Duffield Lawn Tennis Club

LED Lighting upgrade to 6 Tennis Courts

Project code:	30xDX60 + 8xOFA52
Date:	25-09-2023
Designer:	LiAS UK & I - Steve Johnston/Steve Percy
Description:	To upgrade an existing lighting scheme which will be suitable for tennis whilst minimising light spill and glare to neighbouring properties. Scheme based on 29 no. existing 6 metre high columns and 38 no. new Philips ClearFlood Large LED's mounted at a height of 6.7 metres. LED maximum tilt = 26° Courts 1 - 5: 30 no. 530W DX60 LED's Court 7 - 8 no. 530W OFA52 LED's Scheme designed to acheive 500 lux maintained at 0.7 uniformity over the Tennis Court PPA when each court is lit individually. Please note that the predicted spillage is calculated at ground level. Interaction with existing surrounds (i.e. fences, tree's, etc) have not been considered within these spillage plots

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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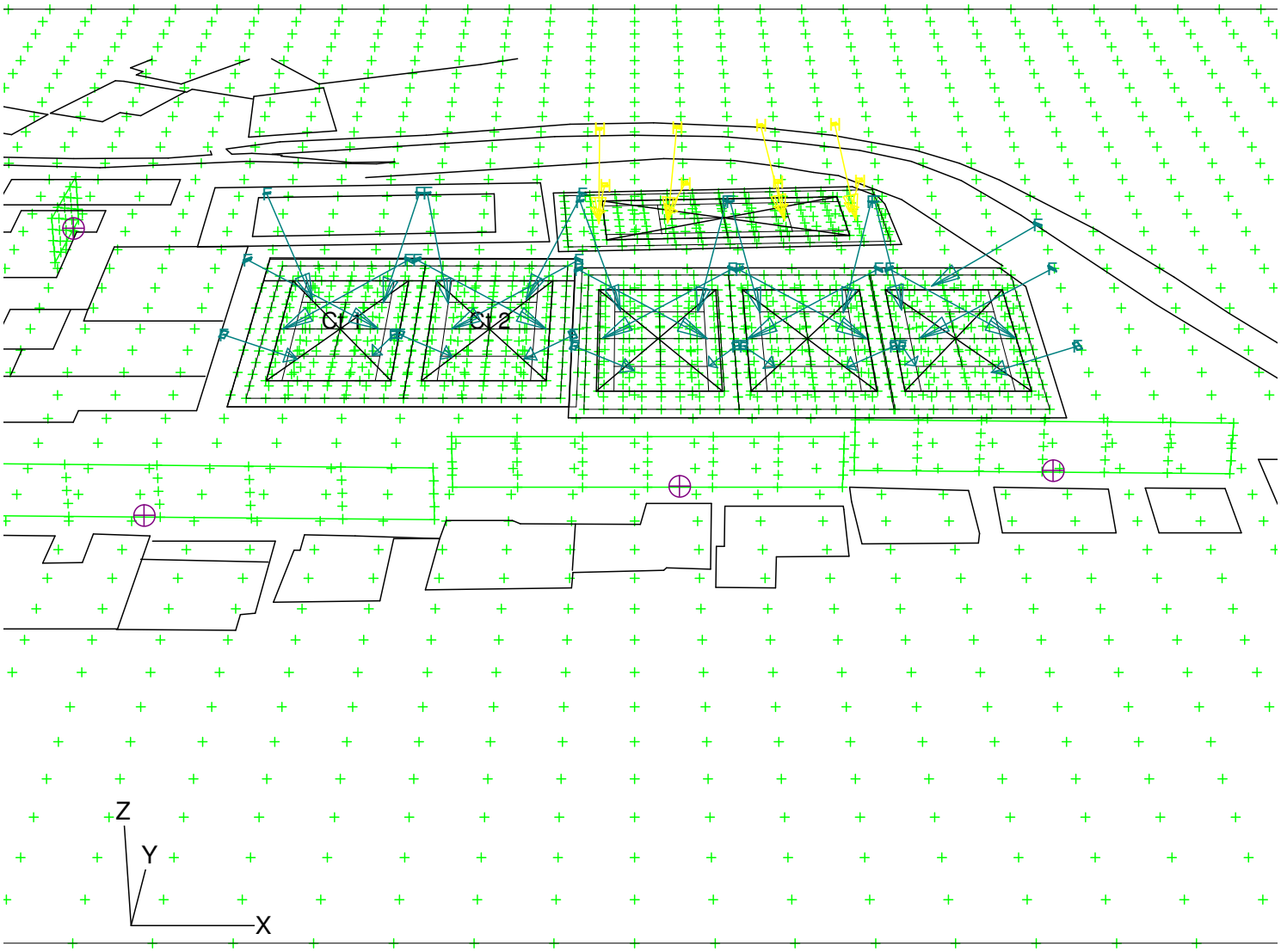
4.1 Project Luminaires 26

1. Project Description

1.1 3-D Project Overview



F → BVP651 T25 DX60 H → BVP651 T25 OFA52

1.2 Top Project Overview



F BVP651 T25 DX60 H BVP651 T25 OFA52

Scale
1:750

2. Summary

2.1 Observer Information

Code	Observer	Position		
		X (m)	Y (m)	Z (m)
Aa	Sth Houses Left	-18.60	-42.00	1.50
Bb	Sth Houses Mid	23.60	-36.60	1.50
Cc	Sth Houses Right	53.95	-33.60	1.50

2.2 Project Luminaires

Code	Qty	Luminaire Type	Lamp Type	Power (W)	Flux (lm)
F	30	BVP651 T25 DX60	1 * LED800-4S/740	530.0	1 * 80000
H	8	BVP651 T25 OFA52	1 * LED800-4S/740	530.0	1 * 80000

The total installed power: 20.14 (kWatt)

Number of Luminaires Per Switching Mode:

Switching Mode	Luminaire Code		Power (kWatt)
	F	H	
Ct1 only	6	0	3.18
Ct2 only	6	0	3.18
Ct 3 Only	6	0	3.18
Ct4 Only	6	0	3.18
Ct5 Only	6	0	3.18
Ct7 Only	0	8	4.24
All lights on	30	8	20.14

2.3 Calculation Results

Switching Modes:

Code	Switching Mode	Maintenance factor
1	Ct1 only	0.95
2	Ct2 only	0.95
3	Ct 3 Only	0.95
4	Ct4 Only	0.95
5	Ct5 Only	0.95
6	Ct7 Only	0.95
7	All lights on	1.00

(Il)luminance Calculations:

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max
Ct1 PPA	1	Surface Illuminance	lux	501			0.76	0.51
Ct1 TPA	1	Surface Illuminance	lux	482			0.66	0.42
Ct2 PPA	2	Surface Illuminance	lux	497			0.76	0.51
Ct2 TPA	2	Surface Illuminance	lux	478			0.64	0.41
Ct3 PPA	3	Surface Illuminance	lux	508	390	784	0.77	0.50
Ct3 TPA	3	Surface Illuminance	lux	491	329	776	0.67	0.42

Calculation	Switching Mode	Type	Unit	Ave	Min	Max	Min/Ave	Min/Max
Ct4 PPA	4	Surface Illuminance	lux	524	399	745	0.76	0.53
Ct4 TPA	4	Surface Illuminance	lux	503	329	791	0.65	0.42
Ct5 PPA	5	Surface Illuminance	lux	518	367	726	0.71	0.51
Ct5 TPA	5	Surface Illuminance	lux	497	313	748	0.63	0.42
Ct7 PPA	6	Surface Illuminance	lux	667	556	999	0.83	0.56
Ct7 TPA	6	Surface Illuminance	lux	591	366	999	0.62	0.37
Ev Houses West	7	Surface Illuminance	lux			8.73		
Ev Houses Sth Left side	7	Surface Illuminance	lux			6.76		
Ev Houses Sth Middle	7	Surface Illuminance	lux			9.21		
Ev Houses Sth Right side	7	Surface Illuminance	lux			10.18		
Spillage	7	Surface Illuminance	lux					

Obtrusive Light Calculations:

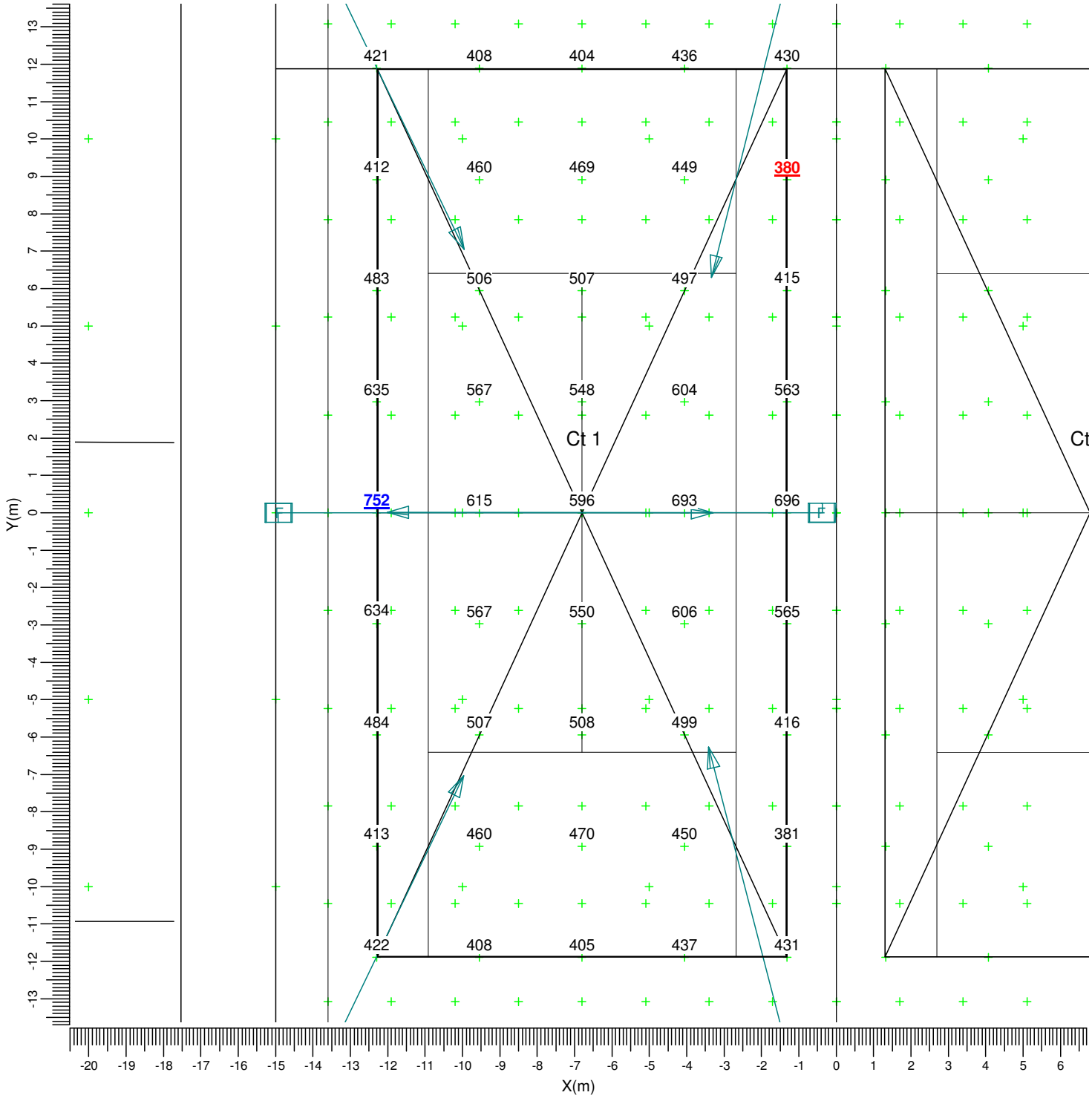
Switching Mode	Observer Code	Luminaire Code	Position			Aiming Angles			Maximum Intensity (cd)
			X (m)	Y (m)	Z (m)	Rot.	Tilt90	Tilt0	
7	Aa	F	28.66	15.36	6.70	-104.13	60.00	0.00	2270
7	Bb	F	29.06	15.25	6.70	-77.46	60.00	0.00	3133
7	Cc	F	14.84	15.36	6.70	-70.55	60.00	0.00	3064
7	Aa	F	28.66	15.36	6.70	-104.13	60.00	0.00	2270

3. Calculation Results

3.1 Ct1 PPA: Graphical Table

Ct1 only

Grid : Ct1 PPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



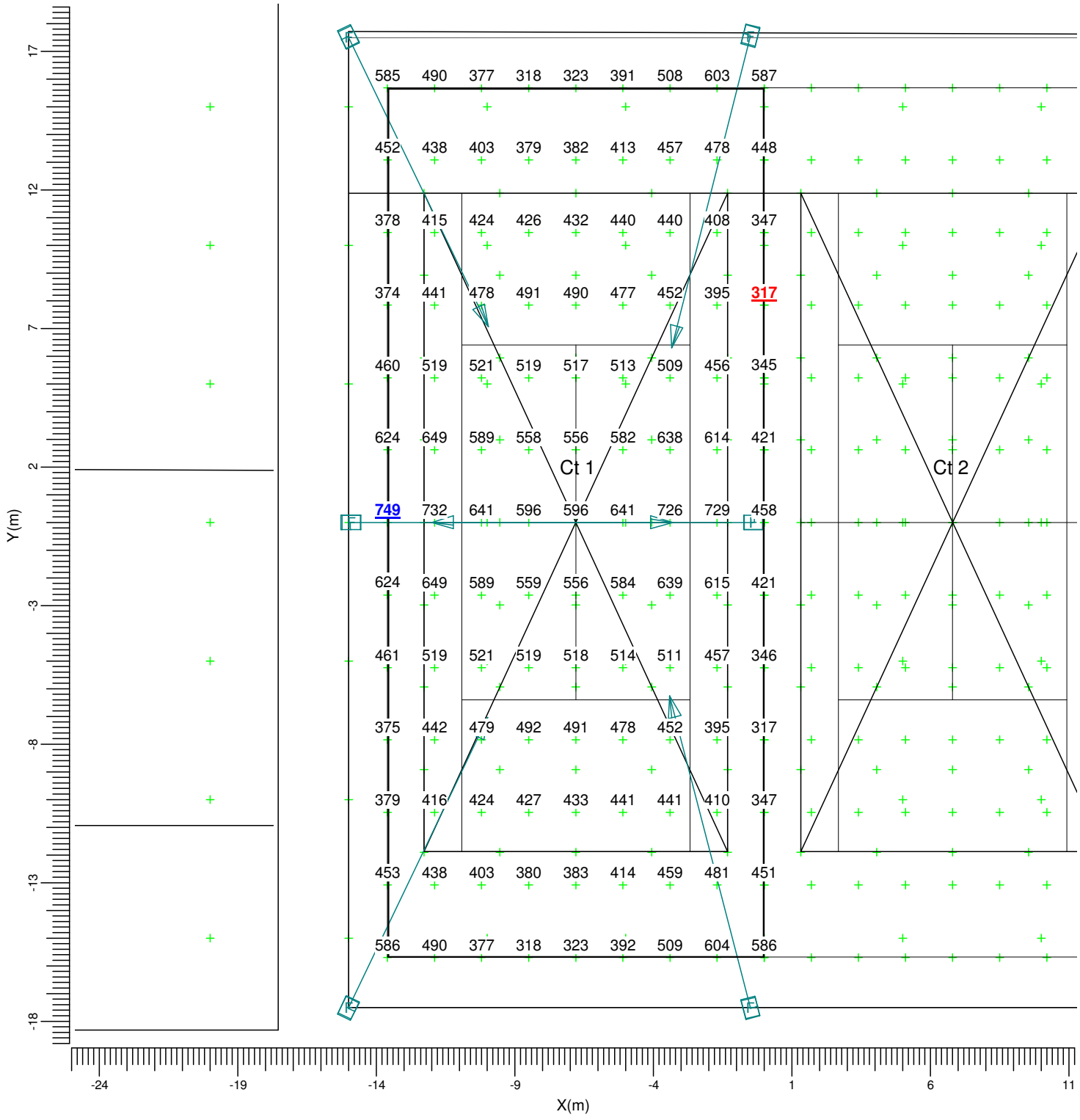
F → BVP651 T25 DX60

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
501	0.76	0.51	0.95	1:150

3.2 Ct1 TPA: Graphical Table

Ct1 only

Grid : Ct1 TPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



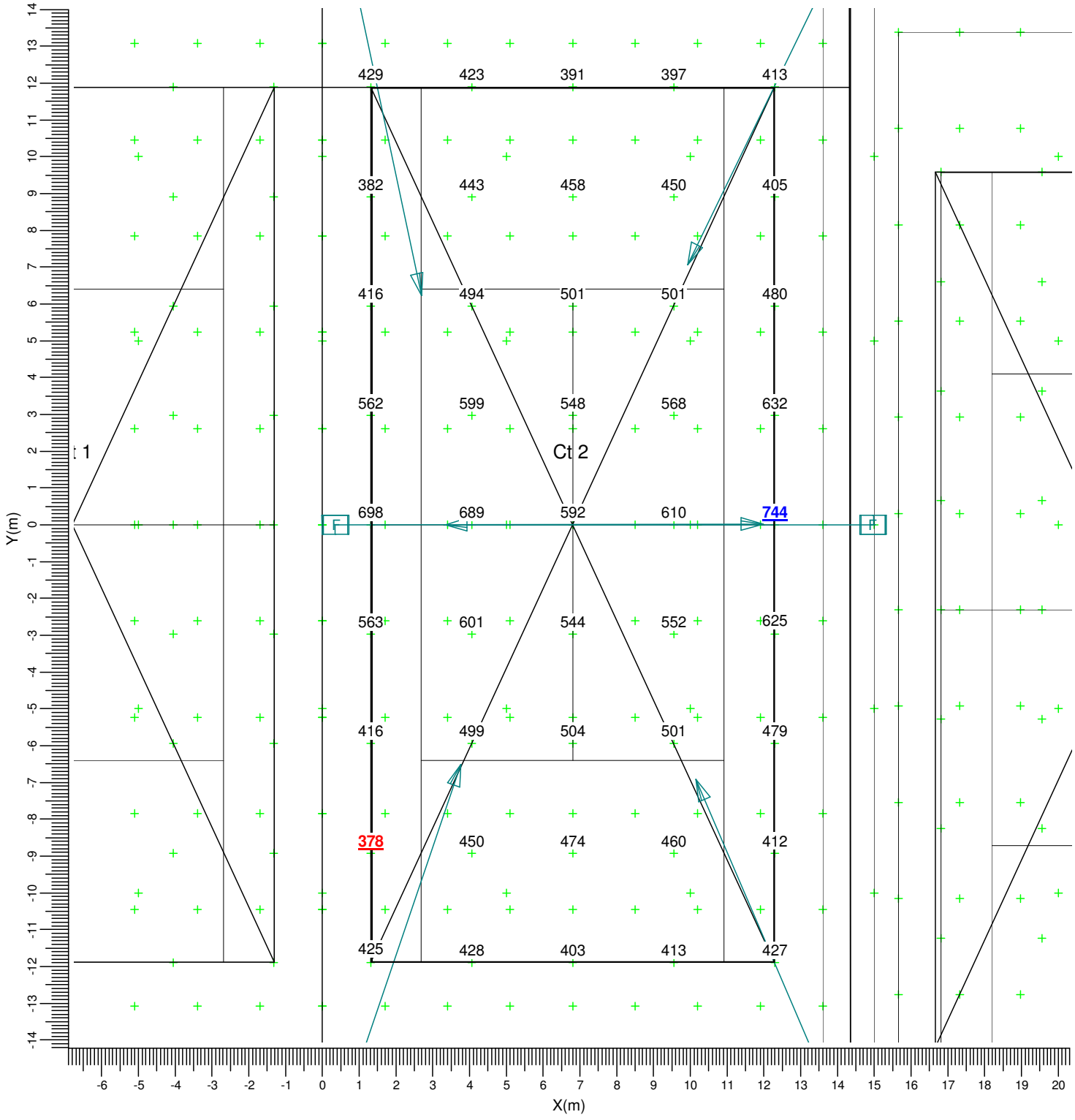
F → BVP651 T25 DX60

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
482	0.66	0.42	0.95	1:200

3.3 Ct2 PPA: Graphical Table

Ct2 only

Grid : Ct2 PPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



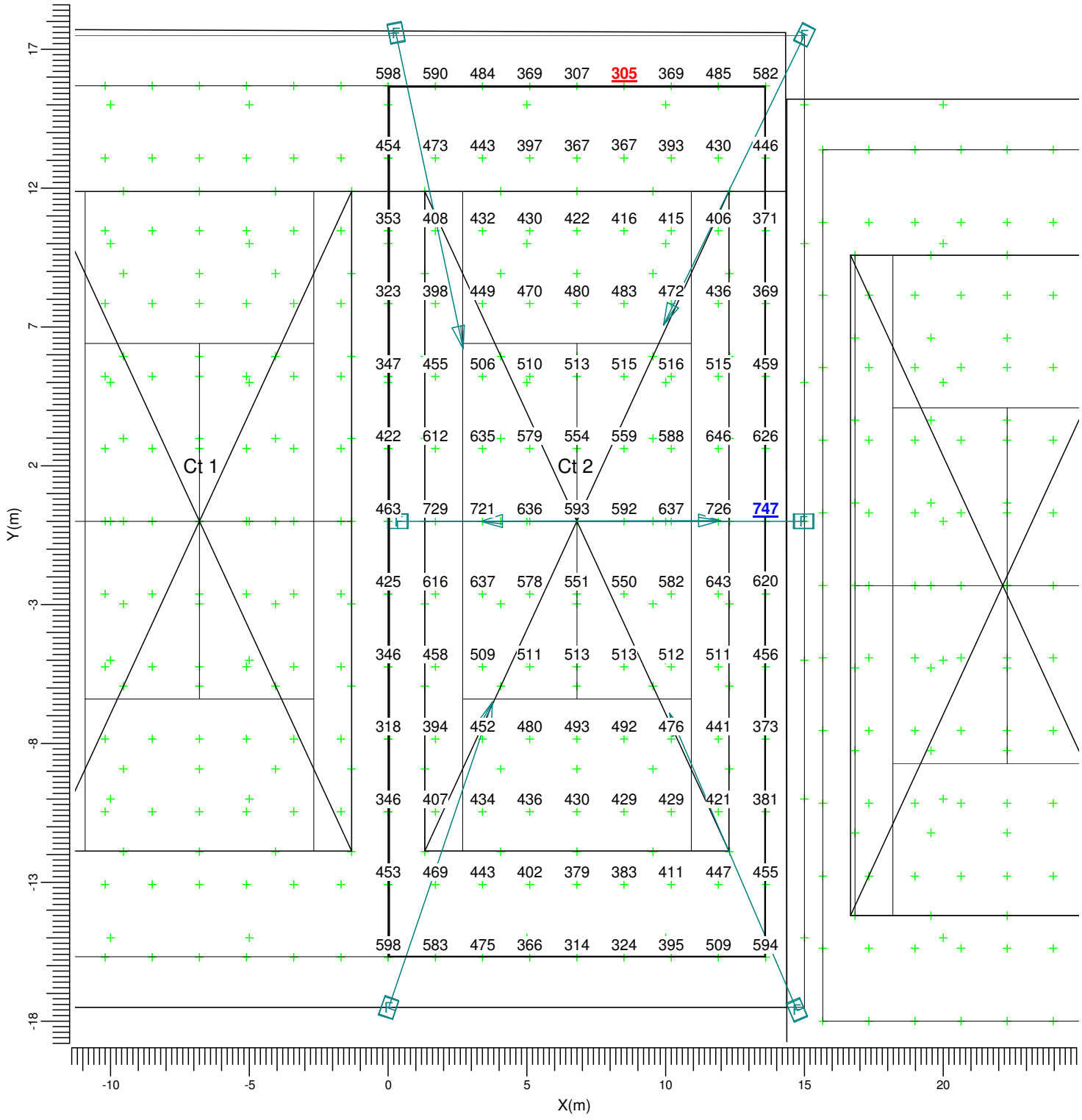
F → BVP651 T25 DX60

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
497	0.76	0.51	0.95	1:150

3.4 Ct2 TPA: Graphical Table

Ct2 only

Grid : Ct2 TPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



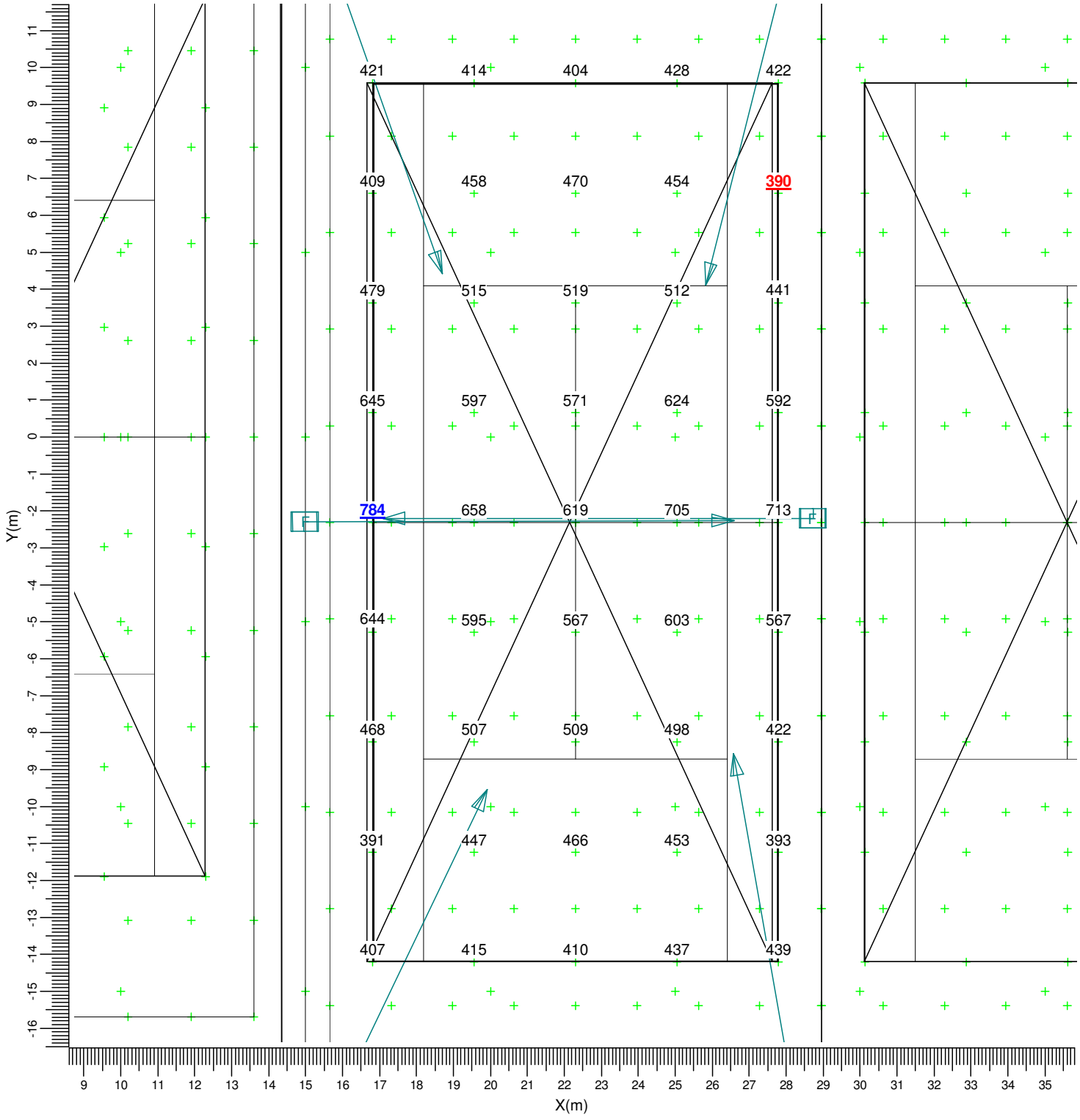
F → BVP651 T25 DX60

Average	Min/Ave	Min/Max	Project maintenance factor	Scale
478	0.64	0.41	0.95	1:200

3.5 Ct3 PPA: Graphical Table

Ct 3 Only

Grid : Ct3 PPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)

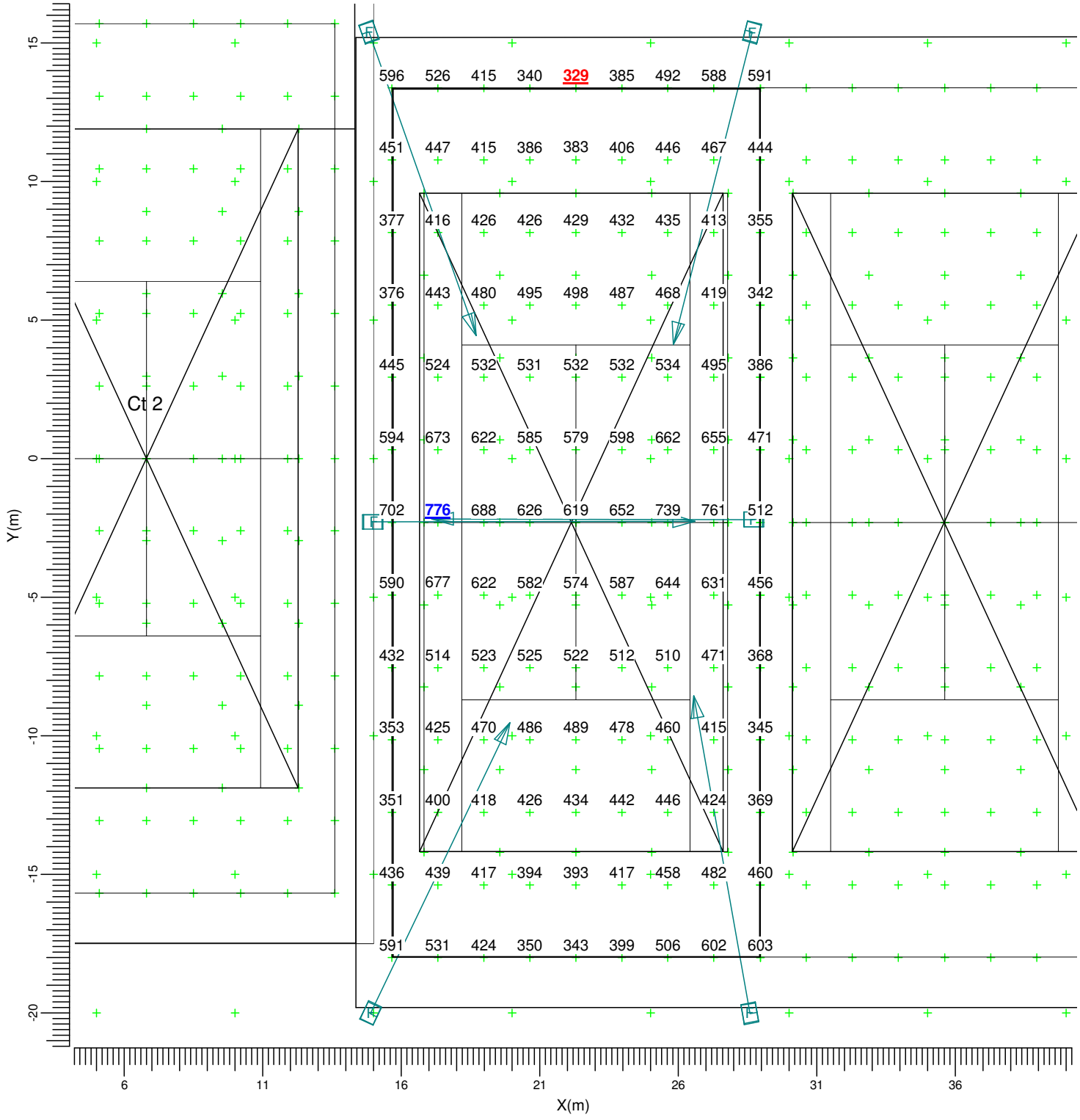


Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
508	390	784	0.77	0.50	0.95	1:150

3.6 Ct3 TPA: Graphical Table

Ct 3 Only

Grid : Ct3 TPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



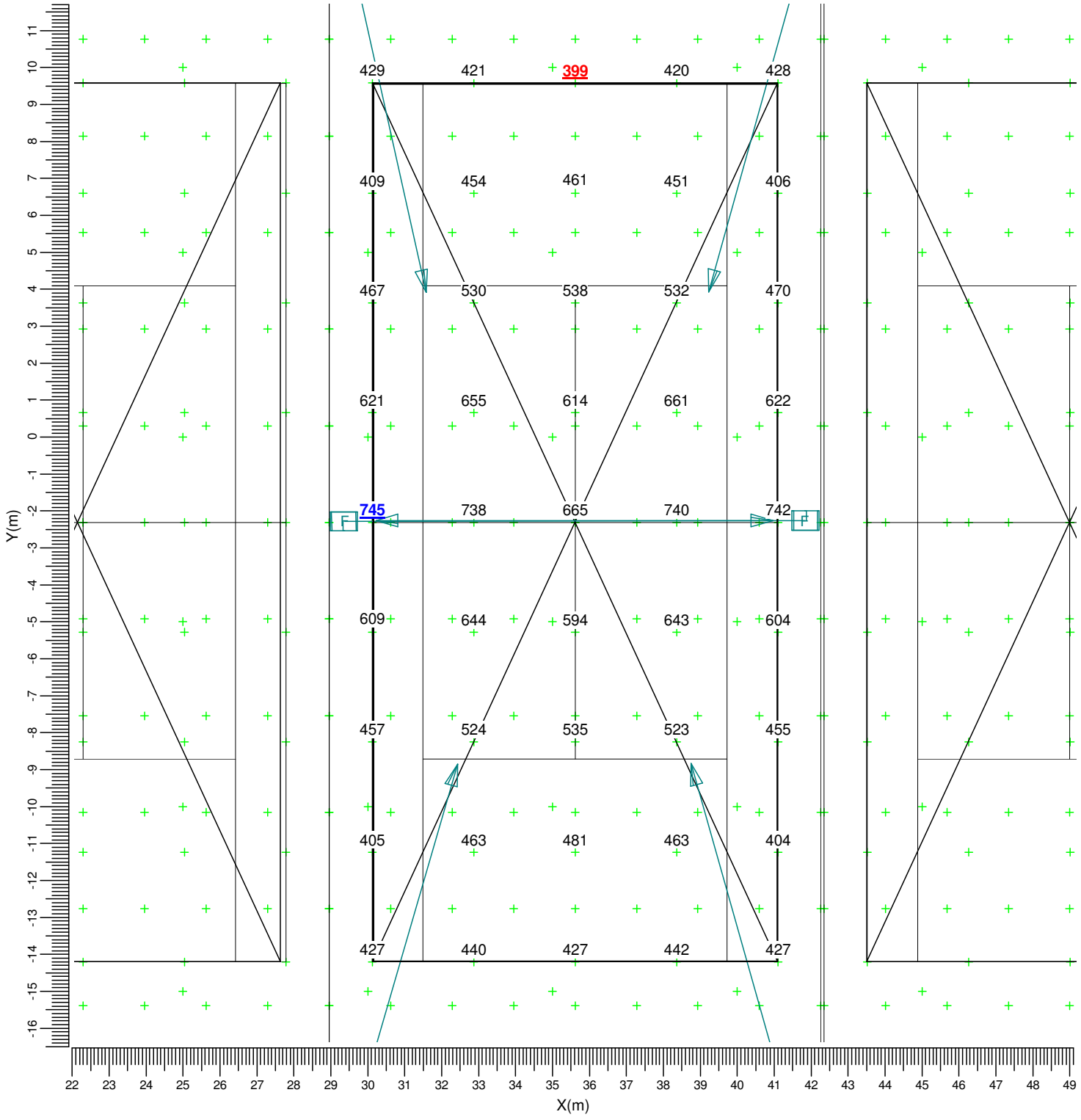
F → BVP651 T25 DX60

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
491	329	776	0.67	0.42	0.95	1:200

3.7 Ct4 PPA: Graphical Table

Ct4 Only

Grid : Ct4 PPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



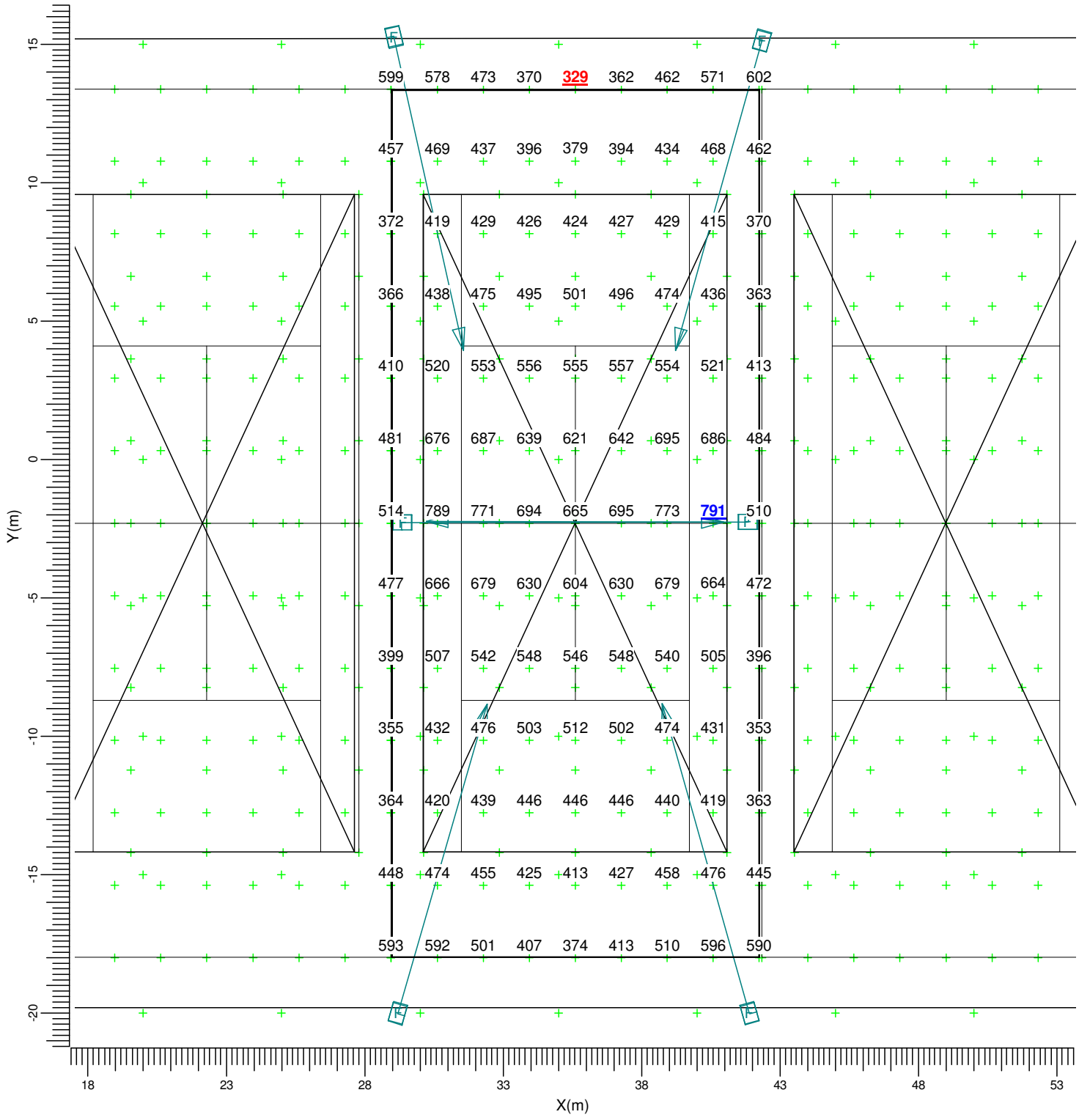
F → BVP651 T25 DX60

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
524	399	745	0.76	0.53	0.95	1:150

3.8 Ct4 TPA: Graphical Table

Ct4 Only

Grid : Ct4 TPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



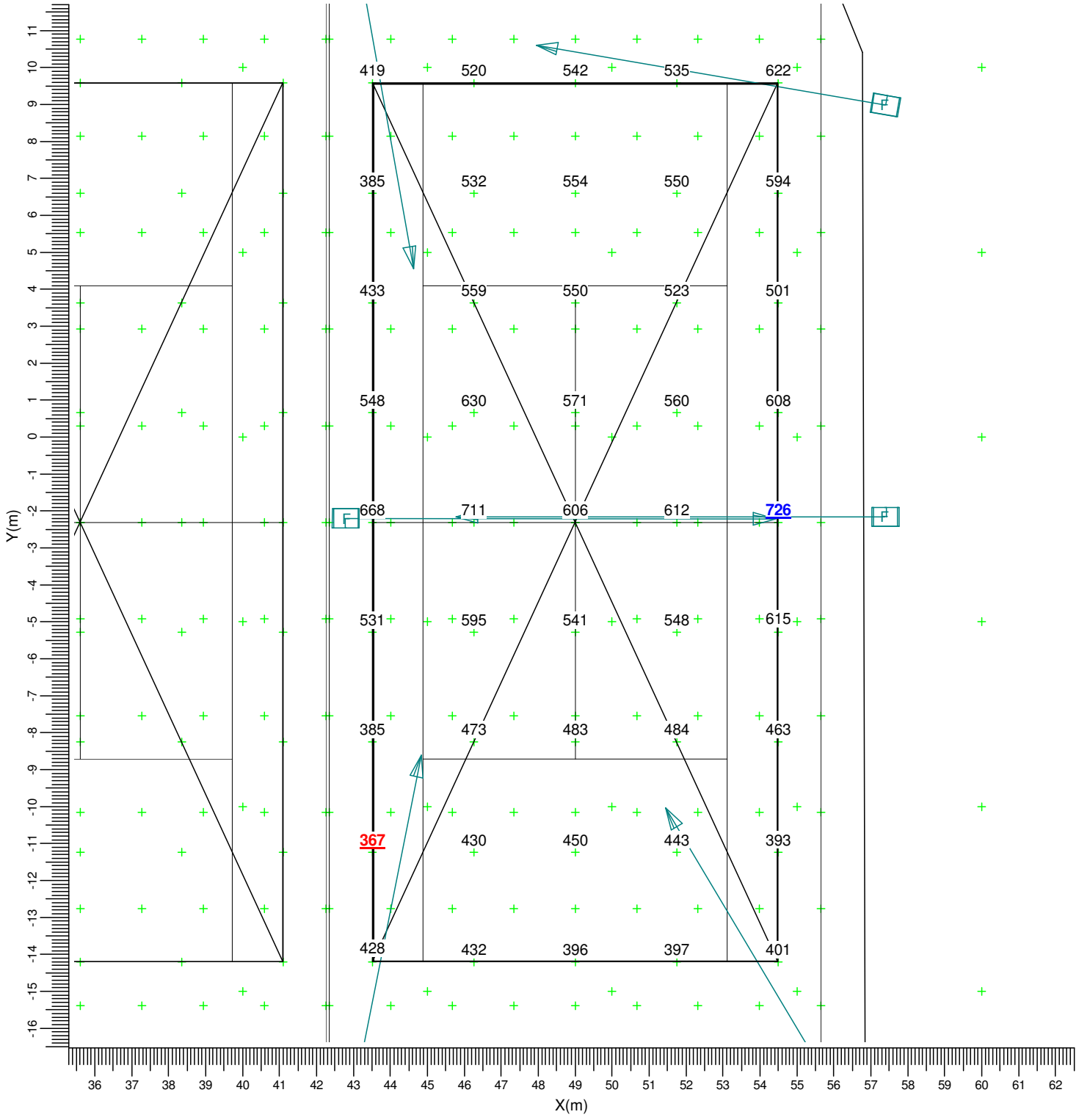
F → BVP651 T25 DX60

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
503	329	791	0.65	0.42	0.95	1:200

3.9 Ct5 PPA: Graphical Table

Ct5 Only

Grid : Ct5 PPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



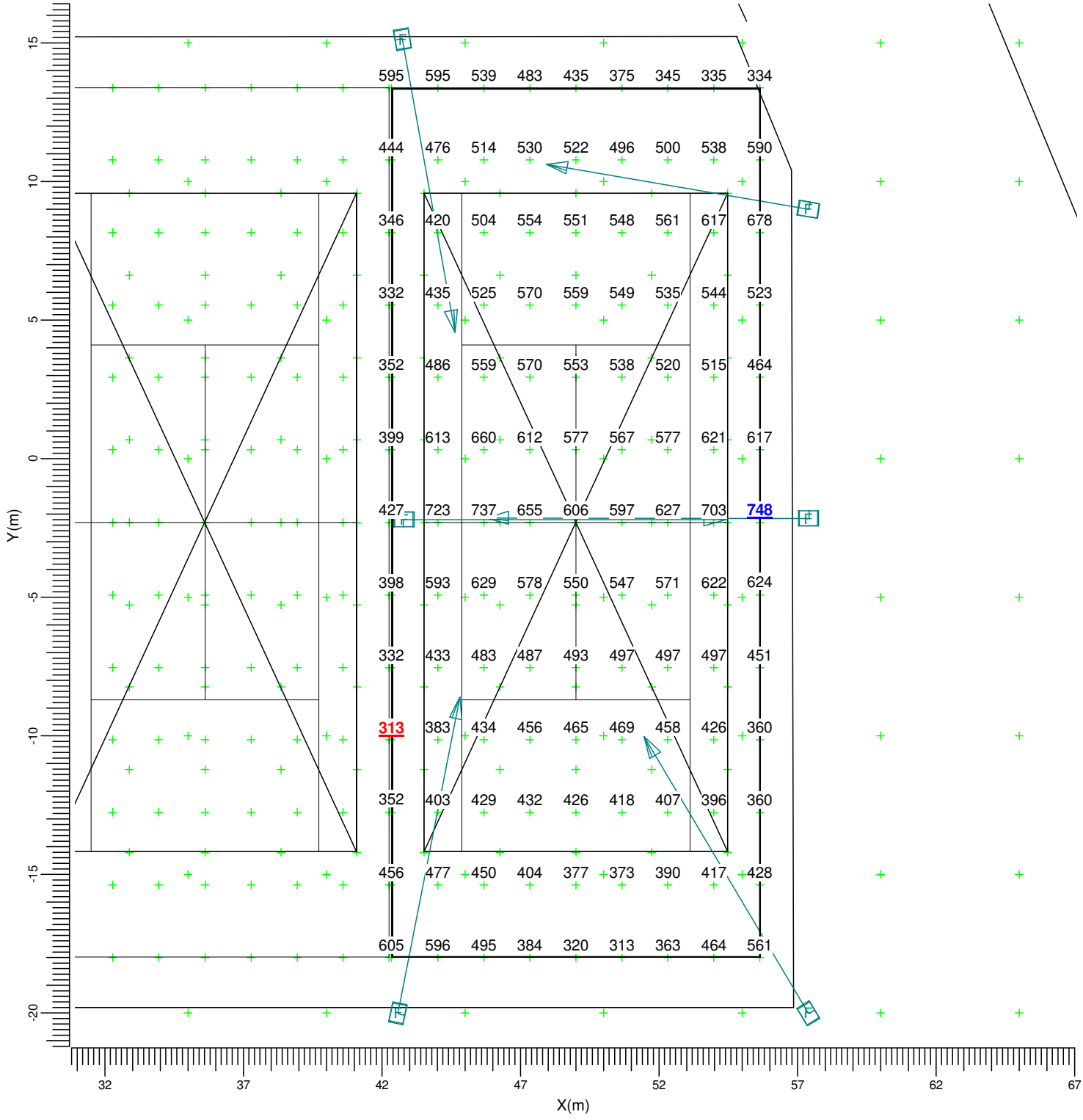
F → BVP651 T25 DX60

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
518	367	726	0.71	0.51	0.95	1:150

3.10 Ct5 TPA: Graphical Table

Ct5 Only

Grid : Ct5 TPA at Z = -0.00 m
Calculation : Surface Illuminance (lux)



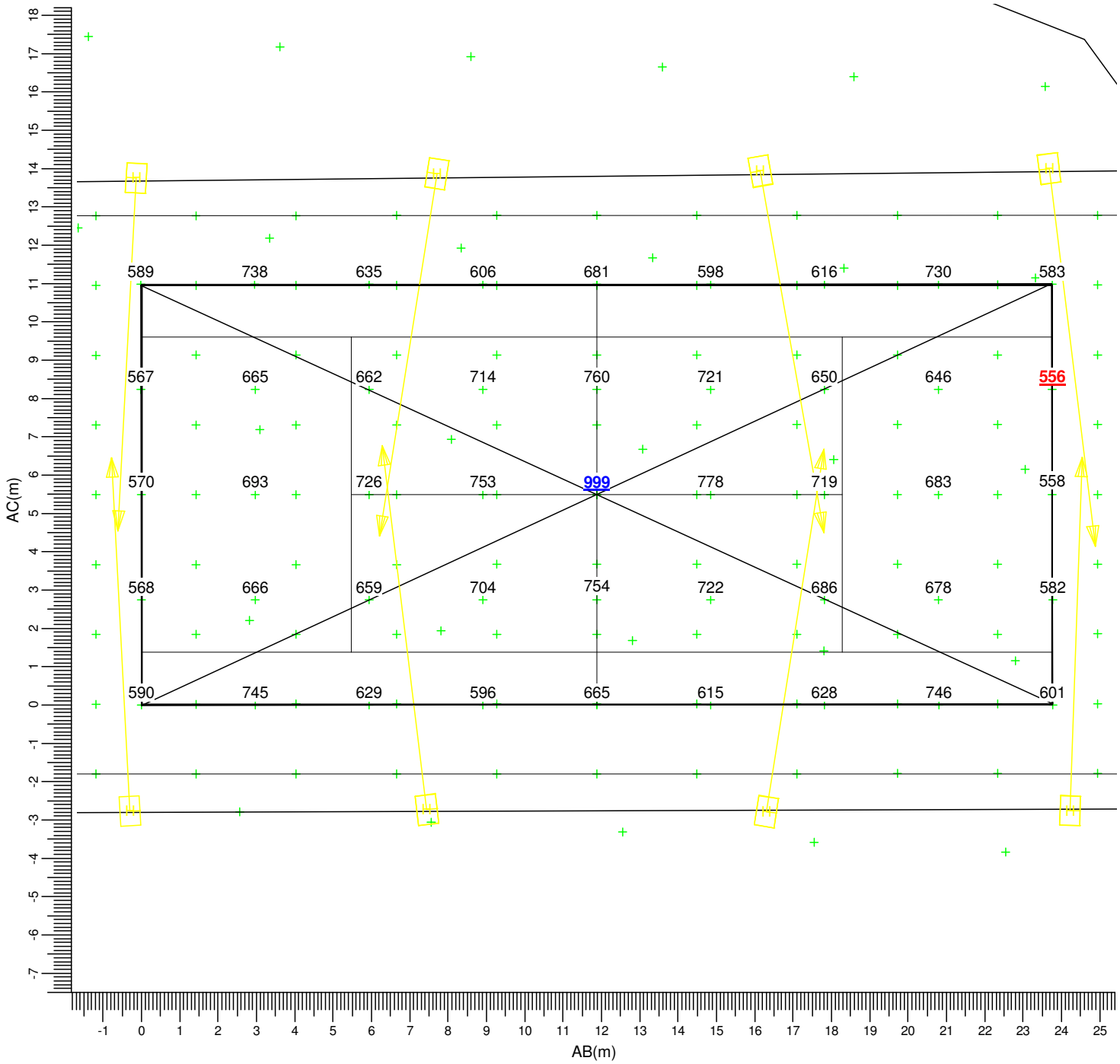
F → BVP651 T25 DX60

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
497	313	748	0.63	0.42	0.95	1:200

3.11 Ct7 PPA: Graphical Table

Ct7 Only

Grid : Ct7 PPA
Calculation : Surface Illuminance (lux)



(16.71, 33.62, -0.00) C-----D (40.45, 34.86, 0.00)
| |
(17.29, 22.66, -0.00) A-----B (41.03, 23.90, -0.00)

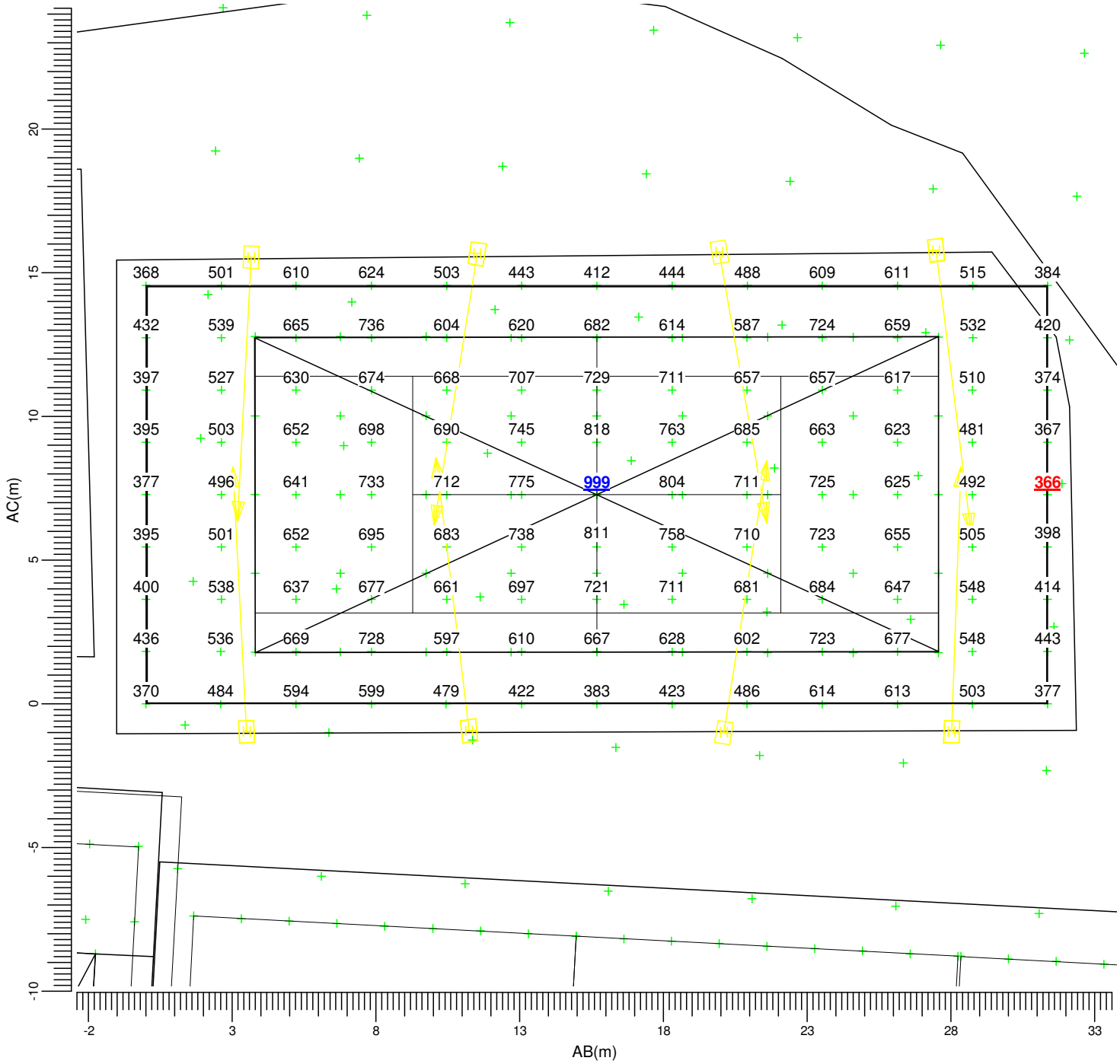
H → BVP651 T25 OFA52

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
667	556	999	0.83	0.56	0.95	1:150

3.12 Ct7 TPA: Graphical Table

Ct7 Only

Grid : Ct7 TPA
Calculation : Surface Illuminance (lux)



(12.83, 35.21, -0.00) C-----D (44.15, 36.86, 0.00)
(13.59, 20.66, -0.00) A-----B (44.91, 22.31, -0.00)

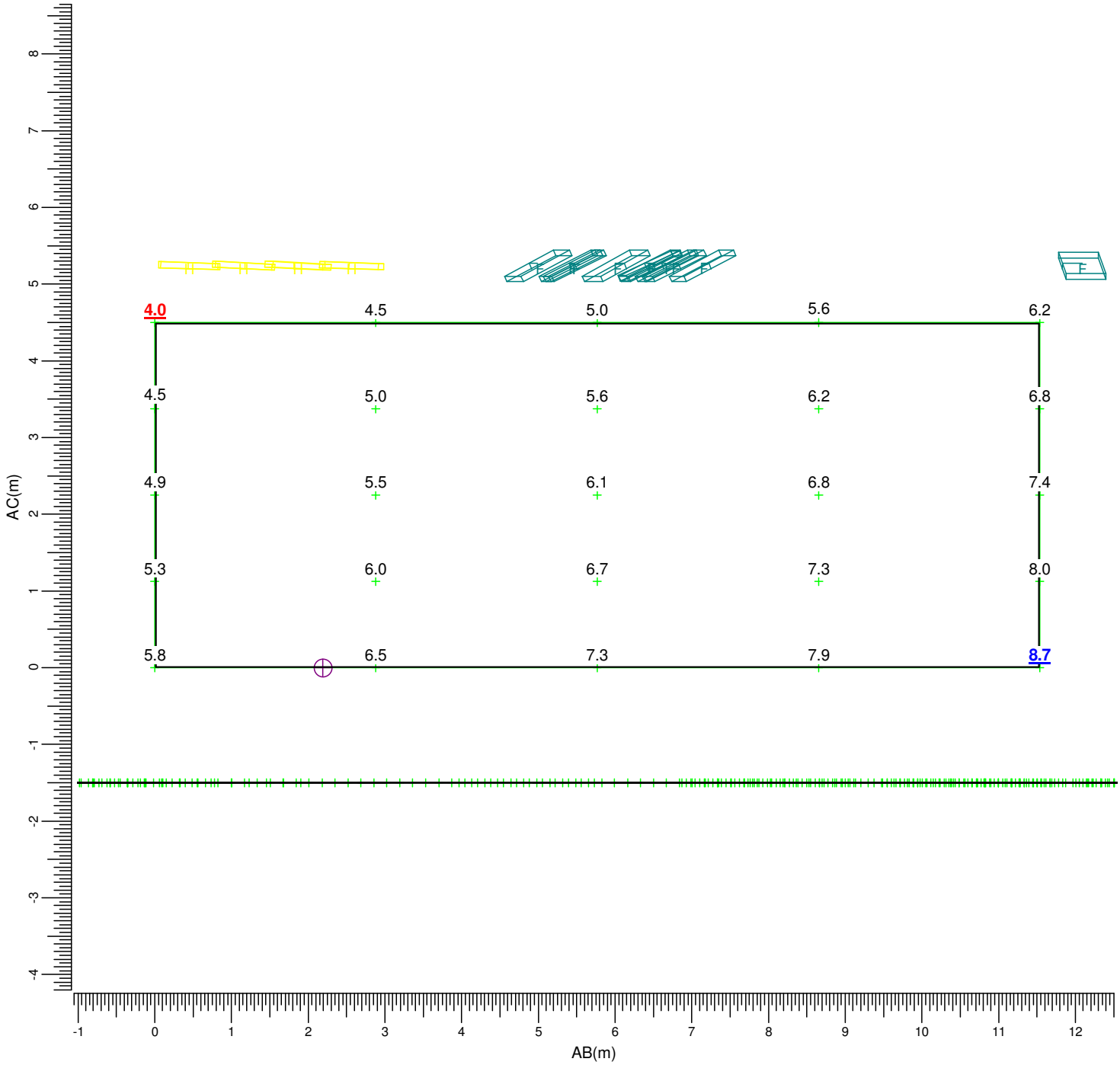
H → BVP651 T25 OFA52

Average	Minimum	Maximum	Min/Ave	Min/Max	Project maintenance factor	Scale
591	366	999	0.62	0.37	0.95	1:200

3.13 Ev Houses West: Graphical Table

All lights on

Grid : Ev Houses West
Calculation : Surface Illuminance (lux)



(-34.35, 24.19, 6.00) C-----D (-34.74, 12.66, 6.00)
| |
(-34.35, 24.19, 1.50) A-----B (-34.74, 12.66, 1.50)

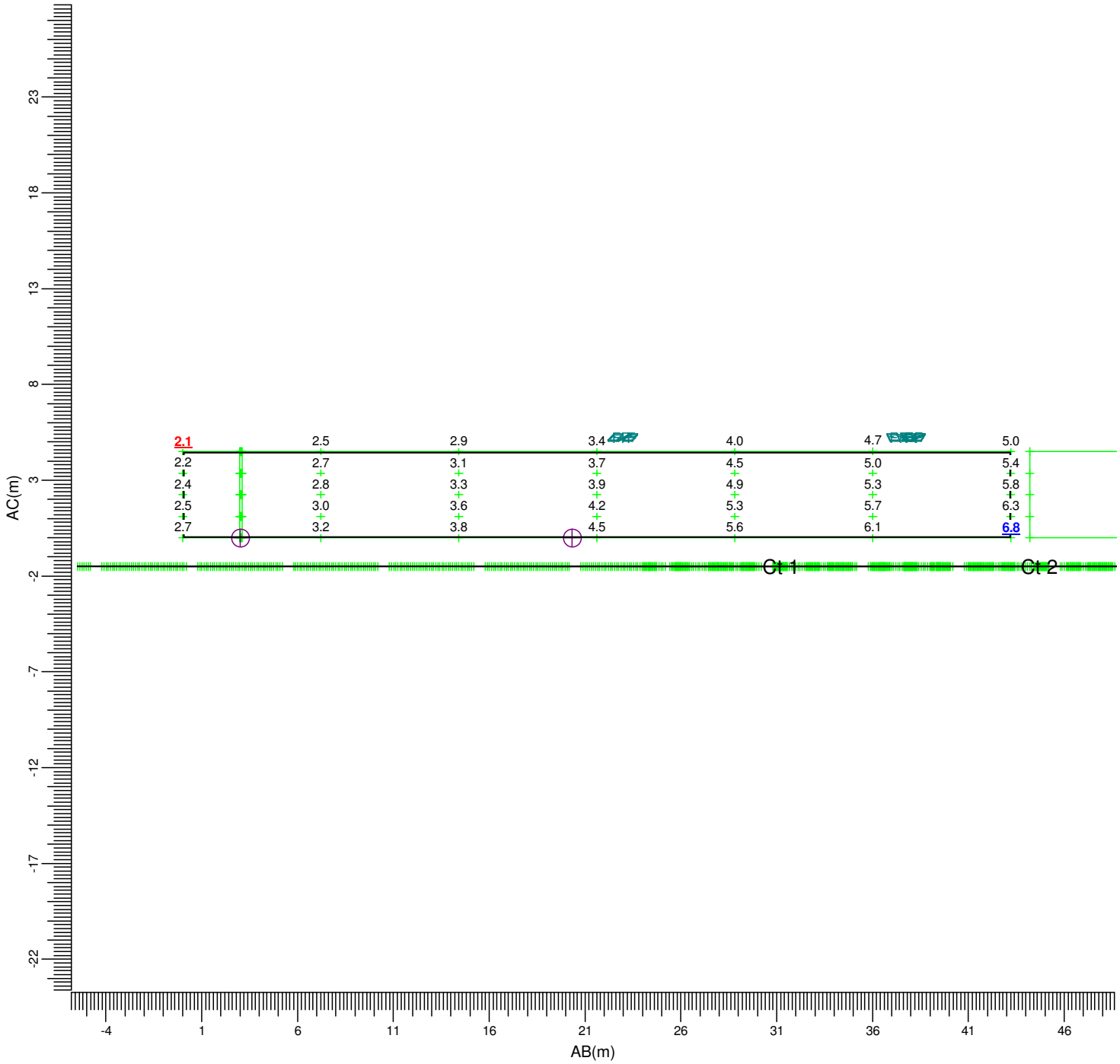
F : BVP651 T25 DX60 H : BVP651 T25 OFA52

Maximum	Project maintenance factor	Scale
8.73	1.00	1:75

3.14 Ev Houses Sth Left side: Graphical Table

All lights on

Grid : Ev Houses Sth Left side
Calculation : Surface Illuminance (lux)



(-38.91, -41.90, 6.00) C-----D (4.30, -42.85, 6.00)
(-38.91, -41.90, 1.50) A-----B (4.30, -42.85, 1.50)

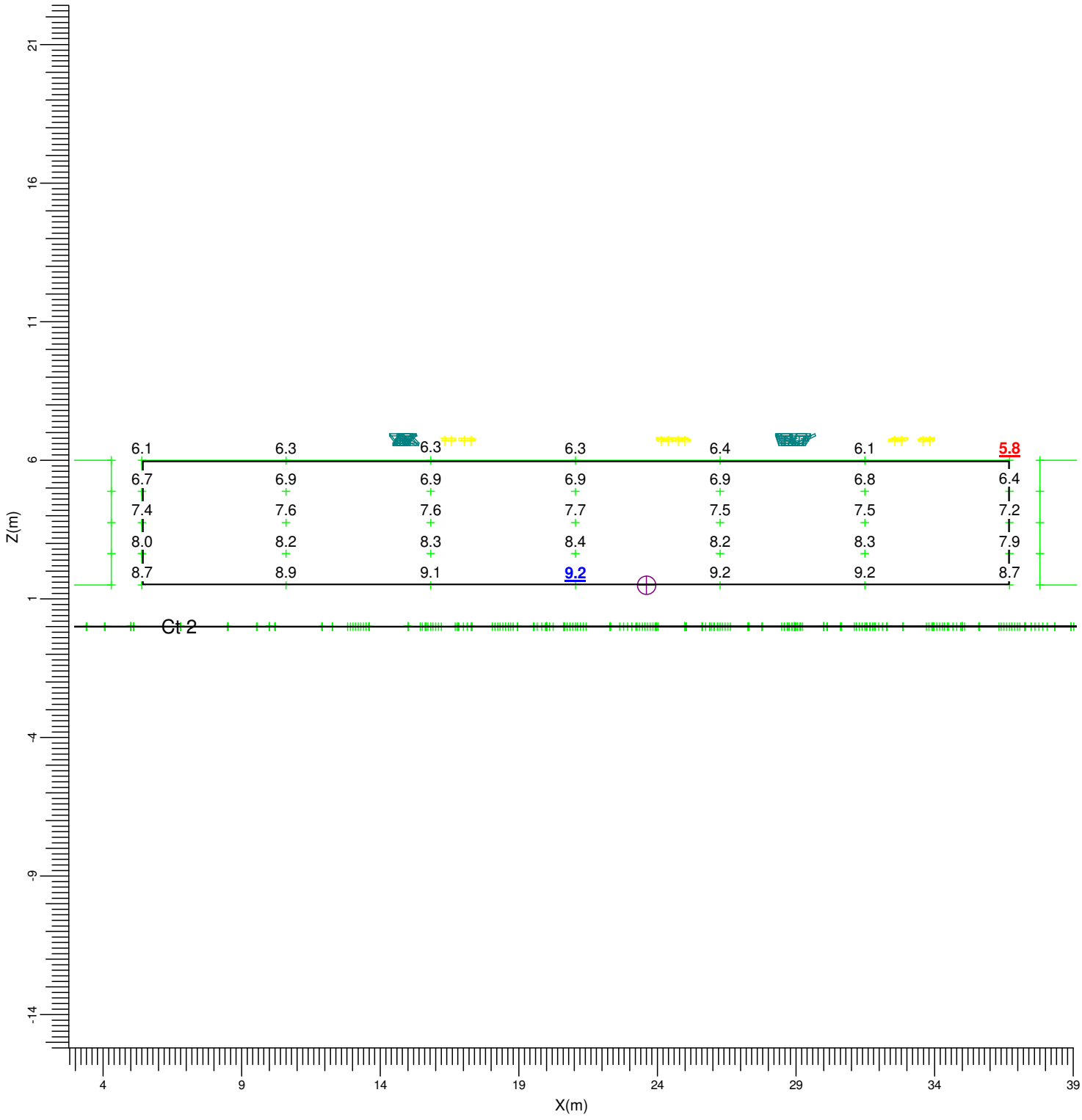
F : BVP651 T25 DX60 H : BVP651 T25 OFA52

Maximum	Project maintenance factor	Scale
6.76	1.00	1:300

3.15 Ev Houses Sth Middle: Graphical Table

All lights on

Grid : Ev Houses Sth Middle at Y = -36.90 m
Calculation : Surface Illuminance (lux)



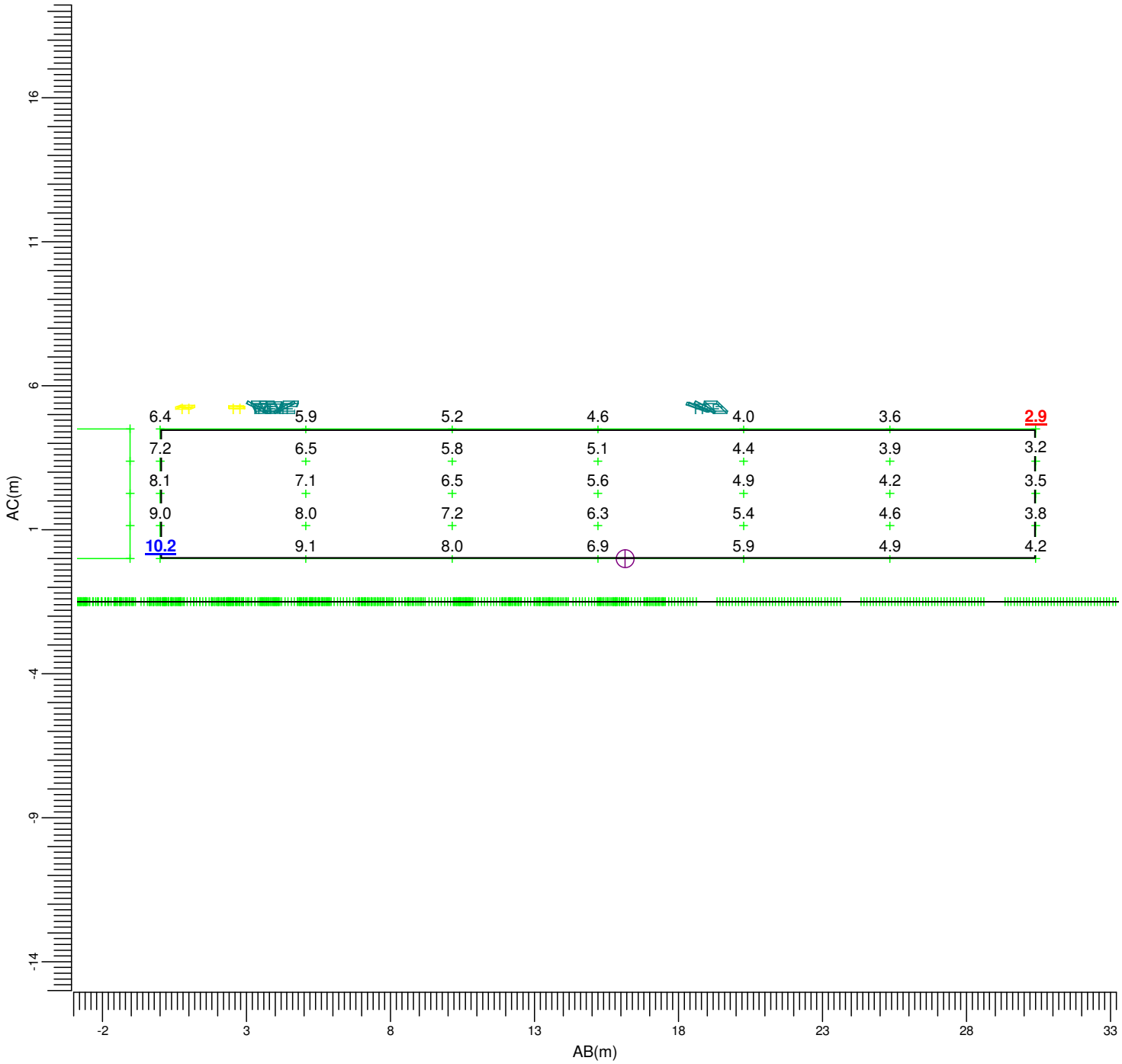
F : BVP651 T25 DX60 H : BVP651 T25 OFA52

Maximum	Project maintenance factor	Scale
9.21	1.00	1:200

3.16 Ev Houses Sth Right side: Graphical Table

All lights on

Grid : Ev Houses Sth Right side
Calculation : Surface Illuminance (lux)



(37.80, -33.60, 6.00) C-----D (68.20, -34.25, 6.00)
(37.80, -33.60, 1.50) A-----B (68.20, -34.25, 1.50)

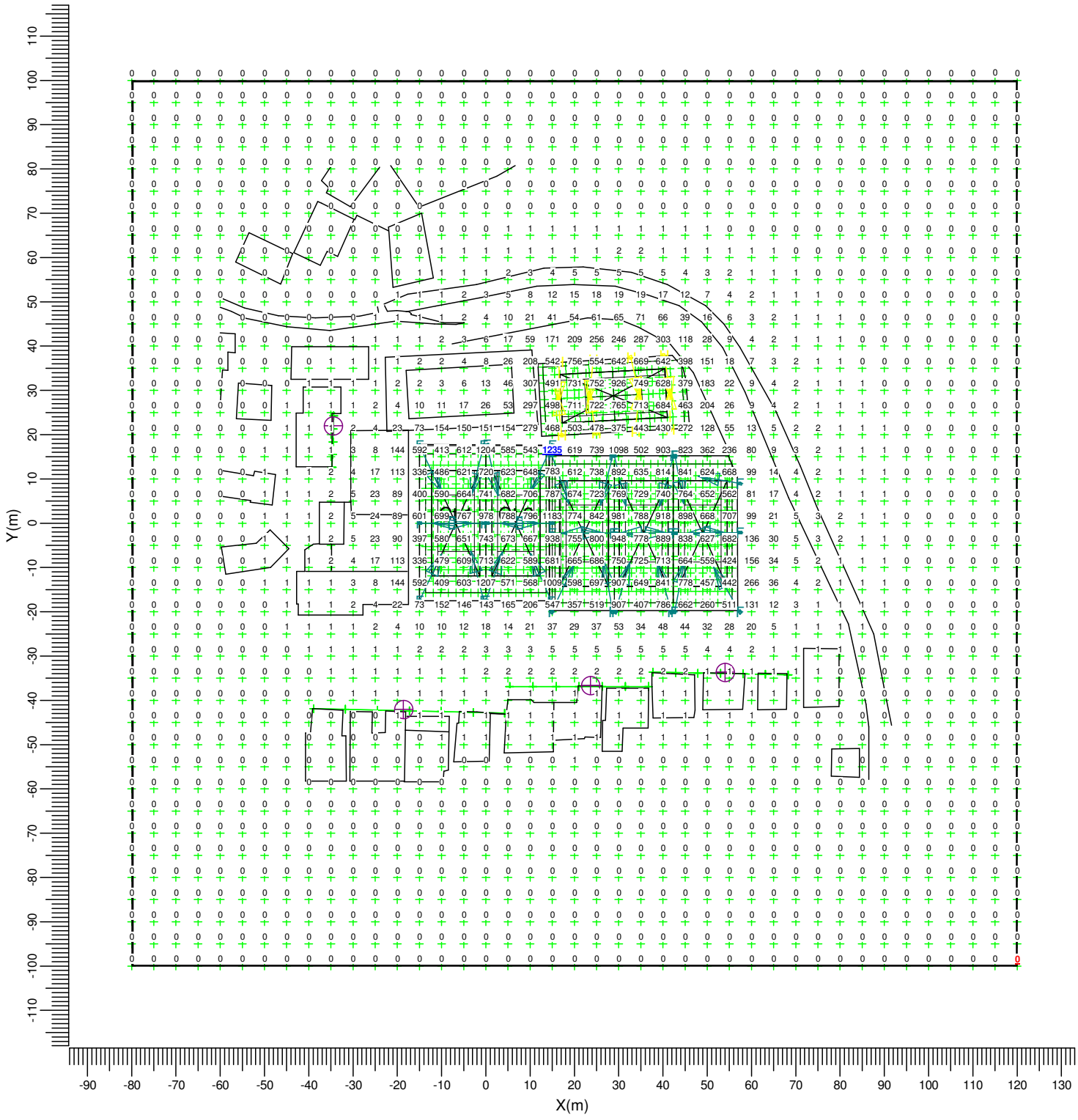
F : BVP651 T25 DX60 H : BVP651 T25 OFA52

Maximum	Project maintenance factor	Scale
10.18	1.00	1:200

3.17 Spillage: Graphical Table

All lights on

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



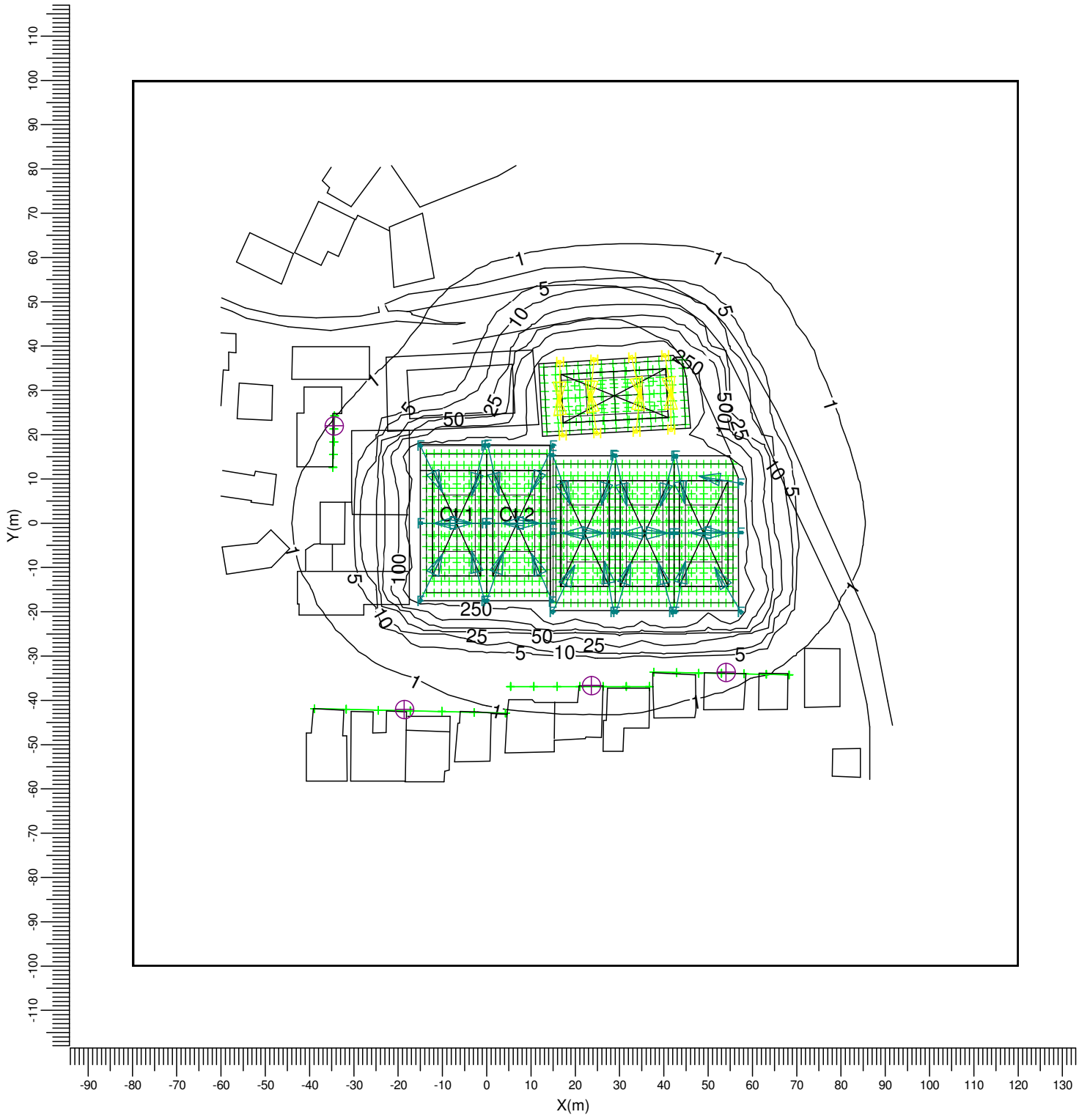
Project maintenance factor
1.00

Scale
1:1250

3.18 Spillage: Iso Contour

All lights on

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



F → BVP651 T25 DX60 H → BVP651 T25 OFA52

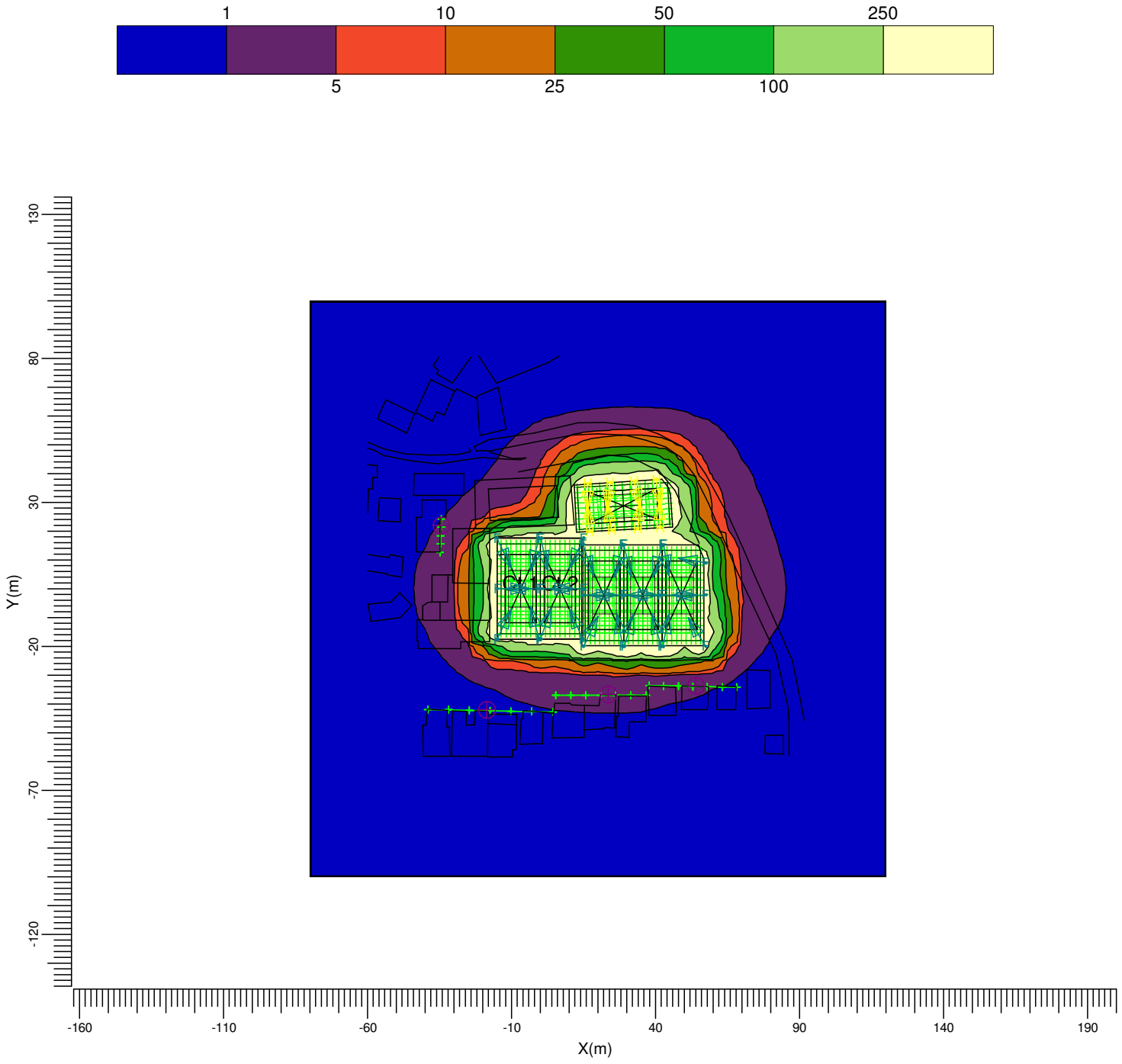
Project maintenance factor
1.00

Scale
1:1250

3.19 Spillage: Filled Iso Contour

All lights on

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



Project maintenance factor
1.00

Scale
1:2000

4. Luminaire Details

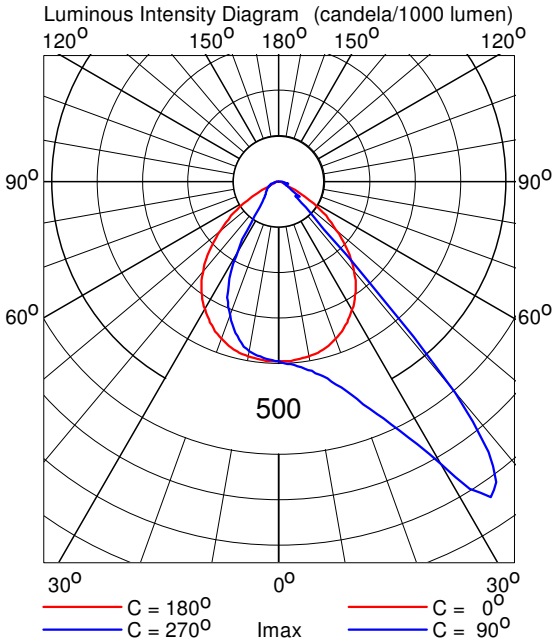
4.1 Project Luminaires

ClearFlood Large
BVP651 T25 1xLED800-4S/740/- - DX60

Light output ratios
- DLOR : 0.87
- ULOR : 0.00
- TLOR : 0.87

Ballast : -
Lamp flux : 80000 lm
Luminaire wattage : 530.0 W
Measurement code : LVE177041B

Note: Luminaire data not from database.



ClearFlood Large
BVP651 T25 1xLED800-4S/740/- - OFA52

Light output ratios
- DLOR : 0.83
- ULOR : 0.00
- TLOR : 0.83

Ballast : -
Lamp flux : 80000 lm
Luminaire wattage : 530.0 W
Measurement code : LVM16A9300

Note: Luminaire data not from database.

