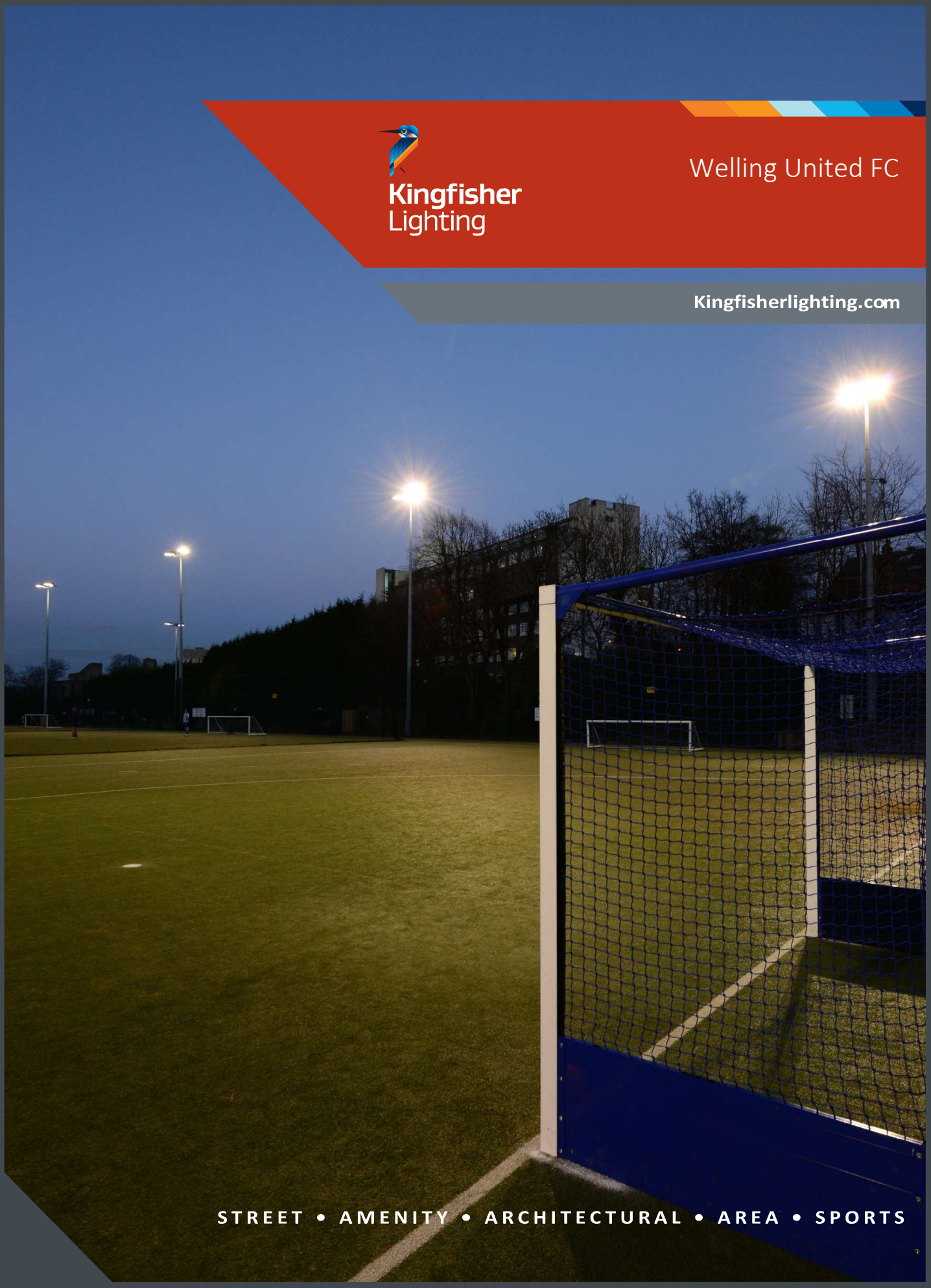
Kingfisher Lighting

Welling United FC

Kingfisherlighting.com



STREET • AMENITY • ARCHITECTURAL • AREA • SPORTS

Executive Summary

A detailed site visit to record the current vertical levels achieved by the existing installation was carried out. This is the best way to look at the current environmental impact of the site lighting to local residence and habitat.
We have provided all readings and relevant photographs taken on site as evidence of this visit.

Then a detailed desk top design was undertaken on AGI32 software. This has taken into account the new pitch location for the designed levels. In this design we have built in the proposed development and placed vertical grids along the façade facing the pitch in order to show the resulting vertical lux levels and candelas on the properties. There has also been vertical grids placed along the existing housing on Roseacre Road and the side perimeter on the South edge where the site meets Danson Park which is a Site of Importance for Nature Conservation to show a reduced impact on these residence and the tree line with new LED fittings.

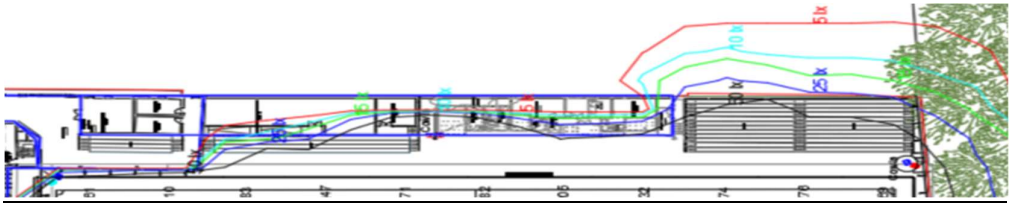
As can be seen in the design report vertical levels provided by a new LED installation at the same height as taken on site currently on the North, South and West boundaries have been reduced.

For example the highest level on the Southern tree boundary was 243Lux at 2m. The highest vertical level at the same height for LED is 65Lux

However as can also be seen by the report the levels are high on the higher verticals on the North and south boundaries. This is due to the proximity of the Masts and fittings to the boundaries. Without lifting equipment it is impossible to take current on site levels at these heights. As the levels have reduced at lower level I would recommend that the current install would also be achieving higher vertical levels at these heights than the new LED installation is showing. Cowls have been added to the fittings but due to the limited size of these its impossible to reduce the vertical levels any further. High levels are purely a result of the location.
Optics which are sensitive to the spill of light have also been utilised where appropriate.

By reducing these levels we are directly protecting the surrounding biodiversity and environment which complies with the required local SP9 and DP20 guidelines.

The Cricket field to the East of the site currently has no lighting and so shouldn't be effected by the new LED installation on Welling FC ground as it is unlikely to be used during the same hours where the new lighting would be on.
LED fittings are more efficient at controlling light spill than the current light source on site which should reduce any nuisance lighting currently spilling over. We have also directed the new LED fittings specifically to minimise any spill. As can be seen on the lighting design there is minimal horizonal spill onto the cricket field. Stands and the new front building have been built into the site which effectively block the light spill. Cowls have also been used on the fittings to the South East which further help to reduce spill where there will be no building.



Welling United FC

This report has been created to outline the new installation of LED lighting and its effect on obtrusive light on the surrounding new flat development, Current residential houses along Roseacre road and the tree line which borders Danson Park Grade I Site of Importance for Nature Conservation (SINC).

The new LED install has been designed based on New 18m masts with 1300w Amnis

Following the FA regulations and guidance the scheme has been designed to achieve 200 Lux 0.6 Min/Av and 0.25 min/max. with a 88 point grid and a 2.5m instep

Football				Table A.21 *BS EN 12193:2007*
I	500	0.7	60	
II	200	0.6	60	
III	75	0.5	20	FA recommend minimum 120 Lux for Class III Football Refer to www.TheFA.com

Kingfisher Lighting

Method of design

To achieve this specification, we have selected the Amnis LED fitting, the lighting design provides instant, controllable white light, with no warmup time- improving visual acuity of people, objects and colours. The asymmetric reflector-based floodlight has a narrow beam with a 65° peak therefore complies with ULWR and overspill onto any properties or boundaries.

The New FA regulations require a fitting which is 5000k and for the current none televised level of this club a CRI70

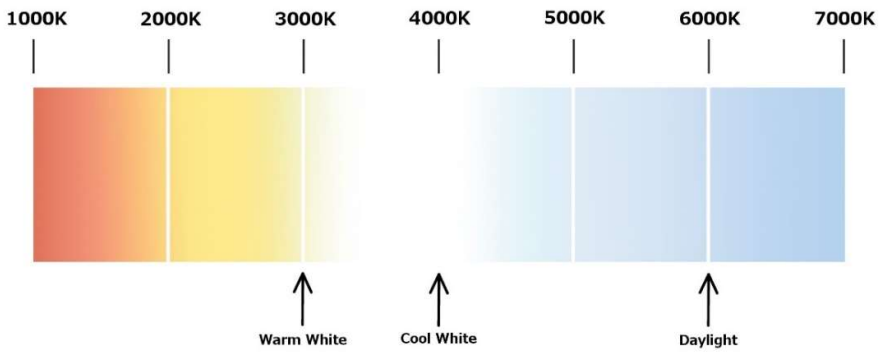
Beams Used :

- 1300w and 665w Amnis Flood with NST, NFT, WST & WST B Optic

Please see the attached design for full details

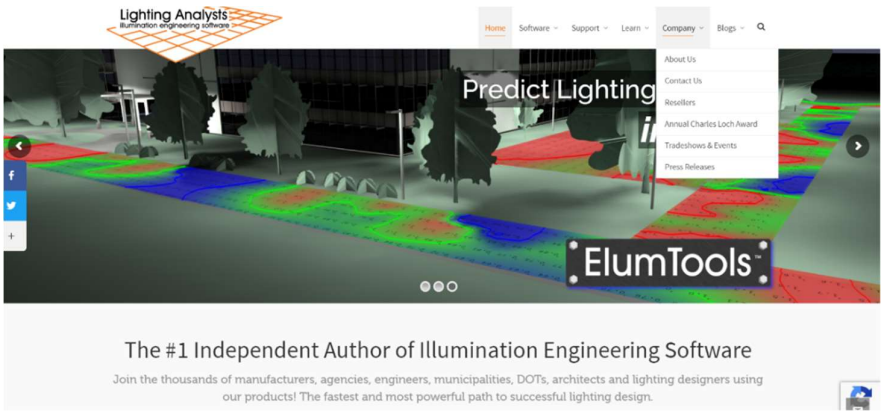
Colour Temperature

For the lighting designs with the Amnis LED luminaire a colour temperature of 5000K was chosen. This is required by the new FA regulations and maintains the efficiency of the LEDs without bringing an uninviting ambience to the locations making for a more comfortable and natural working environment for those on site. Other colour temperatures can be provided on request.



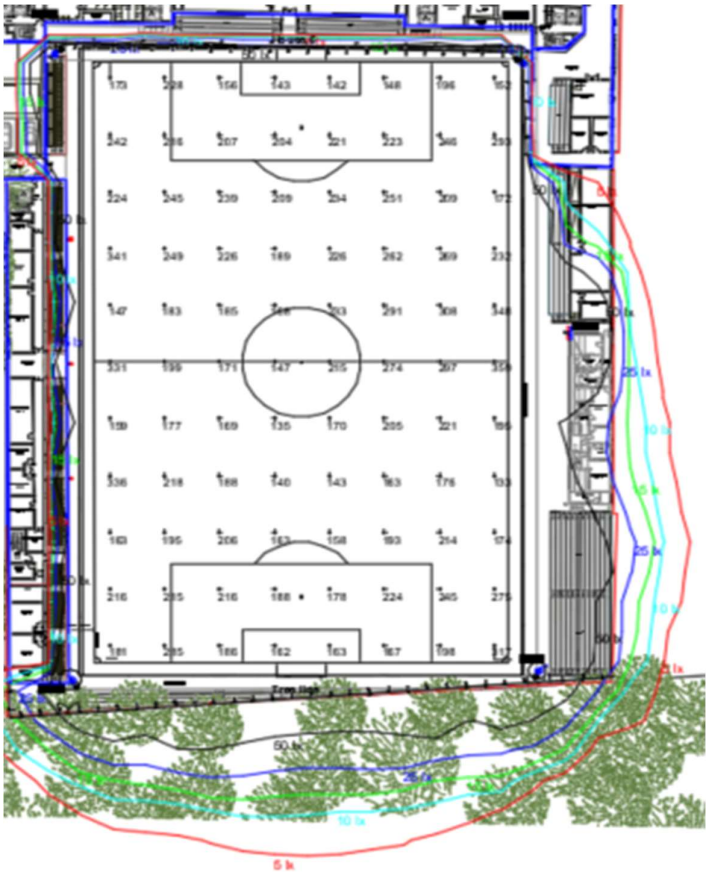
Software

We have produced the lighting design using AGI 32 software to calculate the horizontal lighting levels measured FFL and spill light. A Maintenance Factor of 0.9 has been used for the designs, which means that the site is not over-lit in the early years, preserving the luminaire. We would recommend cleaning period of 12 months.



LED scheme

Using AGI lighting design software and the Kingfisher Amnis LED fitting the resulting levels on the pitch are achieved



Calculation Summary

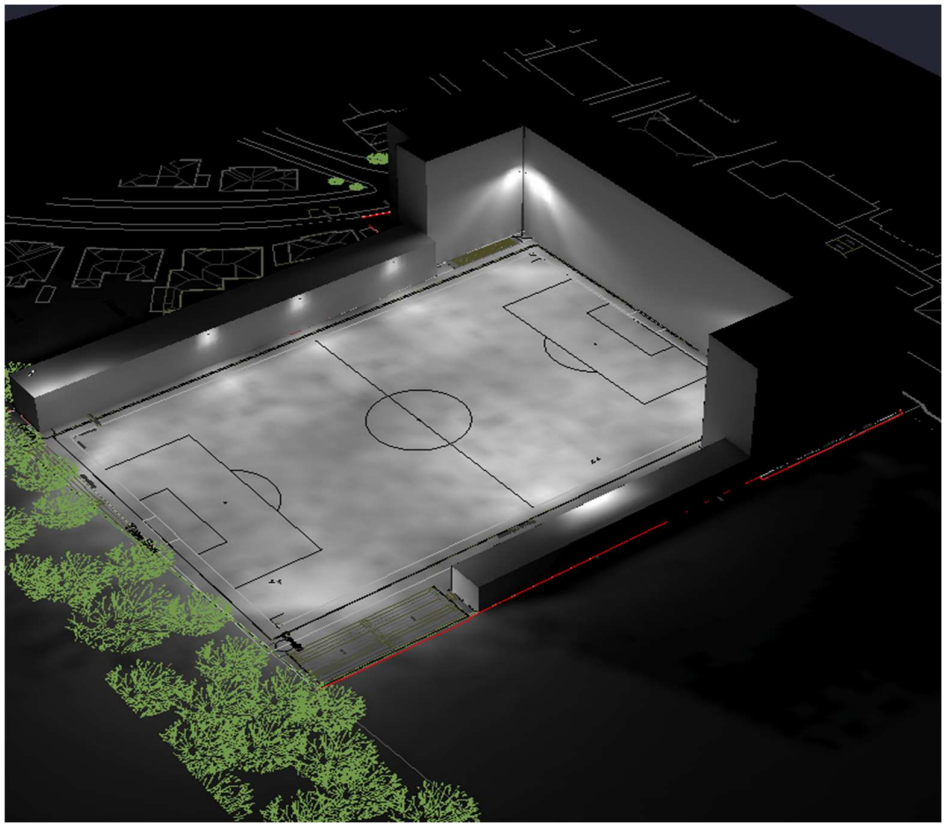
Project: Project_1

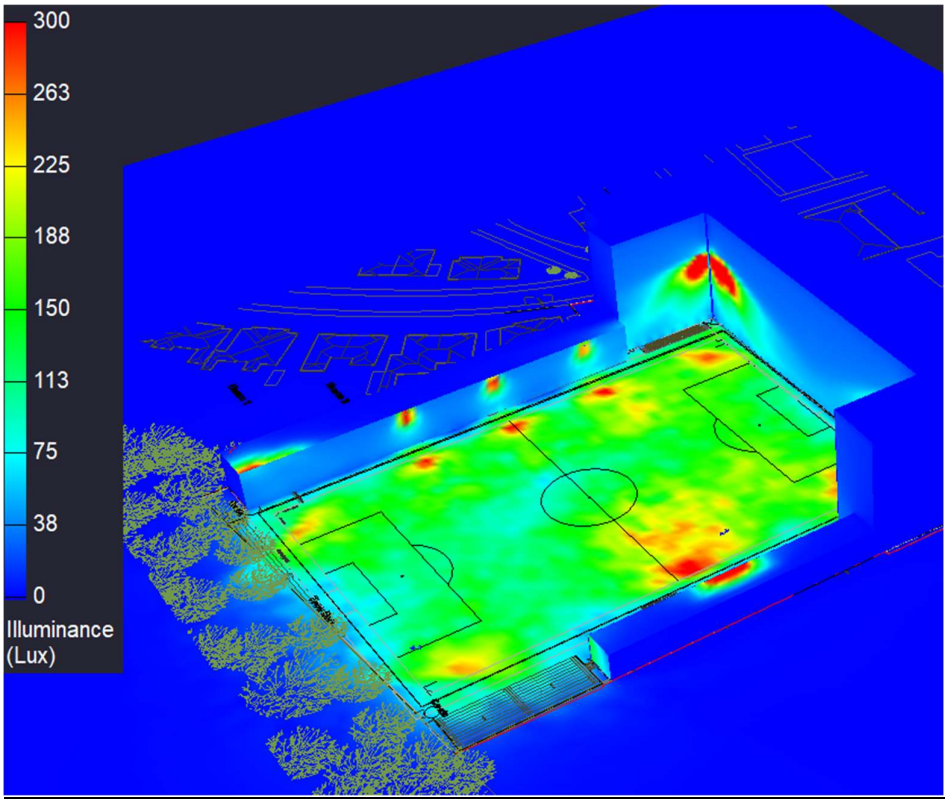
Label	CalcType	Units	Avg	Max	Min	Uniformity (Min/Avg)	Diversity (Min/Max)	Meter Type	Description
Pitch	Illuminance	Lux	218.50	382	132	0.60	0.35	Horizontal	

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	Luminaire LLM	UWLR	TM65 & TM66 Information	Light Engine
	2	A NFT 1300w 5k	SINGLE	-1-1300w LED 5000K Amnis Flood with NFT asymmetric optic @15m Existing	144	0.00	1300w	Lecstar
	2	B 1 NST 1300w 5	SINGLE	-1-1300w LED 5000K Amnis Flood with NST asymmetric optic @15.5m	135	0.00	1300w	Lecstar
	2	B NST 1300w 5k	SINGLE	-1-1300w LED 5000K Amnis Flood with NST asymmetric optic@15m Existing	135	0.00	1300w	Lecstar
	2	C 1 WST 1300w 5	SINGLE	-1-1300w LED 5000K Amnis Flood with WST asymmetric optic @ 15.5m	145	0.00	1300w	Lecstar
	3	D WST 695w 5k	SINGLE	-1-695w LED 5000K Amnis Match with WST asymmetric optic@ 9m stand	144	0.00	695w	Lecstar
	2	CWST B 1300w 5k	SINGLE	1300WLED 5000k Amnis Floodlight with WSTB Optic @ 15m Existing	123	0.00		LAF-WSTB-7K0-1300D-D3

Pseudo colour





Obtrusive Light ('The Institute of Lighting Professionals

In order to calculate the effect of artificial flood lighting installations on existing and new local residences one of the main documents used is '*ILP Guidance notes for the reduction of obtrusive light 2021'*. This document helps prevent and safeguard against the effect of artificial light on surrounding areas. If not correctly controlled this would cause detrimental effects to local residents and wildlife.

The industry recommendations for determining the environmental area, as detailed in the guidance notes, refers to all planning authorities detail the environmental zones in advance, as alterations would cause our design to change dramatically. Categories are shown in Table 2 below;

Table 2: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town / City centres with high levels of night-time activity

The following table breaks down each environmental zone (E0 – E4) and the limitation to which we must abide by. Once we know the environmental zone, we use the table to generate a report within AGI to make sure we are inside the parameters. Table 3 and 4 show the allowable values for each Environmental zone that a design must be compliant with.

Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on premises

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Table 4 (CIE 150 table 3): Limits for the luminous intensity of bright luminaires[4]

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m²)					
		$0<A_p \leq 0.002$	$0.002<A_p \leq 0.01$	$0.01<A_p \leq 0.03$	$0.03<A_p \leq 0.13$	$0.13<A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd)[5]	E0 Pre-curfew Post-curfew	 0 0	 0 0	 0 0	 0 0	 0 0	 0 0
	E1 Pre-curfew Post-curfew	 0.29 *d* 0	 0.63 *d* 0	 1.3 *d* 0	 2.5 *d* 0	 5.1 *d* 0	 2,500 0
	E2 Pre-curfew Post-curfew	 0.57 *d* 0.29 *d*	 1.3 *d* 0.63 *d*	 2.5 *d* 1.3 *d*	 5.0 *d* 2.5 *d*	 10 *d* 5.1 *d*	 7,500 500
	E3 Pre-curfew Post-curfew	 0.86 *d* 0.29 *d*	 1.9 *d* 0.63 *d*	 3.8 *d* 1.3 *d*	 7.5 *d* 2.5 *d*	 15 *d* 5.1 *d*	 10.000 1,000
	E4 Pre-curfew Post-curfew	 1.4 *d* 0.29 *d*	 3.1 *d* 0.63 *d*	 6.3 *d* 1.3 *d*	 13 *d* 2.5 *d*	 26 *d* 5.1 *d*	 25,000 2,500

Full documents can be supplied if required

Proposed New development and Pitch Location

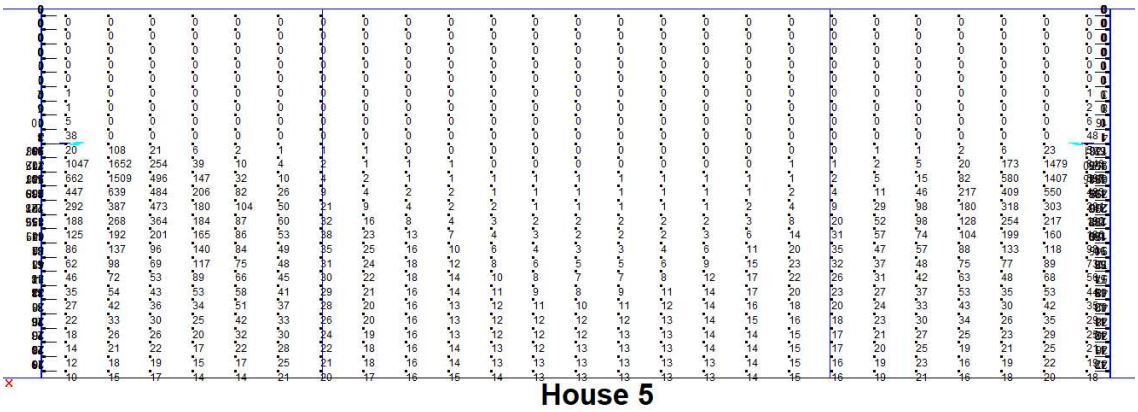
Obtrusive light is classified as the below by the ILP

> **Obtrusive light,** whether it keeps you awake through a bedroom window, impedes your view of the night sky or adversely affects the performance of an adjacent lighting installation, is a form of pollution. It may also be a nuisance in law and can be substantially mitigated without detriment to the requirements of the task.

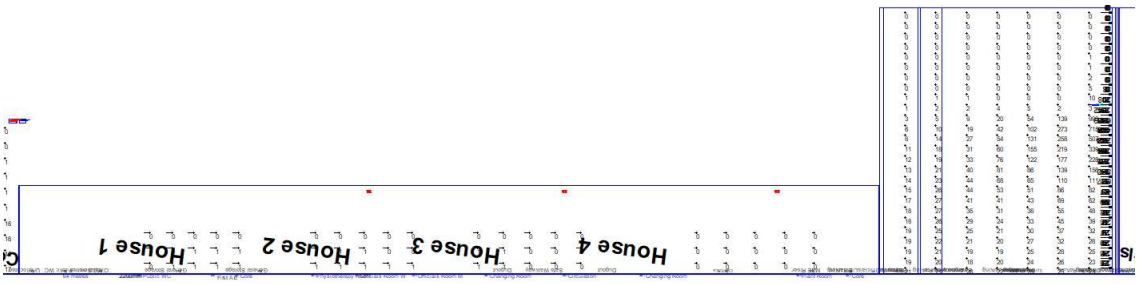
After completing the initial design, grids have been placed on each house, the new flat development and along the South woodland perimeter within AGI lighting software in order to represent windows overlooking the site. Vertical levels are to ascertain the effect of new LED lighting against those recorded from the existing installation

Kingfisher Lighting

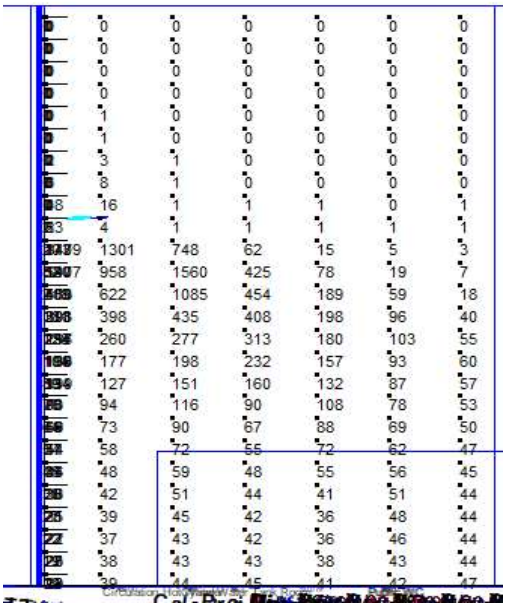
North Vertical View



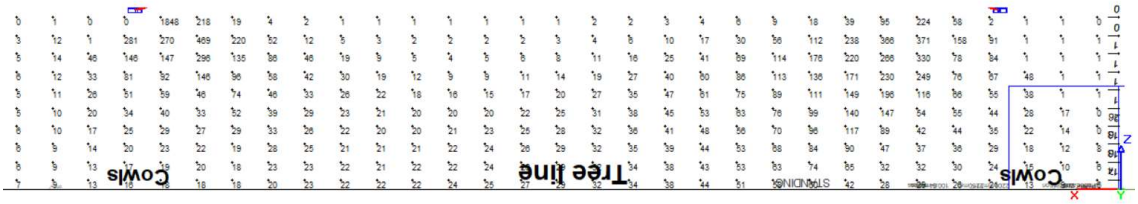
West Vertical View



East Vertical View



South Vertical View



Following the guidelines of the ILP we have assumed that this site would be within an E3 zone.

E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations

The resulting allowable levels are:

10 Lux on the houses / Gardens

Light technical parameter	Application conditions	Environmental zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (E_v)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

Also the candelas must lay within the following permitters.

The Amnis fitting is 0.5m2 and as such can achieve up to 10,000 candelas. The table provided from AGI shows that no grid point is above the 10,000 candelas allowable and confirms the below Pass and the Design write up

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m²)					
		$0<A_p \leq 0.002$	$0.002<A_p \leq 0.01$	$0.01<A_p \leq 0.03$	$0.03<A_p \leq 0.13$	$0.13<A_p \leq 0.50$	$A_p > 0.5$
Maximum luminous intensity emitted by luminaire (I in cd)[5]	E0 Pre-curfew Post-curfew	 0 0	 0 0	 0 0	 0 0	 0 0	 0 0
	E1 Pre-curfew Post-curfew	 0.29 *d* 0	 0.63 *d* 0	 1.3 *d* 0	 2.5 *d* 0	 5.1 *d* 0	 2,500 0
	E2 Pre-curfew Post-curfew	 0.57 *d* 0.29 *d*	 1.3 *d* 0.63 *d*	 2.5 *d* 1.3 *d*	 5.0 *d* 2.5 *d*	 10 *d* 5.1 *d*	 7,500 500
	E3 Pre-curfew Post-curfew	 0.86 *d* 0.29 *d*	 1.9 *d* 0.63 *d*	 3.8 *d* 1.3 *d*	 7.5 *d* 2.5 *d*	 15 *d* 5.1 *d*	 10.000 1,000
	E4 Pre-curfew Post-curfew	 1.4 *d* 0.29 *d*	 3.1 *d* 0.63 *d*	 6.3 *d* 1.3 *d*	 13 *d* 2.5 *d*	 26 *d* 5.1 *d*	 25,000 2,500

The new LED installation compliance test follows:

Obtrusive Light - Compliance Report

CIE 150:2017, E3-Medium District Brightness, Pre-Curfew
Filename: Welling united FC Design Rev B
25/11/2023 17:35:39

Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (9):

Calculation Label	Test Results	Max. Illum.
House Row 1_Ill_Seg1	PASS	1
House Row 2_Ill_Seg1	PASS	1
House Row 3_Ill_Seg1	PASS	1
House Row 4_Ill_Seg1	PASS	0
Tree Line_Ill_Seg1	FAIL	17
Tree Line_Ill_Seg2	FAIL	1848
House Row 5_Ill_Seg1	FAIL	1560
House Row 5_Ill_Seg2	FAIL	1652
House Row 5_Ill_Seg3	FAIL	998

Failed Meter Locations (>250, only first 250 shown):

Calculation Label	Lux	Meter Coords
House Row 5_Ill_Seg1	39	80.882, 120.878, 0.5
House Row 5_Ill_Seg1	41	80.751, 111.879, 0.5
House Row 5_Ill_Seg1	42	80.707, 108.88, 0.5
House Row 5_Ill_Seg1	44	80.838, 117.879, 0.5
House Row 5_Ill_Seg1	45	80.794, 114.879, 0.5
House Row 5_Ill_Seg1	47	80.663, 105.88, 0.5
Tree Line_Ill_Seg1	13	0.224, 12.959, 2.25
Tree Line_Ill_Seg1	13	0.224, 12.959, 3.75
Tree Line_Ill_Seg1	14	0.224, 12.959, 0.75
Tree Line_Ill_Seg1	16	0.224, 15.959, 2.25
Tree Line_Ill_Seg1	16	0.224, 15.959, 3.75
Tree Line_Ill_Seg1	16	0.224, 15.959, 5.25
Tree Line_Ill_Seg1	17	0.224, 15.959, 0.75
Tree Line_Ill_Seg2	11	88.776, 17.963, 8.25
Tree Line_Ill_Seg2	11	49.874, 15.201, 9.75
Tree Line_Ill_Seg2	11	43.89, 14.776, 11.25
Tree Line_Ill_Seg2	12	4.987, 12.013, 3.75
Tree Line_Ill_Seg2	12	88.776, 17.963, 9.75
Tree Line_Ill_Seg2	12	58.852, 15.838, 9.75
Tree Line_Ill_Seg2	12	88.776, 17.963, 12.75
Tree Line_Ill_Seg2	12	67.829, 16.476, 12.75
Tree Line_Ill_Seg2	13	85.784, 17.751, 0.75
Tree Line_Ill_Seg2	13	7.98, 12.226, 0.75
Tree Line_Ill_Seg2	13	85.784, 17.751, 2.25
Tree Line_Ill_Seg2	14	85.784, 17.751, 3.75
Tree Line_Ill_Seg2	14	4.987, 12.013, 5.25
Tree Line_Ill_Seg2	14	46.882, 14.988, 9.75
Tree Line_Ill_Seg2	14	88.776, 17.963, 11.25
Tree Line_Ill_Seg2	15	7.98, 12.226, 2.25
Tree Line_Ill_Seg2	15	52.867, 15.413, 8.25
Tree Line_Ill_Seg2	16	82.792, 17.538, 0.75
Tree Line_Ill_Seg2	16	55.859, 15.626, 8.25
Tree Line_Ill_Seg2	16	40.897, 14.563, 11.25

Tree Line_Ill_Seg2	17	82.792, 17.538, 2.25
Tree Line_Ill_Seg2	17	85.784, 17.751, 5.25
Tree Line_Ill_Seg2	17	4.987, 12.013, 6.75
Tree Line_Ill_Seg2	17	49.874, 15.201, 8.25
Tree Line_Ill_Seg2	17	34.912, 14.138, 12.75
Tree Line_Ill_Seg2	18	79.799, 17.326, 0.75
Tree Line_Ill_Seg2	18	76.807, 17.113, 0.75
Tree Line_Ill_Seg2	18	73.814, 16.901, 0.75
Tree Line_Ill_Seg2	18	73.814, 16.901, 2.25
Tree Line_Ill_Seg2	18	7.98, 12.226, 3.75
Tree Line_Ill_Seg2	18	58.852, 15.838, 8.25
Tree Line_Ill_Seg2	18	25.935, 13.501, 14.25
Tree Line_Ill_Seg2	19	79.799, 17.326, 2.25
Tree Line_Ill_Seg2	19	73.814, 16.901, 3.75
Tree Line_Ill_Seg2	19	61.844, 16.051, 9.75
Tree Line_Ill_Seg2	19	43.89, 14.776, 9.75
Tree Line_Ill_Seg2	19	64.837, 16.263, 11.25
Tree Line_Ill_Seg2	19	73.814, 16.901, 14.25
Tree Line_Ill_Seg2	20	70.822, 16.688, 0.75
Tree Line_Ill_Seg2	20	76.807, 17.113, 2.25
Tree Line_Ill_Seg2	20	82.792, 17.538, 3.75
Tree Line_Ill_Seg2	20	61.844, 16.051, 5.25
Tree Line_Ill_Seg2	20	58.852, 15.838, 5.25
Tree Line_Ill_Seg2	20	85.784, 17.751, 6.75
Tree Line_Ill_Seg2	20	58.852, 15.838, 6.75
Tree Line_Ill_Seg2	20	55.859, 15.626, 6.75
Tree Line_Ill_Seg2	20	52.867, 15.413, 6.75
Tree Line_Ill_Seg2	20	46.882, 14.988, 8.25
Tree Line_Ill_Seg2	21	10.972, 12.438, 0.75
Tree Line_Ill_Seg2	21	61.844, 16.051, 2.25
Tree Line_Ill_Seg2	21	64.837, 16.263, 3.75
Tree Line_Ill_Seg2	21	61.844, 16.051, 3.75
Tree Line_Ill_Seg2	21	58.852, 15.838, 3.75
Tree Line_Ill_Seg2	21	55.859, 15.626, 5.25
Tree Line_Ill_Seg2	21	61.844, 16.051, 6.75
Tree Line_Ill_Seg2	22	64.837, 16.263, 0.75
Tree Line_Ill_Seg2	22	61.844, 16.051, 0.75
Tree Line_Ill_Seg2	22	58.852, 15.838, 0.75
Tree Line_Ill_Seg2	22	64.837, 16.263, 2.25
Tree Line_Ill_Seg2	22	58.852, 15.838, 2.25
Tree Line_Ill_Seg2	22	55.859, 15.626, 2.25
Tree Line_Ill_Seg2	22	76.807, 17.113, 3.75
Tree Line_Ill_Seg2	22	55.859, 15.626, 3.75
Tree Line_Ill_Seg2	22	64.837, 16.263, 5.25
Tree Line_Ill_Seg2	22	7.98, 12.226, 5.25
Tree Line_Ill_Seg2	22	49.874, 15.201, 6.75
Tree Line_Ill_Seg2	22	61.844, 16.051, 8.25
Tree Line_Ill_Seg2	23	67.829, 16.476, 0.75
Tree Line_Ill_Seg2	23	70.822, 16.688, 2.25
Tree Line_Ill_Seg2	23	67.829, 16.476, 2.25
Tree Line_Ill_Seg2	23	79.799, 17.326, 3.75
Tree Line_Ill_Seg2	23	52.867, 15.413, 5.25
Tree Line_Ill_Seg2	23	64.837, 16.263, 6.75
Tree Line_Ill_Seg2	24	55.859, 15.626, 0.75
Tree Line_Ill_Seg2	24	52.867, 15.413, 2.25
Tree Line_Ill_Seg2	24	10.972, 12.438, 2.25
Tree Line_Ill_Seg2	24	52.867, 15.413, 3.75
Tree Line_Ill_Seg2	25	52.867, 15.413, 0.75
Tree Line_Ill_Seg2	25	67.829, 16.476, 3.75
Tree Line_Ill_Seg2	25	82.792, 17.538, 5.25

Tree Line_Ill_Seg2	25	49.874, 15.201, 5.25
Tree Line_Ill_Seg2	25	46.882, 14.988, 6.75
Tree Line_Ill_Seg2	25	37.905, 14.351, 11.25
Tree Line_Ill_Seg2	26	13.965, 12.651, 0.75
Tree Line_Ill_Seg2	26	49.874, 15.201, 2.25
Tree Line_Ill_Seg2	26	49.874, 15.201, 3.75
Tree Line_Ill_Seg2	26	67.829, 16.476, 5.25
Tree Line_Ill_Seg2	26	85.784, 17.751, 8.25
Tree Line_Ill_Seg2	26	64.837, 16.263, 8.25
Tree Line_Ill_Seg2	27	49.874, 15.201, 0.75
Tree Line_Ill_Seg2	27	76.807, 17.113, 5.25
Tree Line_Ill_Seg2	27	43.89, 14.776, 8.25
Tree Line_Ill_Seg2	27	40.897, 14.563, 9.75
Tree Line_Ill_Seg2	28	19.95, 13.076, 0.75
Tree Line_Ill_Seg2	28	70.822, 16.688, 3.75
Tree Line_Ill_Seg2	28	46.882, 14.988, 5.25
Tree Line_Ill_Seg2	28	7.98, 12.226, 6.75
Tree Line_Ill_Seg2	29	46.882, 14.988, 0.75
Tree Line_Ill_Seg2	29	16.957, 12.863, 0.75
Tree Line_Ill_Seg2	29	46.882, 14.988, 2.25
Tree Line_Ill_Seg2	29	46.882, 14.988, 3.75
Tree Line_Ill_Seg2	29	10.972, 12.438, 3.75
Tree Line_Ill_Seg2	29	79.799, 17.326, 5.25
Tree Line_Ill_Seg2	29	73.814, 16.901, 5.25
Tree Line_Ill_Seg2	29	67.829, 16.476, 6.75
Tree Line_Ill_Seg2	30	13.965, 12.651, 2.25
Tree Line_Ill_Seg2	30	64.837, 16.263, 9.75
Tree Line_Ill_Seg2	30	31.92, 13.926, 12.75
Tree Line_Ill_Seg2	31	43.89, 14.776, 6.75
Tree Line_Ill_Seg2	32	43.89, 14.776, 0.75
Tree Line_Ill_Seg2	32	43.89, 14.776, 2.25
Tree Line_Ill_Seg2	32	19.95, 13.076, 2.25
Tree Line_Ill_Seg2	32	16.957, 12.863, 2.25
Tree Line_Ill_Seg2	32	43.89, 14.776, 3.75
Tree Line_Ill_Seg2	32	43.89, 14.776, 5.25
Tree Line_Ill_Seg2	33	70.822, 16.688, 5.25
Tree Line_Ill_Seg2	33	76.807, 17.113, 6.75
Tree Line_Ill_Seg2	33	67.829, 16.476, 8.25
Tree Line_Ill_Seg2	33	85.784, 17.751, 9.75
Tree Line_Ill_Seg2	34	40.897, 14.563, 0.75
Tree Line_Ill_Seg2	34	40.897, 14.563, 2.25
Tree Line_Ill_Seg2	34	82.792, 17.538, 6.75
Tree Line_Ill_Seg2	35	40.897, 14.563, 3.75
Tree Line_Ill_Seg2	35	10.972, 12.438, 5.25
Tree Line_Ill_Seg2	35	40.897, 14.563, 8.25
Tree Line_Ill_Seg2	36	13.965, 12.651, 3.75
Tree Line_Ill_Seg2	36	40.897, 14.563, 5.25
Tree Line_Ill_Seg2	37	16.957, 12.863, 3.75
Tree Line_Ill_Seg2	38	37.905, 14.351, 0.75
Tree Line_Ill_Seg2	38	37.905, 14.351, 2.25
Tree Line_Ill_Seg2	38	40.897, 14.563, 6.75
Tree Line_Ill_Seg2	38	7.98, 12.226, 8.25
Tree Line_Ill_Seg2	39	37.905, 14.351, 3.75
Tree Line_Ill_Seg2	39	70.822, 16.688, 6.75
Tree Line_Ill_Seg2	39	22.942, 13.288, 14.25
Tree Line_Ill_Seg2	40	79.799, 17.326, 6.75
Tree Line_Ill_Seg2	40	37.905, 14.351, 9.75
Tree Line_Ill_Seg2	41	37.905, 14.351, 5.25
Tree Line_Ill_Seg2	41	34.912, 14.138, 11.25
Tree Line_Ill_Seg2	42	22.942, 13.288, 0.75

Tree Line_III_Seg2	42	16.957, 12.863, 5.25
Tree Line_III_Seg2	42	67.829, 16.476, 9.75
Tree Line_III_Seg2	43	34.912, 14.138, 2.25
Tree Line_III_Seg2	44	34.912, 14.138, 0.75
Tree Line_III_Seg2	44	34.912, 14.138, 3.75
Tree Line_III_Seg2	44	13.965, 12.651, 5.25
Tree Line_III_Seg2	44	10.972, 12.438, 6.75
Tree Line_III_Seg2	45	37.905, 14.351, 6.75
Tree Line_III_Seg2	46	76.807, 17.113, 8.25
Tree Line_III_Seg2	46	70.822, 16.688, 8.25
Tree Line_III_Seg2	46	85.784, 17.751, 11.25
Tree Line_III_Seg2	46	67.829, 16.476, 11.25
Tree Line_III_Seg2	47	19.95, 13.076, 3.75
Tree Line_III_Seg2	47	37.905, 14.351, 8.25
Tree Line_III_Seg2	48	34.912, 14.138, 5.25
Tree Line_III_Seg2	48	7.98, 12.226, 9.75
Tree Line_III_Seg2	51	31.92, 13.926, 0.75
Tree Line_III_Seg2	51	82.792, 17.538, 8.25
Tree Line_III_Seg2	52	73.814, 16.901, 6.75
Tree Line_III_Seg2	52	70.822, 16.688, 12.75
Tree Line_III_Seg2	53	31.92, 13.926, 2.25
Tree Line_III_Seg2	53	31.92, 13.926, 3.75
Tree Line_III_Seg2	53	34.912, 14.138, 6.75
Tree Line_III_Seg2	54	16.957, 12.863, 6.75
Tree Line_III_Seg2	55	13.965, 12.651, 6.75
Tree Line_III_Seg2	55	10.972, 12.438, 8.25
Tree Line_III_Seg2	56	31.92, 13.926, 5.25
Tree Line_III_Seg2	56	28.927, 13.713, 12.75
Tree Line_III_Seg2	58	28.927, 13.713, 0.75
Tree Line_III_Seg2	58	70.822, 16.688, 9.75
Tree Line_III_Seg2	58	13.965, 12.651, 14.25
Tree Line_III_Seg2	59	79.799, 17.326, 8.25
Tree Line_III_Seg2	60	25.935, 13.501, 0.75
Tree Line_III_Seg2	60	34.912, 14.138, 9.75
Tree Line_III_Seg2	61	34.912, 14.138, 8.25
Tree Line_III_Seg2	63	28.927, 13.713, 2.25
Tree Line_III_Seg2	63	31.92, 13.926, 6.75
Tree Line_III_Seg2	65	22.942, 13.288, 2.25
Tree Line_III_Seg2	66	13.965, 12.651, 8.25
Tree Line_III_Seg2	67	10.972, 12.438, 9.75
Tree Line_III_Seg2	68	28.927, 13.713, 3.75
Tree Line_III_Seg2	69	31.92, 13.926, 11.25
Tree Line_III_Seg2	70	28.927, 13.713, 5.25
Tree Line_III_Seg2	74	25.935, 13.501, 2.25
Tree Line_III_Seg2	74	73.814, 16.901, 8.25
Tree Line_III_Seg2	75	31.92, 13.926, 8.25
Tree Line_III_Seg2	76	28.927, 13.713, 6.75
Tree Line_III_Seg2	76	13.965, 12.651, 9.75
Tree Line_III_Seg2	78	13.965, 12.651, 11.25
Tree Line_III_Seg2	81	82.792, 17.538, 9.75
Tree Line_III_Seg2	84	25.935, 13.501, 3.75
Tree Line_III_Seg2	84	10.972, 12.438, 11.25
Tree Line_III_Seg2	86	31.92, 13.926, 9.75
Tree Line_III_Seg2	86	70.822, 16.688, 11.25
Tree Line_III_Seg2	89	19.95, 13.076, 5.25
Tree Line_III_Seg2	89	28.927, 13.713, 8.25
Tree Line_III_Seg2	90	22.942, 13.288, 3.75
Tree Line_III_Seg2	91	10.972, 12.438, 12.75
Tree Line_III_Seg2	92	79.799, 17.326, 9.75
Tree Line_III_Seg2	95	19.95, 13.076, 14.25

Tree Line_Ill_Seg2	96	25.935, 13.501, 5.25
Tree Line_Ill_Seg2	96	73.814, 16.901, 9.75
Tree Line_Ill_Seg2	99	25.935, 13.501, 6.75
Tree Line_Ill_Seg2	111	25.935, 13.501, 8.25
Tree Line_Ill_Seg2	112	25.935, 13.501, 12.75
Tree Line_Ill_Seg2	113	28.927, 13.713, 9.75
Tree Line_Ill_Seg2	114	28.927, 13.713, 11.25
Tree Line_Ill_Seg2	116	16.957, 12.863, 8.25
Tree Line_Ill_Seg2	117	22.942, 13.288, 5.25
Tree Line_Ill_Seg2	135	73.814, 16.901, 11.25
Tree Line_Ill_Seg2	136	25.935, 13.501, 9.75
Tree Line_Ill_Seg2	140	22.942, 13.288, 6.75
Tree Line_Ill_Seg2	146	76.807, 17.113, 9.75
Tree Line_Ill_Seg2	146	82.792, 17.538, 11.25
Tree Line_Ill_Seg2	147	19.95, 13.076, 6.75
Tree Line_Ill_Seg2	147	79.799, 17.326, 11.25
Tree Line_Ill_Seg2	149	22.942, 13.288, 8.25
Tree Line_Ill_Seg2	158	13.965, 12.651, 12.75
Tree Line_Ill_Seg2	171	22.942, 13.288, 9.75
Tree Line_Ill_Seg2	176	25.935, 13.501, 11.25
Tree Line_Ill_Seg2	196	19.95, 13.076, 8.25
Tree Line_Ill_Seg2	218	76.807, 17.113, 14.25
Tree Line_Ill_Seg2	220	22.942, 13.288, 11.25
Tree Line_Ill_Seg2	220	73.814, 16.901, 12.75
Tree Line_Ill_Seg2	224	16.957, 12.863, 14.25
Tree Line_Ill_Seg2	230	19.95, 13.076, 9.75
Tree Line_Ill_Seg2	238	22.942, 13.288, 12.75
Tree Line_Ill_Seg2	249	16.957, 12.863, 9.75
Tree Line_Ill_Seg2	266	19.95, 13.076, 11.25
Tree Line_Ill_Seg2	270	79.799, 17.326, 12.75
Tree Line_Ill_Seg2	281	82.792, 17.538, 12.75
Tree Line_Ill_Seg2	296	76.807, 17.113, 11.25
Tree Line_Ill_Seg2	330	16.957, 12.863, 11.25
Tree Line_Ill_Seg2	366	19.95, 13.076, 12.75
Tree Line_Ill_Seg2	371	16.957, 12.863, 12.75
Tree Line_Ill_Seg2	469	76.807, 17.113, 12.75
Tree Line_Ill_Seg2	1848	79.799, 17.326, 14.25

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value calculated from CIE 150:2017 (varies by Projected Area sq.m. and Distance Factor)
For E3-Medium District Brightness, Projected Area and Distance Factors:
(0.002, 0.86) (0.01, 1.9) (0.03, 3.8) (0.13, 7.5) (0.5, 15)
Projected Area (sq.m) = Approx. projected emitting area of luminaire in direction of observer
Distance (m) = Distance from luminaire to observer
Max Cd Allowed = Projected Area Factor * Distance

Calculations Tested (9):

Calculation Label	Test Results
House Row 1_Cd_Seg1	**PASS**
House Row 2_Cd_Seg1	**PASS**
House Row 3_Cd_Seg1	**PASS**
House Row 4_Cd_Seg1	**PASS**
Tree Line_Cd_Seg1	**FAIL**
Tree Line_Cd_Seg2	**FAIL**
House Row 5_Cd_Seg1	**FAIL**
House Row 5_Cd_Seg2	**FAIL**
House Row 5_Cd_Seg3	**FAIL**

Failed Meter Locations (825 total, first 100 shown):

Offending Lum. No.	Label	Cd	Meter Coords
1	B 1 NST 1300w 5k	78564	22.388, 124.138, 1.5
1	B 1 NST 1300w 5k	86553	25.388, 124.085, 1.5
1	B 1 NST 1300w 5k	28394	13.39, 124.3, 2.5
1	B 1 NST 1300w 5k	30405	16.389, 124.246, 2.5
1	B 1 NST 1300w 5k	45409	19.389, 124.192, 2.5
1	B 1 NST 1300w 5k	81981	22.388, 124.138, 2.5
1	B 1 NST 1300w 5k	88161	25.388, 124.085, 2.5
1	B 1 NST 1300w 5k	94333	28.387, 124.031, 2.5
1	B 1 NST 1300w 5k	98052	31.387, 123.977, 2.5
1	B 1 NST 1300w 5k	28376	13.39, 124.3, 3.5
1	B 1 NST 1300w 5k	31582	16.389, 124.246, 3.5
1	B 1 NST 1300w 5k	60152	19.389, 124.192, 3.5
1	B 1 NST 1300w 5k	83539	22.388, 124.138, 3.5
1	B 1 NST 1300w 5k	89980	25.388, 124.085, 3.5
1	B 1 NST 1300w 5k	95817	28.387, 124.031, 3.5
1	B 1 NST 1300w 5k	95990	31.387, 123.977, 3.5
1	B 1 NST 1300w 5k	90003	34.386, 123.923, 3.5
1	B 1 NST 1300w 5k	28182	13.39, 124.3, 4.5
1	B 1 NST 1300w 5k	33316	16.389, 124.246, 4.5
1	B 1 NST 1300w 5k	73539	19.389, 124.192, 4.5
1	B 1 NST 1300w 5k	84834	22.388, 124.138, 4.5
1	B 1 NST 1300w 5k	92004	25.388, 124.085, 4.5
1	B 1 NST 1300w 5k	95394	28.387, 124.031, 4.5
1	B 1 NST 1300w 5k	90813	31.387, 123.977, 4.5
1	B 1 NST 1300w 5k	27663	13.39, 124.3, 5.5
1	B 1 NST 1300w 5k	35283	16.389, 124.246, 5.5
1	B 1 NST 1300w 5k	79261	19.389, 124.192, 5.5
1	B 1 NST 1300w 5k	86801	22.388, 124.138, 5.5
1	B 1 NST 1300w 5k	93246	25.388, 124.085, 5.5
1	B 1 NST 1300w 5k	91494	28.387, 124.031, 5.5
1	B 1 NST 1300w 5k	27215	13.39, 124.3, 6.5
1	B 1 NST 1300w 5k	45036	16.389, 124.246, 6.5
1	B 1 NST 1300w 5k	80850	19.389, 124.192, 6.5
1	B 1 NST 1300w 5k	88725	22.388, 124.138, 6.5

1	B 1 NST 1300w 5k	91286	25.388, 124.085, 6.5
1	B 1 NST 1300w 5k	22413	10.39, 124.354, 7.5
1	B 1 NST 1300w 5k	27508	13.39, 124.3, 7.5
1	B 1 NST 1300w 5k	66960	16.389, 124.246, 7.5
1	B 1 NST 1300w 5k	82427	19.389, 124.192, 7.5
1	B 1 NST 1300w 5k	89217	22.388, 124.138, 7.5
1	B 1 NST 1300w 5k	84175	25.388, 124.085, 7.5
1	B 1 NST 1300w 5k	12143	7.391, 124.408, 8.5
1	B 1 NST 1300w 5k	22479	10.39, 124.354, 8.5
1	B 1 NST 1300w 5k	29322	13.39, 124.3, 8.5
1	B 1 NST 1300w 5k	74481	16.389, 124.246, 8.5
1	B 1 NST 1300w 5k	84032	19.389, 124.192, 8.5
1	B 1 NST 1300w 5k	84229	22.388, 124.138, 8.5
1	B 1 NST 1300w 5k	11637	7.391, 124.408, 9.5
1	B 1 NST 1300w 5k	31783	13.39, 124.3, 9.5
1	B 1 NST 1300w 5k	75707	16.389, 124.246, 9.5
1	B 1 NST 1300w 5k	82651	19.389, 124.192, 9.5
1	B 1 NST 1300w 5k	11024	7.391, 124.408, 10.5
1	B 1 NST 1300w 5k	47036	13.39, 124.3, 10.5
1	B 1 NST 1300w 5k	76351	16.389, 124.246, 10.5
1	B 1 NST 1300w 5k	10182	7.391, 124.408, 11.5
1	B 1 NST 1300w 5k	64218	13.39, 124.3, 11.5
1	B 1 NST 1300w 5k	70278	16.389, 124.246, 11.5
1	B 1 NST 1300w 5k	19642	10.39, 124.354, 13.5
1	B 1 NST 1300w 5k	22047	5.938, 110.195, 1.5
1	B 1 NST 1300w 5k	22057	5.921, 113.195, 1.5
1	B 1 NST 1300w 5k	22336	5.903, 116.195, 1.5
1	B 1 NST 1300w 5k	21343	5.921, 113.195, 2.5
1	B 1 NST 1300w 5k	22220	5.903, 116.195, 2.5
1	B 1 NST 1300w 5k	20688	5.921, 113.195, 3.5
1	B 1 NST 1300w 5k	22025	5.903, 116.195, 3.5
1	B 1 NST 1300w 5k	20328	5.921, 113.195, 4.5
1	B 1 NST 1300w 5k	21614	5.903, 116.195, 4.5
1	B 1 NST 1300w 5k	20560	5.921, 113.195, 5.5
1	B 1 NST 1300w 5k	20919	5.903, 116.195, 5.5
1	B 1 NST 1300w 5k	18814	5.886, 119.195, 5.5
1	B 1 NST 1300w 5k	19889	5.903, 116.195, 6.5
1	B 1 NST 1300w 5k	18835	5.886, 119.195, 6.5
1	B 1 NST 1300w 5k	18596	5.903, 116.195, 7.5
1	B 1 NST 1300w 5k	18771	5.886, 119.195, 7.5
1	B 1 NST 1300w 5k	12883	5.869, 122.195, 7.5
1	B 1 NST 1300w 5k	17427	5.903, 116.195, 8.5
1	B 1 NST 1300w 5k	18489	5.886, 119.195, 8.5
1	B 1 NST 1300w 5k	12523	5.869, 122.195, 8.5
1	B 1 NST 1300w 5k	17398	5.903, 116.195, 9.5
1	B 1 NST 1300w 5k	17915	5.886, 119.195, 9.5
1	B 1 NST 1300w 5k	12053	5.869, 122.195, 9.5
1	B 1 NST 1300w 5k	35065	5.921, 113.195, 10.5
1	B 1 NST 1300w 5k	18650	5.903, 116.195, 10.5
1	B 1 NST 1300w 5k	16697	5.886, 119.195, 10.5
1	B 1 NST 1300w 5k	11467	5.869, 122.195, 10.5
1	B 1 NST 1300w 5k	14399	5.886, 119.195, 11.5
1	B 1 NST 1300w 5k	10711	5.869, 122.195, 11.5
1	B 1 NST 1300w 5k	10076	5.886, 119.195, 13.5
2	C 1 WST 1300w 5k	13156	13.965, 12.651, 6.75
2	C 1 WST 1300w 5k	13181	10.972, 12.438, 6.75
2	C 1 WST 1300w 5k	11230	13.965, 12.651, 8.25
2	C 1 WST 1300w 5k	11227	10.972, 12.438, 8.25
2	C 1 WST 1300w 5k	11101	7.98, 12.226, 8.25
2	C 1 WST 1300w 5k	10846	4.987, 12.013, 8.25

2	C 1 WST 1300w 5k	10624	1.995, 11.801, 8.25
2	C 1 WST 1300w 5k	85695	80.882, 120.878, 0.5
2	C 1 WST 1300w 5k	90529	80.838, 117.879, 0.5
2	C 1 WST 1300w 5k	91821	80.794, 114.879, 0.5
2	C 1 WST 1300w 5k	92222	80.751, 111.879, 0.5
2	C 1 WST 1300w 5k	93753	80.707, 108.88, 0.5

Kingfisher Lighting

Floodlight used

Kingfisher SPORT

Part of the LUCEDO group of companies

Datasheet

Amnis Flood

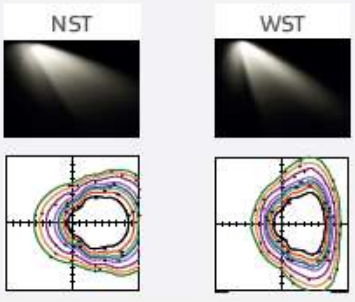
Specification Text

The luminaire shall be manufactured from high pressure die-cast aluminium. It shall have an LED efficacy of up to 139 luminaire lm/W and will be capable of producing up to 175,000 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP66 and IK08.

Specification

Weight:		
	Fitting:	27.5 kg
	Driver:	13.0 kg
	Fitting with integral driver:	32.5 kg
Windage:		0.19m²
Material:		Die-cast Aluminium
Paint Finish:		Marine Grade Powder Coated Anthracite Grey

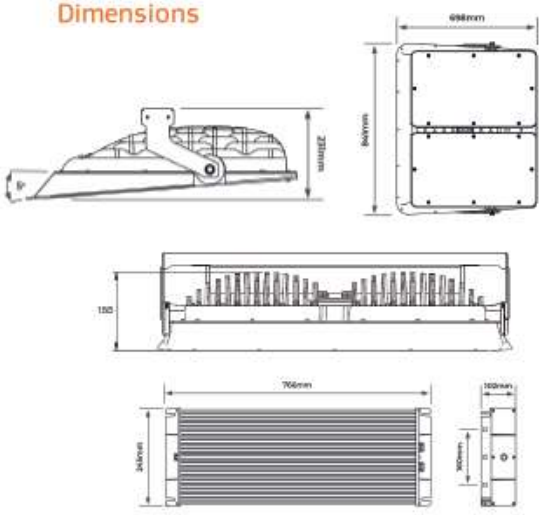
Optics



Key Features

- 900W - 1350W
- 118,000 - 175,000 Luminaire Lumens
- Efficacy up to 139lm/W
- 2700K, 4000K
- CRI >70, CRI >80, CRI >90
- Lifetime >100,000hr
- Asymmetrical
- Driver options
- Marine grade paint

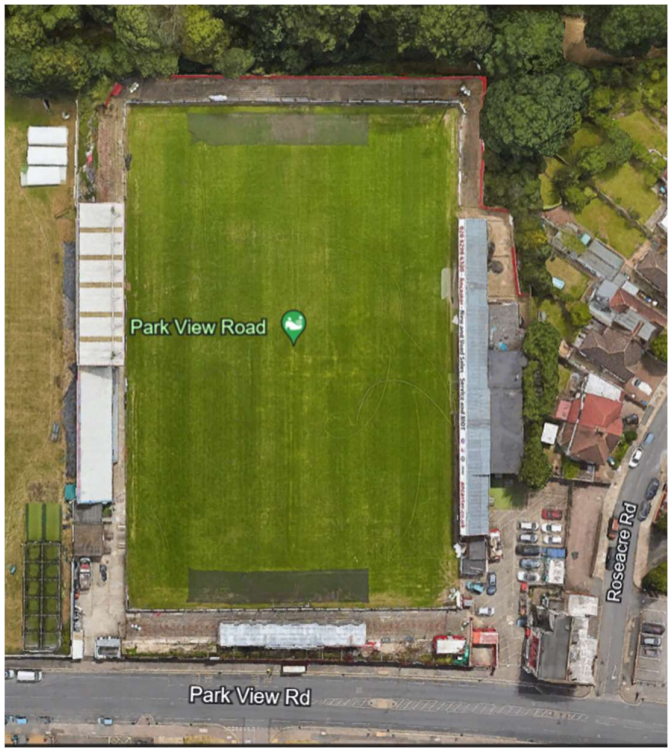
Dimensions



All measurements in mm

Kingfisher Lighting

A survey to ascertain the current impact of flood lighting to Welling united football club was carried out on Thursday 28th September 2023 at 8.30pm. During the survey vertical levels were taken along the top (Park view road), Bottom (tree line) and several locations to the West (Roseacre Road side). These levels were take at 1m and 2m above floor level every 3m to investigate levels achieved by the current 2kw flood lighting on site.



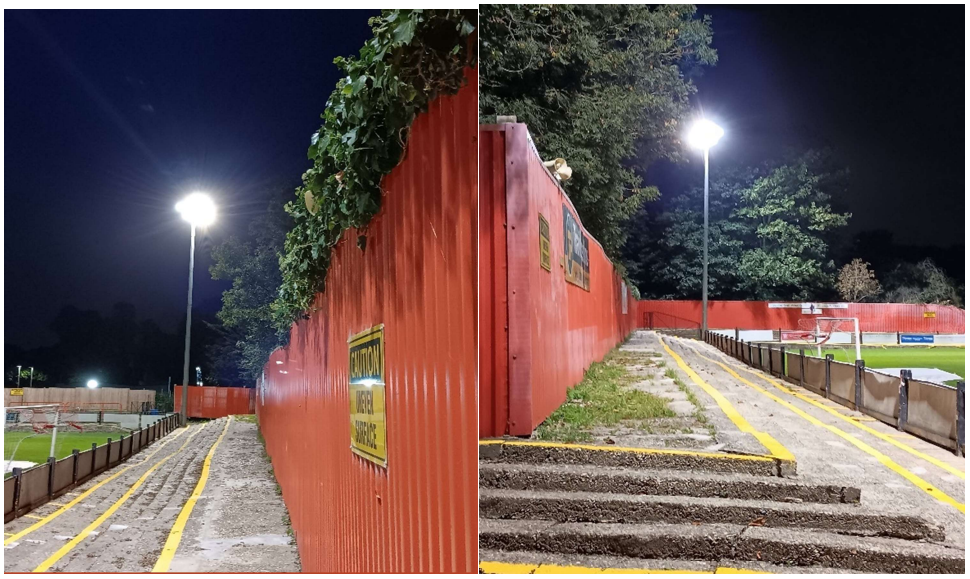
During the survey the weather was clear and dry. A Extech Easy view 33 lux meter was used to conduct the survey. A current calibration certificate can be found at the end of the report.

The below is a report showing the levels taken along with photographs taken during the survey.
It was not possible to gain access to the properties on Roseacre road and so levels were taken on the site perimeter to look at the vertical impact.

Bottom tree line edge

Tree line																																
1m	84	100	140	193	191	188	180	181	127	96	100	80	72	70	50	50	52	59	48	50	45	73	83	83	108	118	109	155	178	205	172	160	133	85	84
2m	91	121	142	204	230	243	203	170	190	150	98	95	86	65	62	48	50	48	43	49	41	37	62	51	92	91	103	115	136	170	123	120	128	81	71

Highest level recorded at 2m 243 lux



N/B – There was some over hanging tree line during the survey which may have caused lover levels at height taken

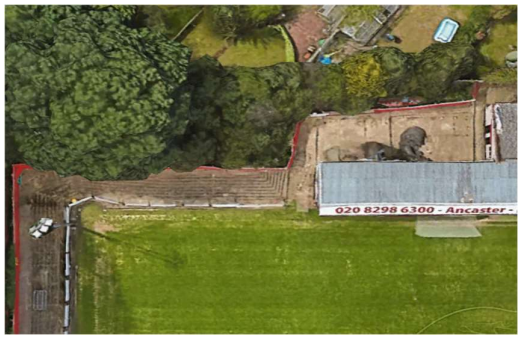
Park view road edge

Park view road taken 2.5m from pitch fence																													
1m	34	45	72	66	50	51	48	53	42	48	44	48	56	64	67	75	82	75	110	97	156	119	132	172	139	142	183	96	142	134	83
2m	45	47	61	39	44	41	46	43	36	46	42	45	48	44	35	52	46	48	68	76	83	82	110	83	94	165	163	137	156	160	129

Highest level recorded at 1m 183 lux

N/B – At the time of the survey it was reported that two flood lights on the North west corner mast were un operational due to lamp failure. This will have resulted in lower vertical levels on this side. In particular on the side of the mast in question

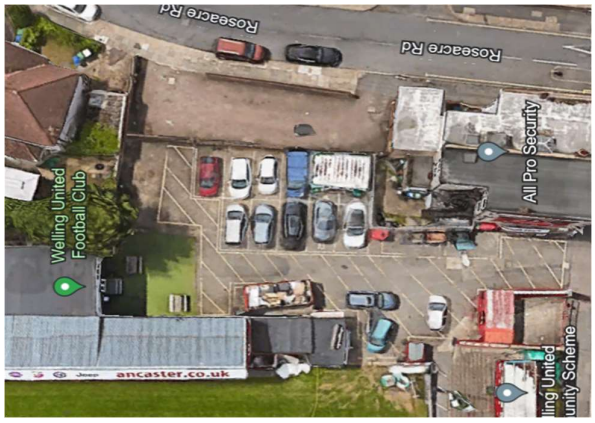
Roseacre Road side. South side of stand

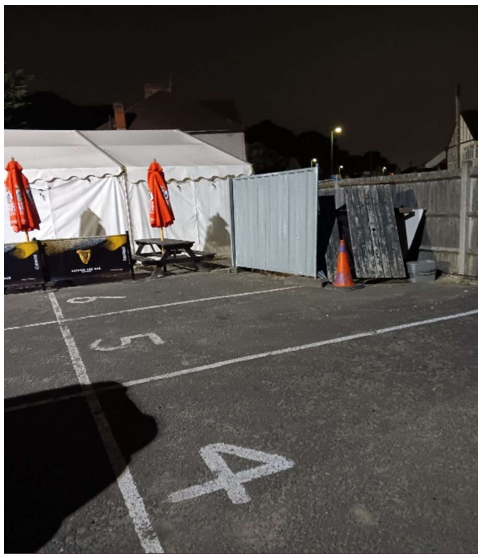


Roseacre Road South side of the stand												Area behind stand						
1m	150	200	247	263	283	301	298	245	169			37	86	68	59	57	55	
2m	115	186	180	208	308	316	265	237	187			83	76	74	66	48	43	

Highest level recorded at 2m 308 lux

Roseacre Road side. North side of stand





Roseacre Road North side of the stand							
1m	22	27	27	30	28		
2m	21	24	23	24	24		

Highest level recorded at 1m 30 lux

Appendix

Standards and Guidance

The following guidance notes and documentation have been used for reference;

- ILP 'Guidance notes for the Reduction of Obtrusive Light' 2021
- The Society of Light and Lighting (CIBSE), Lighting Guide 4 'Sports Lighting' 2006
- BS EN 12193 'Sports Lighting'
- FA Lighting Guidance (Football).

Glossary

Lux

The standard unit of light (luminous flux) used in describing light emitted by a source or received by a surface.

Illuminance and Maintained Illuminance (lumens/m2 or lux)

Illuminance is the term used to describe the level of light on a surface in lumens/square metre or lux.

Maintained

Maintained illuminance is the term used to describe the average light level on a reference surface

Horizontal Illuminance

The level of light falling on to a horizontal plane (i.e. the ground).

Vertical Illuminance

The level of light falling on to a vertical plane (i.e. the walls of a house).

Light Output Ratio (LOR)

This is the ratio of the total light output of a luminaire, relative to the total light output of the lamp/s under reference conditions. Total LOR can be divided into downward (DLOR) and upward (ULOR) light output ratios if appropriate.

Light Intrusion (Light trespass, Overspill, Light into windows)

The flow of light spilling outside the location boundary. With inadequate control Intrusive light may be sufficiently great as to provide a serious nuisance and disturbance to adjacent areas.

Glare

Glare may be divided into two types known as 'disability' and 'discomfort' glare. In a Sports Lighting context, it relates primarily to direct viewing of the flood lights. Only in severe situations would 'disability glare' be experienced. In most instances it is 'discomfort glare' that may be a result, causing annoyance to the users of the site, in the case that adequate screening of flood lights is not provided.

Threshold Increment

Threshold Increment (TI) is a measure of the loss of visibility caused by the 'disability glare' from a proposed lighting installation.

Sky Glow

The general term for the Halo-effect caused by upwardly directed light, forming a glow in the night sky. It can cause diminished contrast of stars against their dark background making astronomical observations difficult or even impossible. The upwardly directed light can be caused by direct waste light from flood lights or redirected light from the sports surface.

ILP

The Institution of Lighting Professionals.

ILP 'Guidance notes for the reduction of light pollution'

A booklet produced by the ILP providing advice on reducing the impact of exterior lighting installations on the environment. This documentation goes into detail about overspill and ULOR, which both vary depending on the environmental zone as categorized in the guidance notes. Full documents can be supplied at a request.