



Environmental Lighting Impact Assessment Report

Old Sarum, Salisbury, Wiltshire

Project number: SHD969

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SHD Lighting Consultancy Ltd

✉: info@shdlighting.co.uk

☎: 07834 490 192

💻: shdlighting.co.uk



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1. INTRODUCTION

1.1 General

- 1.1.1 This report has been prepared by SHD Lighting Consultancy Ltd on behalf of Persimmon Homes, Wessex to support the planning application for the development of an area accessed off Roger Way, Old Sarum, Salisbury (hereafter referred to as the *proposed development*).
- 1.1.2 The report has been prepared by SHD Lighting Consultancy Ltd to the best of our knowledge using information provided by Persimmon Homes, Wessex.
- 1.1.3 The report assesses the potential effects of obtrusive light that could arise from the existing floodlighting installation adjacent to the proposed development.
- 1.1.4 This lighting assessment has been carried out by a Level 4 competent person as per the competency framework provided by the Institution of Lighting Professionals.
- 1.1.5 SHD Lighting Consultancy specialises in lighting impact studies and has the knowledge, experience, and professional qualifications to undertake lighting design calculations and environmental lighting impact assessment reports.
- 1.1.6 SHD Lighting Consultancy Ltd accepts no responsibility or liability for:
- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned.
 - The issue of this document to any third party with whom approval for use has not been agreed.
- 1.1.7 The principal objective is to identify the effects associated with obtrusive light on various sensitive receptors.
- 1.1.8 Obtrusive light or light pollution is any light that strays to areas other than where it is intended and can include light intrusion (spill light) into neighbouring properties, upward light (which can create sky glow), and visual source intensity (glare).
- 1.1.9 The lighting impact assessment considers the maximum adverse scenario concerning the existing lighting, to assess the significance of the potential effects on identified receptors.

2. LEGISLATION, PLANNING AND POLICY GUIDANCE

2.1 Legislative Background

- 2.1.1 Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), which was amended in 2006 to include the following nuisance definition:

“Artificial light emitted from premises so to be prejudicial to health or nuisance”

- 2.1.2 Although light was described as having the potential to cause statutory nuisance, no prescriptive limits or rules were set for impact assessment purposes.

2.2 National Planning Policy Framework

- 2.2.1 The National Planning Policy Framework (NPPF), published on 20th July 2021, sets out the Government planning policies for England and how they are expected to be applied and provides a framework for local plans.
- 2.2.2 Planning policies and decisions should also ensure that the proposed development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions, and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the proposed development.

2.3 Relevant Lighting Standards

Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021): The Institution of Lighting Professionals (ILP)

- 2.3.1 The ILP has proposed lighting guidance and criteria with a recommendation that these be incorporated into the local planning applications.
- 2.3.2 Guidance notes produced by The Institution of Lighting Professionals (ILP) are among the most commonly referenced guidance notes for good practice within the lighting design industry.
- 2.3.3 The ILP guidance notes define various forms of light pollution and describe a series of environmental zones and suitable criteria against which the effects of artificial lighting can be assessed.
- 2.3.4 Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021) as published by The Institution of Lighting Professionals (ILP) should be used in conjunction with CIE 150:2017 and CIE 216:1997 and is not a replacement for the procedures contained therein.
- 2.3.5 Guidance Notes for the Reduction of Obtrusive Light GN01/21 produced by The Institution of Lighting Professionals (ILP) has, therefore, been referred to for this assessment.

CIE 150: Guide on the limitations of the effects of obtrusive light from outdoor lighting installations (2017)

- 2.3.6 The purpose of this guide is to help formulate guidelines for assessing the environmental impacts of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels

CIE 126: Guidelines for Minimising Sky Glow (1997)

- 2.3.7 This document gives general guidance for lighting designers and policymakers on the reduction of sky glow. The report gives recommendations about maximum permissible values for exterior lighting installations.
- 2.3.8 These values are regarded as limiting values. Lighting designers should strive to meet the lowest criteria for the design. Practical implementation of the general guidance is left to national regulations.

The Exterior Environment: Lighting Guide 6 (2016): The Chartered Institution of Building Services Engineers (CIBSE)

- 2.3.9 Lighting Guide 6 provides information and guidance on lighting in the exterior environment particularly light pollution, energy use, and long-term sustainability.

Public Lighting Guide 04: Guidance on Undertaking Environmental Lighting Impact Assessments (2013): The Institution of Lighting Professionals (ILP)

- 2.3.10 Guidance is provided within Public Lighting Guide 04 which outlines the best practice approach to preparing lighting assessments.

3. ASSESSMENT METHODOLOGY

3.1 Environmental Zone Classification

- 3.1.1 All standards consulted are nationally recognised documents, (some internationally also) which deal with all design issues associated with external lighting.
- 3.1.2 CIE Standards, the CIBSE, and the Society of Light & Lighting guidance documents, all apply a common Environmental Zoning system.
- 3.1.3 Using Table 3.1, the proposed development would be classified as having an environmental zone of **E2 Low district brightness**.

ENVIRONMENTAL ZONE CLASSIFICATION AND PARAMETERS			
Zone	Surrounding	Lighting Environment	Example
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty
E2	Rural	Low district brightness	Village or relatively dark outer suburban location
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town or City centres with high levels of night-time activity

Table 3.1: Environmental Zone Classification

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021):

The Institution of Lighting Professionals (ILP)

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed upon with the local planning authority and due to local requirements, a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid-2019 but not retrospective.
6. Astronomical observable dark skies will offer clearer views of the Milky Way and other objects such as the Andromeda galaxy and the Orion Nebula.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their relative intrinsic value in the UK.

3.2 Obtrusive Light Limitation for Outdoor Lighting Installations

- 3.2.1 The ILP Guidance Notes for the Reduction of Obtrusive Light (ILP GN01/21) provide guidelines and threshold values applicable to each environmental zone, which are reproduced in Table 3.2 below.

OBTRUSIVE LIGHT LIMITATIONS FOR EXTERIOR LIGHTING INSTALLATIONS						
Zone	Sky Glow Upward Light Ratio % (i)	Light intrusion into windows, measured in Lux (ii)		Luminaire intensity, measured in kilo candelas (iii)		Building luminance, (cd/m ²) (iv)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Pre-curfew
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2.5	0	0
E2	2.5	5	1	7.5	0.5	5
E3	5.0	10	2	10	1	10
E4	15	25	5	25	2.5	25

Table 3.2: Obtrusive Light Limitations

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021):

The Institution of Lighting Professionals (ILP)

Upward light ratio of the installation – the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky

- I. Vertical illuminance measured flat at the glazing at the centre of the window
- II. Light intensity in kilo candelas
- III. Luminance in candelas per square metre (cd/m²)
 - From public road lighting installations only

- 3.2.2 The proposed development is within an E2 Environmental Zone, with Table 3.2 providing the maximum permissible values of lux for light intrusions into windows.
- 3.2.3 Pre-curfew is considered before 23:00, with a maximum value of 5 lux must not be exceeded, and post-curfew after 23:00, with a maximum value of 1 lux must not be exceeded.
- 3.2.4 It is assumed that no training or events will take place after 23:00, therefore it is expected that the floodlighting units will not be in operation after 23:00.

3.3 Obtrusive Light

- 3.3.1 Obtrusive light (sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users.
- 3.3.2 Nuisance/intrusion, the spilling of light beyond the area or property being lit. Light nuisance can include intrusion into windows of neighbouring properties, but it can also cause issues to habitats and areas of high biodiversity interest.
- 3.3.3 Sky glow, this is the glow that is visible around urban areas resulting from the scattering of artificial light. Sky glow is light from reflected surfaces and badly directed light sources illuminating air molecules and other particles. A major effect of sky glow at night is to reduce contrast in the sky. This is the most pervasive form of light pollution and can affect areas many miles from the original light source.
- 3.3.4 Glare, the uncomfortable brightness of a light source when viewed against a contrasting darker background. Glare forms a veil of luminance from poorly controlled and directed lighting that reduces contrast and visibility.

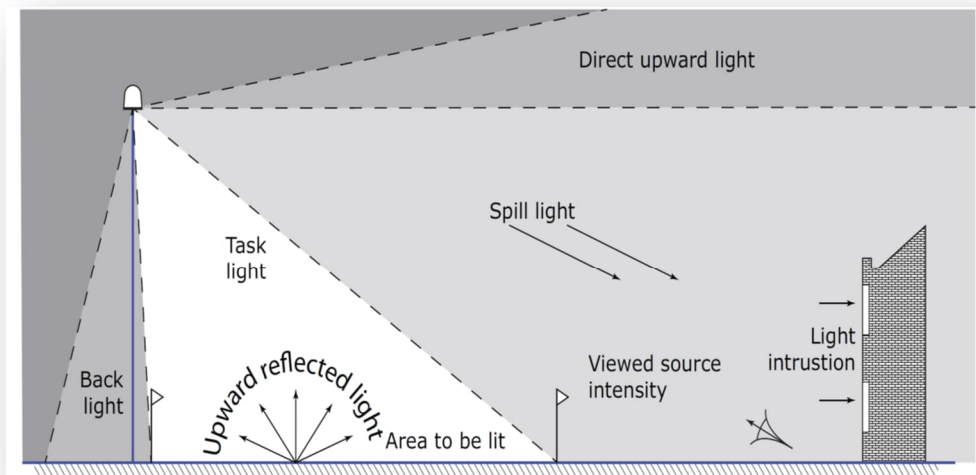


Figure 3.1: Obtrusive light diagram

Extract from Guidance Notes for the Reduction of Obtrusive Light; GN01/21 (2021):

The Institution of Lighting Professionals (ILP)

BASELINE CONDITIONS

3.4 Site Overview

- 3.4.1 The site for the proposed development is off Roger Way, Old Sarum, Salisbury, Wiltshire which is adjacent to an existing football ground, and is located southwest of the proposed development.
- 3.4.2 The area in the vicinity of the proposed development is fairly rural with several new build developments surrounding the site.
- 3.4.3 Information in this report will assess the impact of the existing floodlighting system which will illuminate the football pitch during the hours of darkness for training and other events on the proposed house plots.



Figure 3.2: Proposed development boundary outline (Aerial View)

3.5 Existing Lighting

- 3.5.1 The proposed development is mostly open grassland within the boundaries of the existing developed area and is located between the existing houses and the football ground to the northeast edge.
- 3.5.2 The existing road system in the vicinity of the proposed development has a series of street lighting columns which are owned and maintained by the Local Authority and illuminate the adopted highway during the hours of darkness.
- 3.5.3 Figure 3.3 shows the existing street lighting columns on Roger Way along with the existing floodlighting masts.



Figure 3.3: Existing street lighting columns

4. LIGHTING STRATEGY

4.1 Lighting Brief

4.1.1 Lighting performance details outlined in this section of the document are to be considered in conjunction with the following key documents:

- SHD969-SHD-HLG-SALI-DR-EO-Lighting Calculation-R5

4.2 Lighting Criteria

4.2.1 Floodlighting is currently provided in the area edge in yellow below.:



Figure 4.1: Salisbury Football Club pitch

4.3 Lighting Calculations and Modelling

- 4.3.1 The existing lighting luminaire parameters were extracted from a previous lighting design completed in 2021 by another lighting consultancy.
- 4.3.2 SHD Lighting Consultancy then used the existing luminaire information and replicated the design using a revised housing development layout plan (162 Model 1.3) provided by Persimmon Homes, using Dialux lighting simulation software.
- 4.3.3 Dialux is a lighting calculation package that utilises manufacturers photometric data files to simulate the lighting output of chosen light fittings.
- 4.3.4 It is to be noted that the Dialux calculation report has been produced with a luminaire maintenance factor of 1.00 as specified in the ILP publication, Public Lighting Guide 04 – Guidance on undertaking an Environmental Assessment Report.
- 4.3.5 It defines a maintenance factor of 1.00 as being the worst-case scenario as all the outdoor lighting will be performing at peak intensity as it does not factor light source depreciation, environment conditions, or luminaire driver deterioration which would all occur over the lifespan of the floodlighting installation.
- 4.3.6 Light spill calculations and isolux contour lines are all based on the luminaires at full output, with a maintenance factor of 1.00, as this will represent the worst-case scenario.
- 4.3.7 The calculation model does not include any proposed or existing planting/ hedgerows/ trees on site, or in the surrounding area.

4.4 Sensitive Receptors

- 4.4.1 The proposed development is to be built northeast of an existing football pitch. The geometry of the house plots means several plots face the existing football pitch.

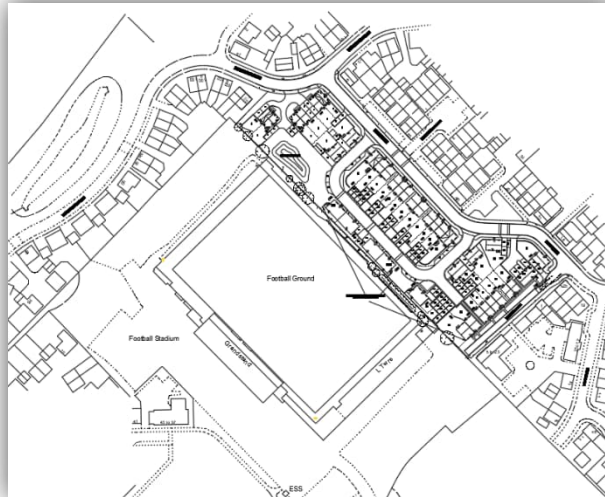


Figure 4.2: Development layout adjacent to existing football pitch

- 4.4.2 The house plots nearest the pitch have been designed so there are no external windows on the facades facing the pitch.
- 4.4.3 House plots 1, 2, 9/10, 11, 12, 13/14, 27 & 28 are the closest properties facing the pitch, with plots 15 to 26 facing the pitch set further away from the pitch.

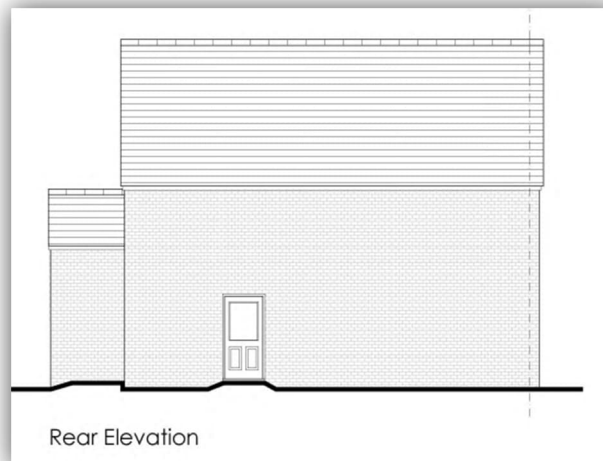


Figure 4.3: Plot style 9/10, 13/14 & 27/28

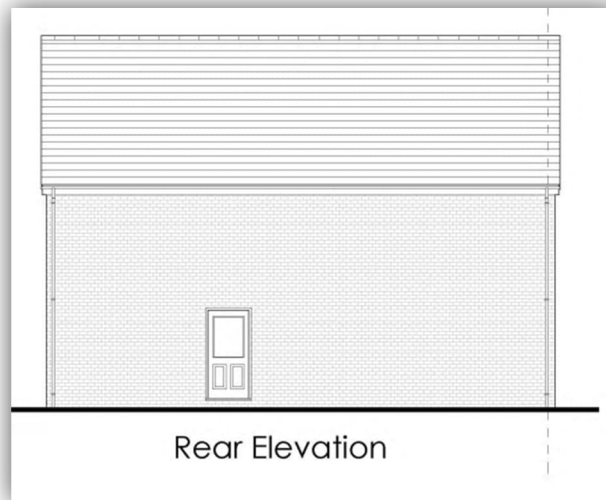


Figure 4.4: Plot style 11 & 12

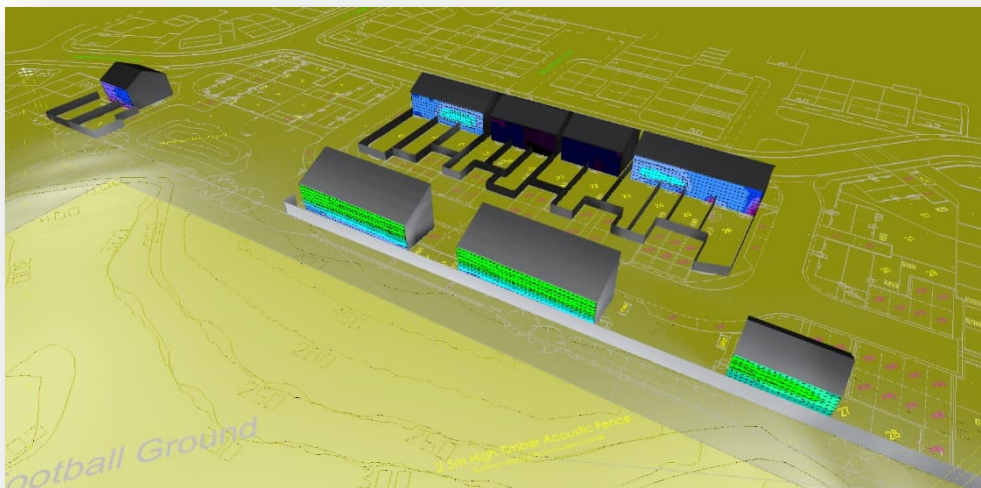
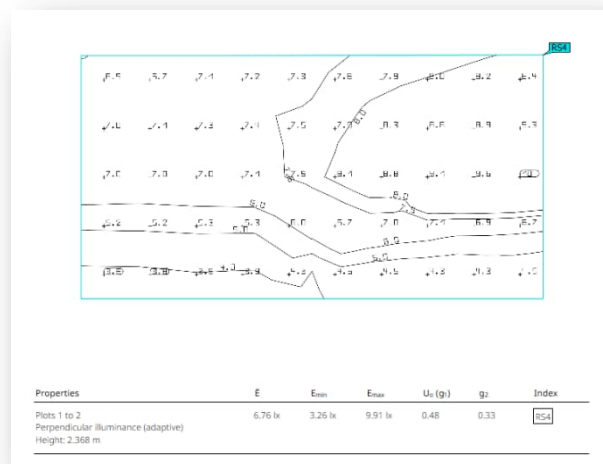
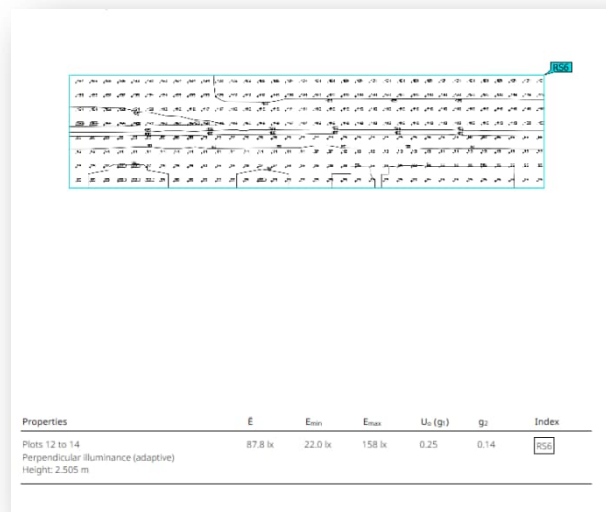


Figure 4.5: 3D models showing house plots facing pitch

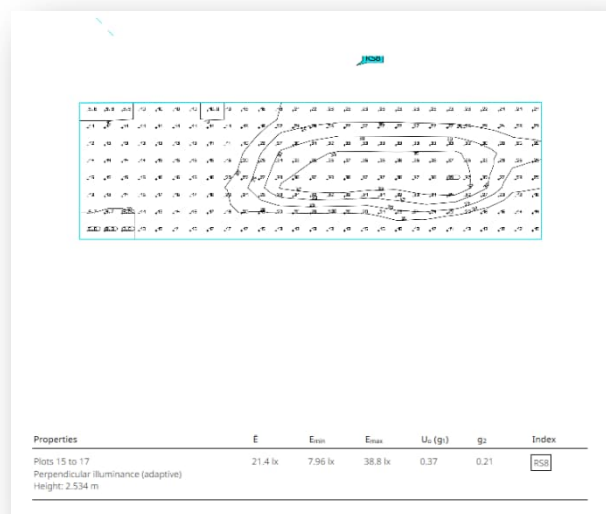
4.5 Calculated Light Spill

- 4.5.1 Each of the house plots façade that faces the pitch, had a lighting simulation calculation grid, drawn from ground level, covering the full façade.
- 4.5.2 Each calculation grid measures the levels of light spill onto the vertical surface.
- 4.5.3 The maximum permissible level of light into windows as described in Section 3.2 of this assessment report is 1.00lux, pre curfew.
- 4.5.4 Pre curfew is considered to be before 23:00, therefore only pre curfew needs to be considered as the lights will not be in operation beyond 23:00.





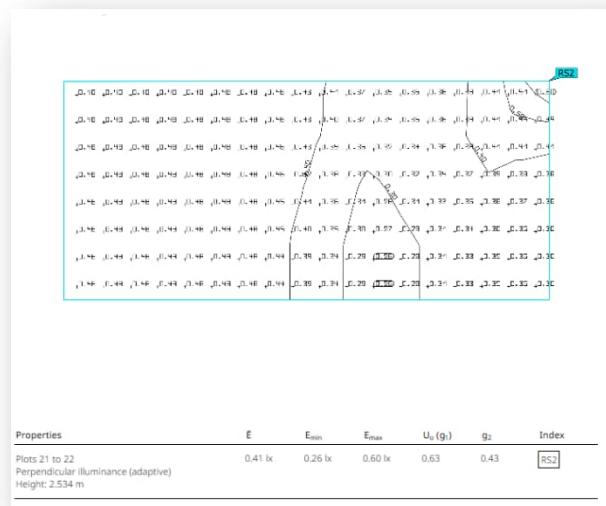
4.5.7 Plot 12 to 14 has a maximum calculated level of 158.00 lux, therefore exceeds 5.00 lux, however this style of house plot does not have any windows facing the pitch, so isn't considered to be affected.



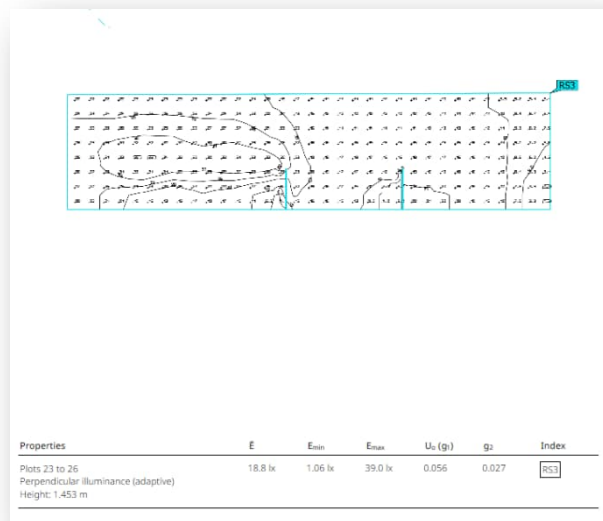
4.5.8 Plot 15 to 17 has a maximum calculated level of 38.80 lux, therefore exceeds 5.00 lux.



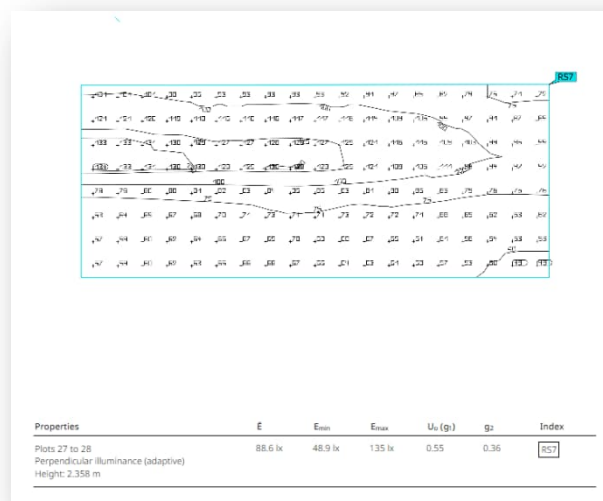
4.5.9 Plot 18 to 20 has a maximum calculated level of 0.52 lux, therefore is below 5.00 lux.



4.5.10 Plot 21 to 22 has a maximum calculated level of 0.60 lux, therefore is below 5.00 lux.



4.5.11 Plot 23 to 26 has a maximum calculated level of 39.00 lux, therefore exceeds 5.00 lux.



4.5.12 Plot 27 & 28 has a maximum calculated level of 135.00 lux, therefore exceeds 5.00 lux.

CONCLUSION

4.6 Expected Lighting Times

- 4.6.1 Consultee comments raised concerns with the possibility of lighting remaining on past 23:00.
- 4.6.2 For context the latest a football match in the UK will kick off is 20.00, it is noted that Salisbury FC had 3 home games within the 2023/24 season kicking off at 19.45 midweek this year with only one being a game that had the possibility of running into extra time.
- 4.6.3 It is, therefore, sensible to look at the timings as such with a standard football match being 90 minutes with a 15 minute break for halftime, when considering any additional stoppage, normal games that are not cup games (i.e. no possibility of Extra Time) will cease at around 21.45 with the stadium vacant shortly after.
- 4.6.4 If considering a cup game kicking off at the same time and duration but the possibility of 30 minutes extra time and the possibilities of penalties the match under any normal circumstances would cease before 22.30 again with the stadium vacant shortly after.
- 4.6.5 There are very little circumstances under which lights should remain on past 23:00 (curfew).

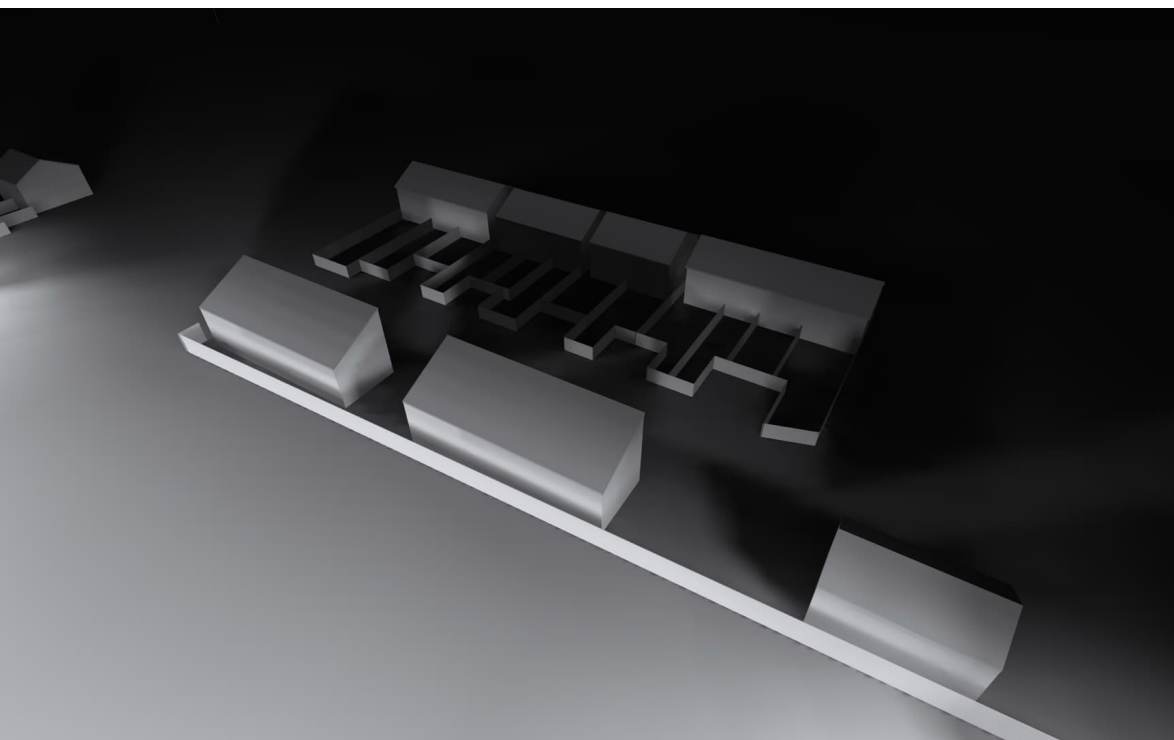
4.7 Recommendations

- The scheme has been carefully designed to minimise potential impacts on the amenity of future occupants from existing floodlighting. In particular, the plots closest to the football ground have been designed without external windows on facades facing the pitch. Additionally, a 2.5m high timber noise fence along the boundary will provide further mitigation against light spill.
- Notwithstanding these measures, this report acknowledges that windows at Plots 1-2, 15-17, and 23-28 are likely to experience light levels exceeding 5 lux during evening matches at Salisbury FC. All affected plots are to be sold on the open market and do not form part of the Affordable Housing provision.
- During the 2023/24 season, Salisbury FC hosted three evening matches.
- It will be for the local planning authority to determine whether any adverse impacts arising from floodlighting outweigh the benefits of the development when assessed against the National Planning Policy Framework as a whole.
- Should the local planning authority consider the impact on these plots to be significant, it may wish to impose a planning condition requiring the submission and approval of a scheme for installing window coverings or blinds for affected plots.

5. APPENDIX A

5.1 Light Calculation Report

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SHD969-SHD-HLG-SALI-CA-EO-Lighting Calculation-R5

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Storey 1

Plots 1 to 2 / Light scene 1 / Perpendicular illuminance (adaptive)	9
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Site 1 - Plots 9 to 11

Storey 1

Plots 9 to 11 / Light scene 1 / Perpendicular illuminance (adaptive)	10
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Site 1 - Plots 12 to 14

Storey 1

Plots 12 to 14 / Light scene 1 / Perpendicular illuminance (adaptive)	11
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Site 1 - Plots 15 to 17

Storey 1

Plots 15 to 17 / Light scene 1 / Perpendicular illuminance (adaptive)	12
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Storey 1

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Site 1 - Plots 21 to 22

Storey 1

Plots 21 to 22 / Light scene 1 / Perpendicular illuminance (adaptive) 14

Site 1 - Plots 23 to 26

Storey 1

Plots 23 to 26 / Light scene 1 / Perpendicular illuminance (adaptive) 15

Site 1 - Plots 27 to 28

Storey 1

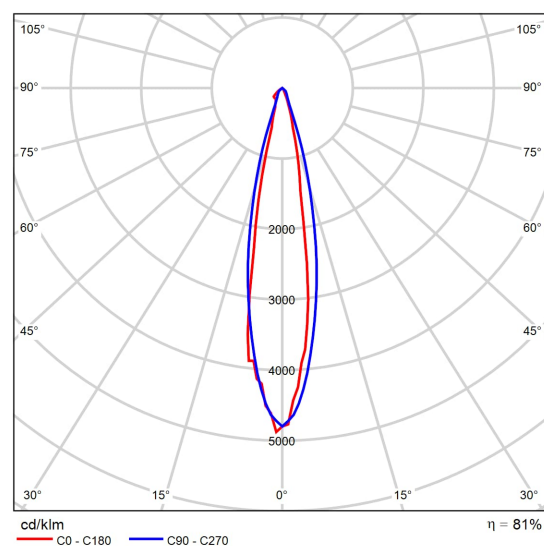
Plots 27 to 28 / Light scene 1 / Perpendicular illuminance (adaptive) 16

Product data sheet

Thorn Lighting - ALTIS 2KW R5 HQITS-S CL1 WI



Article No.	96263374 (STD - standard)
P	2075.0 W
Φ_{Lamp}	200000 lm
$\Phi_{\text{Luminaire}}$	162620 lm
η	81.31 %
Luminous efficacy	78.4 lm/W
CCT	3000 K
CRI	100



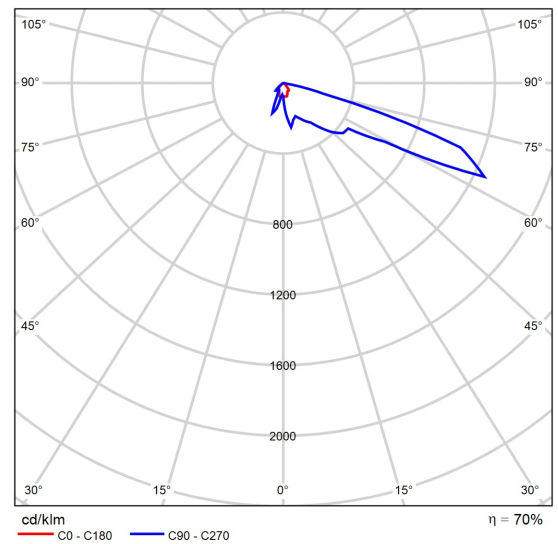
Polar LDC

Product data sheet

Thorn Lighting - Champion 2KW Osram HQI-TS long arc. V1



Article No.	CHAMP2SLA(V1)
P	2089.0 W
Φ_{Lamp}	200000 lm
$\Phi_{\text{Luminaire}}$	140333 lm
η	70.17 %
Luminous efficacy	67.2 lm/W
CCT	4000 K
CRI	100



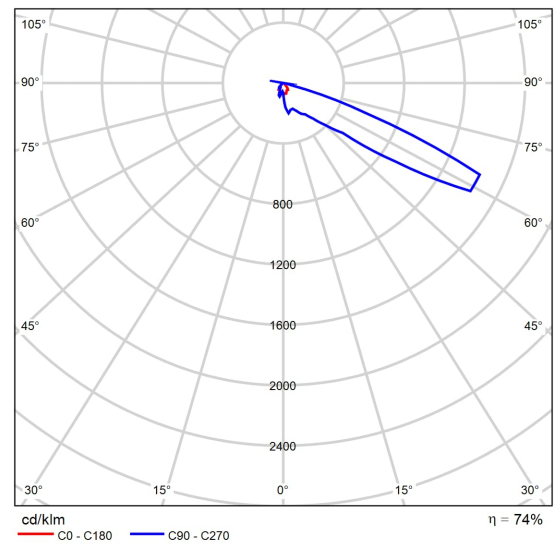
Polar LDC

Product data sheet

Thorn Lighting - Champion 2KW Osram HQI-TS long arc. V2



Article No.	CHAMP2SLA(V2)
P	2089.0 W
Φ_{Lamp}	200000 lm
$\Phi_{\text{Luminaire}}$	148123 lm
η	74.06 %
Luminous efficacy	70.9 lm/W
CCT	4000 K
CRI	100



Polar LDC

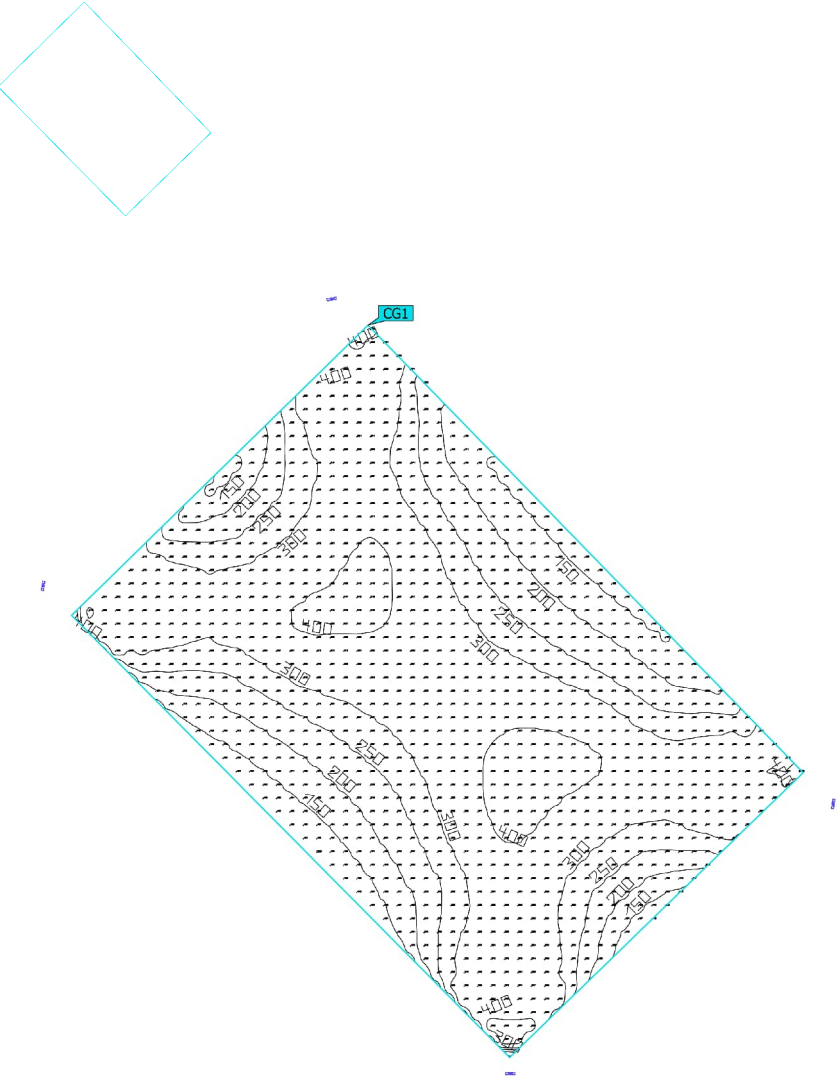
Site 1

Luminaire list

Φ_{total} 4111952 lm	P_{total} 58436.0 W	Luminous efficacy 70.4 lm/W
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pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
4	Thorn Lighting	96263374 (STD - standard)	ALTIS 2KW R5 HQITS-S CL1 WI	2075.0 W	162620 lm	78.4 lm/W
12	Thorn Lighting	CHAMP2SL A(V1)	Champion 2KW Osram HQI-TS long arc. V1	2089.0 W	140333 lm	67.2 lm/W
12	Thorn Lighting	CHAMP2SL A(V2)	Champion 2KW Osram HQI-TS long arc. V2	2089.0 W	148123 lm	70.9 lm/W

Site 1 (Light scene 1)
Football Pitch Surface

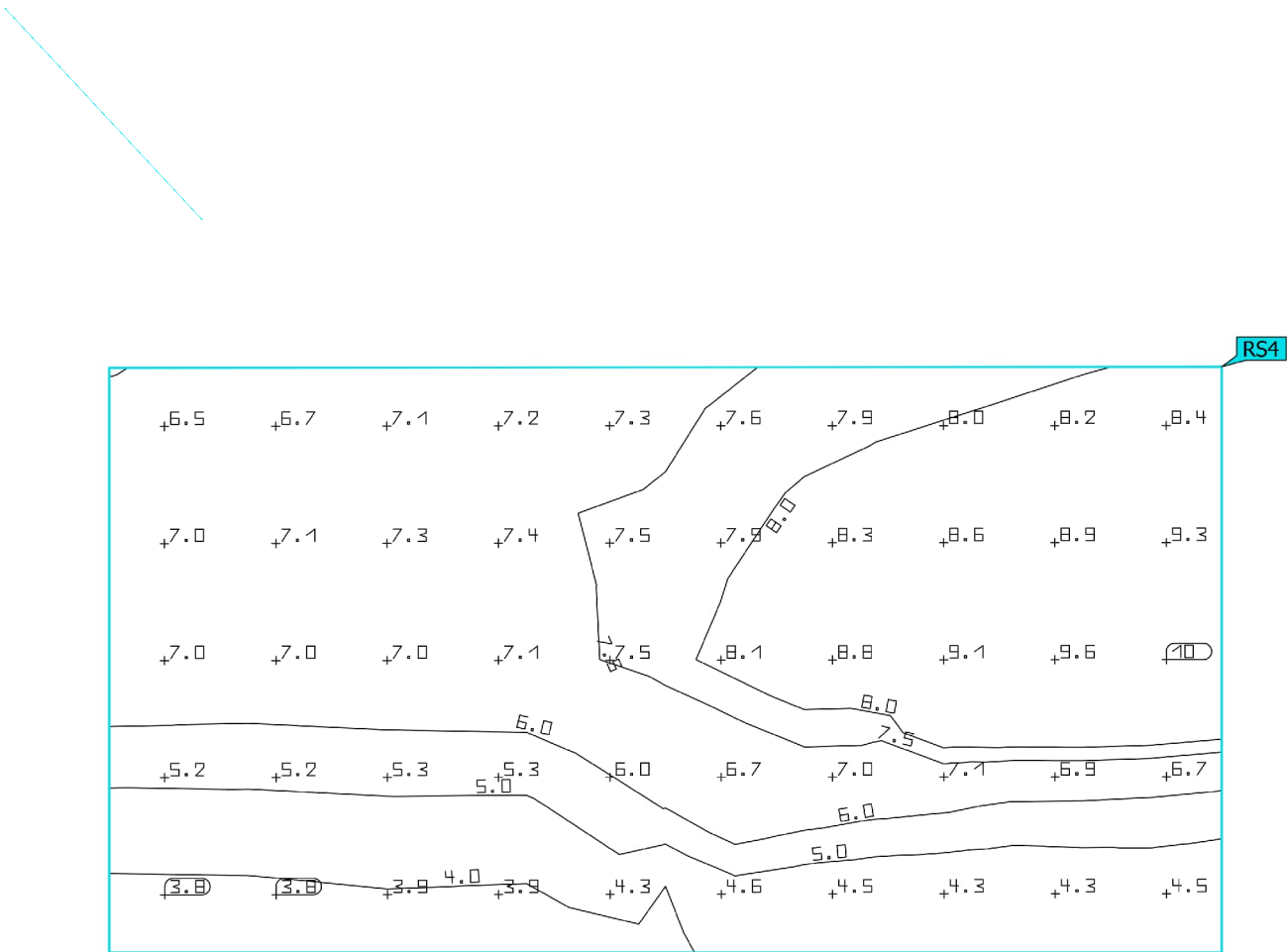


Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Football Pitch Surface Horizontal illuminance Height: 0.000 m	292 lx	106 lx	461 lx	0.36	0.23	CG1

Utilisation profile: General circulation areas at outdoor workplaces (5.1.3 Regular vehicle traffic (max. 40km/h))

Plots 1 to 2 · Storey 1 (Light scene 1)

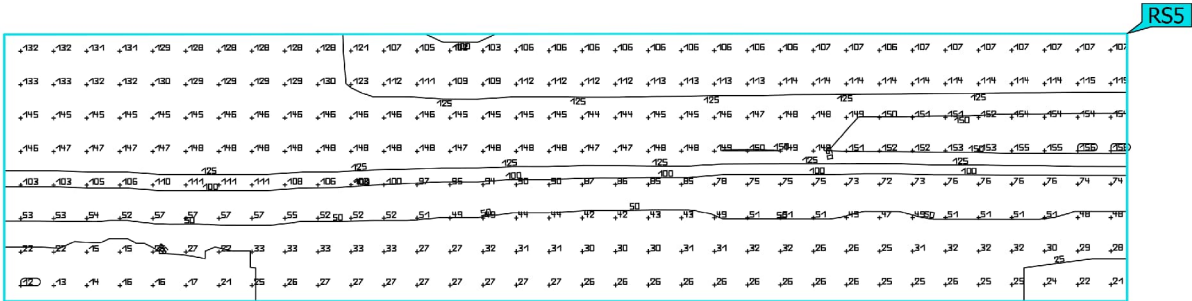
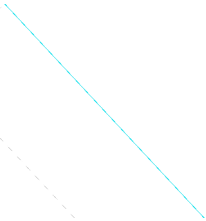
Plots 1 to 2



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 1 to 2 Perpendicular illuminance (adaptive) Height: 2.368 m	6.76 lx	3.26 lx	9.91 lx	0.48	0.33	RS4

Plots 9 to 11 · Storey 1 (Light scene 1)

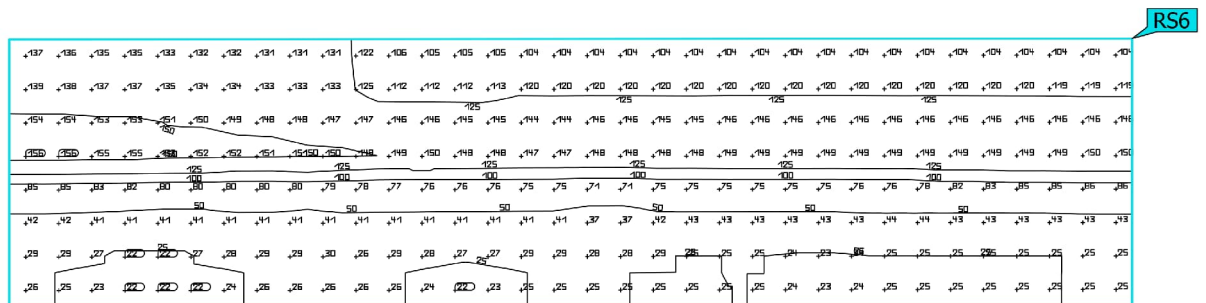
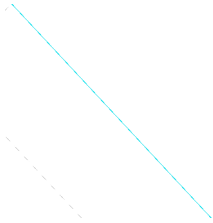
Plots 9 to 11



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 9 to 11	89.6 lx	11.8 lx	155 lx	0.13	0.076	RS5
Perpendicular illuminance (adaptive)						
Height: 2.505 m						

Plots 12 to 14 · Storey 1 (Light scene 1)

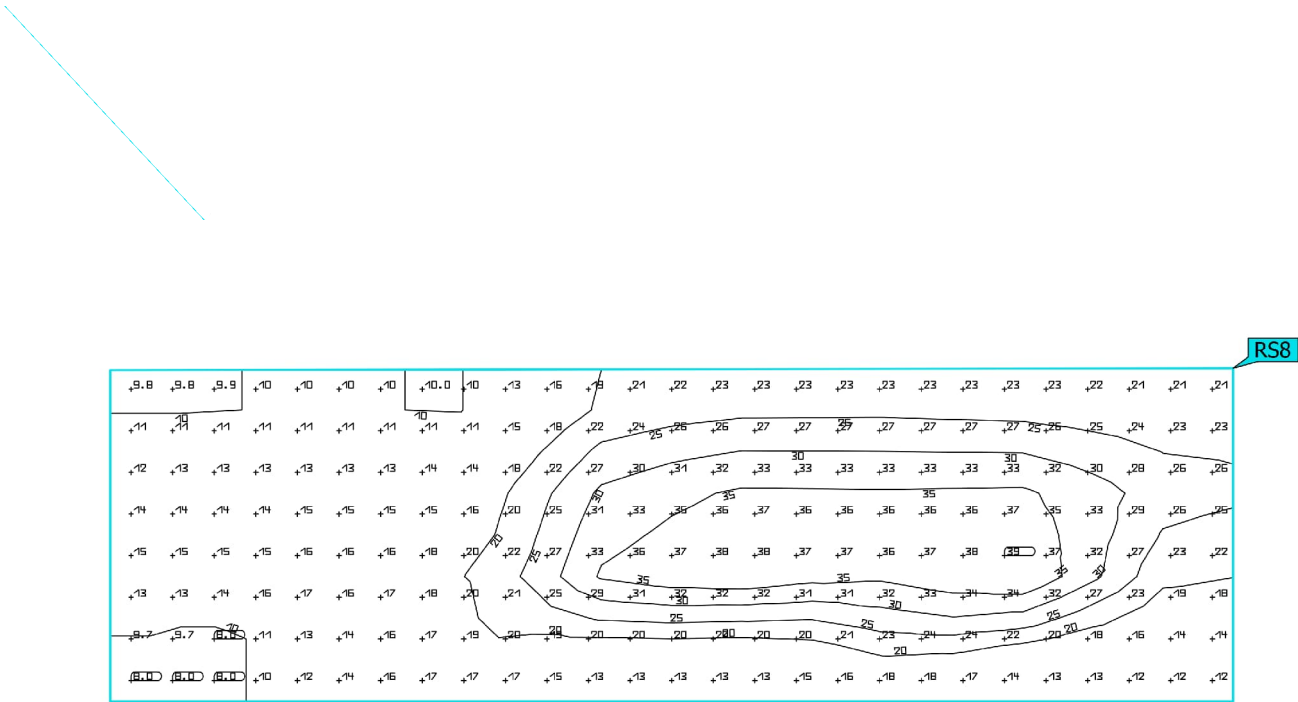
Plots 12 to 14



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 12 to 14	87.8 lx	22.0 lx	158 lx	0.25	0.14	RS6
Perpendicular illuminance (adaptive)						
Height: 2.505 m						

Plots 15 to 17 · Storey 1 (Light scene 1)

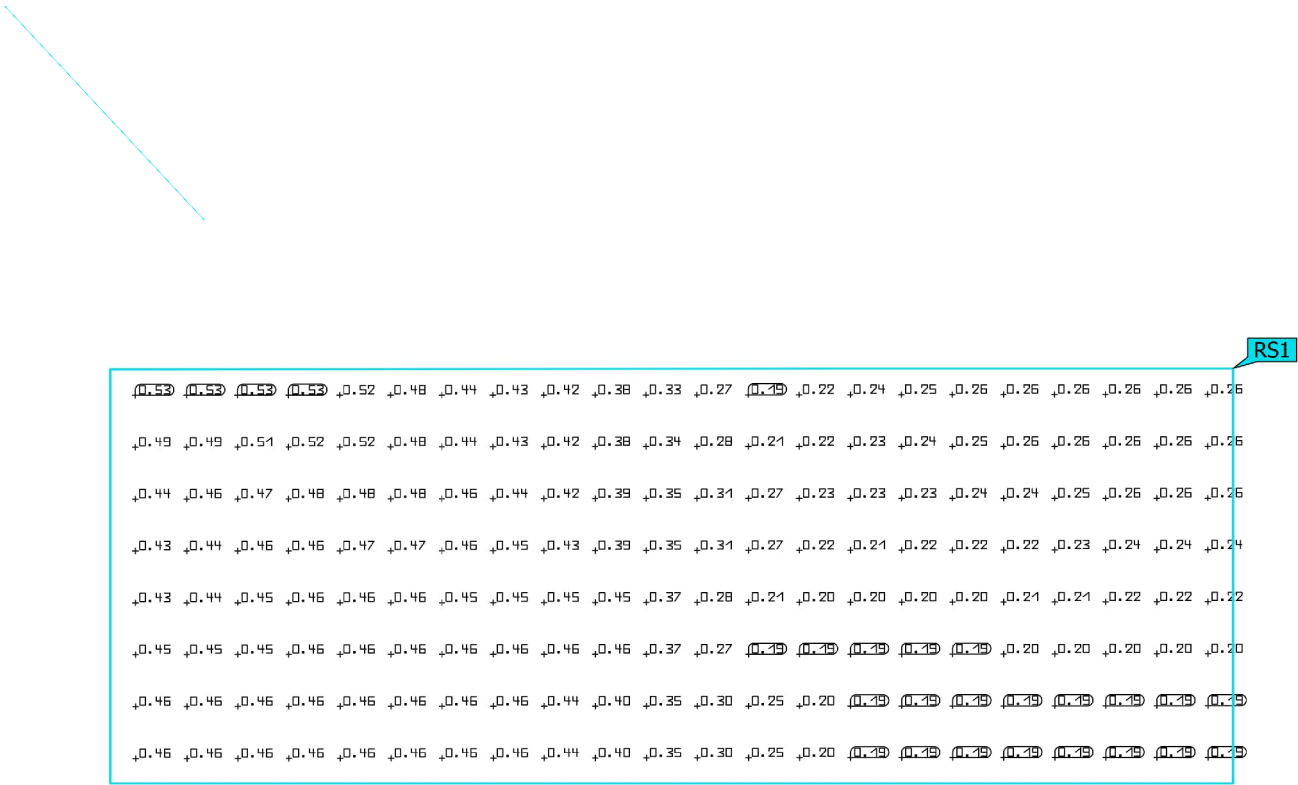
Plots 15 to 17



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 15 to 17 Perpendicular illuminance (adaptive) Height: 2.534 m	21.4 lx	7.96 lx	38.8 lx	0.37	0.21	RS8

Plots 18 to 20 · Storey 1 (Light scene 1)

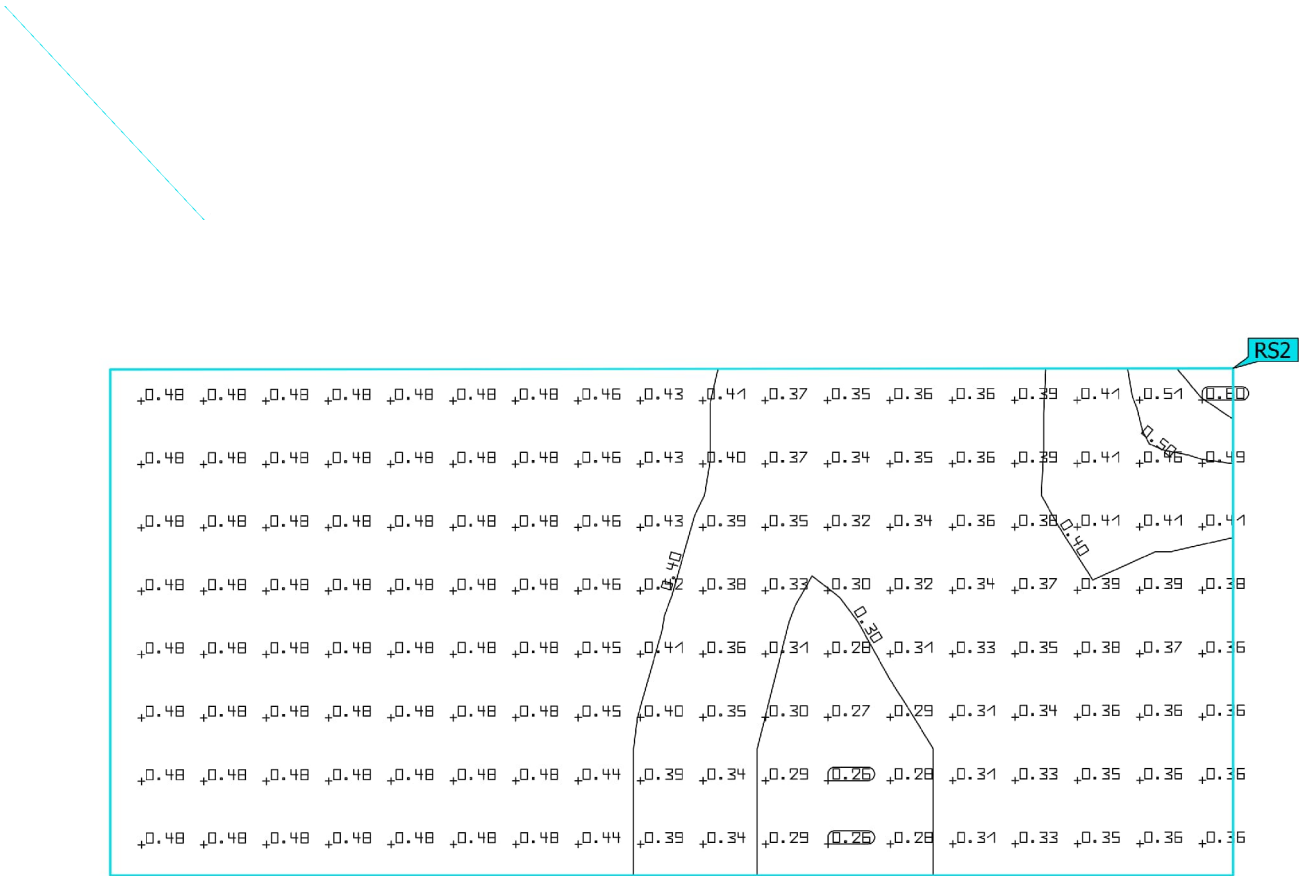
Plots 18 to 20



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 18 to 20 Perpendicular illuminance (adaptive) Height: 2.525 m	0.34 lx	0.19 lx	0.52 lx	0.56	0.37	RS1

Plots 21 to 22 · Storey 1 (Light scene 1)

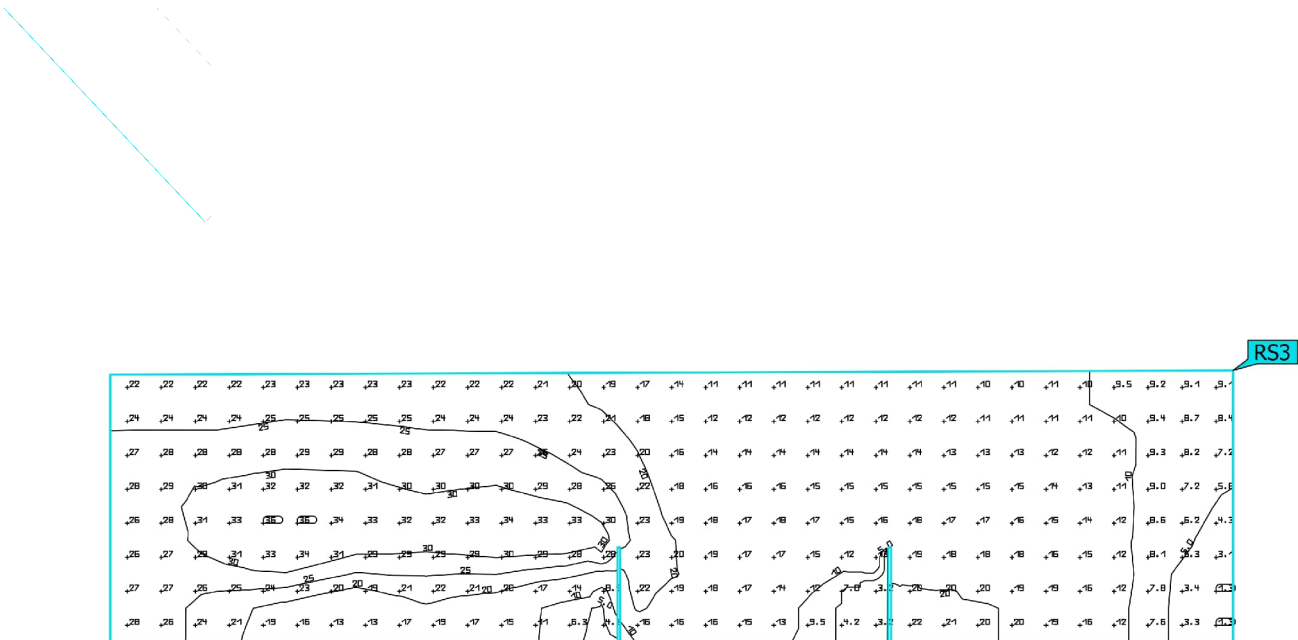
Plots 21 to 22



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 21 to 22	0.41 lx	0.26 lx	0.60 lx	0.63	0.43	RS2
Perpendicular illuminance (adaptive)						
Height: 2.534 m						

Plots 23 to 26 · Storey 1 (Light scene 1)

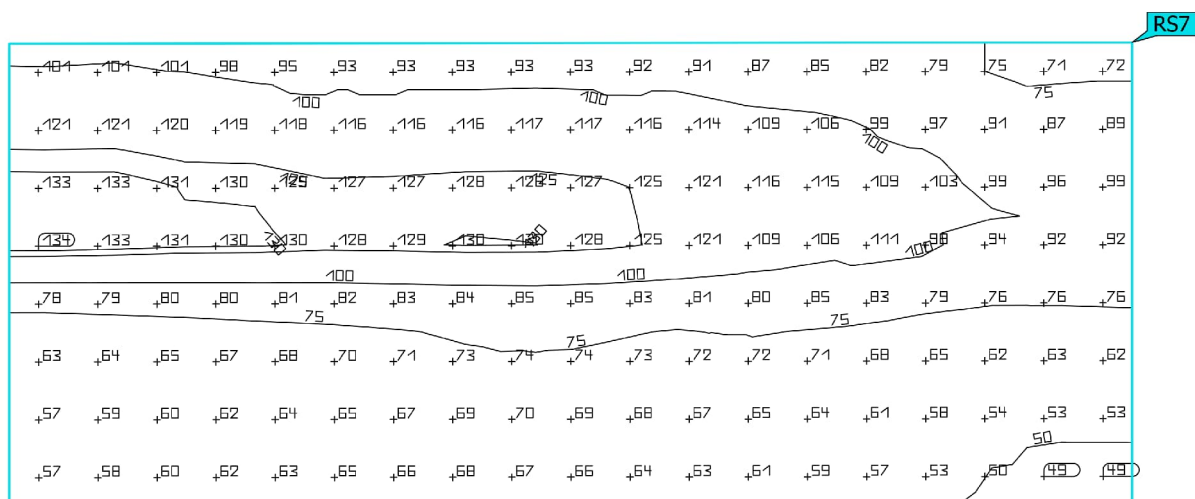
Plots 23 to 26



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 23 to 26 Perpendicular illuminance (adaptive) Height: 1.453 m	18.8 lx	1.06 lx	39.0 lx	0.056	0.027	RS3

Plots 27 to 28 · Storey 1 (Light scene 1)

Plots 27 to 28



Properties	$\bar{E}$	E_{min}	E_{max}	$U_o (g_1)$	g_2	Index
Plots 27 to 28 Perpendicular illuminance (adaptive) Height: 2.358 m	88.6 lx	48.9 lx	135 lx	0.55	0.36	RS7