Oriel

External Lighting Assessment

October 2020

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Oriel
Creating the centre for advancing eye health

Moorfields Eye Hospital NHS Foundation Trust

NHS

Moorfields Eye Charity

UCL INSTITUTE OF OPHTHALMOLOGY

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Oriel
External Lighting Assessment

Prepared for:

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UCL Institute of Ophthalmology
Moorfields Eye Charity

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1 Introduction

1.1 Background

1.1.1 Moorfields Eye Hospital NHS Foundation Trust, on behalf of Oriel[1], have commissioned AECOM to undertake an External Lighting Assessment to accompany a planning application for a new facility that would allow the existing Moorfields Eye Hospital at City Road (Moorfields at City Road) and University College London (UCL) Institute of Ophthalmology (IoO) services at Bath Street to relocate into a single building at the existing St. Pancras Hospital site (hereafter referred to as the 'Proposed Development').

1.1.2 The Proposed Development will be located at part of the existing St. Pancras Hospital site within the London Borough of Camden (LBC) (hereafter referred to as the 'Site'). The boundary of the Site is shown in Figure 1-1.

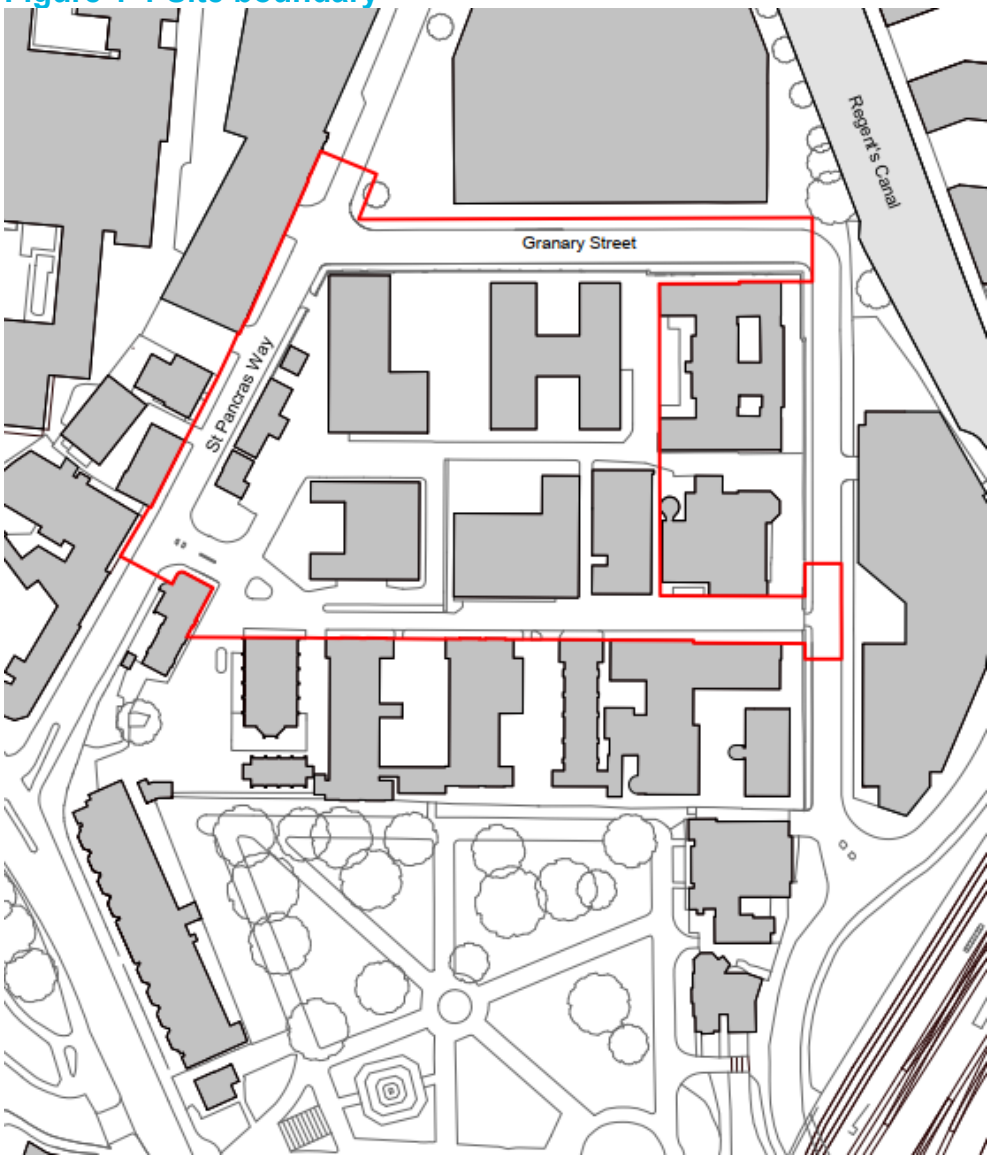
1.1.3 The Proposed Development replaces six existing 1 - 3 storey buildings within the St Pancras Hospital site with a single building, between seven and ten storeys in height (including Ground Level and Lower Ground Level, as well as plant at Roof Level). The development proposals also include the provision of public realm at ground level, blue badge parking, and vehicular drop off points along St Pancras Way. The building is arranged around a central atrium and connection space. There is also a roof terrace on the Sixth Floor Level on the south-western corners of the building.

1.1.4 The Proposed Development will be up to 69.15 metres (m) Above Ordnance Datum (AOD) in height and will have a gross external area of approximately 48,851 square metres (sq m) and a gross internal area of approximately 46,468 sq m.

1.1.5 The Proposed Development will comprise a mix of uses including clinical, research and education purposes, including accident and emergency (A&E) department, outpatients, operating theatres, research areas, education space, café and retail areas, facilities management, office space and plant space.

[1] Oriel is a joint venture between Moorfields Eye Hospital NHS Foundation Trust, UCL Institute of Ophthalmology and Moorfields Eye Charity

Figure 1-1 Site boundary

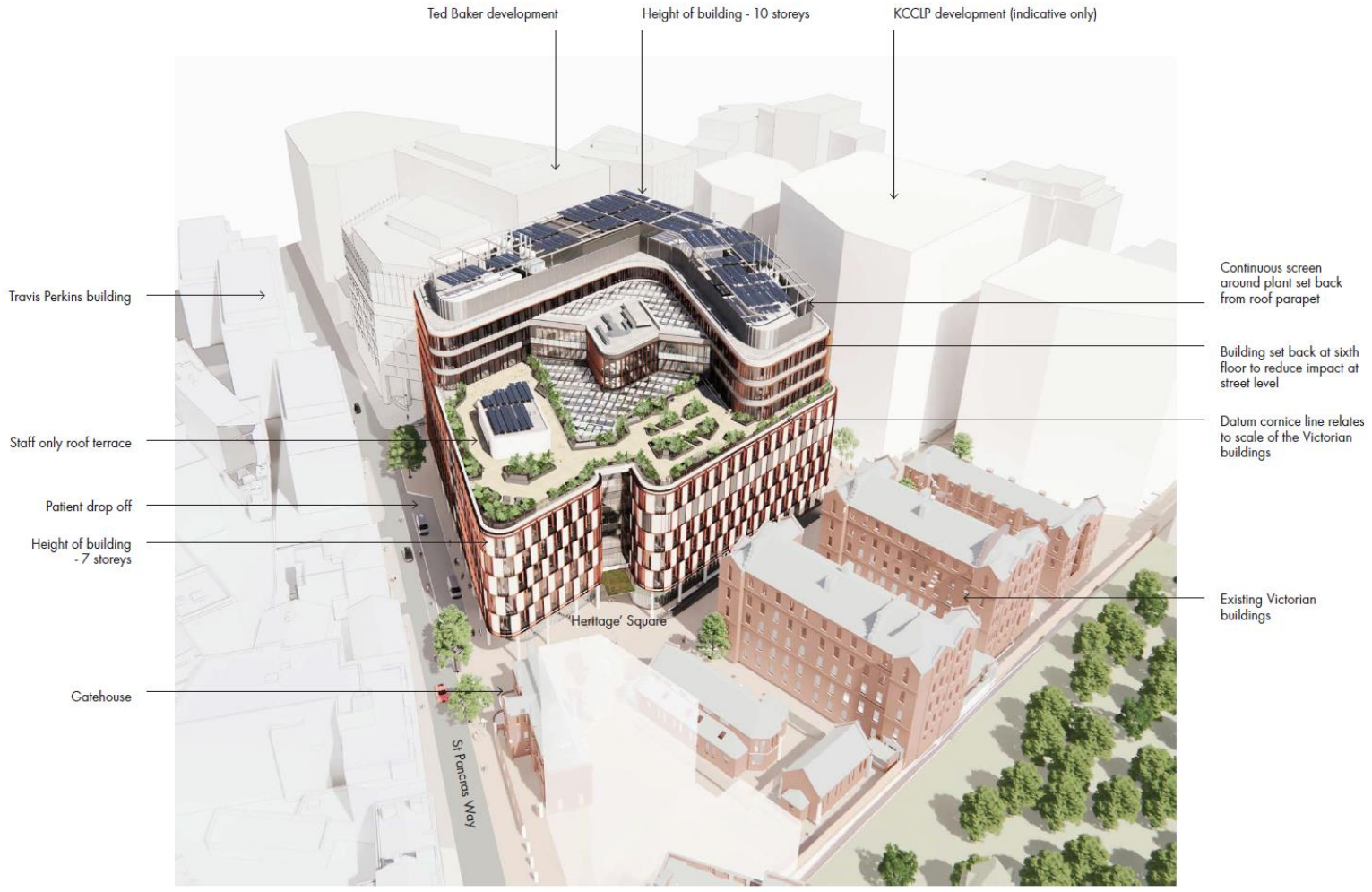


Site boundary

1.1.6 As part of these changes, new lighting is proposed for exterior areas including the public realm at ground level and the external roof terraces on the sixth floor. This report reviews the lighting design and strategy for these exterior spaces and evaluates their compliance with recommendations set out in good practice guidance.

1.1.7 Figure 1-2 shows an illustrative perspective view of the Proposed Development, looking towards the north.

Figure 1-2 Proposed illustrative future site perspective



Extract – Design and Access Statement submitted with the planning application

1.2 Scope

1.2.1 The Proposed Development includes new lighting to provide for safe access and use of the Site.

1.2.2 This lighting assessment considers the potential for effects arising from the following sources:

- Functional lighting to the streets and circulation areas in the public realm;
- Lighting within all relevant publicly accessible areas including the terrace on the sixth floor, covering landscape and feature lighting; and
- Incorporation of control measures which aid in minimising potential obtrusive effects to sensitive receptors.

1.2.3 This report provides:

- An overview of existing conditions and the existing lighting context;
- Confirmation of sensitive receptors, typically residential properties or wildlife / habitat found on, near or utilising the Site;
- An overview of the Proposed Development and proposed lighting context;
- Details of the lighting strategy for external spaces provided by landscape architect, White Arkitekter;
- Technical assessment of the potential effects arising from the lighting design and strategy against good practice guidance (including target criteria and ecological recommendations, where applicable); and
- Commentary on the predicted performance of external lighting against benchmark criteria set out within the Institution of Lighting Professionals (ILP) GN01 guidance notes for light spill, sky glow and glare (Ref. 1) (referred to as ILP GN01).

1.2.4 While the effects of a lighting installation may be commented on, the visual impact of new lighting to adjacent properties is subjective and does not form part of the analysis.

1.2.5 Indicative lighting strategy information for the Proposed Development is provided within Appendix A.

1.3 Legislation, Policy and Guidance

Legislation

1.3.1 The Clean Neighbourhoods and Environment Act 2005, Clause 102 (Ref. 2) and the Environmental Protection Act 1990 (Part III) (Ref. 3), give local authorities the power to consider obtrusive artificial light as a statutory nuisance. These Acts and guidance published by the Department for Environment, Food and Rural Affairs (Defra) (Ref. 4) state that artificial light emitted from premises ‘so as to be prejudicial to health or nuisance’ can be defined as a statutory nuisance. It includes guidance on suggested controls for local authorities for exterior lighting dependent on its context.

Policy

National Policy

National Planning Policy Framework

1.3.2 The National Planning Policy Framework (NPPF) was originally published on 27th March 2012 and details the Government's planning policies for England and how these are expected to be applied. The NPFF was revised on 24th July 2018 and 19th February 2019 (Ref. 5).

1.3.3 With reference to lighting, the NPPF states that planning policies and decisions should also 'ensure new development is appropriate for its location taking into account the likely 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 development. In doing so they should:

[paragraph 180] c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

Planning Practice Guidance

1.3.4 The Light Pollution section of the Planning Practice Guidance (Ref. 6) sets out the circumstances in which light pollution can become relevant to planning, stating *"Artificial light is not always necessary. It has the potential to become what is termed 'light pollution' or 'obtrusive light', and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife and undermine enjoyment of the countryside or the night sky."*

1.3.5 The guidance continues at paragraph 003:

"*Light intrusion occurs when the light 'spills' beyond the boundary of the area being lit. For example, light spill can result in safety impacts related to the impairment or distraction of people (e.g. when driving vehicles), health impacts arising from impaired sleep, cause annoyance to people, compromise an existing dark landscape and/or adversely affect natural systems. These adverse effects can usually be completely avoided with careful lamp and luminaire selection and positioning:*

- *Lighting near or above the horizontal is usually to be avoided to reduce glare and sky glow (the brightening of the night sky).*
- *Good design, correct installation and ongoing maintenance are essential to the optical effectiveness of lighting schemes such as fixed and/or regularly operated functional and decorative lighting elements.*
- *In combination with optical good practice aimed at limiting light pollution, efficient lamp and luminaire selection are important considerations to minimise energy use and associated carbon emissions..."*

Regional Policy

The London Plan – Spatial Development Strategy for Greater London (2016)

1.3.6 The London Plan Spatial Development Strategy for Greater London Consolidated with Alterations Since 2011 (March 2016) is the current strategic development plan for London, and it sets out a framework for development in the capital to 2036 (Ref. 7). It forms part of the regional development plan for Greater London.

1.3.7 Paragraph 7.19 states: *'The lighting of the public realm also needs careful consideration to ensure places and spaces are appropriately lit, and there is an appropriate balance between issues of safety and security, and reducing light pollution.'*

1.3.8 Paragraph 7.61 goes on to state: *'Development proposals should begin by understanding their wider context and viewing promotion of nature conservation as integral to the scheme not as an 'add-on'. The indirect impacts of development (e.g. noise, shading, lighting etc.) need to be considered alongside direct impacts (e.g. habitat loss)'*.

The London Plan – The Spatial Development Strategy for Greater London: Intend to Publish (December 2019)

1.3.9 The Draft London Plan Spatial Development Strategy for Greater London, Intend to Publish (Ref. 8) was issued in December 2019, following the Examination in Public and subsequent recommendations of the Secretary of State on the London Plan. Whilst not adopted, the policies within the Draft London Plan have been taken into consideration during development of the lighting design and strategy and this assessment, where relevant. Polices relevant to this assessment include Policy D8 Public Realm which states:

'B - … Lighting, including for advertisements, should be careful considered and well-designed in order to minimise intrusive lighting infrastructure and reduce light pollution.'

Local Policy

1.3.10 The Camden Local Plan was adopted on 3 July 2017 (Ref. 9). It replaced the Core Strategy and Camden Development Policies as the basis for planning decisions and future development in Camden. Policy A1 of the local plan seeks to ensure that standards of amenity are protected through managing the impact of development. This policy intends to protect the quality of life of occupiers and neighbours.

1.3.11 Paragraph 6.6 of the Local Plan highlights the challenges within the borough with relation to light pollution '*Camden's dense character means that light pollution can be a bigger problem in the borough than in lower density areas where uses are not so close together. Artificial lighting should only illuminate the intended area and not affect or impact on the amenity of neighbours'.*

British Standards

1.3.12 British Standards (BS) are standards produced by The British Standards Institution (BSI Group) and set a standard of quality for goods and services. The BS that are applicable for a development including educational, commercial, recreational and residential components. The BS that are relevant to the external lighting assessment for the Proposed Development include the following:

- BS 5489-1:2013 Code for practice for the design of road lighting Part 1: Lighting of roads and public amenity areas (Ref. 10) – Standard outlining lighting requirements for roads and public amenity areas which provides minimum light levels and uniformities for lighting different road and public space types;
- BS 8300-1:2018 Design of buildings and their approaches to meet the needs of people with disabilities (Ref. 11) – Document providing best practice recommendations for architectural design and the built environment can help improve facilities to better aid accessibility; and
- BS EN 12464-2 Light and Lighting. Lighting of work places. Outdoor work places (Ref. 12) – Standard specifying requirements for outdoor workplaces that focusses on typical lighting for visual tasks which consider visual comfort and performance.

Guidance

1.3.13 The below guidance documents provide design advice for the appropriate illumination of external spaces and design limits for light obtrusion effects. Taken together these documents are referred to as good practice guidance for the purposes of this report.

1.3.14 Institution of Lighting Professionals (ILP) guidance:

- GN01: 2011 Guidance notes for the reduction of obtrusive light (Ref. 1) - Guidance which is commonly used throughout the industry that presents limiting criteria for direct obtrusive lighting effects (such as light spill, sky glow and glare) suitable to a given area brightness condition as well as good practice design approaches.
- 08/18, Bats and Lighting in the UK (written with the Bat Conservation Trust) (Ref. 13) – Guidance for light levels and colour and temperature impacts on different bat species. It also looks at potential solutions to avoid and reduce this harm.

1.3.15 Chartered Institution of Building Services Engineers (CIBSE) guidance:

- CIBSE Lighting Guide 2, 2019 (Ref. 14) – Lighting for Healthcare Premises – guidance that aims to illustrate various ways of lighting the modern hospital environment.
- CIBSE Lighting Guide 6, 2016 - The Exterior Environment (Ref. 15) – guidance relating to the designing exterior lighting, including the consideration and use of developing technologies.

- The SLL Lighting Handbook, 2018 (Ref. 16) – Guide produced by the CIBSE Society for Light and Lighting (SLL) covering lighting fundamentals, technologies and applications of lighting.
- The SLL Code of Lighting, 2012 (Ref. 17) –provides information on lighting matters covering effects of lighting, recommendations for interior and exterior lighting, and an overview of calculations for quantitative lighting design.

1.3.16 International Commission on Illumination (CIE) guidance:

- CIE 150:2017 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (Ref. 18) – Guidance for assessing environmental impact of outdoor lighting, also providing recommendations for limiting obtrusive effects.
- CIE 126:1997 - Guidelines for minimising sky glow (Ref. 19) - Guidance for the reduction of sky glow and maximum permissible values.

1.3.17 Defra guidance:

- Lighting in the Countryside: Towards Good Practice, 1997 (Ref. 20). Guidance which is intended to provide a reference and tool for preventing and alleviating adverse effects of poorly designed and installed lighting schemes on the English countryside.
- Artificial light in the environment: policy update, 2014 (Ref. 21). This update describes the steps that Defra and other government departments have taken to address the issue of light pollution since findings were published by the Royal Commission on Environmental Pollution (Ref. 22).

1.3.18 Camden Planning Guidance:

- Camden Planning Guidance on amenity (March 2018) (Ref. 23), Chapter 4 Artificial Light provides guidance on the LBC's approach to artificial lighting and should be read in conjunction with the Camden Local Plan Policy A1 Managing the impact of development.
- Guidance on lighting assessments available on LBC's website provides further detail on what information should be included in a lighting assessment (Ref. 24).

2 Assessment Approach

2.1 Methodology

2.1.1 The following approach has been adopted in preparing this lighting assessment:

- Review of the existing baseline lighting conditions on the Site and immediate surroundings, including identification and assessment of receptors and their sensitivity;
- Review of the lighting strategy and proposed equipment for external lighting at ground level and the proposed roof terrace; and
- Assessment of the potential effects created by the new lighting condition benchmarked against good practice guidance.

2.1.2 In order to assess the level of change resulting from the new lighting installation, existing lighting conditions have been compared to the proposed lighting condition and evaluated based on recommendations made within good practice guidance.

2.1.3 Determination of the existing conditions also allows identification of receptors that are likely to be affected by changed lighting in the local area as well as establish the type of local lighting character. Areas with similar characteristics are described as environmental zones in ILP GN01 (Ref. 1).

2.1.4 The ILP GN01 guidance (Ref. 1) includes benchmark criteria which aids in limiting potential effects of a new lighting installation as well as helping it to fit better visually with the character of the area. Environmental zones broadly fall into five categories:

- City centre locations with high night-time activity (E4);
- Suburban areas (E3);
- Village or rural locations (E2),
- Natural locations such as those set aside as national parks or Areas of Outstanding Natural Beauty (AONBs) (E1); and
- Protected locations that have achieved dark sky status (E0).

2.1.5 The data for establishing lighting conditions existing and proposed lighting conditions has been obtained from models and drawings of the Proposed Development, site topography information, published information (such as that presented in the documents submitted with the planning application for the Ugly Brown Building (2-6 St Pancras Way),planning reference 2017/5497/P, Ref. 25) and aerial photography.

2.2 Assumptions and Limitations

2.2.1 It is assumed that new permanent lighting will reflect the lighting strategy and design provided in the Landscape Design Report which is submitted with the planning application and described within this report along with any recommended mitigation measures so that potential effects are minimised.

2.2.2 New permanent lighting introduced into the Site will adhere to the design strategy provided for safe vehicular movement and pedestrian safety, where appropriate.

2.2.3 For the purpose of this assessment, it is assumed that the permanent proposed lighting will operate control strategies such as using part-night dimming or shut off during a post-curfew timeframe where not needed for safety or security purposes. It is expected that curfew is generally between 11pm and 7am.

2.2.4 Assessment is made with the assumption that final lighting design will incorporate technical / environmental performance requirements and good practice recommendations regarding performance characteristics.

2.2.5 It is assumed that lighting design proposals for public realm / shared surface routes will replace all existing columns and building mounted lighting on retained structures within the Site.

3 Potential Effects

3.1 Obtrusive Light

3.1.1 Potential obtrusive lighting effects are those effects, measured through a specific set of technical parameters, which relate to changes in lighting that are observed to create a negative response for people, animals and the environment. This is typically created by light that strays away from task areas, results from a too bright installation, or is not correctly aimed.

3.1.2 This lighting assessment has been undertaken to review the potential effects to receptors that would be most likely to experience a noticeable change in lighting condition.

3.1.3 The three types of obtrusive light metrics that have been assessed include:

- Light Spill, which is considered to be '*the spilling of light beyond the boundary of the Site on which a light source is located*' (Ref. 1), to a degree which causes a visual nuisance. Light Spill is often considered to be the intrusion of light into homes; however, it may occur when light reaches an area where it is not intended. Light Spill can have a negative impact on wildlife and ecological systems local to an installation.
- Sky Glow, which is considered to be '*the brightening of the night sky*' above illuminated areas (Ref. 1). This brightness created is constantly varying as a function of many parameters such as direct upward-lighting, ground surface reflectance, overhead cloud cover, and the degree of water droplets in the atmosphere - rain, fog/mist, and snow, for example, exacerbate the effect.
- Glare, the placement of luminaires, their optical and photometric characteristics, in particular, how brightly they are lighting a building or external space compared to the relative brightness of the viewing context.

3.2 Environmental Criteria

3.2.1 The ILP GN01 (Ref. 1) advises that lighting which has the same characteristics as the overall area lighting condition are less likely to cause disturbance, as well as minimising instances of light pollution.

3.2.2 The guidance describes design approaches and different types of brightness characteristics expressed by limiting criteria for obtrusive light. This is done through defining environmental zones which set out the recommended limiting criteria for a new or changed lighting installation. Environmental zones and how they are considered are set out in Table 3-1.

Table 3-1 Environmental Zones (ILP GN01)

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

(extract ILP GN01 2020, Table 2, Ref. 1)

3.2.3 The degree to which an artificial lighting installation is likely to impact on an environment is in part dependent on the visual context. Lighting installations in areas that are relatively dark are likely to have a greater effect on their environment than those in areas that are used throughout the night and are brightly lit. External lighting should be specified with consideration for the environmental context apparent to an installation.

3.2.4 Table 3-2 to Table 3-4 are extracts from ILP GN01 (Ref. 1) and provide an overview of how brightness characteristics are considered and the recommended associated targets.

3.2.5 Note that for any criteria indicating a curfew, the curfew is assumed to be from 11pm. Morning curfew times will need to be agreed with LBC.

Table 3-2 Lighting threshold criteria – Maximum vertical illuminance on properties (light spill)

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

Note: *If the installation s for public (road) lighting, then this may be up to 1 lux.

(extract from ILP GN01 2020, Table 3, Ref. 1)

Table 3-3 Lighting threshold criteria – Limits for upward light (sky glow)

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

Note: this does not take into account of the light reflected upwards from the ground that also contributes to sky glow. This is the traditional method to limit sky glow and is suitable to compare different single luminaires.

(extract from ILP GN01 2020, Table 6, Ref. 1)

Table 3-4 Lighting threshold criteria – Maximum luminous intensity (glare)

Light technical parameter		Application Conditions	Environmental Zone					
			0<Ap<=0.002	0.002<Ap<=0.01	0.01<Ap<= 0.03	0.03<Ap<= 0.13	0.13<Ap<= 0.50	Ap>0.5
Maximum luminous intensity emitted by luminaire (I in cd)	E0	Pre-curfew	0	0	0	0	0	0
		Post-curfew	0	0	0	0	0	0
	E1	Pre-curfew	0.29d	0.63d	1.3d	2.5d	5.1d	2500
		Post-curfew	0	0	0	0	0	0
	E2	Pre-curfew	0.57d	1.3d	2.5d	5.0d	10d	7500
		Post-curfew	0.29d	0.63d	1.3d	2.5d	5.1d	500
	E3	Pre-curfew	0.86d	1.9d	3.8d	7.5d	15d	10000
		Post-curfew	0.29d	0.63d	1.3d	2.5d	5.1d	1000
	E4	Pre-curfew	1.4d	3.1d	6.3d	13d	26d	25000
		Post-curfew	0.29d	0.63d	1.3d	2.5d	5.1d	2500
Aid to gauging Ap			2 to 5m	5 to 10cm	10 to 20cm	20 t0 40cm	40 to 80cm	>80cm
Geometric mean of the diameter (cm)			3.2	7.1	14.1	26.3	56.6	>80
Corresponding Ap representative area (m^2)			0.0008	0.004	0.016	0.063	0.251	>0.5

(extract from ILP GN01 2020, Table 4, Ref. 1)

4 Existing Site and Surroundings

4.1 Site Location

4.1.1 The Site is bound by St Pancras Way to the west and Granary Street to the north and comprises the north-western part of the existing St Pancras Hospital. It consists of six existing buildings and internal roads. It is anticipated that the remaining buildings of the St Pancras Hospital site to the south and east of the Site are to be redeveloped in the future as part of a separate scheme by King's Cross Central Limited Partnership (KCCLP) (Ref. 26).

4.1.2 The surrounding area presents a mix of uses, including residential, office, commercial, retail and education. The Site is located to the east of existing railway lines leading into and out of St Pancras International train station, which is situated approximately 900m to the south of the Site.

4.1.3 Figure 4-1 presents an aerial image of the Site and its surrounding context. The approximate Site area is shaded in red.

Figure 4-1 Study Area and Built Receptors

Google Map overlay, proposed Site indicated by a red hatch

4.1.4 Levels on the Site generally fall from north east to south west, with the high point being 23.00m Above Ordnance Datum (AOD) in the north east of the Site and a low point of 19.09m AOD to the south west.

4.1.5 The main site access is via a gated entrance off the existing St Pancras Way with an additional gated access point off Granary Street to the east.

4.1.6 There are limited existing landscape features within the St Pancras Hospital site although larger areas of mature trees and plantings are located to the south of the Hospital within St Pancras Gardens and to the northeast between Granary Street and Regent's canal. Further details are provided in the Arboricultural Impact Assessment and Preliminary Ecological Appraisal which are submitted with the planning application.

4.2 Lighting Context

Existing Local Lighting Context

4.2.1 The lighting characteristics of the wider area beyond the Site are consistent with more suburban uses, where the majority of lighting is provided for building entrance / perimeter or associated with adjoining roads. Luminaire typologies are consistent with traffic route installations for roads and the more ad-hoc application of private lighting installations that are updated over time.

4.2.2 Granary Street and the St Pancras Way are illuminated streets adjacent to the Site. Lighting of these roads are typical of urban installations, consisting of streetlight style luminaires mounted on 6 – 8m columns on bracket arms. Lamps trend toward with high-pressure sodium lamps (St Pancras Way, Figure 4-2) and LED (Granary Street, Figure 4-3).

Figure 4-2 Existing Street Lighting, St Pancras Way

North view, overlay google streetview July 2019

Figure 4-3 Existing Street Lighting, Granary Street

South West view, overlay google streetview July 2019

4.2.3 Figure 4-4 provides a sample of ad-hoc private lighting around the Site. These installations contribute some light to public realm areas but are primarily used as part of perimeter or entrance illumination for 9 St Pancras Way (a), 5 St Pancras Way gated access (b) and 5 St Pancras Way entrance (c).

Figure 4-4 (a, b, c) Local building perimieter / entry lighting

(a)

(b)

(c)

Overlay google streetview July 2019

Existing Site Lighting Context

4.2.4 The majority of light within the St Pancras Hospital site is provided by building-mounted floodlights situated around the building perimeters, pedestrian circulation areas and roads. Occasional 5m columns with pole top lanterns are placed in locations where higher brightness and uniformity of lighting is required, such as the existing public entrance that allows for 2-way vehicular traffic.

4.2.5 There is existing lighting within the Site, the majority being fixed to building facades. The entrance area benefits from ambient light provided by 5m columns with post top lanterns and building perimeter floodlighting. These features are shown in Figure 4-5 and Figure 4-6.

Figure 4-5 Existing Site Entrance Column Lighting

Overlay google streetview July 2019

Figure 4-6 Existing Site Entrance Wall Lighting

Overlay google streetview July 2019

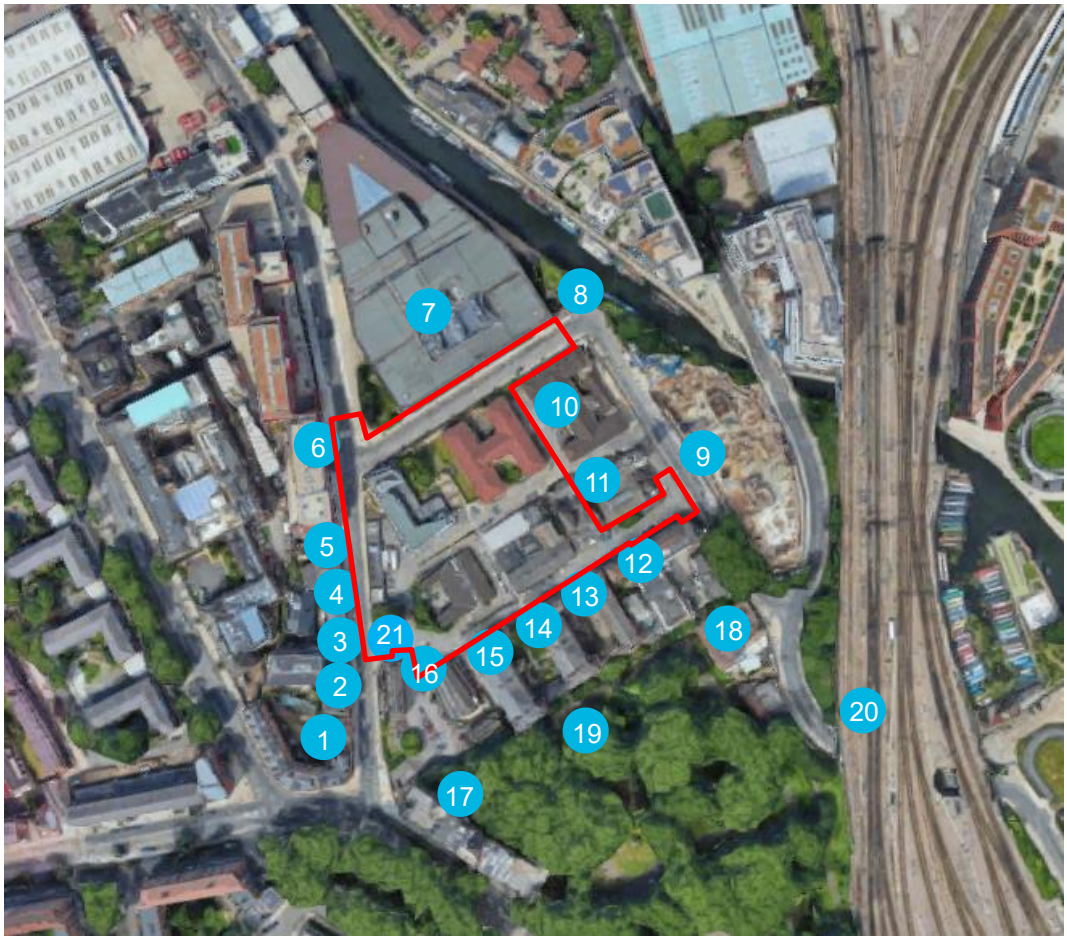
4.3 Sensitive Receptors

4.3.1 There are a mix of property types around the Site including residential, commercial, retail and healthcare which could have a sensitivity to a change in the night-time lighting condition and are considered in this assessment.

4.3.2 There are also potential habitats for ecological receptors near the Site in the form of mature trees in St Pancras Gardens to the south of the St Pancras Hospital, and Regent's Canal across Granary Street to the north. These are likely to be used as amenity space or as a habitat and are considered in this assessment.

4.3.3 Figure 4-7 provides an overview of built and natural receptors identified around the Site. Table 4-1 provides further details of these receptors.

Figure 4-7 Study Area and Receptor Locations



Overlay google maps

Table 4-1 Existing Receptors

Ref.	Height (storey)	Type	Development / Location	Comments
1	6	Residential	Goldington Buildings, Flats 1 – 30	Windows of residential units are considered sensitive to a change in lighting condition.
2	5	Office / retail, residential upper levels	One St Pancras Way	Windows of residential units are considered sensitive to a change in lighting condition. Office / retail space is expected to have a moderate sensitivity
3	5	Residential	3 / 5 St Pancras Way	Windows of residential units are considered sensitive to a change in lighting condition.
4	2 - 3	office and residential accommodation	7 / 7A St Pancras Way	Windows of residential units are considered sensitive to a change in lighting condition. Office space is expected to have a moderate sensitivity.

Oriel
External Lighting Assessment

Ref.	Height (storey)	Type	Development / Location	Comments
5	4, 3 above ground	offices and community housing	9 St Pancras Way, St Mungos Hostel	Windows of residential rooms are considered sensitive to a change in lighting condition. Office space is expected to have a moderate sensitivity.
6	8	Student residential, student services / retail at ground	11 – 13 St Pancras Way, UCL	Windows of residential accommodation are considered sensitive to a change in lighting condition as well as communal habitable space such as kitchens. Retail space is expected to have less sensitivity to a change in lighting condition, student services is considered to be a transitory and also less sensitive.
7	4	Commercial / industrial	The Ugly Brown Building, Plot C	Currently in use as a data centre, not considered to be sensitive to a change in lighting condition.
8	n/a	amenity / habitat	Regent's Canal	Established green space and river banking with mature trees.
9	6 - 13	Commercial / offices / residential	101 Camley Street,	Under construction, new residential units are considered sensitive to a change in lighting condition.
10	2 - 3	patient treatment	St Pancras Hospital site: North Wing, Mary Rankin Unit	Directly faces the Site and new development.
11	2 - 3	Maintenance / offices	St Pancras Hospital site: St Pancras Hospital water tower and boiler room	Expected to be primarily equipment space and be less sensitive to a change in lighting condition.
12	4 - 5	occupational therapy wards	St Pancras Hospital site: Huntley Centre	Expected to have a moderate sensitivity to a change in lighting condition.
13	4	residential	St Pancras Hospital site: Residential block	Windows of residential rooms are considered sensitive to a change in lighting condition.
14	5	Healthcare / restaurant	St Pancras Hospital site: East Wing Building, courtyard restaurant	Expected to have a moderate sensitivity to a change in lighting condition.
15	5	medical offices	St Pancras Hospital site: West Wing Building,	Expected to have a moderate sensitivity to a change in lighting condition.
16	2 - 3	medical offices	St Pancras Hospital site: River Crisis House	Expected to have a moderate sensitivity to a change in lighting condition.
17	5 - 6	inpatient unit	St Pancras Hospital site: 4 St Pancras Way, South Wing	Expected to have a moderate sensitivity to a change in lighting condition.

Ref.	Height (storey)	Type	Development / Location	Comments
18	2	Medical / offices	St Pancras Coroners Court	Expected to have a moderate sensitivity to a change in lighting condition.
19	n/a	Amenity / habitat.	St Pancras Gardens	Established green space with mature trees.
20	n/a	Transportation	Rail line: St Pancras International	Unlikely to have direct views of the Site due to the distance of existing rail lines and existing screening in the form of buildings and trees.
21	3	Medical / offices	St Pancras Hospital site: Gatehouse	Expected to have a moderate sensitivity to a change in lighting condition.

4.4 Environmental Classification

4.4.1 The overall local area lighting characteristic established through observations of the Site is similar to a suburban / urban character, identified as an environmental zone ranging between E3 and E4. These areas will generally have a medium population density, with roads lit to both the standard of residential streets and to traffic route standards.

4.4.2 However, in the vicinity of the St Pancras Gardens and Regent's Canal there is likely to be a reduced brightness which could be better represented by an environmental zone between E2 and E3.

4.4.3 Where there are different brightness character types, guidance (Ref. 1) advises that the stricter criteria should be used to limit obtrusive lighting effects. Given the prevailing area uses and character brightness, an environmental zone of E2 would not provide realistic target criteria.

4.4.4 Therefore, assessment and commentary will be provided in terms of recommendations provided by ILP GN01 (Ref. 1) for an environmental zone E3, in addition to recommendations made as an outcome of the Preliminary Ecological Appraisal which is submitted with the planning application. It is recommended that where development borders St Pancras Gardens or Regent's canal that lighting effects meet or improve on recommendations provided for an environmental zone E2.

4.4.5 The environmental classifications and how they are applied are described further in Section 3 of this report.

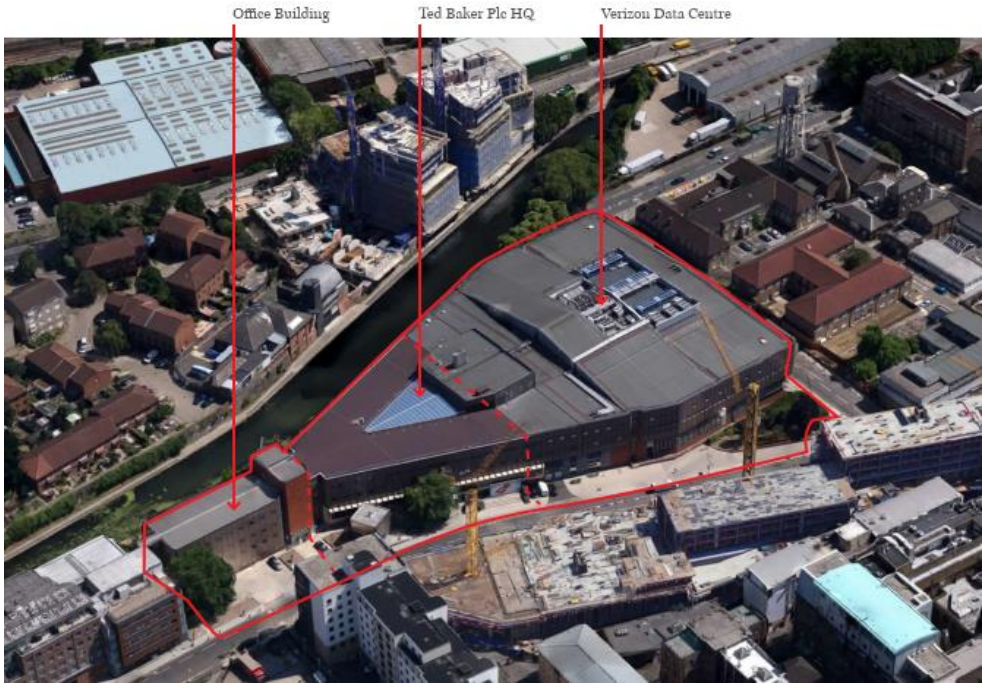
4.5 Future Development - Consented

4.5.1 The future consented developments considered in this assessment comprise those developments which are likely to be affected by new lighting associated with the Proposed Development. There are three consented schemes which are close to the Site, The Ugly Brown Building, 101 Camley Street and 103 Camley Street.

4.5.2 101 and 103 Camley Street are under construction and are close to completion. 103 Camley Street is northeast from the Site across Regent's Canal and is considered too far away from the Proposed Development for potentially obtrusive lighting effects to affect it. The Proposed Development is likely to be visible from upper floors of these consented scheme, however this is considered to introduce a visual change rather than a measurable effect and further assessment is not required. 101 Camley Street is separated from the Site by the remaining buildings on the St Pancras Hospital Site. It is considered within the main lighting assessment as Receptor location 9. The roof terrace of the Proposed Development is also located on the opposite side of the building, away from both these schemes.

4.5.3 Redevelopment of the Ugly Brown Building (2-6 St Pancras Way) has been granted planning permission (planning reference 2017/5497/P, consented in July 2018) and will replace the connected Plots A – C with six new development blocks providing retail, office, residential and hotel development. The majority of new development will have commercial uses. Construction of this scheme has not commenced at the time of preparing this report.

Figure 4-8 The Ugly Brown Building Plot Locations (extract from The Ugly Brown Building Design and Access Statement (Ref. 25))



4.5.4 Plot C contains four blocks, with two of these blocks up to 11 storeys. These form part of the consented scheme's retail / office and residential development. Figure 4-9 provides an overview of where the consented blocks are located.

Figure 4-9 Future Consented Development (extract from The Ugly Brown Building Design and Access Statement, (Ref. 25))

4.6 Emerging Development - St Pancras Hospital Site Concept Design

4.6.1 King's Cross Central Limited Partnership ('KCCLP') is the development partner of the Camden and Islington Foundation NHS Trust ('the C&I Trust') and they intend to submit a planning application for the remaining part of the St Pancras Hospital site in 2021.

4.6.2 The design is at an early stage, however it is currently envisaged that the development will retain the existing Chapel, Gatehouse and Workhouse buildings, converting them to office and retail spaces. The buildings to the east of the Site would be demolished and replaced by three new buildings proposed to be a mixture of ground floor retail, workplaces and residential apartments.

4.6.3 As this is an emerging scheme, details of the construction programme are not available, however it is unlikely to be constructed and operational prior to the commencement of construction or before the Proposed Development is complete.

5 Lighting Strategy and Design

5.1 Proposed Development Overview

5.1.1 The Proposed Development introduces new exterior spaces providing public realm space at ground level/ lower ground level and roof terrace at sixth floor level.

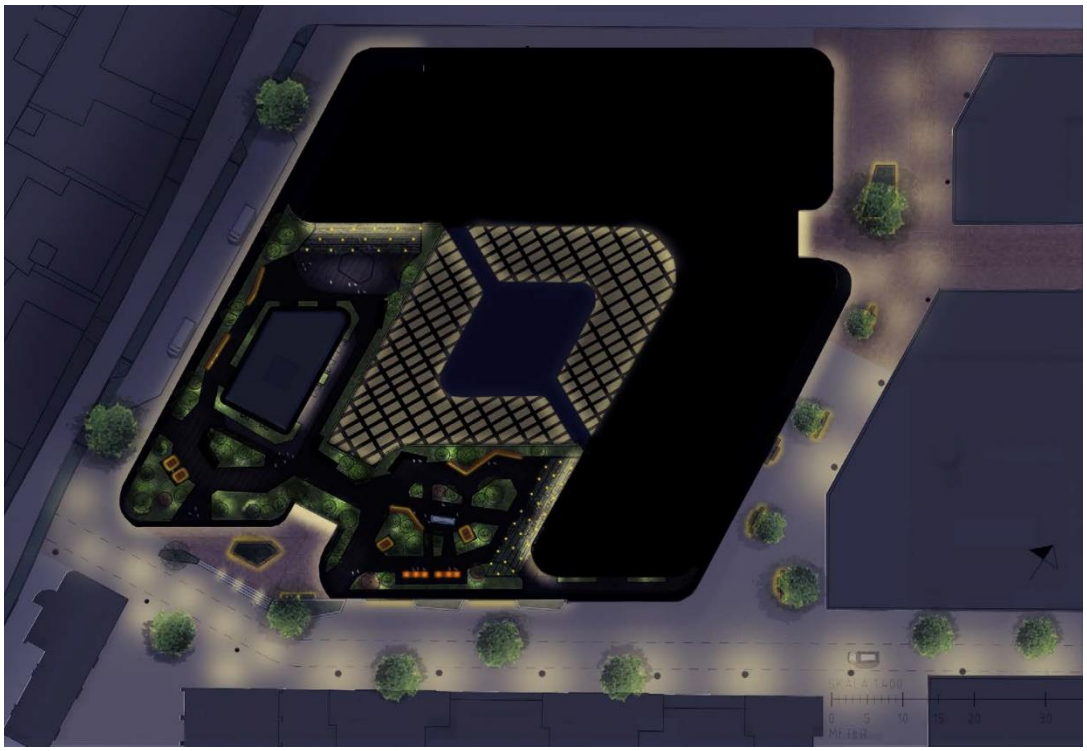
5.1.2 At ground / lower ground level, these areas include pedestrian and shared access routes around the new building, upper and lower ground entrances and landscape in the form of feature trees and vegetation set in ground or in planters. Ground level spaces external to the building will be accessible through the Site throughout the night.

5.1.3 Roof terrace spaces provide a green space which introduces seating and pedestrian circulation that can be used throughout the day. Roof terrace spaces will not be open to the general public, and it is expected that the roof terrace will be less frequently used during night-time hours.

5.1.4 The indicative lighting design and strategy used for assessment is presented in the Landscape Design Report which is submitted with the planning application.

5.1.5 Figure 5-1 provides an overview of the illustrative design for ground level and roof terrace lighting areas in plan view.

Figure 5-1 Illustrative Proposed External Lighting Glow Plan



Extract from the Landscape Design Report, submitted with the planning application

5.1.6 The key design principles which have been integrated within the proposed lighting strategy and design include:

- Area light provided by column mounted lighting from a combination of full cut-off post top luminaires and multi-head, adjustable luminaire arrangement at ground level;
- Accent lighting to benches and planters at ground level and roof terrace;
- Concealed lighting to handrail at ground level;
- Strategic uplighting of trees, and shrubbery at ground level and roof terrace;
- Linear light wash / uplight of ground canopied spaces;
- Soft festoon style lighting to roof terrace entrance areas; and
- Clearly defined entrances and accessible routes for all exterior spaces.

5.2 Technical Requirements

5.2.1 Lighting is required for the Proposed Development to support safe Site use and access.

5.2.2 Lighting technical requirements are expected to reflect the requirements set out within British Standards and CIBSE good practice guidance relating to the lighting of public realm and hospital environs. The following high-level target lighting design criteria are assumed:

- 15 lux average for public realm with a minimum of 3 lux, including shared surface areas;
- 20 lux minimum along accessible routes; and
- 100 lux minimum for ramps, stairs and building entrance/exit areas.

Environmental Requirements and Target Criteria

5.2.3 External lighting should be designed and specified with consideration for the environmental zone. The threshold criteria is anticipated to be consistent with criteria highlighted for E3, the prevailing environmental zone category for the Site.

5.2.4 Note that for any criteria indicating a curfew, the curfew is assumed to be from around 11pm.

5.2.5 The following targets are associated with environmental zone E3.

- Light Spill: 10 lux pre-curfew, (vertically to windows); 2 lux post-curfew.
- Sky Glow: A maximum of 5% light shining directly upward into the sky.
- Glare: 10 kcd pre-curfew; 1 kcd lux post-curfew.

5.3 Design Strategy

5.3.1 The lighting design and strategy is set out in the Landscape Design Report submitted with the planning application, with further details provided in Appendix A of this report. It describes an overall strategy that links the landscape and architecture highlighting entrances, exterior elements and

landscape planting and provides a high quality and glare free lit environment. These aims are central to the lighting design and strategy.

5.3.2 The strategy identifies landscaped areas outside the main entrances as being illuminated using high mast columns with directable spotlights.

5.3.3 Zones in between entrances are illuminated with lower ‘park’ luminaires with a street lighting optic to create a more even light environment than outside the main entrances.

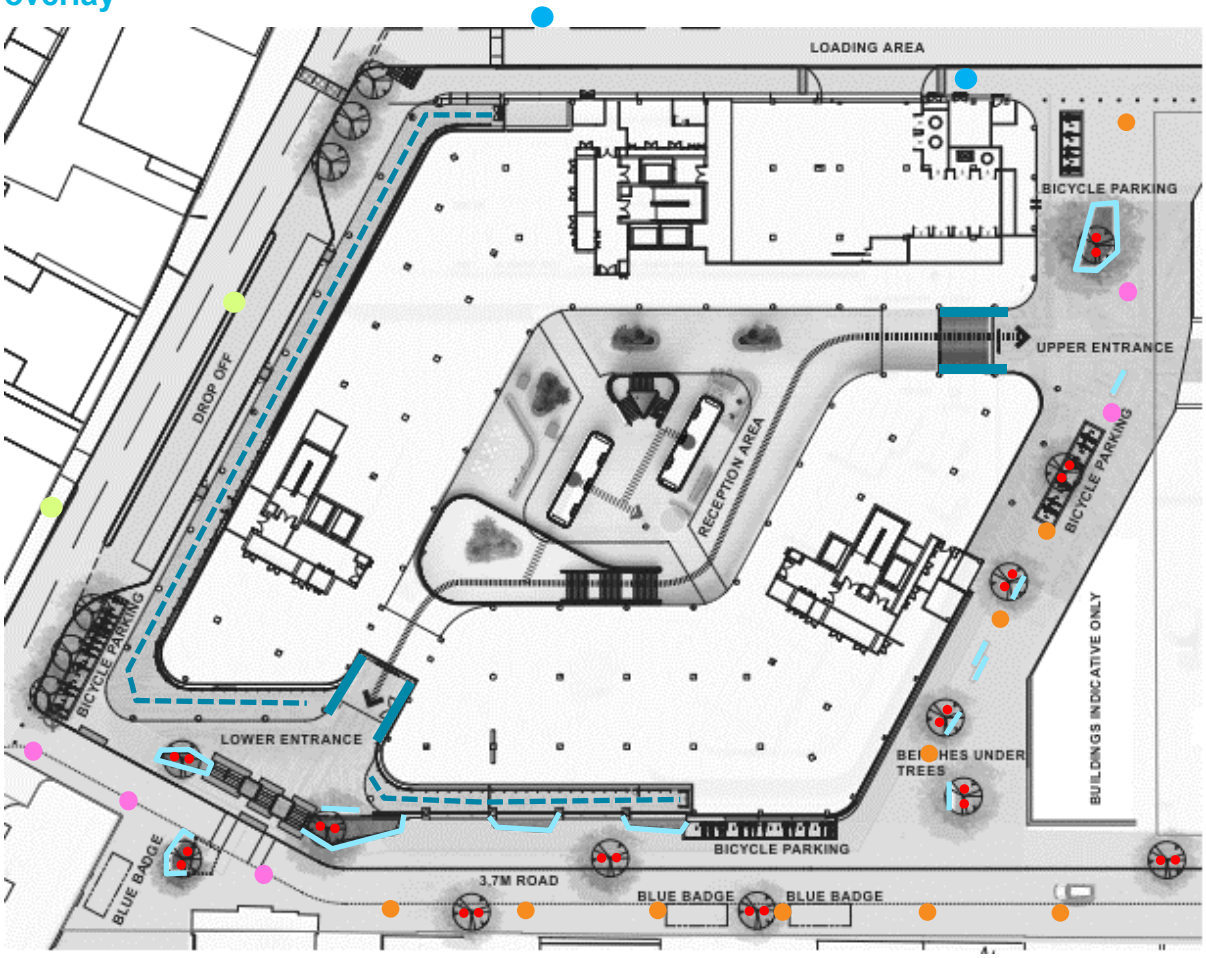
5.3.4 The entrance canopies are proposed to be illuminated by indirect and integrated lighting, as well as using borrowed light from internal spaces through glazed facades at the ground floor to create a bright and welcoming zone around the building.

5.3.5 The lighting strategy seeks to create attractive urban spaces and interesting views from inside the proposed building during dark hours, where lighting emphasises the green structure (landscape planting) through a combination of uplighting and projectors that shine through the foliage.

5.3.6 A human scale is highlighted through the use of lower level integrated lighting in benches, planting zones and handrails.

5.3.7 Figure 5-2 provides the indicative details of the proposed lighting arrangements at ground level. The proposed lighting equipment is outlined and existing functional lighting around the Site identified in Table 5-1.

Figure 5-2 Indicative Ground level layout for Proposed External Lighting overlay



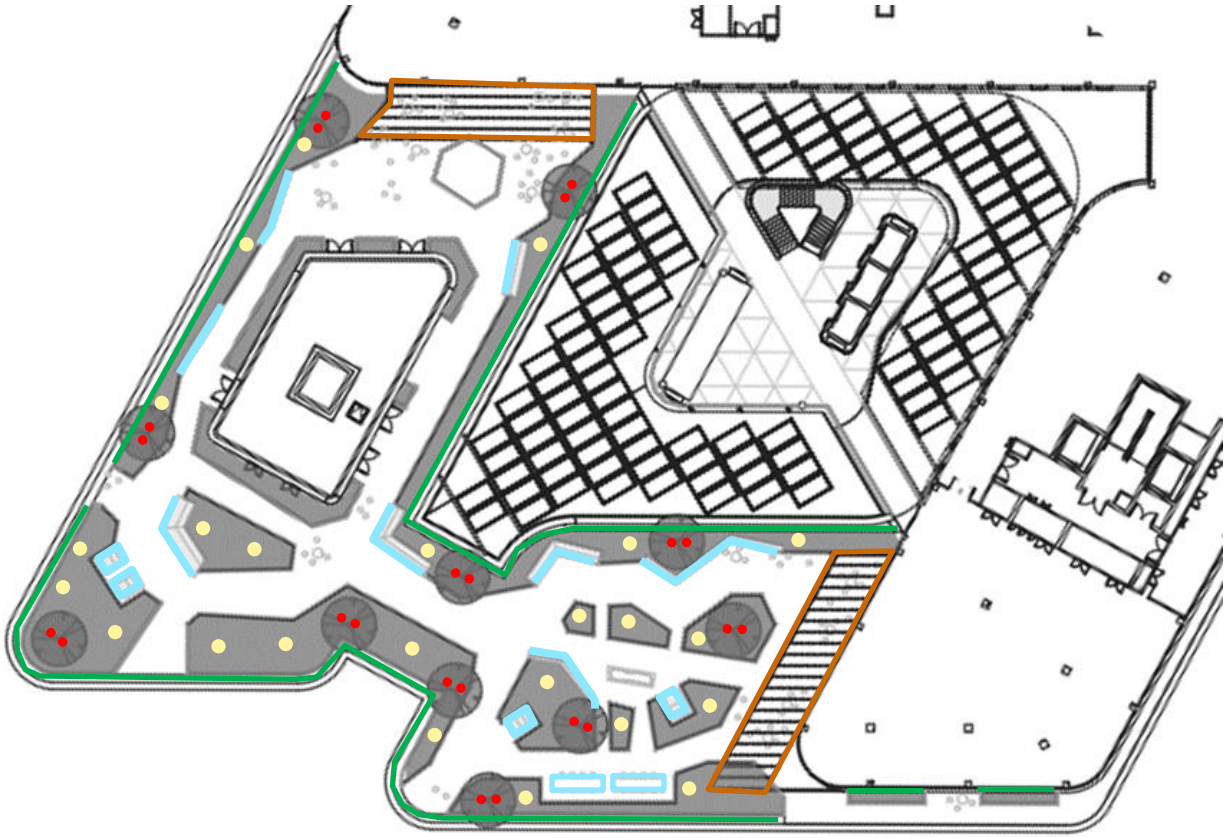
Extract from Landscape Design Report submitted with the planning application, with a key provided in Table 5-1 below.

Table 5-1 Proposed Landscape Lighting Equipment

Colour Code/ Symbol	Proposed Luminaire	Product Image	Source Details	Mounting Details
●	Meyer Monospot 3		LED, Medium beam, 3000K, 3283 lm	3 heads per 7m column with bracket mounted spotlights mounted between 6.5 and 7m
●	Focus Lighting, Sky Park V22 with shield		LED, 3000K, 6600lm	4.5 – 5m column
▬	Linear LED		LED, Warm White	Surface mounted to bench and planter edges
▬	Handrail Lighting		LED, Warm White	LED nodes integrated into handrail
▬	Vice Lighting, Lightway 6 Outdoor 60 symmetrical baffle		LED, 3000K, 1500lm (approx.), CRI >90	Ground recessed under canopy areas with baffle
▬	Canopy Downlight, deep recessed		LED, medium beam, 3000K, 1200lm and 1600lm, CRI >90	Recessed into building overhang or entrance canopy
●	Tree Uplighter		LED, Warm White	Ground / planter recessed
●	Existing column / streetlight head St Pancras Way (A5202)		High Pressure Sodium (SON)	6 – 8m, 1m bracket arm
●	Existing column / streetlight head Granary Street		LED (Granary Street)	6 – 8m, 1m bracket arm

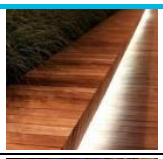
5.3.8 Figure 5-3 provides indicative details of the proposed lighting arrangements for the roof terrace. Proposed lighting equipment is identified in Table 5-2.

Figure 5-3 Indicative External Lighting Layout for Proposed Roof Terrace on the sixth floor



Extract from Landscape Design Report submitted with the planning application, with a key provided in Table 5-2 below.

Table 5-2 Proposed Roof Terrace Landscape Lighting Equipment

Colour Code/Symbol	Proposed Luminaire	Product Image	Source Details	Mounting Details
	Linear LED		LED, Warm White	Surface mounted to bench and planter edges
	Linear LED		LED, Warm White	Concealed behind planter
	Pergola Lighting		Festoon LED, Warm White	Surface mounted
	Tree Uplighter		LED, Warm White	Ground / planter recessed

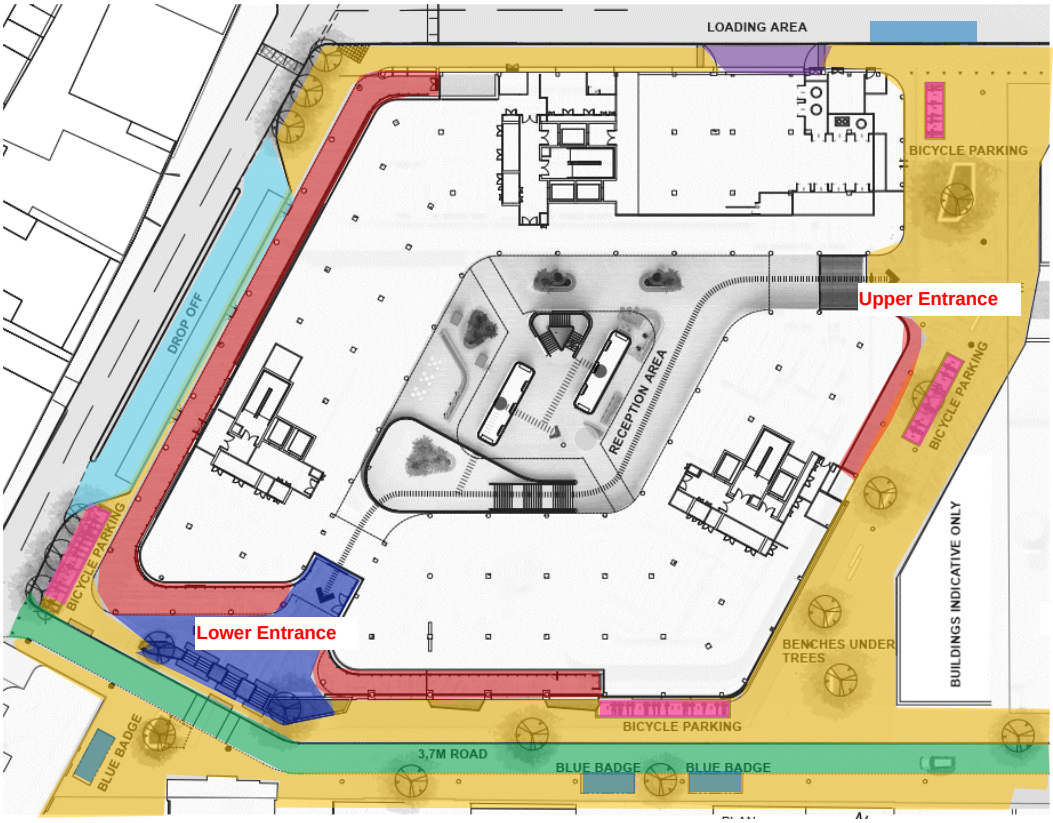
Colour Code/Symbol	Proposed Luminaire	Product Image	Source Details	Mounting Details
●	Planter Lighting		LED, Warm White	Surface / Spike mounted into planter beds

5.3.9 The lighting design approaches for specific areas within the Proposed Development are described in further detail below.

Ground Level Public Circulation

5.3.10 Ground level areas form a mixture of vehicle drop off zones, bicycle parking and public circulation for predominantly pedestrian access with shared vehicular surfaces. Figure 5-4 provides a high level map of these areas.

Figure 5-4 Ground Level map – Area typology overlay



Key

Level pedestrian routes
Shared vehicle route
Drop off
Loading Area
Blue badge parking
Cycle parking
Stair and lower ground space
Undercanopy / colonnade areas

Extract from Landscape Design Report submitted with the planning application

5.3.11 The surrounding shared surface acts as a circulation route and entry point that accommodates pedestrians, cyclists and motorists. It is assumed this route will see a mixture of traffic composition during day and night hours which may include emergency vehicles.

5.3.12 Multi-head columns are currently proposed to provide functional illumination to the main site entry locations off St Pancras Way and Granary Street of a height with existing streetlight columns. Each column is proposed to incorporate three directional LED heads mounted between 6.5 and 7m.

Building Entrance / Exits

5.3.13 Connections between the entrances and surrounding streets is an important space characteristic, and will allow visitors to be able to move easily without any obstructions.

5.3.14 Entrance areas and building perimeter will be covered by canopy. A colonnade effect is created at the building perimeter. Ground surfaces across the Site are gradually sloping which leads to building access occurring at different levels, creating an upper and lower entrance, Figure 5-4. Figure 5-5 and Figure 5-6 show the visual and spatial relationship between the ground and each entrance area.

Figure 5-5 Lower Ground Entrance

Extract from the Design and Access Statement submitted with the planning application

Figure 5-6 Upper Ground Entrance

Extract from the Design and Access Statement submitted with the planning application

5.3.15 A post-top ‘park’ style light mounted between 4.5 – 5m is proposed to provide a softer illumination of the entrance areas.

5.3.16 The canopies outside the main entrances integrate deep recessed downlights that set-in focus the area around the entrances.

5.3.17 This is used in combination with in-ground linear uplights to enhance the colonnades structure and materiality, creating a soft and welcoming appearance around the building. Deep recessed downlights, with glare control, provide additional light to meet required illuminance levels at street level.

5.3.18 Visually, the zone under the canopies is intended to stand out from the rest of the building, with brighter light indicating destination points and also to serve as a transitional zone between different light levels in outdoor and indoor spaces.

5.3.19 Lighting in the colonnades is also intended to emphasize the shape of the building and activates the area around it at street level. Canopy and colonnade spaces will also contribute light to the public realm.

5.3.20 High quality and glare free lighting is of high importance and integral to the lighting design and strategy.

Shared Vehicle Surface / Pedestrian Priority Route

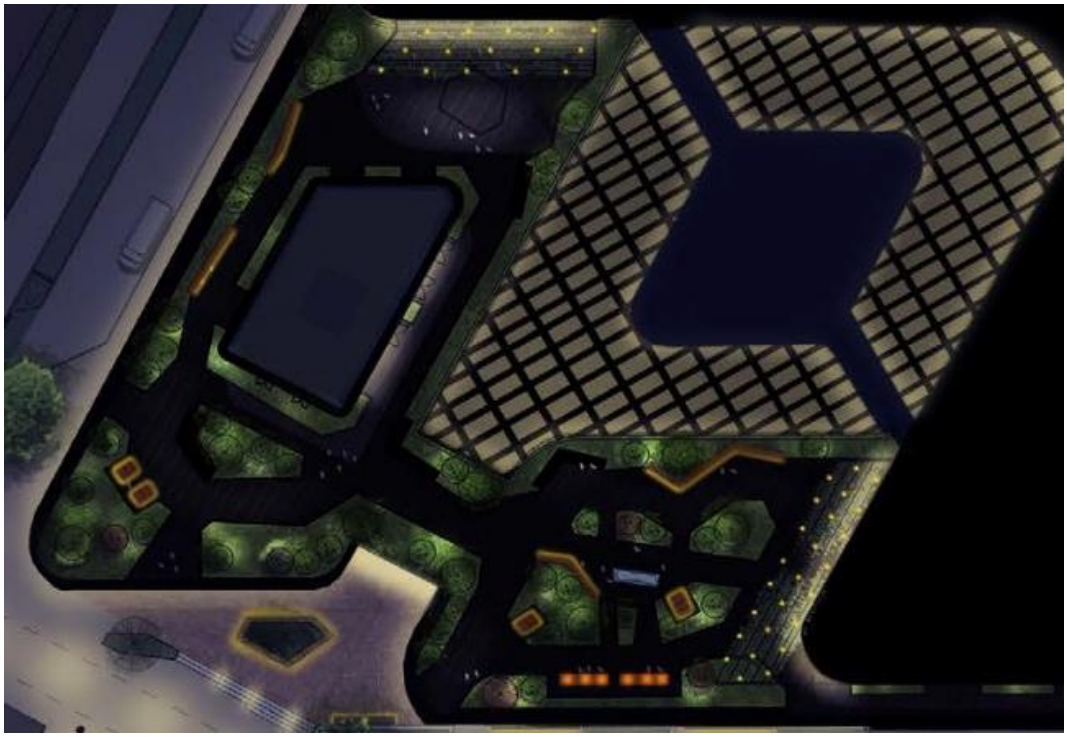
5.3.21 A shared vehicle / pedestrian route runs across the site southwest to southeast. While this is predominantly pedestrianised space, it will allow service vehicles to access the remainder of the Site.

5.3.22 A post-top 'park' style light mounted between 4.5 – 5m is proposed to illuminate the shared surface route as it extends through the St Pancras Hospital site.

Roof Terrace

5.3.23 An open-air terrace is provided at sixth floor level and is planned as an attractive, relaxing and flexible outdoor space for staff and students, as well as use as an events space during day or night hours. The illustrative design for roof terrace lighting areas in plan view is shown in Figure 5-7.

Figure 5-7 Illustrative Proposed External Lighting Glow Plan - Roof Terrace



Extract from Landscape Design Report submitted with the planning application

5.3.24 The roof terrace welcomes visitors to experience the "walk of senses" focusing on sight, sound, smell, touch and taste though the materials and plantings used. The terrace also affords views of the London skyline.

5.3.25 In order to avoid obstructing the view over London and to support the human scale of the roof terrace, in general, the majority of lighting is placed in a low position.

5.3.26 The design approach focuses on accentuating and enhancing the wooden furniture elements and landscape planters. The lighting subtly highlights architectural features and vegetation, integrates seating zones and marks access points to support orientation and wayfinding.

5.3.27 Pergolas located adjacent to building entrances are illuminated from above, using a more festive approach by incorporating lighting via a catenary or festoon style system with decorative light points.

Accessible Routes

5.3.28 Accessible routes are those used to access and use a place or space, including streets, parks and landscaped areas to approach a building or move between them.

5.3.29 Accessible routes will link to the wider masterplan for the St Pancras Hospital site and surrounding area, see the Design and Access Statement submitted with the planning application for further details. Accessible routes are expected to be located between drop off / parking points and the proposed building. This includes routes between the drop off area and proposed building from St Pancras Way and from the blue badge parking to in the southern end of the site to the proposed building .

5.4 Lighting Control

5.4.1 Lighting control is assumed to be comprised of a combination of photocell with astronomical time clock override to allow for lighting to be dimmed or switched off, as required, during the hours of darkness.

5.4.2 A manual override for the roof terrace may be desired to allow for more control over lighting for night-time events.

5.4.3 Key lighting control principles comprise:

- All external lighting, except that used for safety and security, can be automatically switched off between 23:00 and 07:00 supporting targets within the Building Research Establishment Environmental Assessment Method (BREEAM); and
- 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 IL GN01 (Ref. 1). This is referenced in Section 3 within this report.

5.4.4 The power/output of accent lighting is anticipated to be low to avoid overlighting feature elements, and will incorporate the use of smart controls to ensure the luminaires are off or dimmed at the appropriate time.

6 Technical Assessment

6.1 Assessment of Equipment Selection

6.1.1 Lighting performance is assessed based on the lighting design proposals and strategy and indicative equipment selection provided by White Arkitekter.

6.1.2 The proposed luminaire typologies range from predominantly functional lighting supplied by pole top and directional multi head columns to accent illumination for building canopy, tree canopies, low plantings and street furniture.

6.1.3 Where necessary, all luminaires will use relevant accessories to effectively control glare and minimise spill lighting to surrounding areas, particularly for any luminaires with directly viewable light sources or those needing additional control over how light is distributed. These accessories may include external shields, glare cowls or use of attachments to minimise lighting effects.

Ground Level Lighting

6.1.4 Lighting for public realm spaces at ground level uses a mixture of equipment typologies and lighting design techniques to provide an inviting atmosphere that meets the required performance criteria.

6.1.5 Functional streetlight style lighting for pedestrian only and shared surfaces is provided utilising a combination of three column mount directional LED heads placed at a maximum of 7m column and oriented toward the ground, or a post-top column design mounted at a maximum height of 5m and does not contribute light above the horizontal.

6.1.6 Lighting of stairs aids in illuminating a change in level as part of circulation routes between the public realm, building and lower ground entrance using integrated handrail lighting which is directed toward the ground.

6.1.7 Bench integrated lighting has a low-level output and fittings are concealed within joinery details. This accent lighting is not directly visible and does not present a high contrast with the surrounding area.

6.1.8 Canopy and tree uplights are the only lighting equipment at ground level that would normally be pointed above the horizontal in the upward direction. Canopy lighting is ground recessed below the structure to uplight and wash light across the undersurface of the canopies. Tree uplights are directed toward the landscape feature being lit.

Roof Terrace Level Lighting

6.1.9 The roof terrace provides space to walk and linger across the terrace area, with transitional spaces covered by slatted pergolas at the building edge.

6.1.10 Lighting of the roof terrace utilises a combination of joinery integrated lighting for benches or planters. These accent lights are not directly visible and will not present a high contrast with the surrounding area.

6.1.11 Tree and planter uplighting are the only lighting equipment for the roof terrace that would normally be pointed above the horizontal in the upward direction. Uplights will be directed toward the landscape feature being lit and be further shielded where additional control of light distribution is need, therefore it is unlikely that these will allow for direct views of the light source or contribute light directly into the sky.

6.1.12 Pergola lighting is provided by a festoon or catenary style of light and provides direct light only to the roof terrace. The final pergola style will influence the design of luminaire. A more solid canopy may allow for some upward light component where a more open canopy would require careful selection and placement to reduce potential contributions to upward light.

6.2 Assessment of Lighting Strategy and Design

6.2.1 The majority of proposed lighting equipment for external areas is designed or integrated in such a way that the design will inherently limit obtrusive light effects.

6.2.2 Internal lighting will have some influence on the lighting environment depending on final arrangements and façade glazing; however, this is expected to be largely constrained to the proposed building and building perimeter area, and have a limited effect to external spaces.

6.2.3 It is likely that direct views of internal lighting will create a somewhat visually brighter night condition above three storeys for some receptors due to the Proposed Development. It is expected that this will be a visual impact rather than a measurable lighting effect.

6.2.4 Table 6-1 provides an overview of the expected outcomes for the indicative lighting design at ground level and the roof terrace in terms of light spill sky glow and glare. Receptors with direct views of the Proposed Development will notice that their views have changed, however please note that the anticipated effects to receptors are based only on the predicted technical performance of the lighting design.

6.2.5 Variable screening that might be provided by mature trees or shrubbery is not included within the assessment. However, it is recognised that they will provide some degree of obstruction to direct views of the Proposed Development and new external lighting throughout the year from some viewing locations depending on scale of the planting and density of leaf.

6.2.6 Outcomes are considered in terms of not likely (N) or as having the potential to affect windows on a building or an exterior location (P).

Table 6-1 Anticipated Effects to Receptors

Ref.	*Development / Location*	*Light Spill*	*Sky Glow*	*Glare*	*Comments*
1	Goldington Buildings, Flats 1 – 30	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, oblique views of the Site. Unlikely to be affected by the lighting proposals.
2	One St Pancras Way	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, oblique views of the Site. Unlikely to be affected by the lighting proposals.
3	3 / 5 St Pancras Way	N	N	N	Exposed to streetlights and building perimeter lighting under existing conditions, oblique views of the Site. Unlikely to be affected by the lighting proposals.

Ref.	Development / Location	Light Spill	Sky Glow	Glare	Comments
4	7 / 7A St Pancras Way	N	N	P	Exposed to streetlights and building perimeter lighting under existing conditions. Possible views of directional light sources from new column at St Pancras Way entry but can be minimised through implementation of measures outlined in the Mitigation through Design section below.
5	9 St Pancras Way, St Mungos Hostel	N	N	P	Exposed to streetlights and building perimeter lighting under existing conditions. Possible views of directional light sources from new column at St Pancras Way entry, direct views of a brighter space with a more open public realm, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
6	11 – 13 St Pancras Way, UCL	N	N	P	Exposed to streetlights and building perimeter lighting under existing conditions. Upper floors may have views of the roof terrace and could increase visual brightness for some rooms depending on final equipment selection and output. Low level and controlled mounting combined with minimal light levels and integrated lighting reduce the potential for obtrusive effects, combined with implementation of measures outlined in the Mitigation through Design section below
7	The Ugly Brown Building, Plot C	N	N	N	Not considered sensitive to a change in lighting condition. Exposed to streetlights and building perimeter lighting under existing conditions. Unlikely to be affected by the lighting proposals.
8	Regent's Canal	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, direct views largely screened by existing development, including roof terrace lighting. Unlikely to be affected by the lighting proposals.
9	101 Camley Street,	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, direct views largely screened by existing development, including part of roof terrace. Unlikely to be affected by the lighting proposals.

Ref.	Development / Location	Light Spill	Sky Glow	Glare	Comments
10	St Pancras Hospital site: North Wing, Mary Rankin Unit	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of directional light sources where windows occur near the upper ground entrance, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
11	St Pancras Hospital site: St Pancras Hospital water tower and boiler room	N	N	N	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Sufficient distance between new lighting and the existing building that obtrusive effects are unlikely. Not considered to be particularly sensitive to a change in lighting condition.
12	St Pancras Hospital site: Huntley Centre	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching some windows or views of light sources, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
13	St Pancras Hospital site: Residential block	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of light sources where columns are near windows, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
14	St Pancras Hospital site: East Wing Building, courtyard restaurant	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of light sources where columns are near windows, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.

Ref.	Development / Location	Light Spill	Sky Glow	Glare	Comments
15	St Pancras Hospital site: West Wing Building,	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of directional light sources where windows occur near the lower ground entrance, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
16	St Pancras Hospital site: River Crisis House	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of directional light sources where windows occur near the lower ground entrance, this can be minimised through implementation of measures outlined in the Mitigation through Design section below.
17	St Pancras Hospital site: 4 St Pancras Way, South Wing	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, direct views largely screened by existing development. Unlikely to be affected by the lighting proposals.
18	St Pancras Coroners Court	N	N	N	Sufficient distance from the Site to be unaffected by new streetlighting, direct views largely screened by existing development. Unlikely to be affected by the lighting proposals.
19	St Pancras Gardens	N	N	N	Sufficient distance from the Site to be unaffected by new ground level lighting, direct views of the roof terrace largely screened by existing development or landscape.
20	Rail line: St Pancras International	N	N	N	Sufficient distance from the Site to be unaffected by new ground level lighting, direct views of the roof terrace largely screened by existing development or landscape.
21	St Pancras Hospital site: Gatehouse	P	N	P	Exposed to streetlights / floodlights and building perimeter lighting under existing conditions. Possible increase to light reaching windows or views of light sources where windows occur near directional luminaire heads. This can be minimised through implementation of measures outlined in the Mitigation through Design section below.

Light Spill

6.2.7 The potential for light spill from the indicative lighting design is largely controlled through the selection and placement of lighting equipment.

6.2.8 Light distribution is expected to be largely contained within the Site / St Pancras Hospital site and follow similar patterns to existing streetlighting / floodlighting.

6.2.9 Proposed column mounted luminaires have the highest potential to create new instances of stray light as they are intended to light roads and large areas of the public realm. Stray light is not likely to reach receptors identified outside the St Pancras Hospital site, with most receptors already exposed to existing streetlighting associated with St Pancras Way and Granary Street.

6.2.10 New public realm lighting near the existing entrance off St Pancras Way and the new access from Granary Street may contribute to local increases at their respective junctions. This is unlikely to alter the visual conditions of the roadway since this is already lit by nearby existing columns.

6.2.11 New lighting columns near existing windows, as along the new shared access route through the Site, have the potential to introduce light to interior spaces. However this is only likely up to a height of 7m maximum near the lower and upper ground entrances and 5m along other areas within the Site.

6.2.12 Windows are expected to receive some degree of light exposure from existing building mounted floodlighting and streetlight style installations under current conditions so the change between lit conditions is expected to be perceived as minimal.

Sky Glow

6.2.13 Functional lighting at ground level is controlled and is unlikely to contribute direct light above 90 degrees, other luminaires with more of an upward component are recommended to incorporate design measures to minimise potential contribution to sky glow.

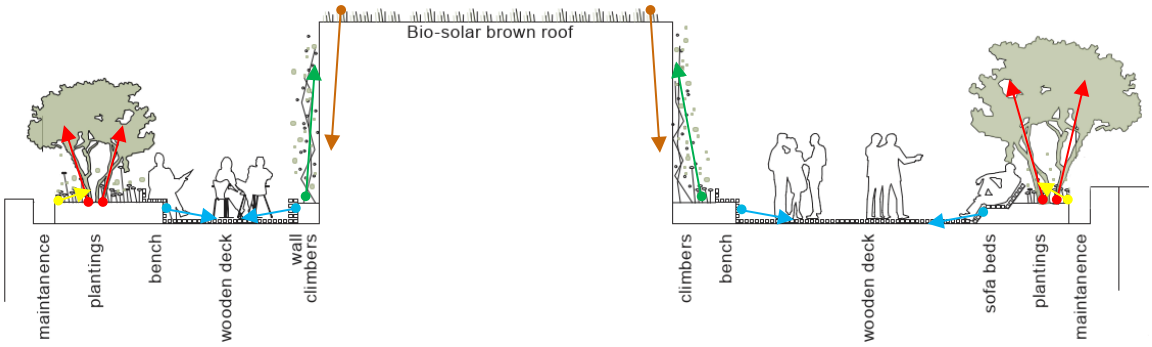
6.2.14 Based on the proposed design, the lighting proposals include canopy, tree and planter uplighting, where luminaires will be directed upward above 70 degrees, to provide area and accent light to the building canopy and accent light to tree canopies, low vegetation and climbing planters.

6.2.15 Canopy uplighting at ground level has the potential to shine light into the sky and so careful placement in relation to the canopy as well as selection of a fitting with good beam control will aid in reducing the potential for direct light shining into the sky.

6.2.16 Landscape uplighting is prevalent to the terrace on the sixth floor where many of the luminaires have an upward light distribution. This will aid in providing an illuminated vertical element along circulation routes and may need to be seasonally adjusted (reduced lumen output, monitoring illumination of tree canopy) based on plantings and the time of year.

6.2.17 It is expected that this type of lighting will be directed at the surface or object being lit, and utilise shielding, as required, to avoid direct upward light. Figure 6-1 provides an overview of this principle.

Figure 6-1 Terrace Section Directional Lighting Sketch



- Linear / spot uplighter (behind planters / climbers)
- Concealed linear (furniture edge accent)
- Uplighter (tree canopies)
- Spike / Surface spotlight (low vegetation)
- Catenary light (pergola shown over brown roof for example)

Overlay of section extracted from the Landscape Design Report

6.2.18 There is potential for perceived sky glow via existing windows at or above the new roof terrace at the sixth floor. There will be a visual change at high level which introduces new light where there would have previously been open sky which is expected to result in a brighter view. This is considered to be a visual impact rather than a measurable lighting effect.

Glare

6.2.19 Instances of glare typically result from direct views of bright lamp sources against a darker surround creating extreme contrast conditions. In some cases, this may be the result of a lamp with a higher light output than is necessary, or a bright source being directed away from the task area / ground surface to a sensitive location that is not intended to be lit.

6.2.20 The majority of the proposed lighting equipment directs light down only or is concealed by furniture. Multi-head columns and tree / planter uplighting have the highest potential to introduce visible light sources due to flexible aiming. It is expected that this type of lighting will be directed at the surface or object being lit, and utilise shielding, as required, to avoid direct views of light sources.

6.2.21 The proposed lighting is also not likely to create a significant bright / dark contrast as the current Site is lit and new external lighting will be viewed against a lit background, reducing potential visual discomfort.

6.2.22 There is potential for perceived glare via existing windows at or above the new roof terrace at the sixth floor from some viewing locations. There will be a visual change at high level which introduces new light where there would have previously been open sky, which is expected to result in a brighter view, as with sky glow. This is considered to be a visual impact rather than a measurable lighting effect.

Mitigation through Design

6.2.23 The proposed lighting strategy incorporates the following embedded mitigation:

- To provide light without overlighting, which includes designing for the minimum brightness required for safety and access, as well as using equipment capable of remote switching and dimming.
- The selection of full cut-off luminaires, or inclusion of accessories within the design to limit obtrusive effects, combined with relatively low mounting height of proposed luminaires which helps to control how light is distributed internal and external to the Site in both the outward and upward directions.
- All new lighting will be directed toward road surfaces, task areas or features within the Site, limiting the potential for stray light to spill over other areas, contribution to upward light or direct view of light sources.
- Use of narrow beam / controlled optics to focus all light onto feature trees and their canopies or landscape in planters. Dimming can be utilised particularly during winter months when some lighting can be reduced or switched off.
- Careful consideration of angling and aiming for the adjustable luminaires when designing for required light levels.

6.3 Consented Development

6.3.1 As indicated in Section 4.5, future consented development near the Proposed Development consist of The Ugly Brown Building, 101 and 103 Camley Street.

6.3.2 101 Camley Street has been considered within the main assessment at Receptor location 9. It is considered to be located a sufficient distance from the Site to be unaffected by new streetlighting, direct views largely screened by existing development, including part of the proposed roof terrace.

6.3.3 103 Camley Street is unlikely to experience potentially obtrusive effects due to the distance between it and the Site. There is the likelihood that the new building will be visible from upper floors, however this is considered to be a visual change rather than create a measurable effect.

6.3.4 Redevelopment of the Ugly Brown Building will introduce three new blocks of up to 11 storeys to Plot C which face the St Pancras Hospital site, replacing the existing four storey building. Two of the proposed blocks, C2 and C3, directly face the Proposed Development.

6.3.5 The change in land use on this site (from commercial use to retail, office, residential and hotel development) does not influence the effects of lighting proposals for the Proposed Development at ground level. The increased height of the consented development on this site compared to the current building has the potential to create some direct views of the proposed roof terrace although the roof plant above level 10 is expected to provide screening of both the new exterior space and new lighting within the Proposed Development. Where the roof terrace is visible, it is expected to be classified as a visual change rather than a change resulting in a measurable effect.

6.3.6 The conclusions of the lighting assessment of the consented schemes together with the Proposed Development for all other buildings and spaces are unchanged from those reached for assessment of lighting effects arising from the Proposed Development in isolation (as set out in Section 6.2 above).

7 Summary and Conclusions

7.1 Proposed Development

7.1.1 The potential for light spill, sky glow and glare to be created by new lighting associated with the Proposed Development will be minimised through the selection and placement of lighting equipment.

7.1.2 It is expected that the majority of receptors will experience a noticeable visual change with the new building and new lighting in place, however measurable effects are expected to be largely contained within the Site and the St Pancras Hospital site, with most following similar patterns to existing streetlighting and floodlighting.

7.1.3 The proposed indicative lighting design, which follows the lighting strategy, incorporating good practice design approaches, and recommendations where made in this report, is expected to meet the benchmark criterial for an environmental zone E3 with reference to ILP GN01 (Ref.1).

7.2 Consented Development

7.2.1 Lighting conditions are expected to be brighter at the ground level with the consented redevelopment of the Ugly Brown Building in place, as part of the consented scheme indicates an increase public realm spaces across Plots A – C compared to the existing conditions.

7.2.2 The Proposed Development is expected to provide a similar lighting environment to existing conditions with some brighter instances around the Proposed Development as part of accessible routes or building perimeter areas. This type of lighting is not anticipated to significantly increase the future lighting conditions, although it will constitute a visual change when viewing the Site.

7.2.3 Some areas on the upper floors of the proposed blocks Plots C2 and C3 may have direct views of the proposed roof terrace, but this is expected to be a visual change rather than contribute to obtrusive lighting effects.

7.2.4 Overall, the conclusions of the lighting assessment of the consented scheme together with the Proposed Development for all other buildings and spaces are consistent with the findings of the assessment of the lighting strategy and design for the Proposed Development.

8 References

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Ref. 2. Her Majesty's Stationery Office 2005. The Clean Neighbourhoods and Environment Act 2005
Ref. 3. Her Majesty's Stationery Office 1990. Environmental Protection Act
Ref. 4. Department for Environment, Food and Rural Affairs 2011 Artificial light statutory nuisance. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/82391/artificial-light-statutory-nuisance1.pdf
Ref. 5. Ministry of Housing, Communities and Local Government (2019), National Planning Policy Framework
Ref. 6. Ministry of Housing, Communities and Local Government (2019), Planning Practice Guidance – Light Pollution
Ref. 7. Greater London Authority, 2016; The London Plan – The Spatial Development Strategy for London Consolidated with Alterations Since 2011
Ref. 8. Greater London Authority, 2019; The London Plan – Spatial Development Strategy for Greater London – Consolidated Suggested Changes. July 2019
Ref. 9. London Borough of Camden (2017). Camden Local Plan.
Ref. 10. British Standards Institution, BS 5489-1:2013 Code for practice for the design of road lighting Part 1: Lighting of roads and public amenity areas
Ref. 11. British Standards Institution, BS 8300-1:2018 Design of buildings and their approaches to meet the needs of people with disabilities
Ref. 12. British Standards Institution, BS EN 12464-2 Light and Lighting. Lighting of work places. Outdoor work places
Ref. 13. Institution of Lighting Professionals 08/18, Bats and Lighting in the UK (written with the Bat Conservation Trust)
Ref. 14. Chartered Institution of Building Services Engineers Lighting Guide 2, 2019
Ref. 15. Chartered Institution of Building Services Engineers Lighting Guide 6, 2016 - The Exterior Environment
Ref. 16. Chartered Institution of Building Services Engineers Society for Light and Lighting, The SLL Lighting Handbook, 2018
Ref. 17. Chartered Institution of Building Services Engineers Society for Light and Lighting, The SLL Code of Lighting, 2012
Ref. 18. International Commission on Illumination 150:2017 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations
Ref. 19. International Commission on Illumination 126:1997 - Guidelines for minimising sky glow
Ref. 20. Defra, Lighting of the Countryside: Toward Good Practice, 1997
Ref. 21. Defra, Artificial Light in the Environment Policy Update, 2014
Ref. 22. The Royal Commission on Environmental Pollution, Artificial Light in the Environment, 2009
Ref. 23. London Borough of Camden, Camden Planning Guidance Amenity, 2018
Ref. 24. London Borough of Camden online guidance https://www.camden.gov.uk/lighting-assessments [accessed September 2020]

Ref. 25. Bennetts Associates, Sept 2017. The Ugly Brown Building Design and Access Statement, planning reference 2017/5497/P

Ref. 26. https://www.kingscross.co.uk/press/2019/12/03/st-pancras-hospital-redevelopment [accessed Sept 2020]

Appendix A Lighting Design Concept and Strategy Information

ORIEL

LIGHTING DESIGN CONCEPT
LANDSCAPE

2020-10-09

white

LIGHTING DESIGN

STREETS AND ENTRANCES

The exterior lighting aims to create attractive, accessible urban spaces that welcome visitors to the building and activate the area at night.
The lighting design strategy interplays with the landscape and architecture highlighting entrances, exterior elements and greenery.

The landscape outside the main entrances is illuminated through tall standards with directable spotlights. Whilst zones in between entrances are illuminated with lower park luminaires, creating a more even light environment than outside the main entrances.

The entrance canopies, with indirect and integrated lighting as well as glazed facades at the ground floor, create a bright and welcoming zone around the building.

In order to create attractive urban spaces and interesting views from the inside during dark hours, the lighting brings forward the green structure, through a combination of uplights and projectors that shine through the foliage.

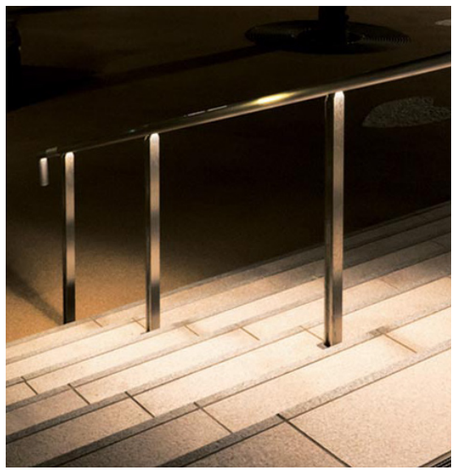
The human scale is highlighted through integrated lighting in benches, planting zones and railings.

High quality and glare free lighting are of high importance throughout the lighting design strategy.

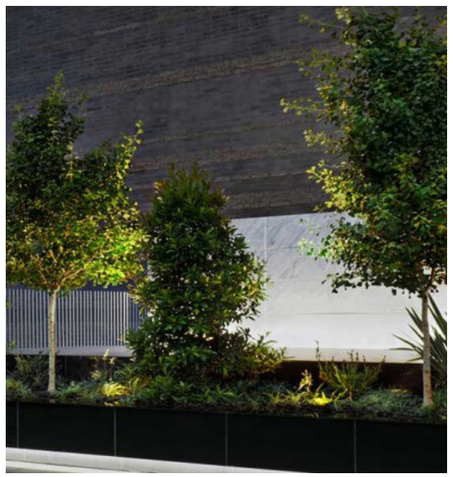
High masts with directable spotlights outside main entrances

Dappled light effect from spotlights and trees

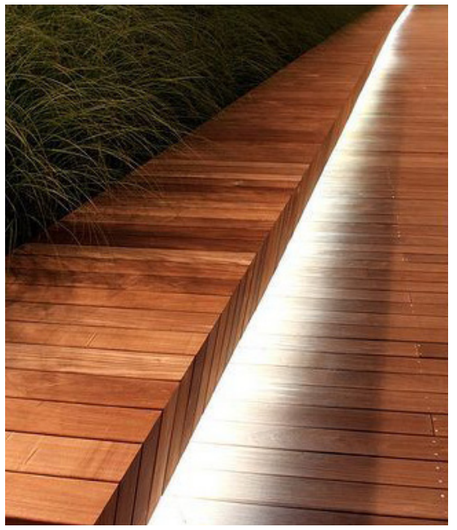
Park luminaire illuminate landscape between main



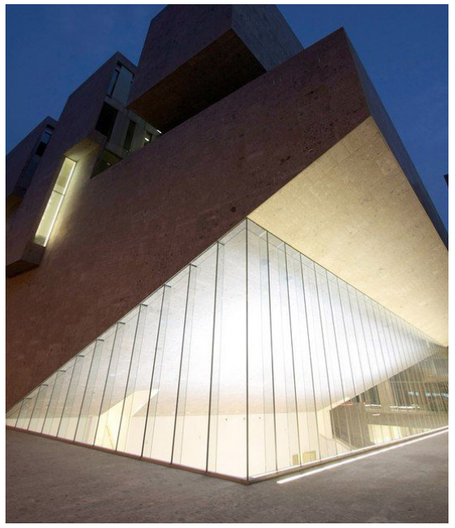
Lighting integrated in handrail



Uplight for plants and trees inside planters



Soft light integrated under benches



Indirect light illuminate entrance's

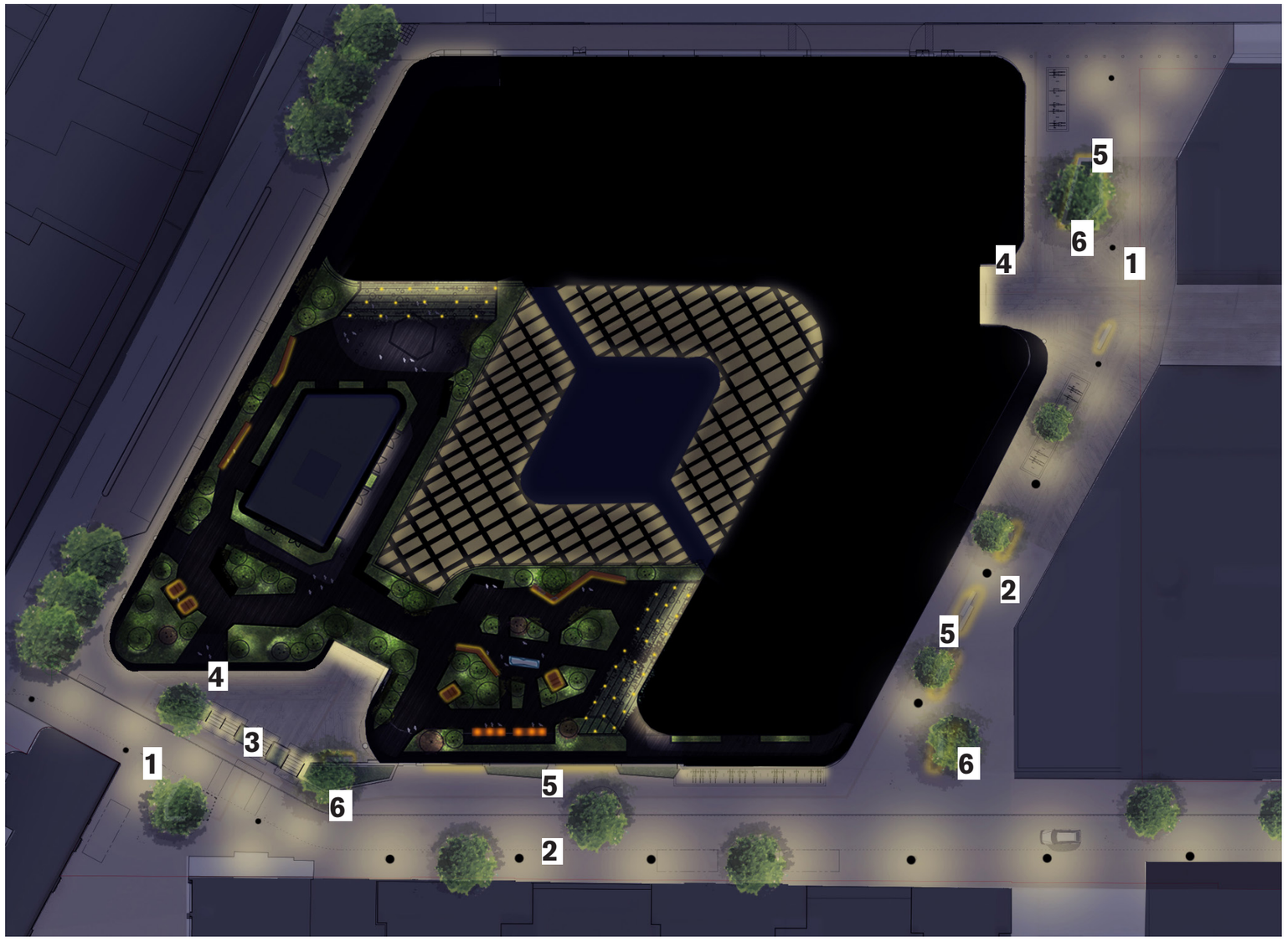
LIGHTING DESIGN

OVERVIEW LIGHTING PLAN STREET AND ENTRANCES

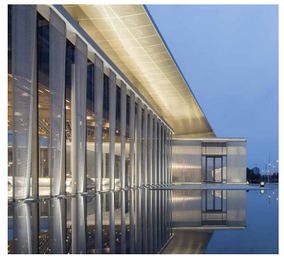
1- High masts with directable spotlights, good glare protection. Reference : Monospot, Meyer.

2- Lower park/pedestrian fixtures, simple design, indirect lighting. Reference : Sky Park, Focus Lighting.

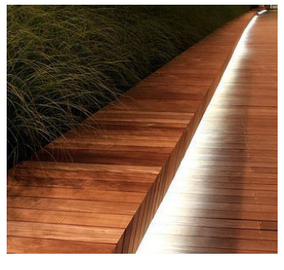
3 - LED lighting intregrated in handrails.



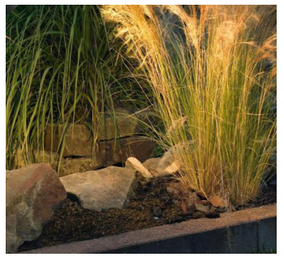
Night plan illustrating the public space and the roof terrace



4- Uplight on canopies, to be complemented with deep recessed downlights if and when needed.



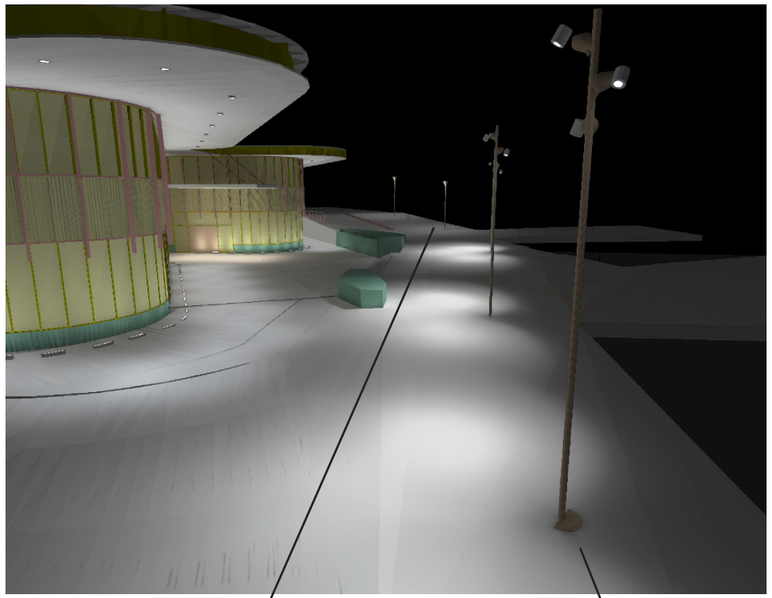
5- LED linear lights integrated under wooden benches.

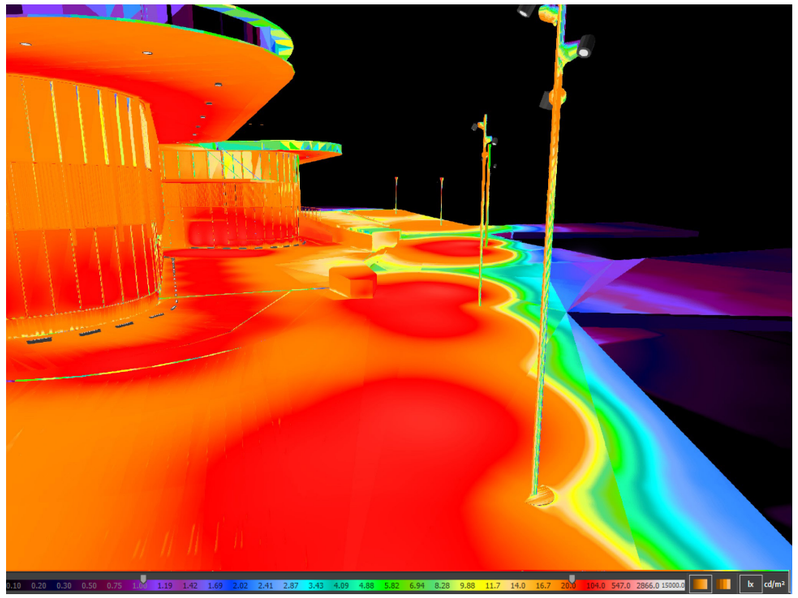


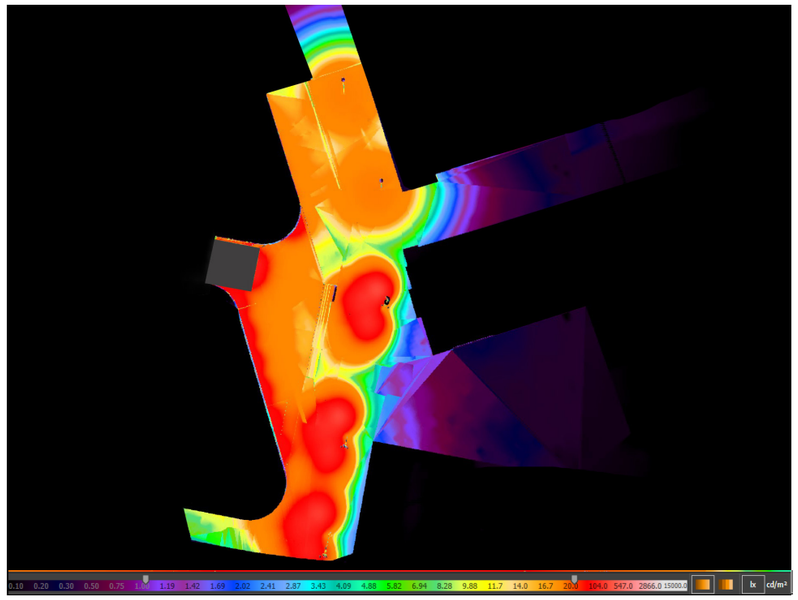
6- Small uplight fixtures highlight greenery in some of the planters.

LIGHTING DESIGN

STREETS AND ENTRANCES







Type of fixture: Park lighting fixture, LED, 3000K, ca 6500lm, CRI >80, with direct and indirect lighting.

For the simulation above we used:
Sky Park fixture V22 Shielded, 6689 lumen, 40W, mounted at 5 meters above ground, by Focus Lighting DK.

Type of fixture: Directable spotlight mounted on masts, LED fixture, 3000K, ca 3000lm, CRI >90, medium beam.

For the simulation above we used:
3 x Monospot 3, 3283 lumen, medium beam, 36W, mounted between 6 -7 meters above ground, by Meyer Lighting.

Reference illuminance levels derived from British Standards (BS 5489, BS 13201, BS 8300) and CIBSE lighting guides (LG2, LG6):

- 15 lux average for public realm with a minimum of 3 lux (including shared surface areas)
- 20 lux minimum along accessible routes
- 100 lux minimum for ramps, stairs and building entrance/exit

LIGHTING DESIGN

COLONNADE AND CANOPIES

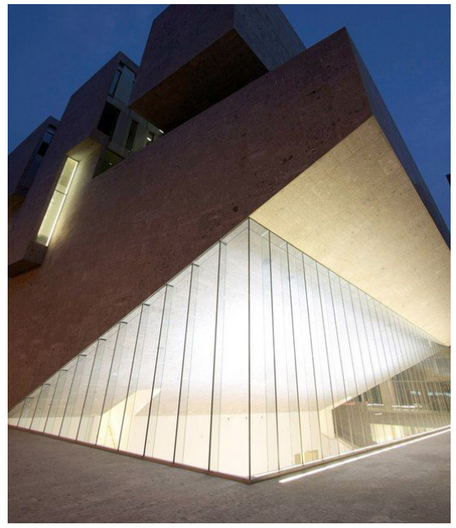
The lighting design concept for the colonnade and canopies aims to intuitively guide visitors towards the main entrances, which is achieved through the combination of uplight and downlight.

In-ground linear uplights enhance the colonnades structure and materiality, creating a soft and welcoming zone around the building. Deep recessed downlights, with optimal glare control, complement the uplight to achieve required illuminance levels at street level.

The canopies outside the main entrances integrate deep recessed dowlights that set in focus the area around the entrances. Visually, the zone under the canopies stand out from the rest of the building area, with brighter light indicating a destination point. Thus the indirect and softer light under the colonnades work as a transition zone which is benefitial for the adapatation to different levels of light at night, from dark to light, from outdoors to indoors.
In addition, the lighting in the colonnades emphasizes the shape of the building and activates the area around it at street level.

The lighting from the canopies and colonnades also contributes to the illuminance levels required in their inmediate public realm, interplaying seemlesly with the architecture and landscape design.

High quality and glare free lighting is of high importance all through the lighting design strategy.

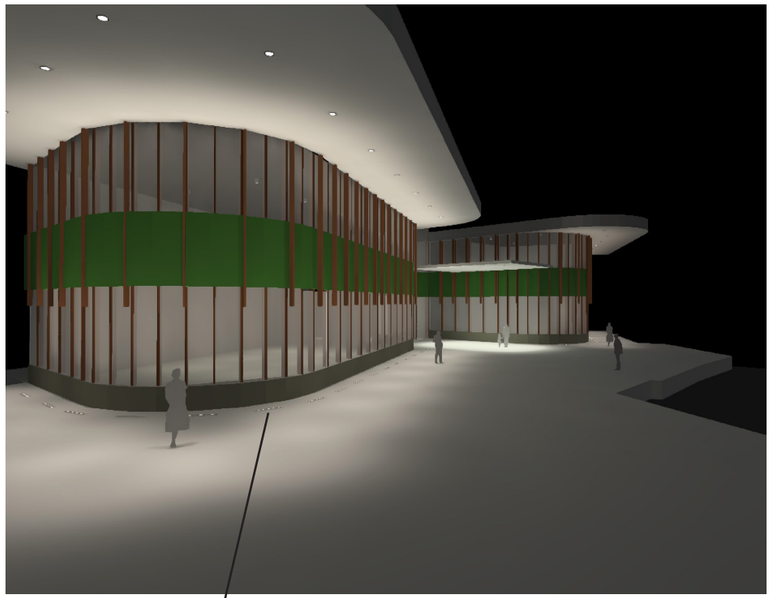


Indirect light illuminates colonnade's ceiling

Deep recessed small downlights integrated in colonnades and canopies

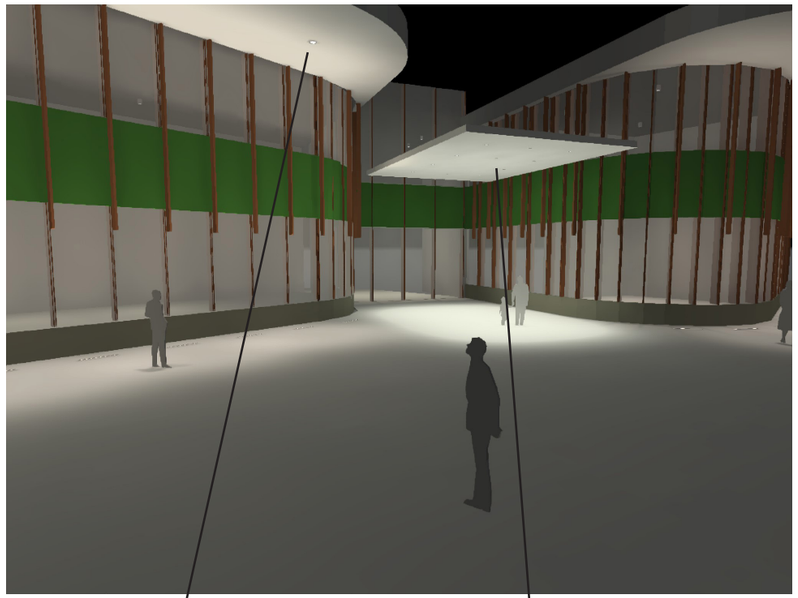
LIGHTING DESIGN

COLONNADE AND CANOPIES



Type of fixture: In-ground linear LED fixture, 3000K, CRI >90, ca 1500lm.

For the simulation above we used:
Vice Lighting, Lightway 6 Outdoor 60 Symetrical Baffle (for glare control), medium beam, 20W, with a distance of 2m between fixtures (center to center)

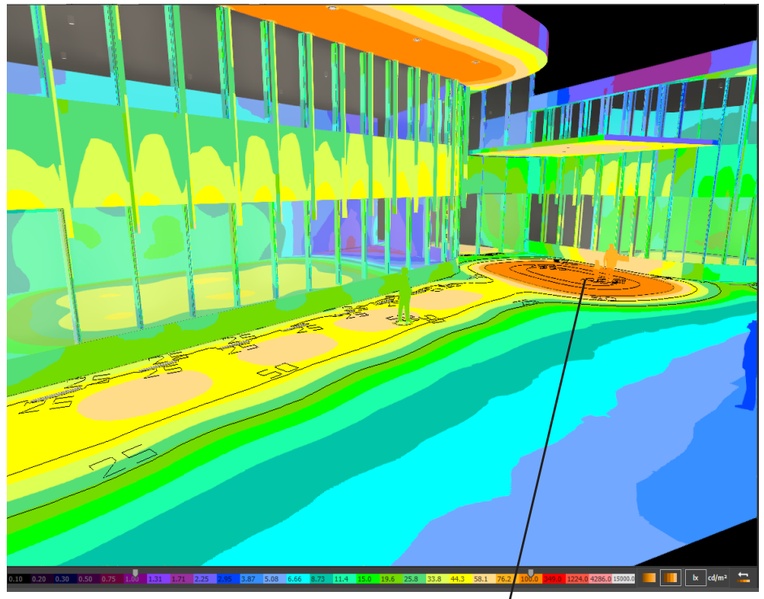


Type of fixture: Deep recessed downlight, 3000K, 1200lm, CRI >90, medium beam.

For the simulation above we used:
A standard 1200lm downlight. Distance between center of down-light ca 3.6m.

Type of fixture: Deep recessed downlight, 3000K, 1600lm, CRI >90, medium beam.

For the simulation above we used:
A standard 1600lm downlight. Distance between downlights 1.8m.



Average illuminance >100lx

LIGHTING DESIGN

ROOF TERRACE

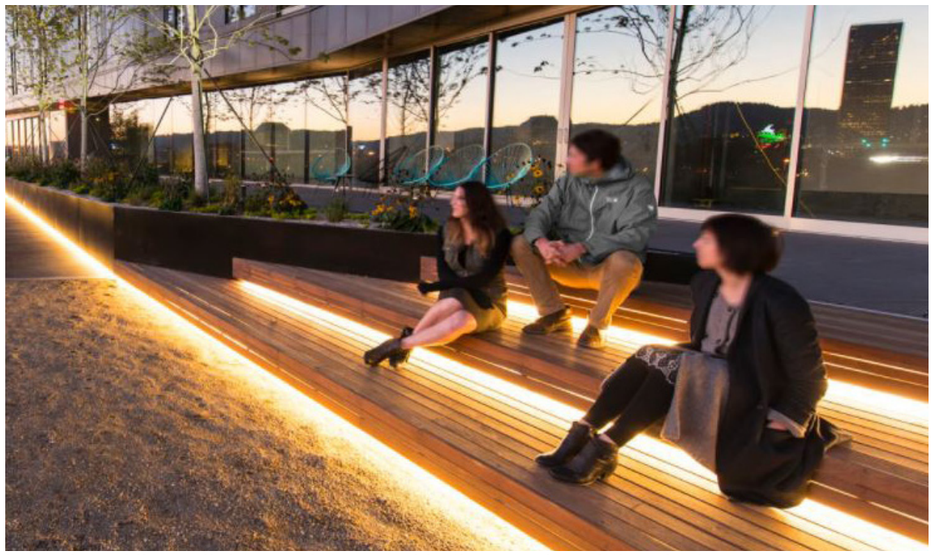
The lighting design strategy for the roof terrace aims to create attractive and flexible spaces that welcome visitors to experience” the walk of senses” and the beautiful skyline of London at night.

The lighting subtly highlights architectural features and vegetation, integrates in seating zones and marks access points to support orientation and wayfinding.

In order to avoid obstructing the view over London and to support the human scale of the roof terrace, in general, all lighting is placed in a low position.

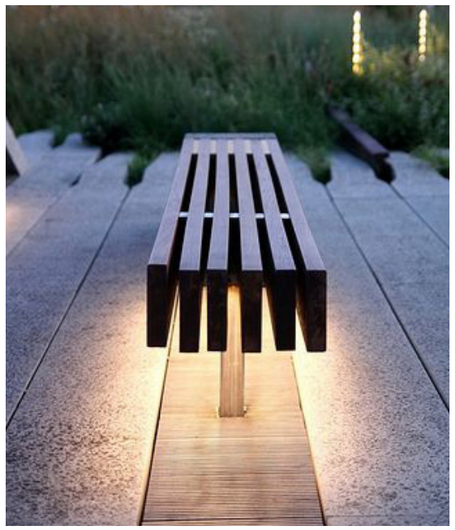
The pergola is illuminated with a more festive gesture of light through a catenary system with decorative lights.

Lighting fixtures inside planters illuminate vegetation and caternary light illuminates the pergola

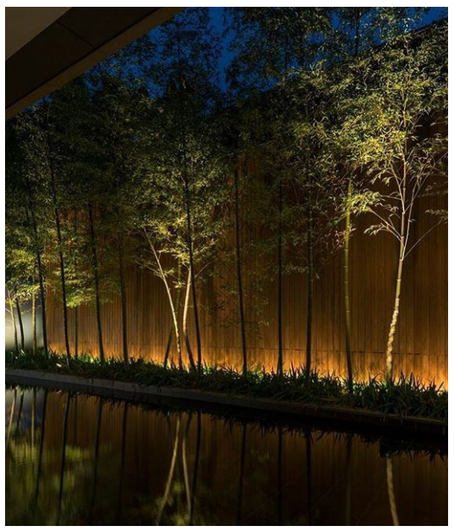


Low placed linear lights are integrated in the wooden sitting deck

Lighting inside planters



Soft light integrated under stand alone benches



Grazing light on higher walls behind

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Oriel-london.org.uk