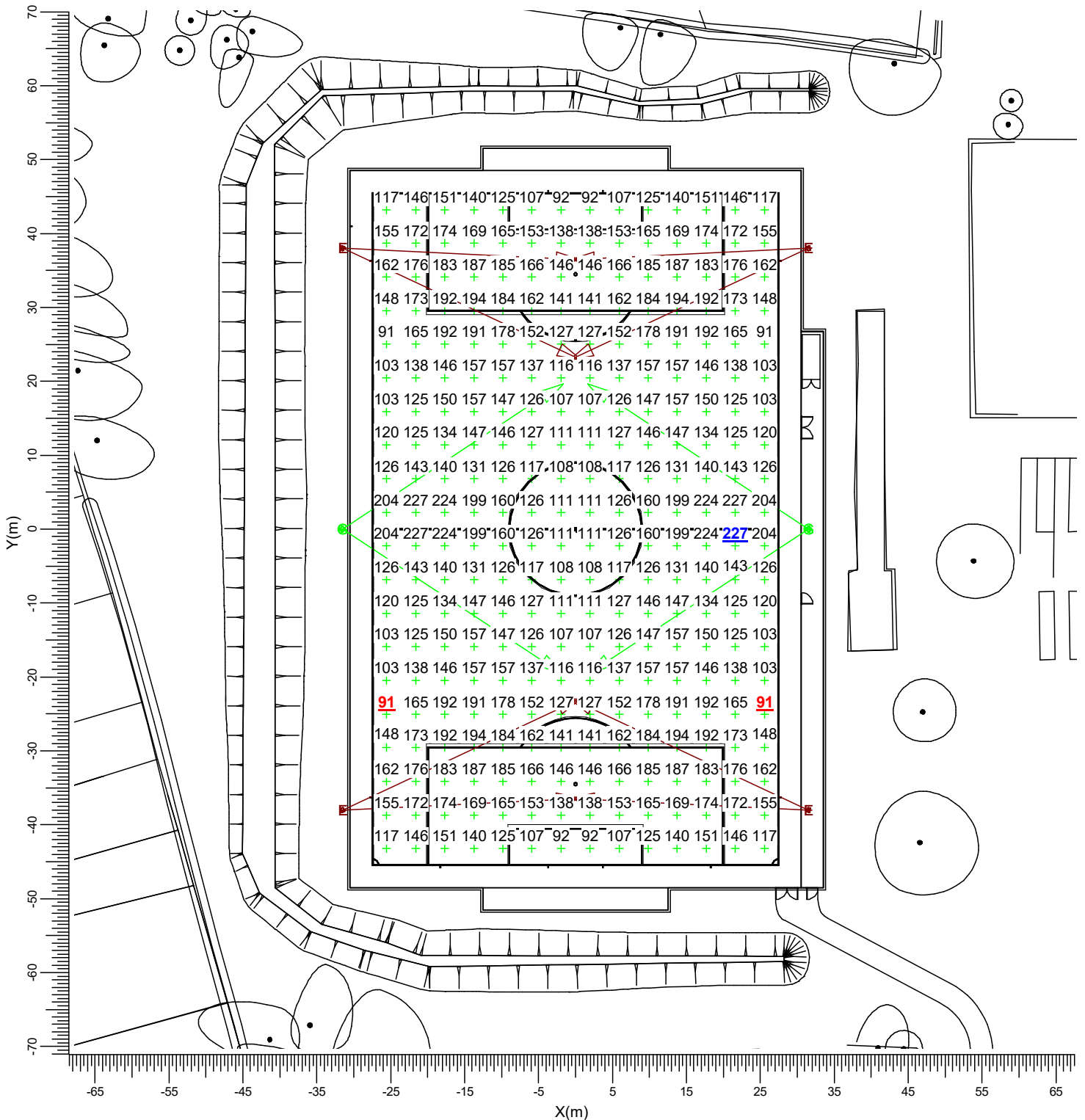
Project maintenance factor
0.90

Scale
1:750

3.2 Football 120 Lux: Graphical Table

120 Lux Switching

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



E → BVP518 OUT T35 A35-NB LO G → BVP528 OUT T35 A35-NB LO

Average
149

Min/Ave
0.61

Min/Max
0.40

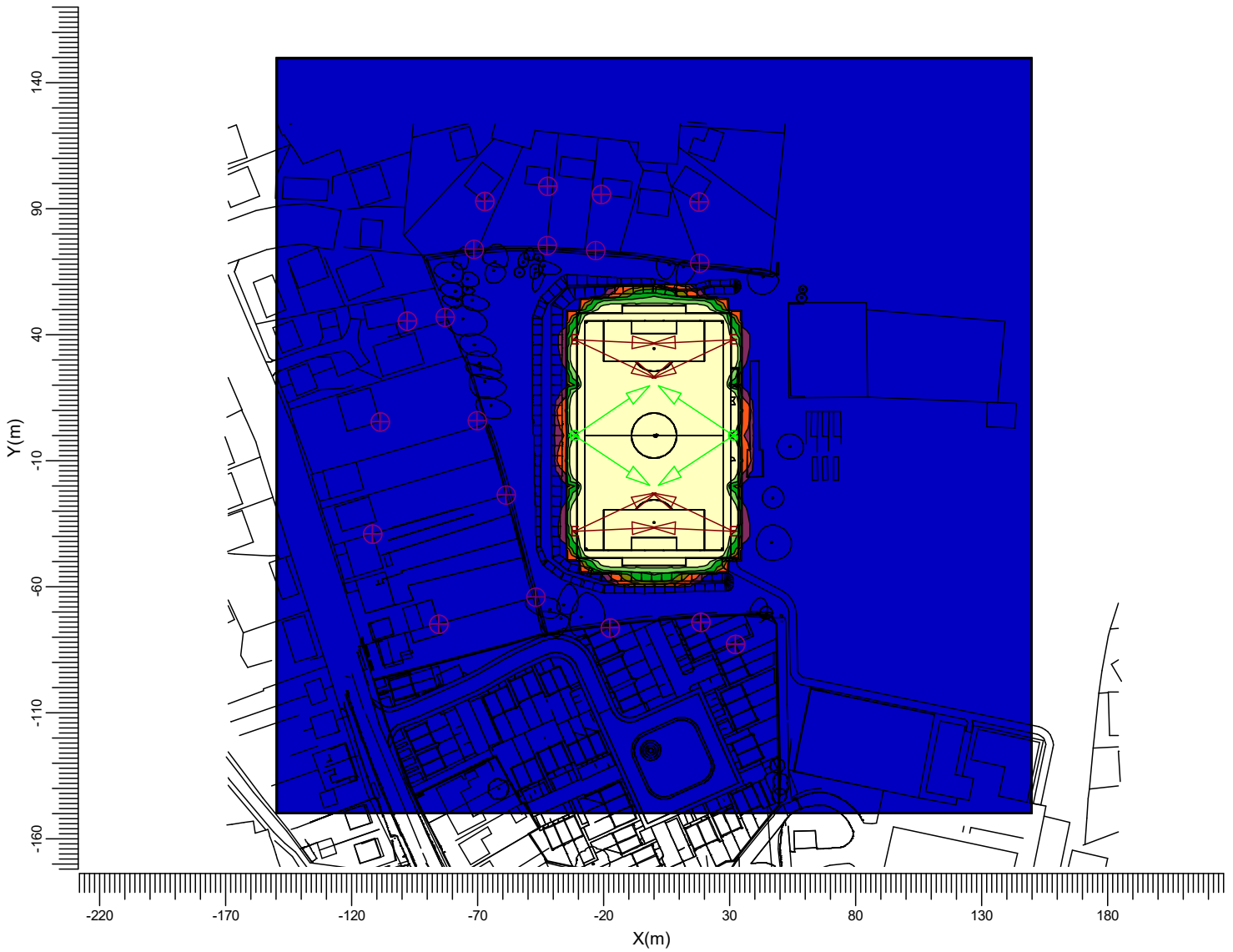
Project maintenance factor
0.60

Scale
1:750

3.3 Spillage Grid 0m: Filled Iso Contour

Spillage Switching

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



E BVP518 OUT T35 A35-NB LO G BVP528 OUT T35 A35-NB LO

Average
15.2

Min/Ave
0.00

Min/Max
0.00

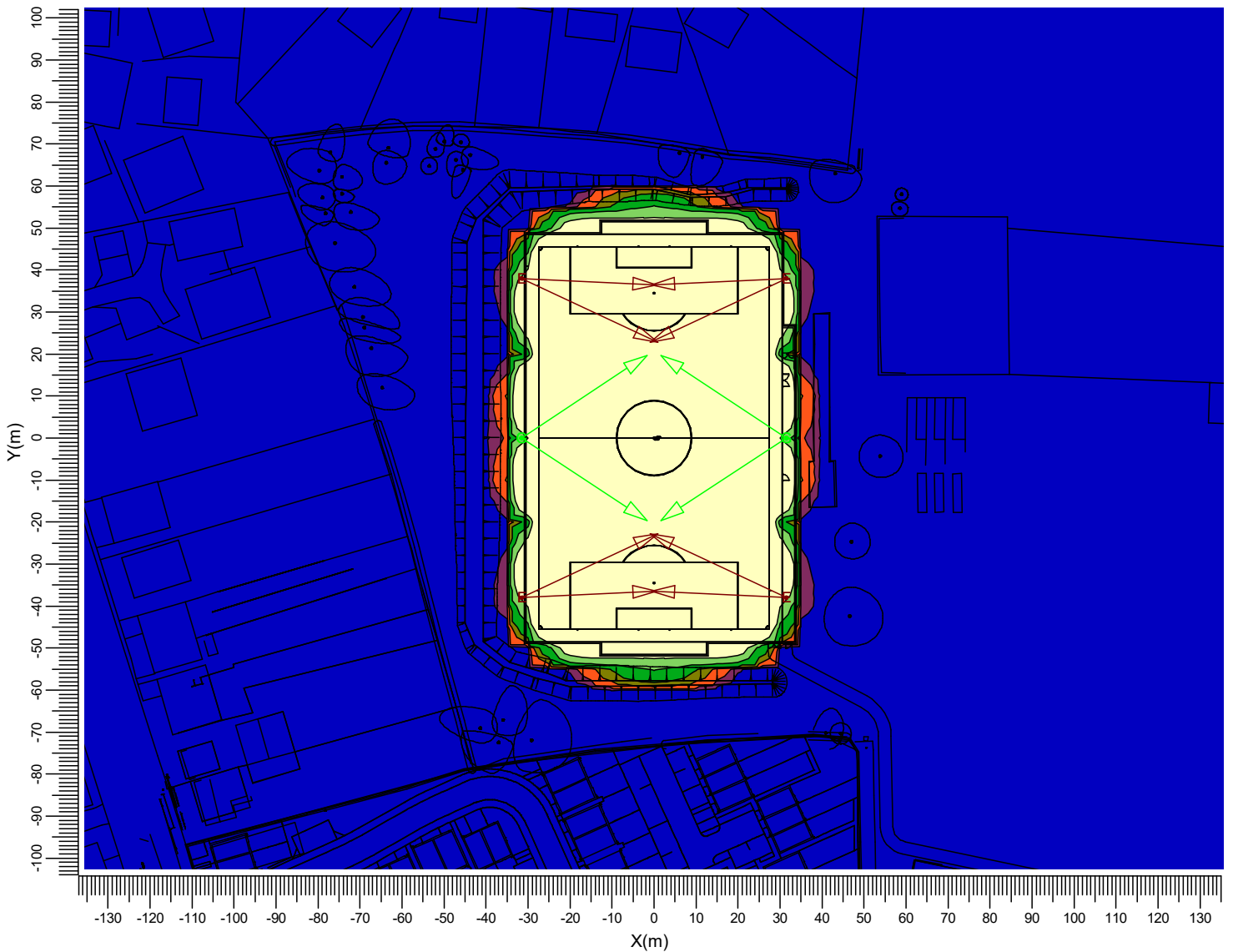
Project maintenance factor
1.00

Scale
1:2500

3.4 Spillage Grid 0m Zoomed: Filled Iso Contour

Spillage Switching

Grid : Spillage Grid at Z = -0.00 m
Calculation : Horizontal Illuminance (lux)



E BVP518 OUT T35 A35-NB LO G BVP528 OUT T35 A35-NB LO

Average
15.2

Min/Ave
0.00

Min/Max
0.00

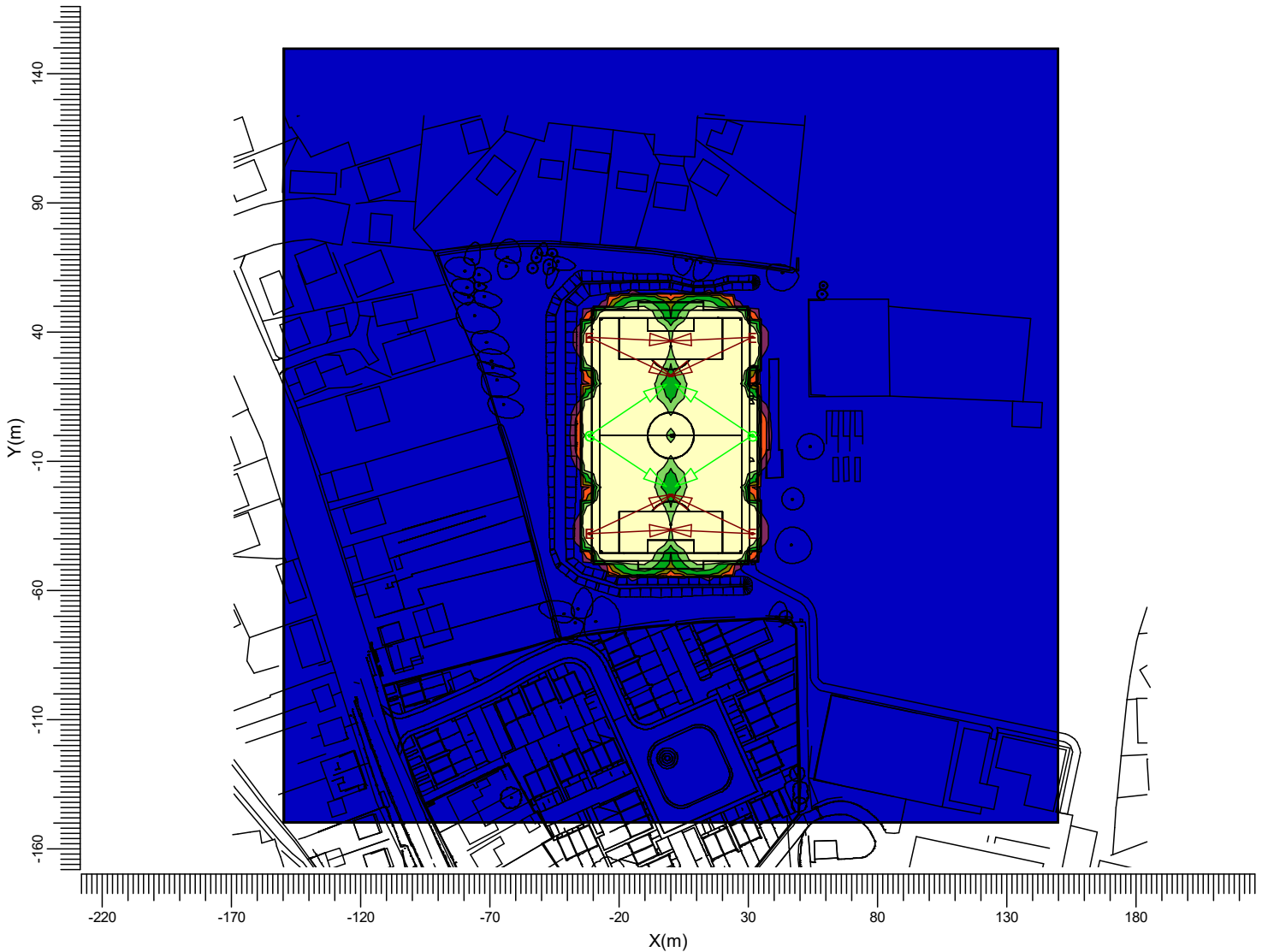
Project maintenance factor
1.00

Scale
1:1500

3.5 Spillage Grid 3m: Filled Iso Contour

Spillage Switching

Grid : Spillage Grid at Z = -0.00 m
 Calculation : Horizontal Illuminance (lux)
 Height above grid : 3.00 m



E BVP518 OUT T35 A35-NB LO G BVP528 OUT T35 A35-NB LO

Average
15.0

Min/Ave
0.00

Min/Max
0.00

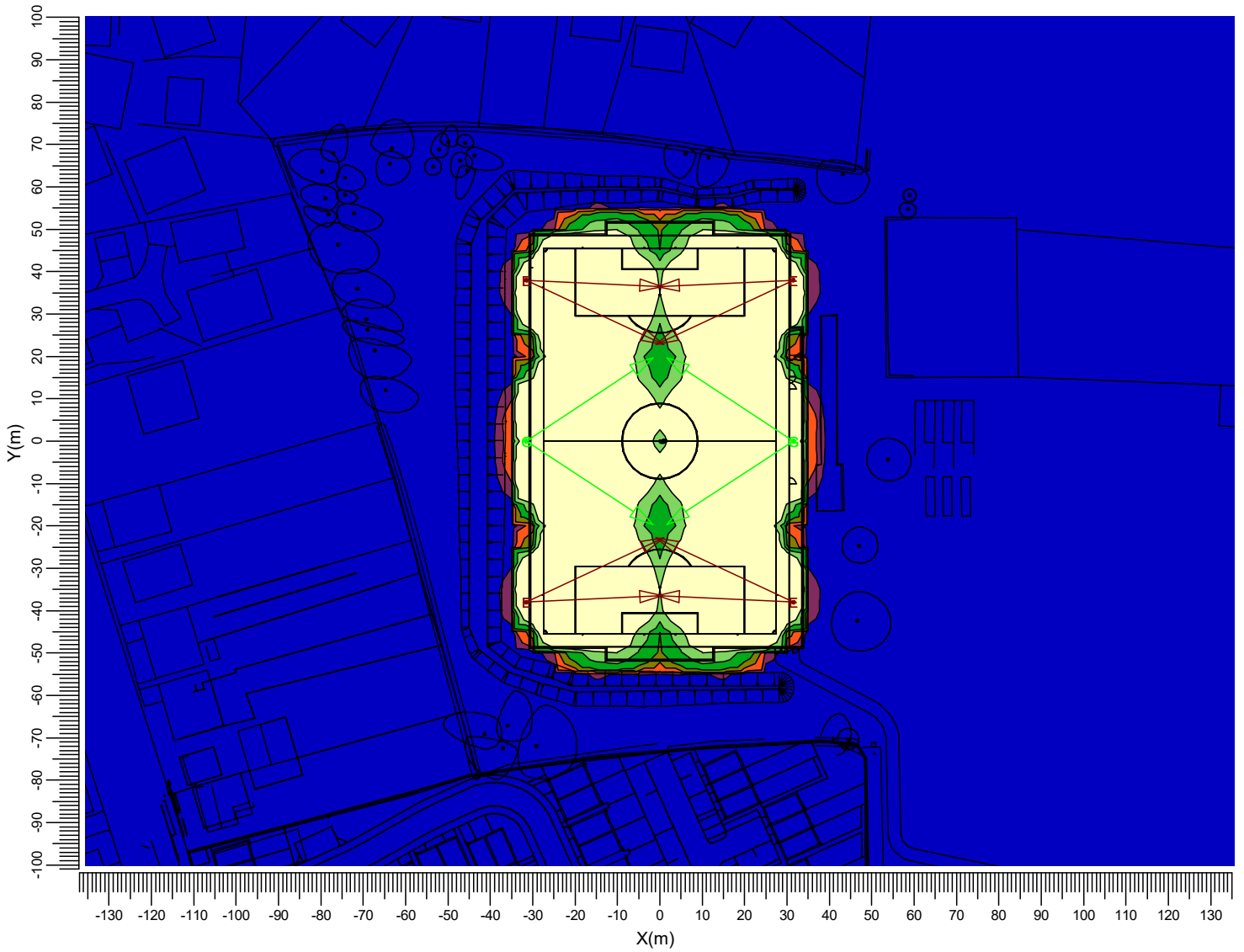
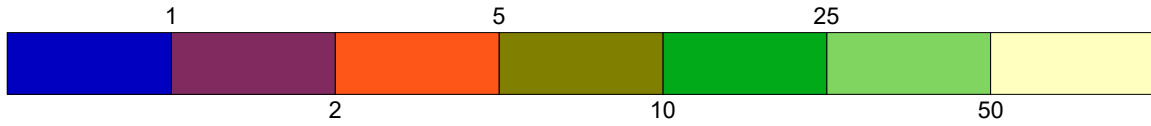
Project maintenance factor
1.00

Scale
1:2500

3.6 Spillage Grid 3m Zoomed: Filled Iso Contour

Spillage Switching

Grid : Spillage Grid at Z = -0.00 m
 Calculation : Horizontal Illuminance (lux)
 Height above grid : 3.00 m



E BVP518 OUT T35 A35-NB LO G BVP528 OUT T35 A35-NB LO

Average
15.0

Min/Ave
0.00

Min/Max
0.00

Project maintenance factor
1.00

Scale
1:1500

4. Luminaire Details

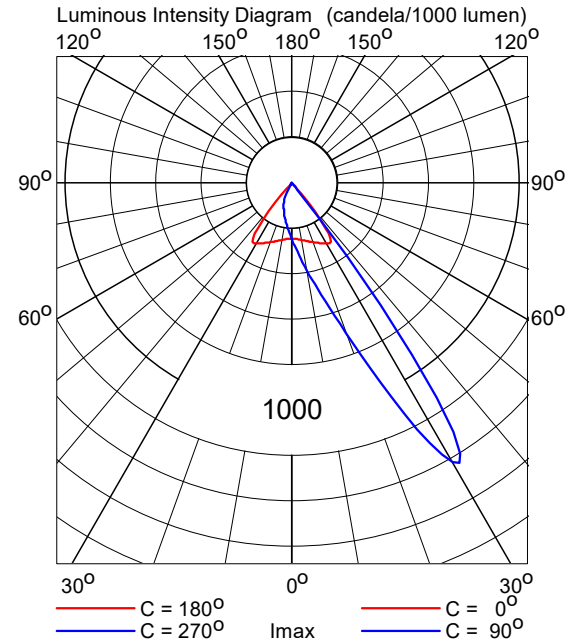
4.1 Project Luminaires

OptiVision LED gen3.5 2022
BVP518 OUT T35 1xLED1720-4S/740/740 E3/D4I A35-NB LO

Light output ratios

DLOR	: 0.59
ULOR	: 0.00
TLOR	: 0.59
Ballast	: E3/D4I
Lamp flux	: 172000 lm
Luminaire wattage	: 1006.0 W
Measurement code	: LVM2047300

Note: Luminaire data not from database.

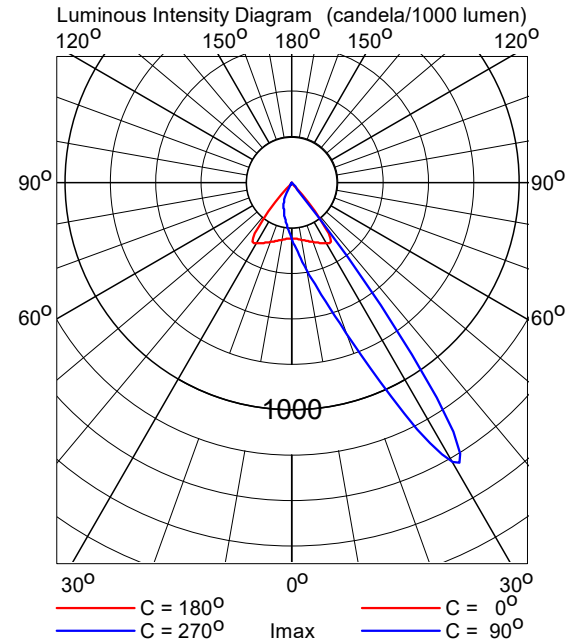


OptiVision LED gen3.5 2022
BVP528 OUT T35 1xLED2590-4S/740/740 E3/D4I A35-NB LO

Light output ratios

DLOR	: 0.59
ULOR	: 0.00
TLOR	: 0.59
Ballast	: E3/D4I
Lamp flux	: 259000 lm
Luminaire wattage	: 1505.9 W
Measurement code	: LVM2047300

Note: Luminaire data not from database.



5. Installation Data

5.1 Legends

Project Luminaires:

Code	Qty	Luminaire Type	Lamp Type	Flux (lm)
E	8	BVP518 OUT T35 A35-NB LO	1 * LED1720-4S/740	1 * 172000
G	4	BVP528 OUT T35 A35-NB LO	1 * LED2590-4S/740	1 * 259000

Switching Modes:

Code	Switching Mode
1	200 Lux Switching
2	120 Lux Switching
3	Spillage Switching

5.2 Luminaire Positioning and Orientation

Qty and Code	Position			Aiming Angles			Switching Modes (%)		
	X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	1	2	3
1 * E	-31.50	-38.00	13.00	2.8	68.0	-0.0	100	100	100
1 * E	-31.50	-38.00	13.00	25.1	70.0	-0.0	100	100	100
1 * G	-31.50	-0.00	13.00	-33.4	70.0	0.0	100	100	100
1 * G	-31.50	-0.00	13.00	33.4	70.0	-0.0	100	100	100
1 * E	-31.50	38.00	13.00	-2.8	68.0	0.0	100	100	100
1 * E	-31.50	38.00	13.00	-25.1	70.0	0.0	100	100	100
1 * E	31.50	-38.00	13.00	177.2	68.0	0.0	100	100	100
1 * E	31.50	-38.00	13.00	154.9	70.0	0.0	100	100	100
1 * G	31.50	-0.00	13.00	-146.6	70.0	-0.0	100	100	100
1 * G	31.50	-0.00	13.00	146.6	70.0	0.0	100	100	100
1 * E	31.50	38.00	13.00	-177.2	68.0	-0.0	100	100	100
1 * E	31.50	38.00	13.00	-154.9	70.0	-0.0	100	100	100