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Amenity External Lighting Note

GHX0011 Site Infrastructure

Garth Wymott 2

608623-0000-PEV-GHX0011-XX-RP-E-0012
Issue Number P02
S3 – Suitable for Review and Comment
14/06/2022

Ministry of JUSTICE

Security Classification:
OFFICIAL

Document History

Issue	Date	Comment	Author	Chk'd
P01	01/06/2022	First Issue S3 - Suitable for Review & Comment	AI	AR
P02	14/06/2022	Clause Nos added – S3 Suitable for Review & Comment	AI	AR

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Table of Contents

1.0 Executive Summary

1.01 The external lighting design for the new Category C Resettlement Prison at Garth Wymott 2 site has been developed using the following documents to ensure it is compliant with the associated criteria.

- Estates Directorate Technical Specification STD/SPEC/018
- Estates Directorate Design Guide STD/Z/DG/062
- Estates Directorate Design Guide STD/Z/DG/068
- BS 5489-1:2020 Design of Road Lighting
- BREEAM Credit Pol 04 Reduction in Night-time Light Pollution

1.02 The design utilises LED lamp sources for maximum efficacy with minimal operational costs using luminaires meeting the above criteria and limiting lighting overspill to as minimal as practicably possible.

1.03 On other NPP sites the overspill has been confirmed as little as 0.5 lux within a few metres of the perimeter fence lines.

1.04 External lighting for the secure perimeter is essential to the safe operational requirements of the Prison and should not be compromised.

1.05 The car park and access road lighting although expected to be operated dusk until dawn, could be controlled to be 'dimmed' or switched off say from 11.00pm in agreement with the Prison Operators.

1.06 Please also refer to the following sections taken from our External Lighting Report reference 608623-0000-PEV-GHX0011-XX-RP-E-0011 Rev. P04 issued for Outline Planning. The original External Lighting Report is document A34.

2.0 Introduction

2.01 The new Garth Wymott 2 site will be developed on mainly undeveloped land adjacent to the existing men's prison at HMP Garth and HMP Wymott in Lancashire.

2.02 This Report has been prepared to provide support and additional information to the following external lighting drawings.

- 608623-0000-PEV-GHX0011-ZZ-DR-E-6311 Sheet 1
- 608623-0000-PEV-GHX0011-ZZ-DR-E-6312 Sheet 2
- 608623-0000-PEV-GHX0011-ZZ-DR-E-6313 Sheet 3

The drawing references are document references A54, A55 & A55 respectively.

2.03 Information provided within in this report has been carried out in conjunction with Kingfisher Lighting Ltd for the purpose of the hybrid planning stage.

2.04 Drawings at this stage are intended to show expected levels of lighting for the hybrid planning stages and not intended for scale measurements at this time. Scaled drawings for this project shall follow at RIBA Stage 3.

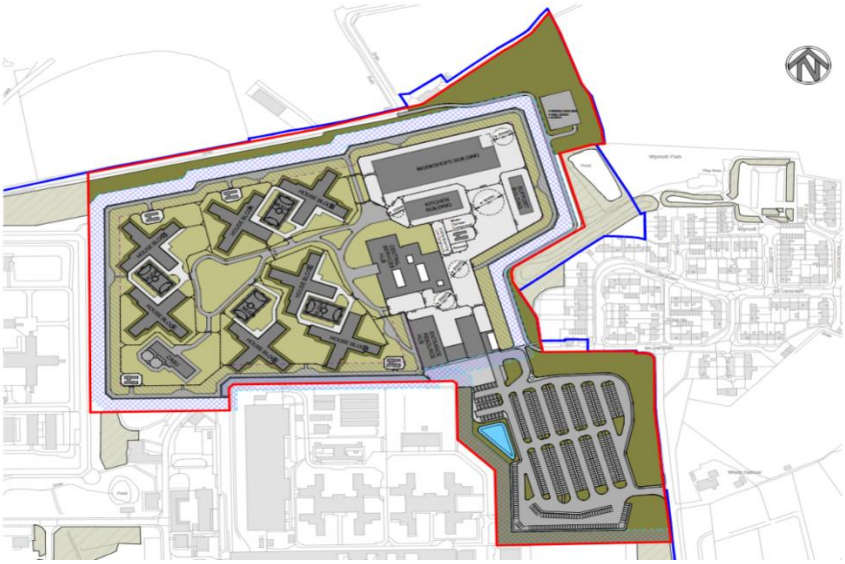
2.05 The designs have been prepared in accordance with the MoJ Technical Standards Specifications and relevant British standards.

- Estates Directorate Technical Specification STD/SPEC/018
- Estates Directorate Design Guide STD/Z/DG/062
- Estates Directorate Design Guide STD/Z/DG/068
- BS 5489-1:2020 Design of Road Lighting

3.0 Proposed Site Design Strategy

3.01 The site is to be developed to provide a new Category C Re-Settlement prison, to provide facilities for 1715 residents and 700 staff. Accommodation will be provided in 7 houseblocks, with several additional support buildings providing all necessary facilities.

3.02 The proposed site is located to the north of the existing HMP Wymott and East of HMP Garth sites. The proposed site extends across several fields between these existing sites and with Ridley Lane boundary to the North and a diverted Pump House Lane to the East.



Proposed Site Layout

3.03 Garth Wymott 2 general area lighting will be designed so that prison officers, when patrolling at night, can see the outer wall, the inner fence, the sterile area; and all adjacent flanking spaces and buildings; so that these areas can be patrolled in safety.

3.04 The area lying between the inner perimeter road and buildings will also be illuminated. The inner and outer perimeter lighting will also be of such a standard that it will allow CCTV cameras and surveillance systems to operate to required performance levels.

3.05 Lighting levels, target areas and uniformity ratios shall comply with those requirements specified within the MoJ Specification document STD/E/SPEC/018.

3.06 Lighting of the sterile area will be a circular, hemispheric, or other anti-hook shaped lamp fitting; this fitting to be of laminated polycarbonate, or other high impact and corrosion resistant material. Fittings will be mounted at a height of 4 to 6m, on the sterile area side of the inner perimeter fence.

3.07 Column mounted fittings will be mounted on 6m high, columns spaced at a maximum of 24m centres as a rule but the actual spacing/design will meet the illumination and uniformity requirements. Lighting levels for internal roads, around buildings, paths and flanking spaces will be 7.5 lux (minimum 5 lux).
Individual section switching will be required for the outer perimeter lighting, sterile area lighting and inner perimeter lighting and all external lighting shall be served by the standby generator.

3.08 Lighting column heights and luminaires will be specified and arranged to avoid glare to cameras, with areas covered by the CCTV designed to provide an adequate illumination level to meet the VDU image definition requirements and be sufficient to facilitate the safe passage of staff around the Establishment.

3.09 As Garth Wymott 2 will be classified as a Category C prison the lighting will be required as follows: -

- Minimum illumination levels on vertical and horizontal target surfaces are 5 lux at commissioning and 3 lux in operation.
- Vertical targets include the secure side of the fence plus 1m above the top of that fence.
- Horizontal target surfaces include a 4m strip on the secure side of the fence (measured from the base of the fence.
- The non-secure side of Cat C perimeter fences/walls are not normally lit unless a roadway or pathway follows the perimeter, in which case normal street/pathway lighting standards will apply

3.10 Specific Area Overview.

3.10.01 Car Park and Access Road Lighting

The expected operating time for this area is expected to be from dusk till dawn, but also with the option to extinguish the area at a desired time if required.

The car park and access road lighting luminaires will be electrically supplied from an external feeder pillar with their operation controlled via individual local photocell/contactor arrangement. There will also be a manual override facility within the new control room with the capability to switch the lighting on/off if required for emergency, testing and maintenance.

The car park and road lighting will consist of column mounted luminaires. The columns will comprise of 6 metre galvanised steel flange mounted columns.

The new car park lighting will be designed to provide an external illuminance averaging 20 lux at ground level, while the access road lighting will be designed to provide an external illuminance averaging 7.5 lux (minimum 5 lux) at ground level. For security reasons the car park and access road lighting will be illuminated from dusk to dawn.

The luminaires themselves will be of the same type and manufacturer as the general and perimeter lighting consisting of dark sky compliant zero upward light ratio flat glass metal halide lantern luminaires.

3.10.0.2 Sports Pitch & MUGA Lighting

Floodlighting will be installed to the new sports pitches to enable their use during low light conditions. The areas themselves will not be used at night and would not be illuminated past 20.00 hours.

The new floodlighting will consist of LED floodlights mounted on 8m galvanised steel flange mounted columns, positioned locally to the areas. The floodlighting will be controlled manually via a local override facility within each of the relevant House Blocks.

The new sports external lighting will be designed to provide an external illuminance averaging 120 lux at ground level, when operational.

A control system shall be incorporated into the final designs of the All-weather pitch that will further enable the reduction of lighting to this area down to 7.5 Lux and to enable the lighting to be extinguished when the pitch is not in use. Control systems will be developed through stage 3 and 4.

3.10.0.3 General Lighting - Service Roads and Free Flow Areas

The expected operating time for this area is expected to be from dusk till dawn due to security reasons.

The general external lighting shall consist of a mixture of column mounted and building mounted luminaires mounted at a height of 6m.

The general building mounted luminaires will be electrically supplied on a building, by building basis with their operation controlled via individual local photocell/contactor arrangements. There will also be a manual override facility within the new control room with the capability to switch the general building mounted luminaires on/off if required for emergency, testing and maintenance.

The general column mounted external luminaires will be electrically supplied from a secure 3 phase circuit, via external feeder pillars, with adjacent luminaires wired sequentially across each of the phases. Their operation will be controlled via individual photocell/contactor arrangements for each of the phases.

The general column mounted external lighting to Internal site footpaths, internal roads, around buildings and general circulation areas will be designed to provide an external illuminance averaging 7.5 lux (minimum 5 lux) at ground level. For security reasons the general lighting will be illuminated from dusk to dawn.

The luminaires themselves will be of the same type and manufacturer as the perimeter lighting consisting of dark sky compliant zero upward light ratio flat glass LED lantern luminaires mounted at 0°

3.10.04 General Lighting - Restricted Compound and Inmate Areas

The expected operating time for this area is expected to be from dusk till dawn due to security reasons

The general external lighting shall consist of a mixture of column mounted and building mounted luminaires mounted at a height of 6m.

The general building mounted luminaires will be electrically supplied on a building, by building basis with their operation controlled via individual local photocell/contactor arrangements. There will also be a manual override facility within the new control room with the capability to switch the general building mounted luminaires on/off if required for emergency, testing and lamp replacement etc.

The general column mounted external luminaires will be electrically supplied from a secure 3 phase ring main circuit, via external feeder pillars, with adjacent luminaires wired sequentially across each of the phases. Their operation will be controlled via individual photocell/contactor arrangements for each of the phases.

4.0 Equipment Technical Specification Detail

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Kingfisher Lighting

Reference	Image	Description	Product Code	Output (W)	Light Source	Dimensions (LxWxH or ØxH)mm	Mounting Details
X1		Italo 1, 4 mod 93w 10380 lum 2700K	IT1-SO5-2.7-4M1F	93W	LED	615 x 343	Column mounted at 6m
X2		Italo 1, 4 mod 93w 10380 lum 2700K	IT1-SO5-2.7-4M1F	93W	LED	615 x 343	Twin Heads column mounted at 6 m
X3		Italo 1 - 2 mod 40W 4720 Lum 2700K	IT1-SO5-2.7-2M1F	40W	LED	615 x 343	Column m ounted at 6m

Kingfisher Lighting

Reference	Image	Description	Product Code	Output (W)	Light Source	Dimensions (LxWxH or ØxH)mm	Mounting Details
X4		Italo 1 - 3 module 58W	IT1-SO5-2.7-3M1F	58W	LED	615 x 343	Column mounted at 6m
X4 Wall		Italo 1, 3 Mod, 7030 lum.lm, 58W, 700mA, 121lm/W, 4000K, Asym.Street Optic (SO5), DALI Driver inc, Class 1, Semi-Gloss Satin Grey, 60/76mm Ptop & Sentry, 76mm recmd Sentry, IP66, IK09, 7kg max, Windage 0.06-0.18m², Fixed with no dim profile.	IT1-SO5-4.7-3M1F	58W	LED	615 x 343	Wall moiunted at 6m
X5 Twin		Italo 1, 3 Mod, 7030 lum.lm, 58W, 700mA, 121lm/W, 4000K, Asym.Street Optic (SO5), DALI Driver inc, Class 1, Semi-Gloss Satin Grey, 60/76mm Ptop & Sentry, 76mm recmd Sentry, IP66, IK09, 7kg max, Windage 0.06-0.18m², Fixed with no dim profile.	IT1-SO5-4.7-3M1F	58W	LED	615 x 343	Twin column mounted 6m

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Kingfisher Lighting

Reference	Image	Description	Product Code	Output (W)	Light Source	Dimensions (LxWxH or ØxH)mm	Mounting Details
X5 Fence		Italo 1, 3 Mod, 7030 lum.lm, 58W, 700mA, 121lm/W, 4000K, Asym. Street Optic (SO5), DALI Driver inc, Class 1, Semi-Gloss Satin Grey, 60/76mm Ptop & Sentry, 76mm recmd Sentry, IP66, IK09, 7kg max, Windage 0.06-0.18m², Fixed with no dim profile.	IT1-SO5-4.7-3M1F	58W	LED	615 x 343	Fence mounted at 5m
X6 Twin		Italo 1, 3 Mod, 7030 lum.lm, 58W, 700mA, 121lm/W, 4000K, Asym. Street Optic (SO5), DALI Driver inc, Class 1, Semi-Gloss Satin Grey, 60/76mm Ptop & Sentry, 76mm recmd Sentry, IP66, IK09, 7kg max, Windage 0.06-0.18m², Fixed with no dim profile.	IT1-SO5-2.7-4M1F	93W	LED	615 x 343	Twin Heads column mounted at 6 m
Y1		Viva-City Flood, 16,780 lum.lm, 120W, 808mA, 140lm/W, 4000K, Asym. Flood Optic - 50˚, Driver inc, Class 1, IP66, IK08, RAL7016 Anthracite Grey Finish, 8.2kg, Surface mount bracket, Dimmable	VCYF-FL50-4.8-120D	120W	LED	386 x 416	Column mounted at 8m

Kingfisher Lighting

Reference	Image	Description	Product Code	Output (W)	Light Source	Dimensions (LxWxH or ØxH)mm	Mounting Details
Y2		Viva-City Flood, 7,001 lum.lm, 60W, 805mA, 117lm/W, 4000K, Asym. Forward Throw Optic - 70˚, Driver inc, Class 1, IP66, IK08, RAL7016 Anthracite Grey Finish, 7.9kg, Surface mount bracket, Dimmable	VCYF-FW70-4.6-60D	60W	LED	386 x 416	Wall mounted at Various heights
Z1		Amnis Flood. 167,000lum.lm, 1350W, 130lm/W, 6 Row, Remote Near Standard Driver 1-10V Dimmable, Narrow Short Throw Optic, 2700K, IP66, IK08, RAL7016 30% Gloss Anthracite Grey Marine Grade Finish.	LAFL167NRS6NST727	1350w	led	800 x 461	Column mounted at 12m

5.0 Site BREEAM Information

BREEAM New Construction 2018 (UK)

Kingfisher Lighting

Part of the Luceco PLC group of companies LUCECO

Pol 04 - Reduction of night time light pollution

No. of credits available: 1 **Minimum Standards: No**

Aim: To ensure that external lighting is concentrated in the appropriate areas and that upward lighting is minimised, thereby reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties

Assessment criteria:
1 External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users.
OR alternatively, where the building does have external lighting, one credit can be awarded as follows:
2 The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 20111.
3 All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.
4 If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes.
5 Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.2.

Table 2 – Obtrusive Light Limitations for Exterior Lighting Installations – General Observers

Environmental Zone	Sky Glow ULR [Max %] (1)	Light Intrusion (into Windows) E_v [lux] (2)		Luminaire Intensity I [candelas] (3)		Building Luminance Pre-curfew (4)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average, L [cd/m²]
E0	0	0	0	0	0	0
E1	0	2	0 (1*)	2,500	0	0
E2	2.5	5	1	7,500	500	5
E3	5.0	10	2	10,000	1,000	10
E4	15	25	5	25,000	2,500	25

Zone	Surrounding	Lighting Environment	Examples
E1	Natural	Intrinsically dark	National parks or protected sites
E2	Rural	Low district brightness	Industrial or residential rural areas
E3	Suburban	Medium district brightness	Industrial or residential suburbs
E4	Urban	High district brightness	Town centres and commercial

ENE 03 - External lighting

No. of credits available: 1 **Minimum Standards: No**

Aim: To reduce energy consumption through the specification of energy efficient light fittings for external areas of the development.

The following demonstrates compliance:
1 No external lighting (which includes lighting on the building, at entrances and signs).
OR
2 External light fittings within the construction zone with:
2.a: Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt
2.b: Automatic control to prevent operation during daylight hours
2.c: Presence detection in areas of intermittent pedestrian traffic

Hea 01 Visual comfort

No. of credits available: 1 **Minimum Standards: No**

Aim: To encourage best practice in visual performance and comfort by ensuring daylighting, artificial lighting and occupant controls are considered.

Assessment criteria:
10 All external lighting located within the construction zone is specified in accordance with BS 5489-1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas4 and BS EN 12464-2:20145 Light and lighting - Lighting of work places - Part 2: Outdoor work places. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.
11 Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 8–9.c.

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D42663 - HMP Garth Wymott

Qty	Range	Light Source	Lamp Lumens	Circuit Watts	Lm/W	LOR	Luminaire Lumens	ULOR	Upward Lmns	RA	ART Hour Per Day	CO² Calculation for year	
												CO² (Tonnes)	Kw/hour
68	Italo 1	S05 - 700mA 4 Module	8990	76	118.29	100.0%	611320	0.0%	0	70	12	5.23	22635.84
185	Viva City PRO Flood	59w LED FW70	7001	59	118.66	100.0%	1295185	0.0%	0	60	12	11.05	47807.70
126	Italo 1	S05 - 525mA 2 Module	3690	31	120.98	100.0%	464940	0.0%	0	70	12	3.89	16832.34
12	Italo 1	ASP7W - 700mA 1 Module	6090	52	117.12	100.0%	73080	0.0%	0	70	12	0.63	2733.12
21	Italo 1	S05 - 700mA 3 Module	7030	58	121.21	100.0%	147630	0.0%	0	70	12	1.23	5334.84
45	Fortis	15w LED	1500	15	100.00	100.0%	67500	8.6%	5805	70	12	0.68	2956.50
32	Viva City PRO Flood	120w LED FL50	18360	120	153.00	100.0%	587520	0.0%	0	70	12	3.89	16819.20
23	Viva City PRO Flood	118w LED FW70	14002	118	118.66	100.0%	322046	0.0%	0	60	12	2.75	11887.32

Total Installation Lumens	3569221.00	Total ULR	0.16%

Table 1 compliance

Environmental zone	E3

Sky Glow	Target	Achieved	Status
	5.00%	0.16%	Pass

Source Intensity (candelas)				
Pre curfew	10,000		Pass	Note - we have not been able to calculate this as no housing is shown on the drawing
Post curfew	1,000		Pass	Note - we have assumed no fittings will be left on Post curfew

Light Trespass into windows (Lux)				
Pre curfew	10		Pass	Note - we have not been able to calculate this as no housing is shown on the drawing
Post curfew	2		Pass	Note - we have assumed no fittings will be left on Post curfew

Building Luminance (cd/m²)	10		

Compliance Status:		
Pol 04	Reduction of night time light pollution	Pass
Ene 03	Energy efficent external lighting	Pass
Hea 01	Internal and external lighting levels	Pass

Note - HEA01 in this report only applies to exterior lighting

Total CO² per year (Tonnes)	29.34
Total Electrical consumption (Kw)	29.00
Total Electrical consumption per year (Kwh)	127,006.86
Average luminaire lumens per circuit Watt	123.09

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