

St Austell Campus Playzone

Lighting Impact Assessment

In Accordance with ILP

'Guidance notes for the reduction of Obtrusive Light'

Project Ref : HLS6836

Report By – Neil Johnson

24/10/2023

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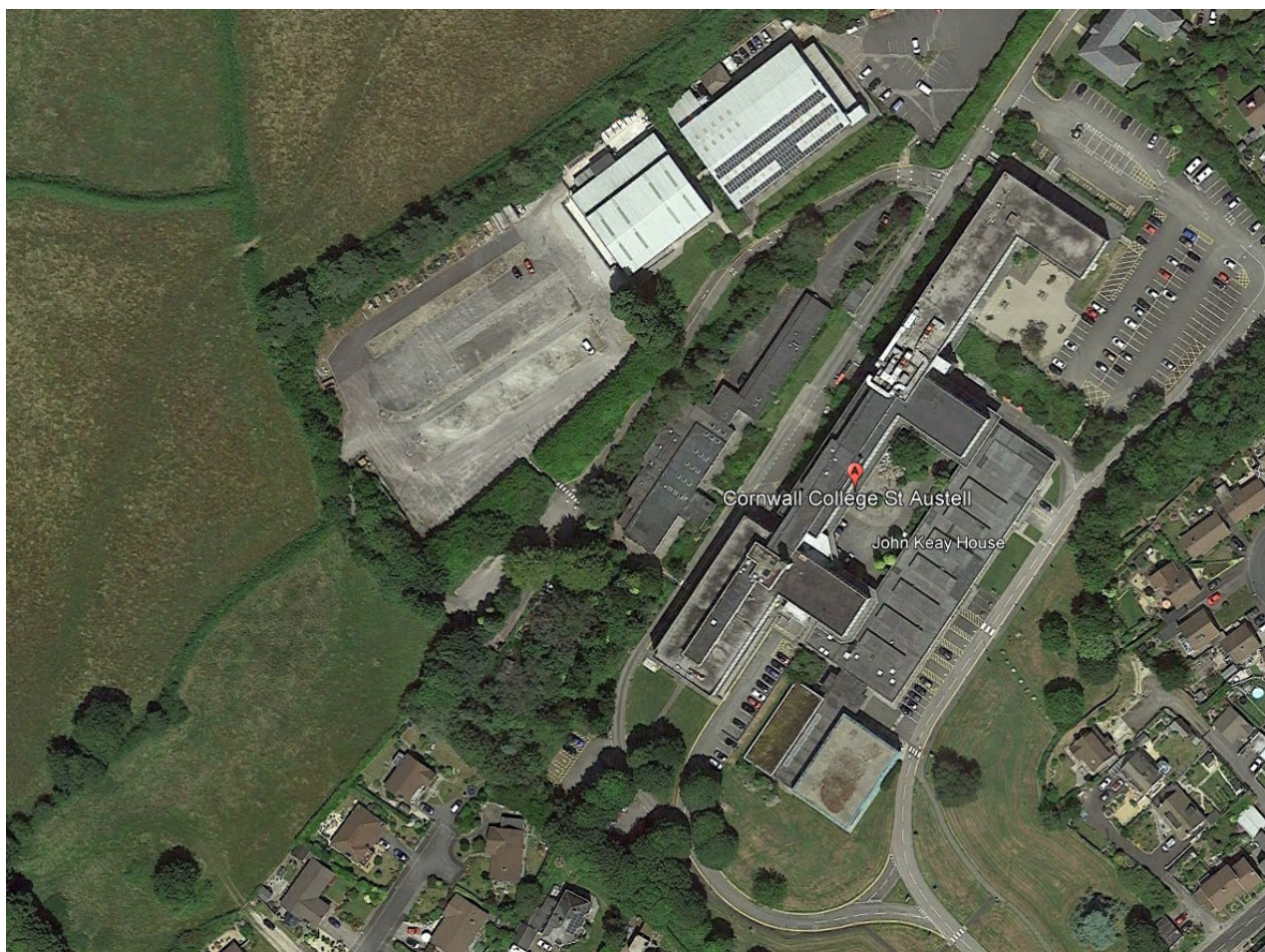
1.0 Introduction

This report has been produced by Halliday Lighting as part of the Football Foundation Playzone Scheme at St Austell Campus. The proposals include the installation of floodlights for a new Playzone. The floodlights will be mounted on extended fence posts to provide lighting suitable for community football and coaching.

The report has been produced by Neil Johnson, a specialist Sports Lighting Engineer with over 35 years of experience. The aim of the report is to ensure that the proposed floodlight system will comply with current standards for Football Coaching and with nationally recognized obtrusive light limitations.

2.0 Site Location

The Play Zone is to be located within the existing car park of St Austell College Campus. The site is on the outskirts of St Austell within sight of open countryside.



Aerial View

3.0 Design Standards

The floodlighting proposals have been assessed using the guidance outlined the following publications:-

BS EN 12193 Light and Lighting - Sports Lighting (2018)

BS EN 12193 sets the minimum lighting levels for sports within Europe, it classifies sports into three standards.

Class III – Training and recreational use

Class II – High quality coaching and low level competition

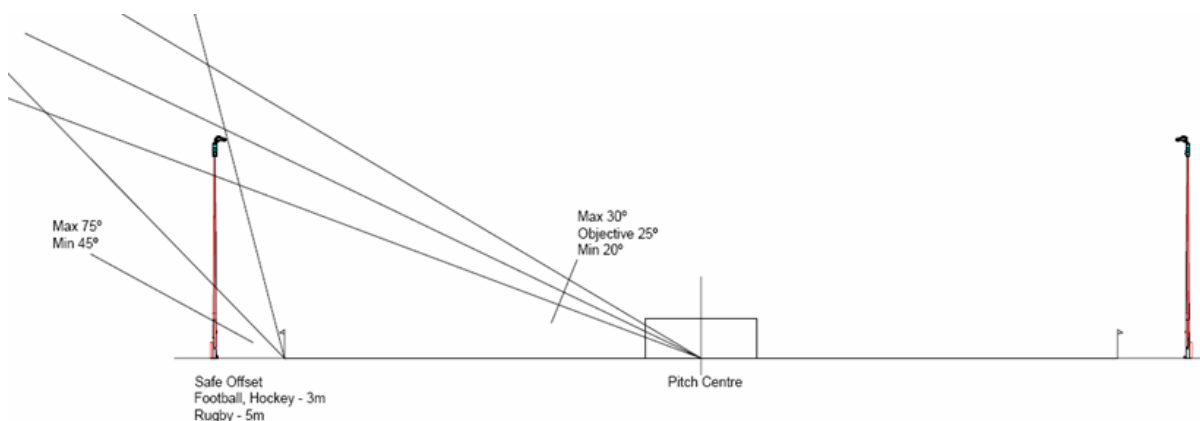
Class I – National standard coaching and high level competition

ILP Guidance notes for the reduction of obtrusive light (2021)

Sets the guidelines for maximum values of light spill and glare dependent on the environmental zone category of the site.

CIBSE Lighting Guide LG4 - Sports Lighting (2006)

Many of the lighting guides available offer little design guidance, however, CIBSE Guide LG4 provides the designer with a wealth of information, including how to use floodlight beams, the control of glare and spill light containment. There is also a method of calculating the optimum mounting height for floodlights using maximum and minimum angles projected from the centre of the pitch or court. This method effectively limits the aiming angle of the floodlight in order to produce the most efficient lighting design with limited overspill or waste light.



Calculation method for floodlight mounting height for CIBSE LG4

FA –Guide to Floodlighting

The FA – Floodlighting Guidance sets the minimum illuminance levels recommended by the Football Association for match play and training.

Using the guidance available the following illuminance levels were chosen to comply with the minimum requirements for a Class III Facility.

Average Maintained Illuminance(Eave)=100 Lux

Uniformity Ratio(E_{min}/E_{ave})=0.60

Floodlight Mounting Height=6m

4.0 Obtrusive Light Limitations

The Institute of Lighting Professionals has produced a guidance document to be used by lighting professionals, planning authorities and people with an interest in reducing the environmental impact of lighting installations. The *ILP GN01 'Guidance note for the reduction of obtrusive light' 2021* categorises the environment into five zones. The categorisation is according to the amount of urbanisation, the existing background illumination and the degree of protection required to maintain the current environmental zone.

The environmental zone categories are shown in Table 2 and the obtrusive light limitations in Tables 3, 4 and 6.

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

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 luminaires⁴

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

Table 6 (CIE 150 table 5): Maximum values of upward light ratio (ULR) of luminaires

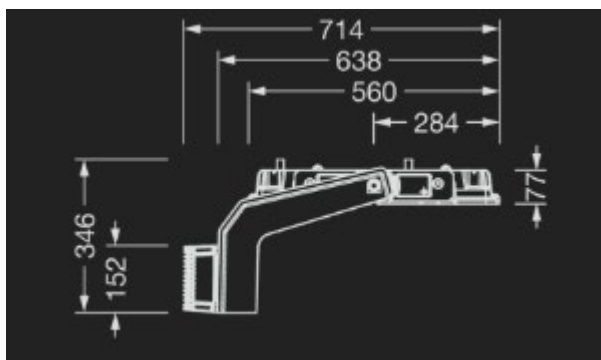
Light technical parameter	Environmental zones				
	E0	E1	E2	E3	E4
Upward light ratio (ULR) / %	0	0	2.5	5	15

The site is located on the outskirts of a relatively densely populated suburban location with a medium/low background illuminance. The proposed lighting installation should therefore meet the requirements for an environmental zone E2. This requires that upward waste light will be less than 2%, to avoid sky glow and spill towards residential properties must be less than 5 Lux to maintain the amenity of residents.

6.0 Proposed Lighting System

The proposed court lighting system has been designed by Halliday Lighting Limited using the FL11 floodlight manufactured by Siteco Lighting.

Halliday Lighting has proposed a design using 4 x 6m extended fence posts using the Siteco FL11 floodlight fitted with BLC spill reduction optics. The FL11 uses flat style optics which project light at an angle of 60 degrees when horizontal. This reduces the need to elevate the optical system resulting in zero upward light and rapid cut off of vertical obtrusive light(see product photograph below):-



Siteco FL11 BLC

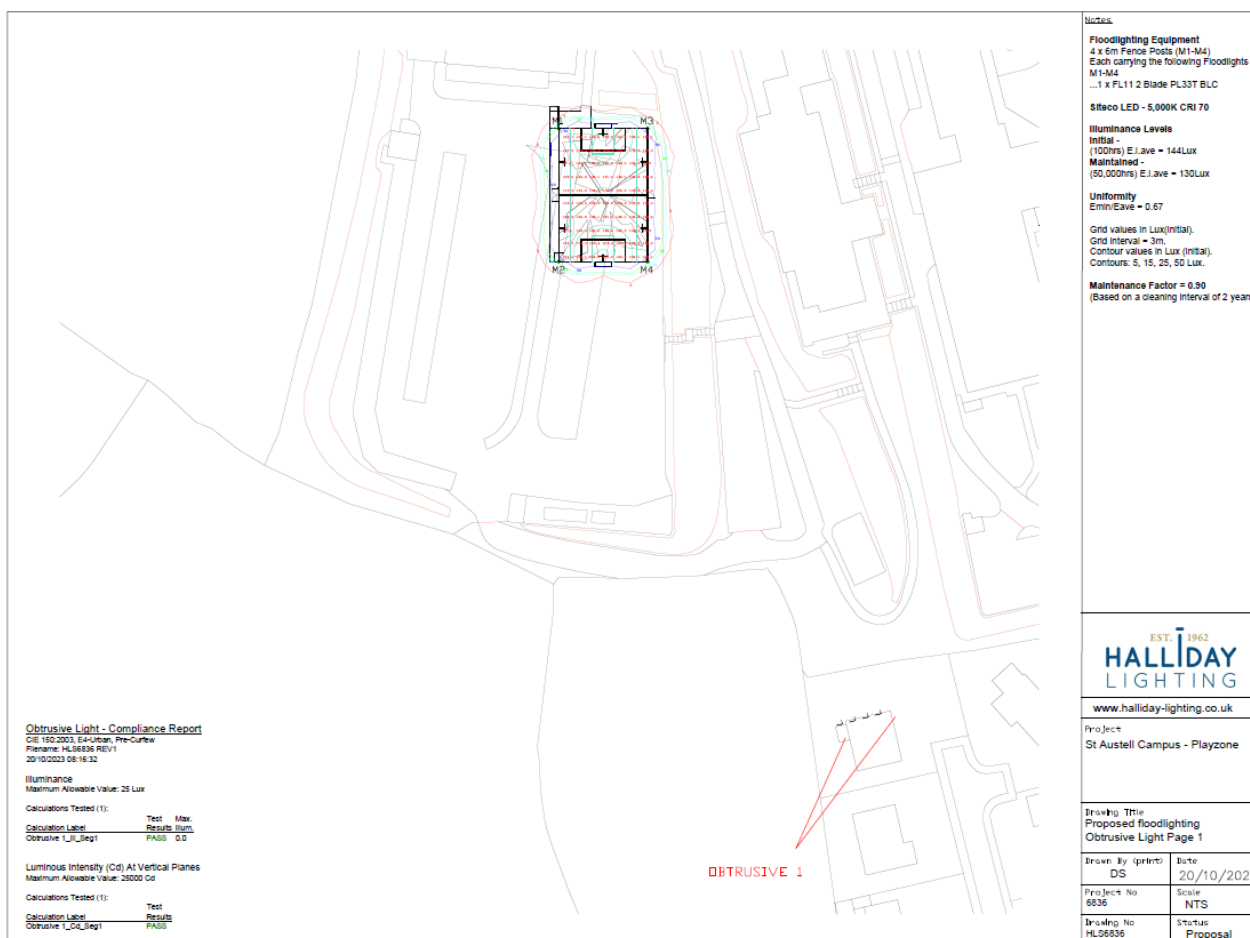
The lighting proposals are shown on Halliday design drawings which show the proposed mast locations, floodlight orientation, playzone lighting levels and overspill predictions. The lighting has been designed to comply with the Football Association/England Netball recommended illuminance level of 100 Lux average over play area.

The proposed design has also been designed to comply with the recommendations of ILP GN08 Bats and Lighting. The proposed floodlights have a warm colour temperature and produces no UV and as a result will not attract insects, which would divert bats from their natural foraging routes. No floodlights are directly aimed towards foraging routes or bat roosts and the light spill will be cut off before it reaches the nearby wooded areas.

The use of LED lighting provides a system which is energy efficient with low maintenance costs. The LED light source provides acute cut off which reduces light spill and maintains the dark skies of the local neighbourhood.

7.0 Light Spill Calculations

The lighting design details are shown on Halliday Lighting drawing HLS6836 Rev1 (see extract below). The drawing shows the proposed mast locations, pitch lighting levels and overspill predictions.



Halliday Drawing HLS6836 Rev 1

Light containment is excellent with spill light being cut off sharply as it reaches the site boundary with light levels falling to less than 1 lux before it reaches the nearby woodland.

The nearest residential properties are over 60m from the site and are screened by the mature tree line. As a result, the properties are subjected to a maximum vertical illuminance of 0.0 Lux on the front façade of the buildings, with a maximum source intensity of less than 250cd at the nearest observer positions. This is within the maximum limitations recommended for an environmental zone E2. It is therefore unlikely that the residents will be subjected to excessive obtrusive light or disturbance.

The upward light output ratio for the lighting system has been calculated as 0%. This confirms

that the proposed lighting installation will not have a negative effect on the existing night sky.

The proposals fully comply with the recommendations of the *ILP 'Guidance notes for the reduction of obtrusive light'* for an environmental zone E2 and would be suitable for installing in a sparsely inhabited Rural Landscape with a low background illuminance.

8.0 Conclusion.

The proposed lighting system for the proposed Playzone has been designed to meet the specific lighting requirements for Football and Netball and is suitable for high quality coaching and community use whilst ensuring that nationally recognised environmental standards are adhered to.

The design takes account site of location within relatively dark background. The designer has chosen a luminaire with excellent spill control systems ensuring that it is fully Dark Skies compliant and has been oriented to avoid the disturbance observers located within nearby properties.

The proposals have also been designed with the protection wildlife in mind. The warm lamp colour temperature of 3000K complies with the recommendations of ILP GN08 in order to protect bats. The floodlight also incorporates internal BLC shielding which reduces stray back light, preventing light spill penetrating into the nearby woodland habitat.

Light calculations have been produced taking account of the local terrain but have not included the shading effect of existing mature trees. As a result the calculations represent the worst case scenario and spill values will be further reduced in reality.

Neil Johnson
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