TITLE:	Exterior Lighting Statement
PROJECT:	Richmond Upon Thame College
REF:	LTG-TN-RUT-SH01
ISSUE:	02
DATE:	24/05/2017
AUTHOR:	Gareth Davies
STATUS:	For Planning

ATKINS

Richmond Upon Thame College – Sports Hall
Exterior Lighting Statement

Summary

This document narrates the exterior lighting design for the exterior lighting system in the vicinity of the Sports Hall development at Richmond Upon Thames College. The statement captures the designs as developed to a RIBA Stage D level of production.

The equipment layout, luminaire details and details calculation report are attached to this document for reference.

Context

The application site forms part of a multiphase development. The sports hall will be utilised by the school, college and community groups.

We have not been advised of any areas of ecological significance within the immediate vicinity of the application site.

Design Criteria

There are 4 key external areas in consideration for external lighting

- Car Park
- Pedestrian circulation
- Bicycle Store
- Escape Stairs

Lighting is provided to allow for safe external movement around the building and car parks as well as facilitate appropriate CCTV Coverage.

We have developed the exterior lighting inside the college site in accordance with best practise guidance BS EN 12464-2 Lighting of Outdoor Work Places. Specific lighting criteria are shown below.

Table 1: Exterior Lighting Design Levels

Area	Design Maintained average illuminance	Working plane Height AFFL (m)	Uniformity (min/ave)
Car park	10 lux	0	0.25
Disabled parking bays	25 lux	0	0.4
Public space	5 lux	0	N/A
Pedestrian routes	5 lux	0	0.25

	As some areas are under canopy, illumination levels are expected to be higher		

Reference and consideration has also been given to Secure by Design requirements.

Lighting egress from the application site has been assessed against the criteria given in *Guidance Notes for the Reduction of Obtrusive Light GN01:2011.*

The zone definition and performance criteria are shown in the tables below.

Table 2 - Classification of environmental zones

Zone	Surrounding	Lighting environment	Examples
E3	Suburban	Medium brightness	Industrial or residential rural suburbs

Table 3 – Obstructive light performance criteria

Environmental Zone	Sky Glow ULR [Max %](	Light Intrusion (into Windows) Ev [lux]		Luminaire Intensity I [candelas]		Building Luminance Pre-curfew
		Pre- curfew	Post curfew	Pre- curfew	Post curfew	Average, L [cd/m2]
E3	5.0	10	2	10,000	1000	10

Design

The proposed development forms part of a wider redevelopment of the site and as such should not be considered in isolation. There will be contributions of light from adjacent areas and visa versa.

Car park lighting utilises the same luminaire as proposed within the Phase 1 of the College Development Zone. These luminaires are mounted at 6m. Within the calculations a notional layout for Marsh Farm Lane has been included utilising the same luminaires

Cycle bays are illuminated from the rear spill of car park luminaires with contribution from the under overhang lighting of the building.

The pedestrian routes around the building are predominantly illuminated from recessed downlights within the overhang of the first floor. The recessed downlights provide a wide ambient distribution which should reduce pooling of light on the ground and harsh shadows on faces. Illumination levels reduce as pedestrians move out of the canopy. On the east side these levels remain sufficient to the edge of the path. On the West side lighting levels are acceptable with the contributions from expected streetlights to the west road. Whilst the development is phased then temporary lighting may be required on the western perimeter fence in lieu of streetlamps to the roadway.

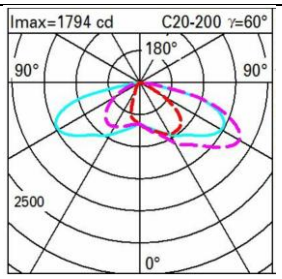
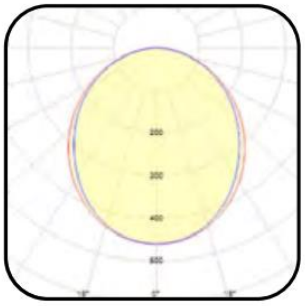
Escape stairs are illuminated from bulkhead luminaires mounted on the outer edge of the balustrade, facing towards the building.

The building will have a dedicated DALI based lighting control system which will control all building mounted luminaires, enabling these to be programmed to dim or switch in accordance with the curfew and operational requirements of the development. At present, it is assumed that Curfew would be 23:00.

Car Park lighting will be linked to a BMS following the same specification as the Main College building

"The car park lighting… shall be controlled by the BMS system for a time activation at the beginning and end of the day…"

Generic Luminaire Types

X9	Street light as per other phases of development. Mounted at 6m		
X20	Recessed Linear luminaire Notional 600mm length Notional 900 lumens per metre	 Recessed IP54 Version	

Calculation Methodology

Lighting calculations have been undertaken within AGI32. The building footprint has been imported from Architectural models.

Illuminance calculations to establish the functional performance within the application site have been carried out with a maintenance factor of 0.7. Obtrusive lighting calculations have been calculated with a maintenance factor of 1 representing the initial installed performance.

Obtrusive calculation points have been included 20metres from the boundary on the east, south and west sides. These extend up to height of 10 metres. It should be noted that the calculation model does not incorporate, trees, foliage and boundary conditions which would cause reductions to any obtrusive light exiting the application site.

Figure 1 – Site model

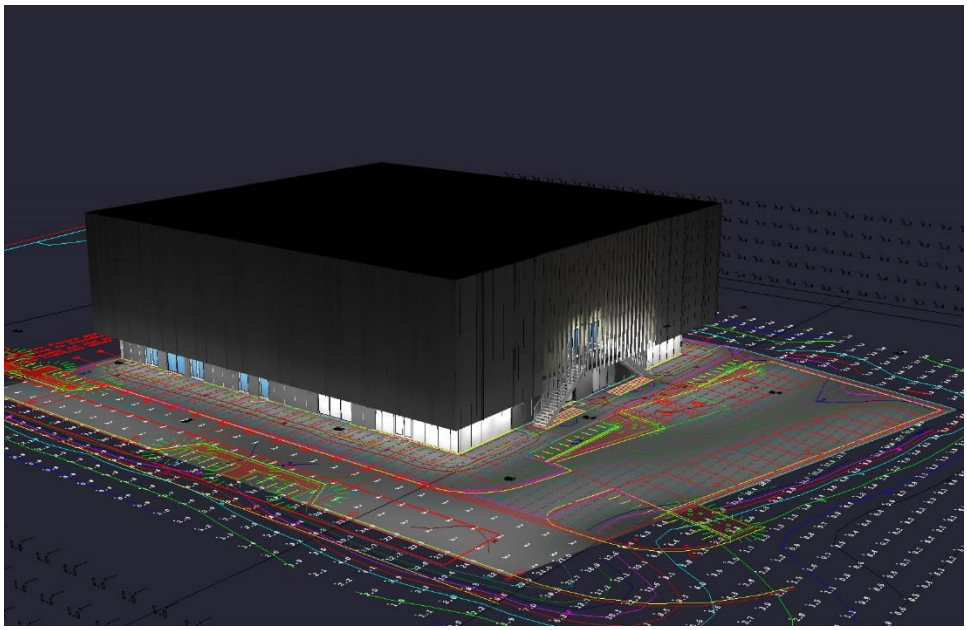
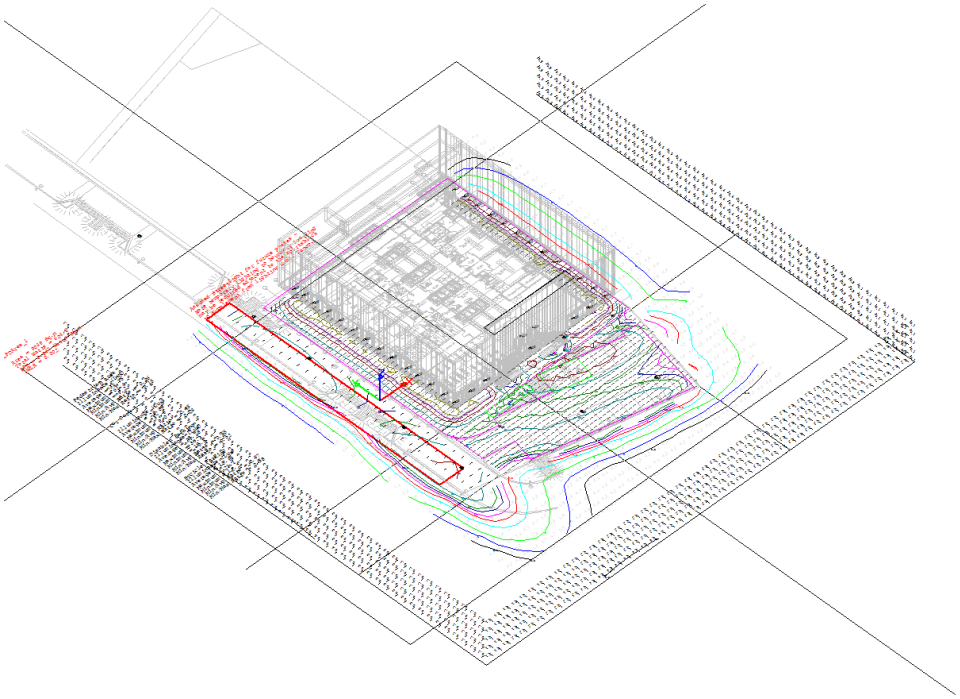
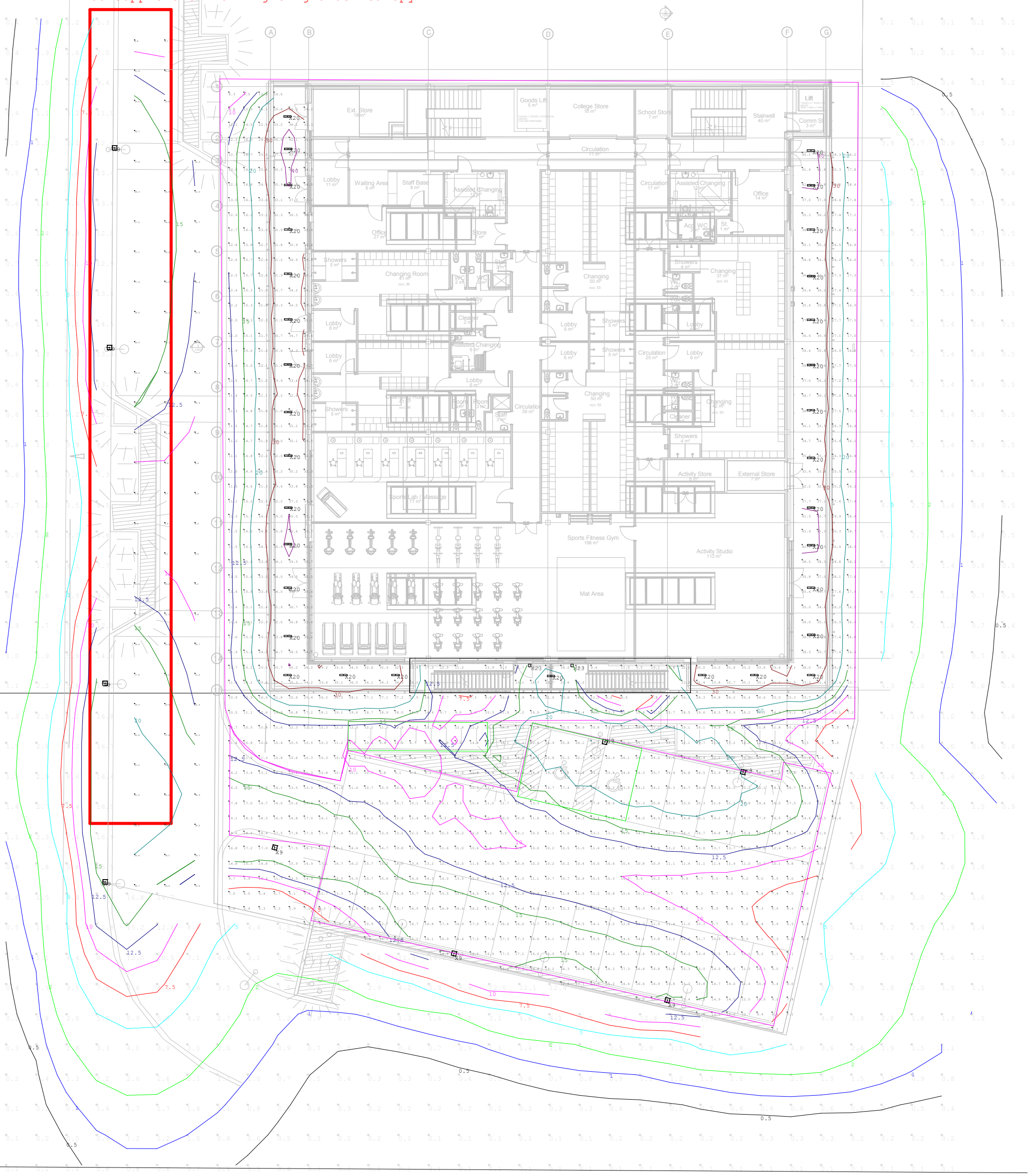


Figure 2 – Site calculation grids



Assumed Streetlight for future phases -
Note temporary lighting to boundary hoarding
may be required adjacent to the sportsblock
to supplement from lighting under canopy



Pedestrian area
Illuminance (Lux)
Average = 24.33
Maximum = 43.0
Minimum = 6.5
Min/Avg Ratio = 0.27
Min/Max Ratio = 0.15

Car Park

Illuminance (Lux)
Average = 14.05
Maximum = 26.4
Minimum = 6.3
Min/Avg Ratio = 0.45
Min/Max Ratio = 0.24

Disabled Parking
Illuminance (Lux)
Average = 20.85
Maximum = 26.1
Minimum = 13.7
Min/Avg Ratio = 0.66
Min/Max Ratio = 0.52

Bycicle Parking
Illuminance (Lux)
Average = 11.16
Maximum = 14.8
Minimum = 8.5
Min/Avg Ratio = 0.76
Min/Max Ratio = 0.57

Upward Light

UWLR = 0.002

Results

The calculation results are shown in the tables below. A detailed lighting report is shown at the end of this document.

Table 3 -Functional Lighting Calculation Results

Area	Average Illuminance	Minimum Illuminance	Uniformity (min/ave)
Pedestrian Areas	24.40	6.50	0.27
Car Park	14.09	6.30	0.45
Disabled Bays	20.94	13.70	0.65
Cycle Racks	11.19	8.6	0.77

Direct Upward Light is calculated at <0.1% of total luminous flux.

The façade of the building is not illuminated as a feature element; sources of building luminance are contained below the overhang and within the void of the external escape stairs. Based on the illuminance levels and materials of the building it is not foreseen that building luminance will be a source of obtrusive light.

The following extracts from AGI32 show the obtrusive lighting results based on vertical calculation planes at 20 metres from the site perimeter. Whilst a Curfew is considered for the site, the post curfew assessment has been run based on all luminaires at full on, therefore the pre-curfew scheme is consistently compliant with post-curfew requirements.

Table 4 –Obtrusive Lighting Calculation Results

Obtrusive Light - Compliance Report
CIE 150:2003, Pre-Curfew, E3 - Surburban
Filename: LTG-RUTC-CALC-05-01 External
25/05/2017 18:20:49

Illuminance
Maximum Allowable Value: 10 Lux

Calculations Tested (3):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_1_Ill_Seg1	PASS	1.1
ObtrusiveLight_1_Ill_Seg2	PASS	0.6
ObtrusiveLight_1_Ill_Seg3	PASS	0.6

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 10000 Cd

Calculations Tested (3):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS
ObtrusiveLight_1_Cd_Seg3	PASS

Obtrusive Light - Compliance Report
CIE 150:2003, Post-Curfew, E3 - Surburban
Filename: LTG-RUTC-CALC-05-01 External
25/05/2017 18:21:33

Illuminance
Maximum Allowable Value: 2 Lux

Calculations Tested (3):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_1_Ill_Seg1	PASS	1.1
ObtrusiveLight_1_Ill_Seg2	PASS	0.6
ObtrusiveLight_1_Ill_Seg3	PASS	0.6

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 1000 Cd

Calculations Tested (3):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS
ObtrusiveLight_1_Cd_Seg3	PASS

Conclusions

- Calculations have demonstrated that our proposed lighting system delivers the functional and aesthetic requirement for the site whilst respecting the existing lighting conditions of the surrounding environment. Obstructive light from function lighting system is within the performance criteria given in Guidance Notes for the Reduction of Obtrusive Light GN01:2011 (category E3)