HOARE LEA

Manor Road / Richmond

Lighting Strategy

Hoare Lea

November 2019

Audit sheet.

Rev	Date	Description	Prepared	Verified
01	20/08/2018	Preliminary Issue	MC	CF
02	14/12/2018	Draft Issue	JB	CF
03	04/01/2018	Updated draft for final comment	BJ	JF
04	16/01/2019	Final issue for planning	BJ	JF
05	25/10/2019	Revised draft issue	MC	CF
06	07/11/2019	Revised lighting strategy	MC	CF
07	18/11/2019	Draft - Scheme revision Block E	MC	CF
08	21/11/2019	Scheme revision Block E	MC	CF

1.0 Introduction.

This document will outline the revised lighting strategy for the amended proposals at Manor Road, London Borough of Richmond upon Thames. It will cover the key lighting consideration, criteria and design strategies to provide a safe and inviting lit environment. This revised report has been prepared to address the amended bus layover arrangement located within Block E.

On behalf of Avanton Richmond Development Ltd, a detailed planning application (ref. 19/0510/FUL) was submitted to the London Borough of Richmond Upon Thames (LBRuT) in February 2019 for the redevelopment of the Homebase store at 84 Manor Road, North Sheen.

The application was considered at LBRuT Planning Committee on 3 July 2019 and was recommended for refusal by LBRuT officers. The Planning Committee resolved that they were minded to refuse the Application in line with the officer's recommendation for six reasons relating to affordable housing; design; residential amenity; living standards; energy; and absence of a legal agreement.

On 29 July 2019 the Mayor issued a Direction pursuant to Article 7 of the Town and Country Planning (Mayor of London) Order 2008 and powers conferred by Section 2A of the Town and Country Planning Act (1990) that he would act as the LPA for the purposes of determining the Application.

Further to the Mayor's direction to take over the Planning Application for his determination, the Applicant, in consultation with the GLA and TfL, has taken the opportunity to review the scheme with the principle aim of increasing the delivery of affordable housing through additional density and addressing other issues raised in the Mayor's Stage 2 Report.

The Amended scheme now proposes a residential-led redevelopment of five buildings of between three and ten storeys. The development will provide 433 residential units (Class C3), flexible retail /community / office uses (Classes A1, A2, A3, D2, B1), a police facility (Use Class B1), a bus layover with driver facilities (Sui Generis Use), car and cycle parking, landscaping, public and private open spaces and other necessary enabling works.

The proposed changes necessitate an amendment to the Applications description of development. The revised description of development is as follows:

Demolition of existing buildings and structures and comprehensive phased residential-led redevelopment to provide residential units (Class C3), flexible retail /community / office uses (Classes A1, A2, A3, D2, B1), a police facility (Use Class B1), a bus layover with driver facilities (Sui Generis Use), provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works.

2.0 Site overview.

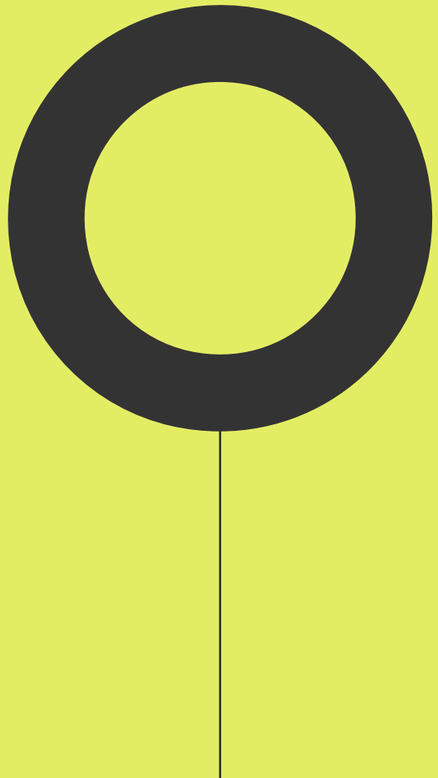
Key Areas:

- Main site entrance.
- Public squares.
- Building entrances.
- Resident courtyards.

Site interaction:

- Vehicular movement.
- Primary pedestrian movement.
- Secondary pedestrian movement.
- Bus layover parking
- Covered bus layover

Lighting design considerations.



3. Lighting design considerations.

3.1 External lighting.

The first question people ask regarding exterior lighting is “why light at all?”. Excluding street lighting, most unplanned exterior lighting installations appear as a decorative indulgence which consume valuable energy resources and result in potential glare and light pollution.

By contrast, good exterior lighting can play a positive role in the way people feel about their environment; it can reveal and enhance our buildings aesthetically, improve our sense of local identity, safety and civic pride and make people more willing to use the streets, squares and parks after dark. Used correctly exterior lighting can thus boost an area’s night-time use and commercial viability. For all these reasons it is generally accepted that effective, varied lighting of buildings and townscapes, both public and private, is a sound investment, that well justifies the relatively small capital and energy costs involved.

A badly-designed lighting scheme distributes light where it is not wanted, causing light pollution, while wasting energy unnecessarily and creating poor visual environments. Designed lighting solutions create better exterior schemes and give a new dimension to the urban environment at night rather than, the all too often, so called ‘functional’ lighting approach which adds little to the night scene.

3. Lighting design considerations.

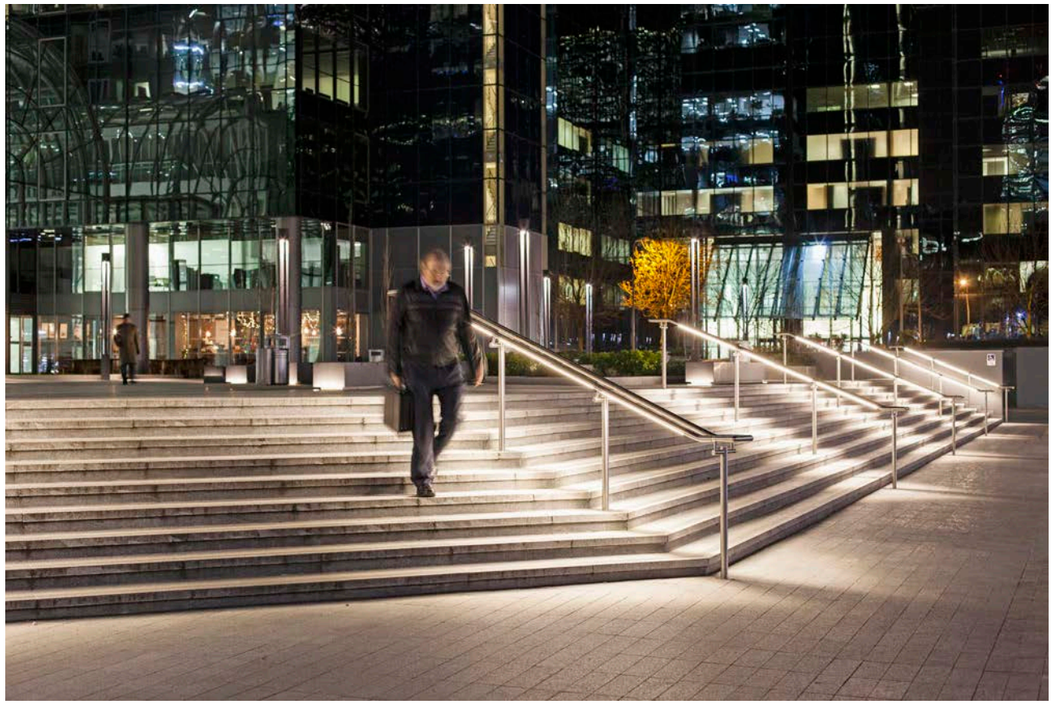
3.2 Safety & orientation.

The amount of lighting required for obstacle avoidance and visual orientation is minimal. For example, emergency lighting standards suggest a value of between 0.5 and 1 lux for a person, in a high stress situation, to safely negotiate a safe passage. Often these low levels of illumination are provided by existing light spill and moonlight alone.

In reality the purpose of urban realm pedestrian lighting is not one of obstacle avoidance, but of human subjectivity. Research has shown that the ability to read a persons facial features in external realm environments is a key function in reducing “fear of crime”.

Appropriately illuminated pedestrian areas can reduce fear of crime, which is known to encourage footfall – this in turn can increase natural and community surveillance and further deter criminal acts.

A pleasing and visually interesting exterior environment can be further enhanced by creating spaces and zones of interaction which encourage residence to utilise spaces in the evening.



3. Lighting design considerations.

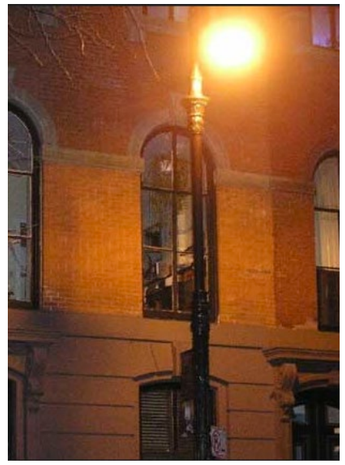
3.3 Light pollution

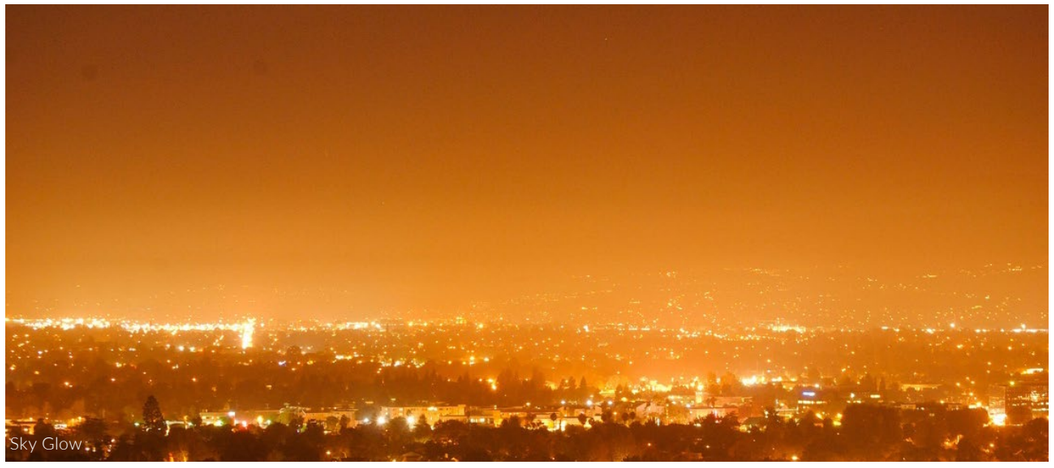
The general heading for the negative effects of light at night is Light Pollution but this heading actually covers four key factors. These are:

- Glare occurs when the site user sees light directly from the fixture (or lamp) and contrast ratios are high.
- Light Trespass/Encroachment: Poor outdoor lighting shines onto neighbourhood properties and into bedroom windows, reducing privacy and hindering sleep.
- Sky Glow: A large fraction of poor lighting shines directly upwards, creating the adverse sky glow above towns and cities that washes out views of the dark night sky, taking away an important natural resource.
- Energy Waste: Much outdoor lighting wastes energy because it is not well-designed with light not directed where it is required.

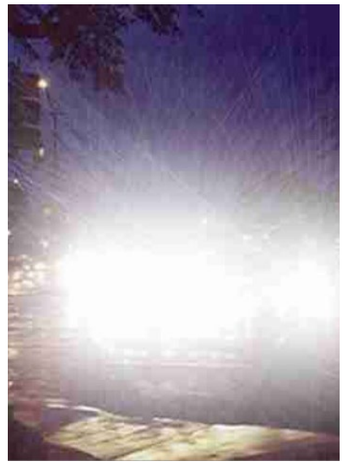
There is new legislation as part of the 'Clean Neighbourhoods and Environment Bill' which will covers lighting as a social nuisance, although there are many exclusions, it does start to highlight the importance of well designed external lighting as a integral part of the modern urban landscape.


Sky Glow




Sky Glow


Glare



3. Lighting design considerations.

3.4 Colour temperature and colour rendering

When one considers colour in light it is important to consider the colour of white lighting. Like daylight and sunlight, the range of colours available within the white spectrum.

Changes in white colour temperature are often an intuitive experience for people, as it relates to the natural rhythms of daylight.

Different colours of white light will provide different impressions and have differing properties when it comes to rendering surface finish.

Impressions of character and impact can be expressed through the appropriate use of colour.

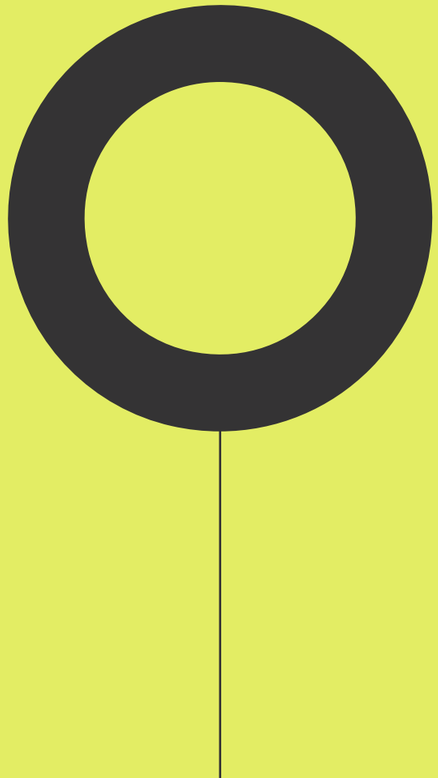
The visual impact of coloured light changes in relation to illumination levels, be that through daylight or artificial light sources.

By understanding the eye's sensitivity to colour one can utilise coloured light to create a strong visual impression that would have required a greater amount of energy to achieve in white light.

The use of warm white light of 2700K or 3000K is becoming more and more widely used across the industry. There is vast amounts of research ongoing by the industry findings, exploring the environmental impacts of cool coloured LEDs in street lighting and its effects on peoples well being and on nature. Aesthetically, the use of warm white LEDs is bridging the gap in the relationship between visual aesthetics of roadways when metal halide was used in the past.

Hoare Lea recommend using a warmer white light colour temperature of 3000K. This is to add warmth and enhance the materiality of the building. There is evidence to reflect that the future of LED street lighting will use the warmer spectrum.

Lighting criteria.



4.0 Lighting criteria.

4.1 External realm lighting

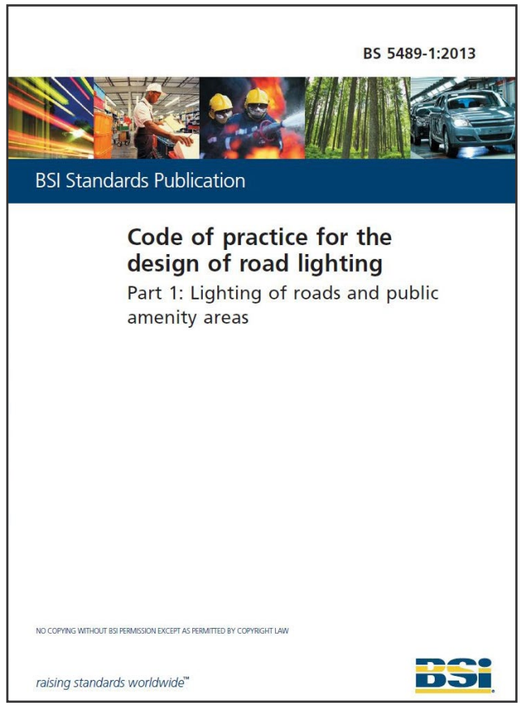
A number of documents lay down the best practise and guidance on providing sufficient and appropriate lighting for vehicular thoroughfares, pedestrians passage and visual interest.

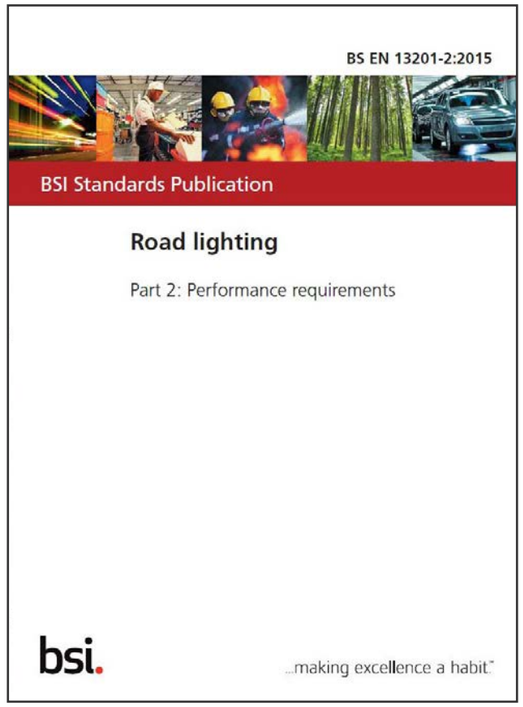
These are:

- BS 5489-1:2013
- BS EN 13201-2:2015
- CIE 136:2000

And if appropriate:

- CIBSE Lighting Guide 6: The Outdoor Environment 1992
- CIBSE Lighting the Environment: A guide to good urban design



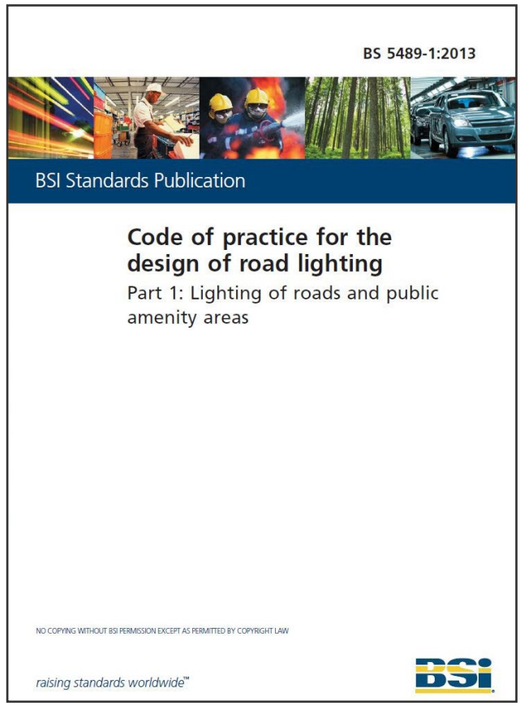


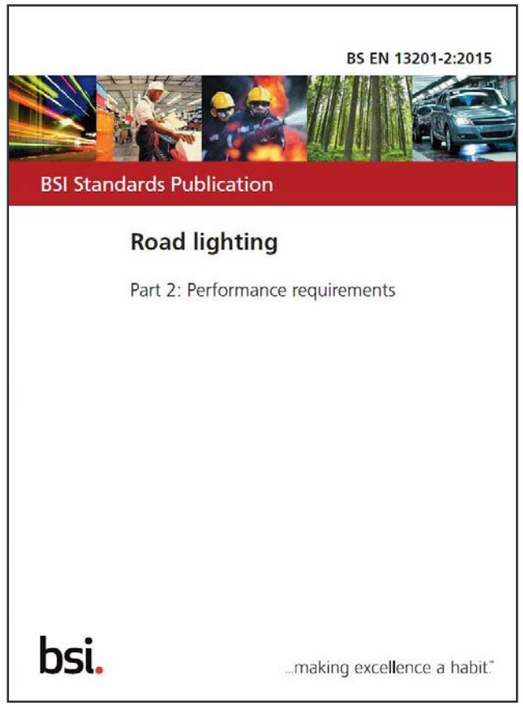
4.0 Lighting criteria.

4.2 Wildlife

Section 7.8 of BS 5489-1:2013 also gives a brief insight to lighting areas around aerodromes, railways, coastal waters, harbours and inland waterways. Areas which are in the vicinity of bat roosting or foraging corridors require consideration to minimise the impact to the bats natural behaviour and maintain clear access to their roosting, mating and feeding grounds. Some useful awareness and mitigation strategies are highlighted within “Bats and Lighting in the UK” by the Bat Conservation Trust”.

- Lighting levels; should be “as low as guidelines permit”
- Light colour temperature; Reduce UV light emission by using warmer colour temperature lighting.
- Lighting column height; should be as “short as possible” to reduce ecological impact.
- Pedestrian zones; should “take the form of low level lighting” where possible





4. Lighting criteria.

4.3 Light pollution

A number of documents lay down the best practise and guidance on reducing the visual and environmental impact of external lighting in relation to light pollution.

These are:

- CIE Technical Report - CIE 150: 2003
- ILE Guidance Notes for the Reduction of Obtrusive Light

The implementation of these standards is vital because of “The Clean Neighbourhoods and Environmental Act, 2005” which makes light a statutory nuisance.

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CIE

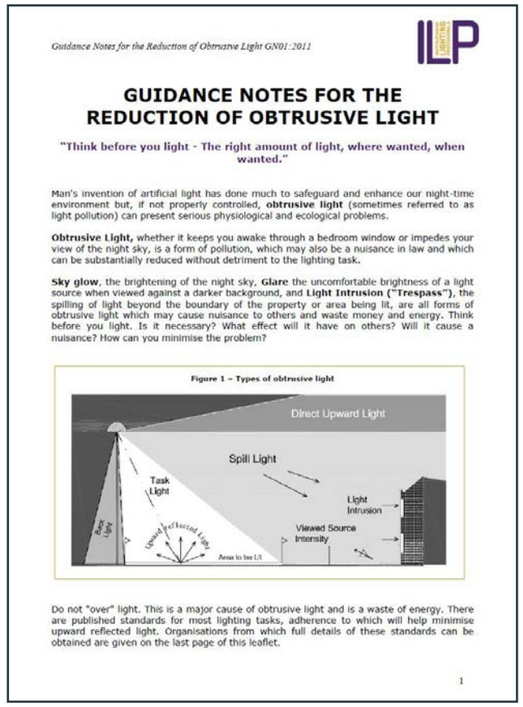
COMMISSION INTERNATIONALE DE L'ECLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

TECHNICAL REPORT

GUIDE ON THE LIMITATION OF THE EFFECTS OF OBTRUSIVE LIGHT FROM OUTDOOR LIGHTING INSTALLATIONS

CIE 150:2003

UDC: 628.931 628.971 Descriptor: Artificial lighting: Design and calculation Exterior lighting



Guidance Notes for the Reduction of Obtrusive Light GN01: 2011

ILP

GUIDANCE NOTES FOR THE REDUCTION OF OBTRUSIVE LIGHT

“Think before you light - The right amount of light, where wanted, when wanted.”

Man's invention of artificial light has done much to safeguard and enhance our night-time environment but, if not properly controlled, **obtrusive light** (sometimes referred to as light pollution) can present serious physiological and ecological problems.

Obtrusive Light, whether it keeps you awake through a bedroom window or impedes your view of the night sky, is a form of pollution, which may also be a nuisance in law and which can be substantially reduced without detriment to the lighting task.

Sky glow, the brightening of the night sky, **Glare** the uncomfortable brightness of a light source when viewed against a darker background, and **Light Intrusion (“Trespass”)**, the spilling of light beyond the boundary of the property or area being lit, are all forms of obtrusive light which may cause nuisance to others and waste money and energy. Think before you light. Is it necessary? What effect will it have on others? Will it cause a nuisance? How can you minimise the problem?

Figure 1 – Types of obtrusive light

Do not “over” light. This is a major cause of obtrusive light and is a waste of energy. There are published standards for most lighting tasks, adherence to which will help minimise upward reflected light. Organisations from which full details of these standards can be obtained are given on the last page of this leaflet.

1

4. Lighting criteria.

4.4 Lighting considerations adjacent to railways

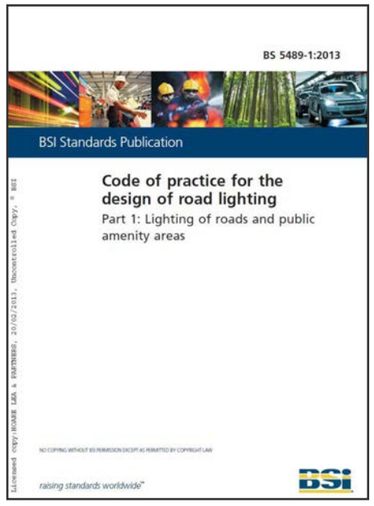
Due to the close proximity of the site to the railway, one must be mindful to not produce a lighting scheme that has a detrimental impact to the safe use of the railway.

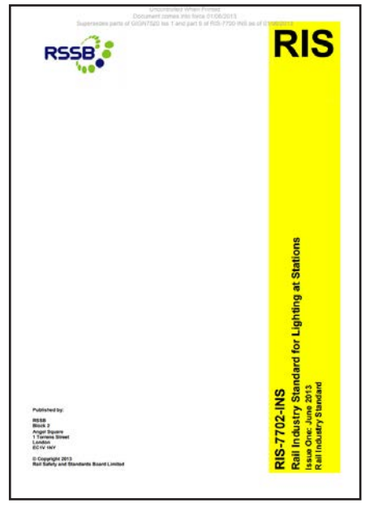
A number of standard outline guidances of what to be mindful of when designing lighting schemes adjacent to railways, these include:

- BS 5489-1:2013 (section 7.8.3)
- Rail Safety and Standards Board (RSSB)

These guidances and institutional standards should be consulted when developing the scheme design. Some of the key consideration should be paid to:

- Light trespass
- Glare
- Colours of light





7.8.3 Lighting in the vicinity of railways

NOTE 1 The area within which a road lighting scheme can affect the safe use of a railway is not defined because of the diversity of fixing locations for signals and curvature of railway lines.

Lighting close to the field of view of a train driver should be carefully designed to avoid compromising the visibility of signals. In particular:

- light spill should be minimized in the vicinity of a railway bridge crossing/passing above a road;
- columns should be placed as far away as practicable from a rail bridge or the fence line of railway track;
- unwanted glare should be minimized for the train driver by the use of luminaires conforming to an appropriate G class selected from BS EN 13201-2:2003, Table A.1 or shielding.

Where light might spill on to rail property, or luminaires might be mistaken for railway signals by train drivers, or lighting operatives risk falling on to rail property, then the rail authority should be contacted.

NOTE 2 Further information, related in particular to level crossings, can be found in Part 2, Section E of the HSE publication Railway safety principles and guidance *[48].*

It is essential that any lighting scheme does not affect track visibility for railway operatives. It is also essential, when designing the location of lighting columns adjacent to railways, that any likely foreseeable collision with a lighting column by road traffic does not then lead to a hazard on the railway by the lighting column falling onto the railway.

Colours in a lighting scheme should not conflict or cause confusion with colours used for signal lights.

NOTE 3 Information on colours and colour classes is given in BS 1376.

4. Lighting criteria.

4.5 Site context - Manor Road

To select the most appropriate lighting classifications for within the site it is important to have an understanding of the surrounding road classifications. This is to ensure illuminance levels do not drop suddenly between one zone and another, creating distinct contrast and the appearance of being dark.

The following lighting classifications have been assumed based on the road characteristics in accordance with the appropriate guidances BS 5489-1:2013

Manor Road - Assumed lighting class (P2):

8.6 lux - Minimum average maintained (assumed warm white)

1.7 lux - Minimum maintained (assumed warm white)

Table A.5 **Lighting classes for subsidiary roads with a typical speed of main user $v \leq 30$ mph**

Traffic flow	Lighting class			
	Ambient luminance: very low (E1)	Ambient luminance: low (E2)	Ambient luminance: moderate (E3)	Ambient luminance: high (E4)
Busy [A]	S3 or P3	S3 or P3	S2 or P2	S2 or P2
Normal [B]	S4 or P4	S4 or P4	S3 or P3	S3 or P3
Quiet [C]	S5 or P5	S5 or P5	S4 or P4	S4 or P4

*NOTE 1 Table A.5 assumes no parked vehicles – see risk assessment in **A.3.3.2**.*

NOTE 2 If facial recognition is important then an ES lighting class from BS EN 13201-2:2003, Table 5, or an E_{sc} lighting class from CIE 115:2010 [N1], Table 7, can be selected as an additional criterion. Good colour rendering contributes to better facial recognition. (The ES lighting class in BS EN 13201-2:2003 is expected to be replaced by SC upon publication of the revised edition.)

NOTE 3 To ensure adequate uniformity, the actual value of the maintained average illuminance is not to exceed 1.5 times the value indicated for the class.

NOTE 4 It is recommended that the actual overall uniformity of illuminance U_o be as high as reasonably practicable.

NOTE 5 Grey highlighting indicates situations that would not usually occur in the UK.

NOTE 6 The ambient luminance descriptions E1 to E4 refer to the environmental zone as defined in ILP GN01 [N5].

[A] Busy traffic flow refers to areas where the traffic usage is high and can be associated with local amenities such as clubs, shopping facilities, public houses, etc.

[B] Normal traffic flow refers to areas where the traffic usage is of a level equivalent to a housing estate access road.

[C] Quiet traffic flow refers to areas where the traffic usage is of a level equivalent to a residential road and mainly associated with the adjacent properties or properties on other equivalent roads accessed from this road.

Table A.7 **Variation of maintained lighting level with S/P ratio of light source**

Values in lux

Lighting class	Benchmark (e.g. R_a < 60 or when S/P ratio of light source is not known or specified)		S/P ratio = 1.2 and $R_a \geq 60$ (e.g. some types of warm white lamp such as metal halide)		S/P ratio = 2 and $R_a \geq 60$ (e.g. some types of cool white compact fluorescent or LED)	
	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}
P1 or S1	15.0	3.0	13.4	2.7	12.3	2.5
P2 or S2	10.0	2.0	8.6	1.7	7.7	1.5
P3 or S3	7.5	1.5	6.3	1.3	5.5	1.1
P4 or S4	5.0	1.0	4.0	0.8	3.4	0.7
P5 or S5	3.0	0.6	2.2	0.4	1.8	0.4
P6 or S6	2.0	0.4	1.4	0.4	1.1	0.4

Table extracted from 'BS5489-1:2013 | Code of practice for design of road lighting'.

Table 1 – Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

Table extracted from 'Guidance Notes for the Reduction of Obtrusive Light GN01:2011'.

4. Lighting criteria.

4.6 Site thoroughfares.
The following lighting classification have been selected in accordance with appropriate guidances BS548-1:2013. These figures assume the luminaires selected have an S/P ratio of 1.2 and a Ra of 60+ with a 3000K colour temperature.

Vehicle Access Route (P3):
- 6.3 lux - Minimum average maintained
- 1.3 lux - Minimum maintained

Primary Pedestrian Route (P4):
- 4.0 lux - Minimum average maintained
- 0.8 lux - minimum uniformity

Secondary Pedestrian Route (P5):
- 2.2 lux - Minimum average maintained
- 0.4 lux - Minimum maintained

Bus layover external parking:
- 5 lux - Minimum average maintained
- 25% Uniformity

Covered bus layover:
- 75 lux - Minimum average maintained
- 40% Uniformity

4. Lighting criteria.

4.6 Site thoroughfares

The following lighting classifications have been selected in accordance with the appropriate guidances BS 5489-1:2013

Due to the relatively low levels of slow moving vehicular traffic, based on the percentage of parking space for residents, it is proposed that slightly lower illuminance levels are required.

Vehicle Access Route (P3): →

6.3 lux - Minimum average maintained

1.3 lux - Minimum maintained

Primary Pedestrian Route (P4): →

4.0 lux - Minimum average maintained

0.8 lux - minimum uniformity

Secondary Pedestrian Route (P5): →

2.2 lux - Minimum average maintained

0.4 lux - Minimum maintained

Social & Congregation:

Areas that are for the use as social and congregation spaces, such as open squares gardens, should be treated as such and are not as critical to illuminate to a uniform standard. Feature lighting should be utilised to supplement ambient lighting to create a welcoming environment. As such these areas may not be lit to the BS5489 stated illuminance levels.

Bus layover external parking: - - -

5 lux - Minimum average maintained

25% Uniformity

Covered bus layover: (Assumed to be treated as an internal car-park.)

75 lux - Minimum average maintained

40% Uniformity

PIRs should be used to control dimming settings to reduce energy consumption when not in use.

Terraces - Assumed private access only.

Table A.5 **Lighting classes for subsidiary roads with a typical speed of main user $v \leq 30$ mph**

Traffic flow	Lighting class			
	Ambient luminance: very low (E1)	Ambient luminance: low (E2)	Ambient luminance: moderate (E3)	Ambient luminance: high (E4)
Busy [A]	S3 or P3	S3 or P3	S2 or P2	S2 or P2
Normal [B]	S4 or P4	S4 or P4	S3 or P3	S3 or P3
Quiet [C]	S5 or P5	S5 or P5	S4 or P4	S4 or P4

Table A.6 **Lighting classes for subsidiary roads with mainly slow-moving vehicles, cyclists and pedestrians**

Traffic flow	Lighting class	
	Ambient luminance: very low (E1) or low (E2)	Ambient luminance: moderate (E3) or high (E4)
Busy [A]	S4 or P4	S4 or P4
Normal [B]	S5 or P5	S5 or P5
Quiet [C]	S6 or P6	S6 or P6

Table A.7 **Variation of maintained lighting level with S/P ratio of light source**

Values in lux

Lighting class	Benchmark (e.g. R_a < 60 or when S/P ratio of light source is not known or specified)		S/P ratio = 1.2 and $R_a \geq 60$ (e.g. some types of warm white lamp such as metal halide)		S/P ratio = 2 and $R_a \geq 60$ (e.g. some types of cool white compact fluorescent or LED)	
	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}	$\bar{E}$	E_{min}
P1 or S1	15.0	3.0	13.4	2.7	12.3	2.5
P2 or S2	10.0	2.0	8.6	1.7	7.7	1.5
P3 or S3	7.5	1.5	6.3	1.3	5.5	1.1
P4 or S4	5.0	1.0	4.0	0.8	3.4	0.7
P5 or S5	3.0	0.6	2.2	0.4	1.8	0.4
P6 or S6	2.0	0.4	1.4	0.4	1.1	0.4

Tables extracted from 'BS5489-1:2013 | Code of practice for design of road lighting'.

Table 5.34 — Places of public assembly – Public car parks (indoor)

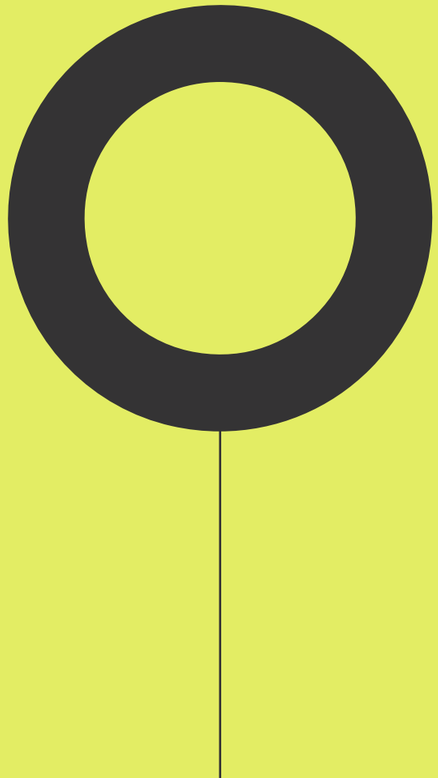
Ref. no.	Type of area, task or activity	$\bar{E}_m$ lx	UGR_L –	U_o –	R_a –	Specific requirements
5.34.4	Parking areas	75	-	0,40	40	1. Illuminances at floor level. 2. Safety colours shall be recognisable. 3. A high vertical illuminance increases recognition of peoples faces and therefore the feeling of safety.

Table extracted from 'BS12464-1:2011 | Lighting of work places - indoor workplaces'.

Table 5 **Maintained lighting levels for outdoor car parks**

Type of area and usage	$\bar{E}$ lx	U_o
Light traffic, e.g. parking areas of shops, terraced and apartment houses; cycle parks	5	0.25
Medium traffic, e.g. parking areas of department stores, office buildings, plants, sports and multipurpose building complexes	10	0.25
Heavy traffic, e.g. parking areas of schools, churches, major sports and multipurpose sports and building complexes	20	0.25

Ambient lighting strategy.



5. Ambient lighting strategy.

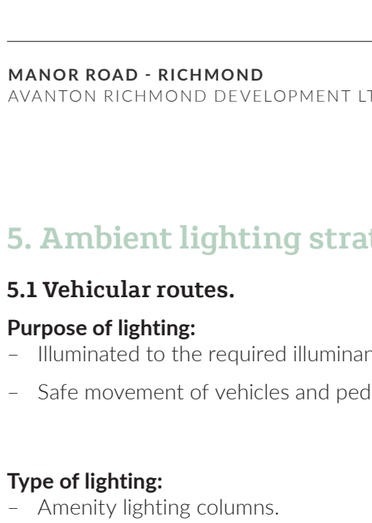
5.1 Vehicular routes.

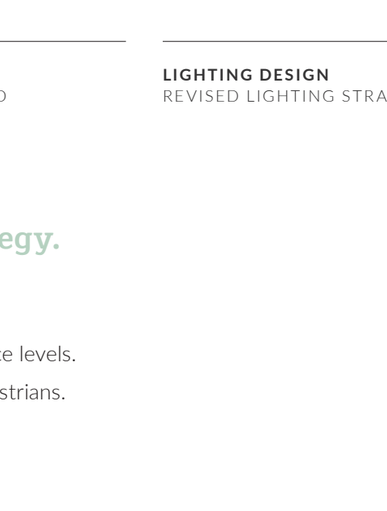
Purpose of lighting:

- Illuminated to the required illuminance levels.
- Safe movement of vehicles and pedestrians.

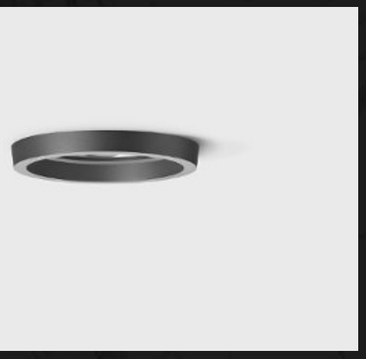
Type of lighting:

- Amenity lighting columns.
- 4m-6m in height.
- Downlights within under canopy areas.
- 3000K warm white colour temperature.
- Good optical control.
- Range of anti glare accessories.
- Colour rendering of 80+ CRI.
- Dimmable





A. Typical Column Mounted Luminaire
Asymmetric street optic. Product and optic may vary across scheme.
3000K.



B. Recessed downlighter
Recessed downlighter to provide illumination to floor
Glare control/visual comfort required.
3000K.

5. Ambient lighting strategy.

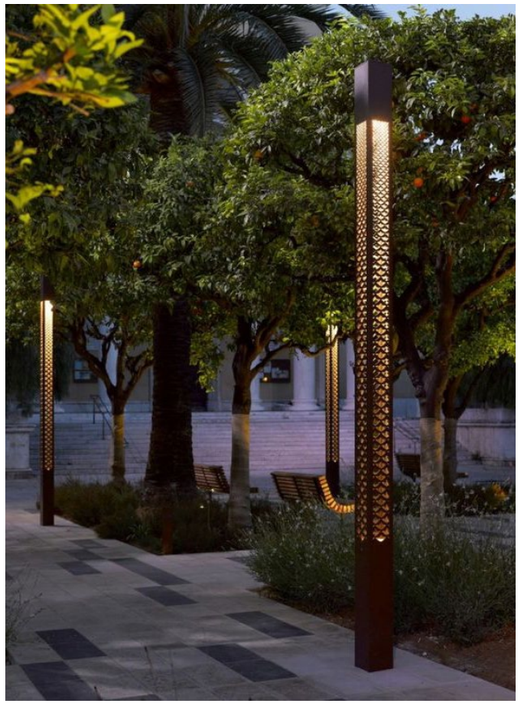
5.2 Primary pedestrian routes.

Purpose for lighting:

- To guide users through the space.
- Safety and security.
  - Illuminate paving and level changes to avoid trips and falls
  - Good facial recognition to increase the appearance of safety.

Type of lighting:

- Low hight, human scale, feature columns
  - Provide both ambient and feature lighting to avoid a uniform flat light pattern.
- 3000K warm white colour temperature.
- Good optical control.
  - Downward directional optic
  - No indirect lighting component to minimise light pollution.
- Colour rendering of 80+ CRI.
- Dimmable



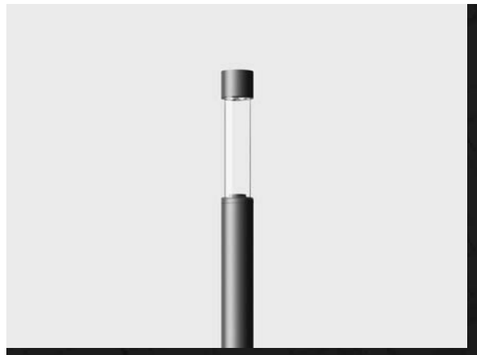
5. Ambient lighting strategy.

5.3. Event space - ambient lighting.

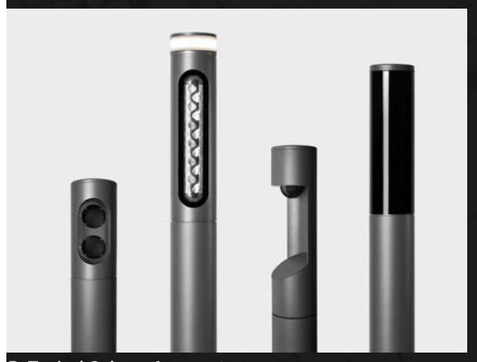
6-8m multi-optic lighting columns to provide a flexible lighting solution to cater various events

Applicable lighting column:

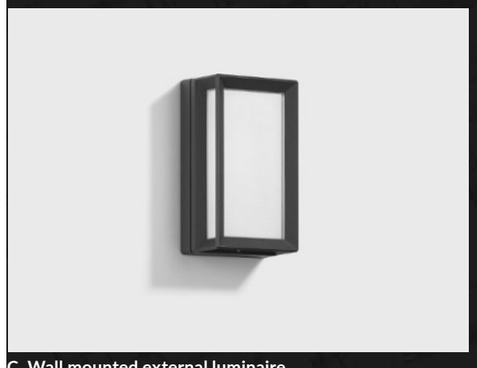
- Column selection could provide and integrate the following non lighting related elements:
- Security
- Speakers
- Wifi
- Power for market stalls



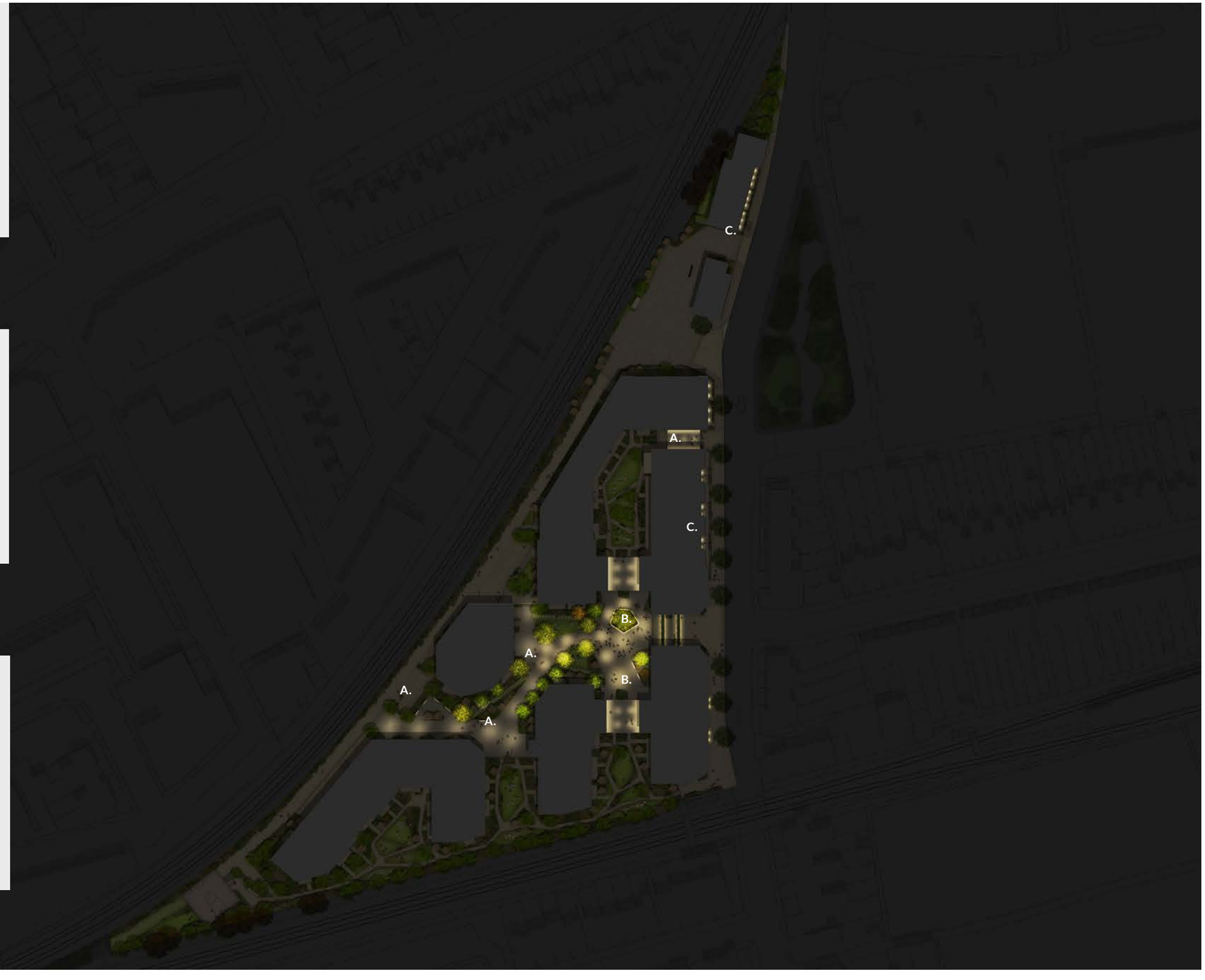
A. Typical Column
Asymmetric street optic. Product and optic may vary across scheme.
3000K.



B. Typical Column for event space.
Adjustable Multi-optic.
3000K.
Additional integration of media / security / electrical provisions.



C. Wall mounted external luminaire.
To provide quality diffuse illumination to entrances
High Ip and IK rating required
3000K.



5. Ambient lighting strategy.

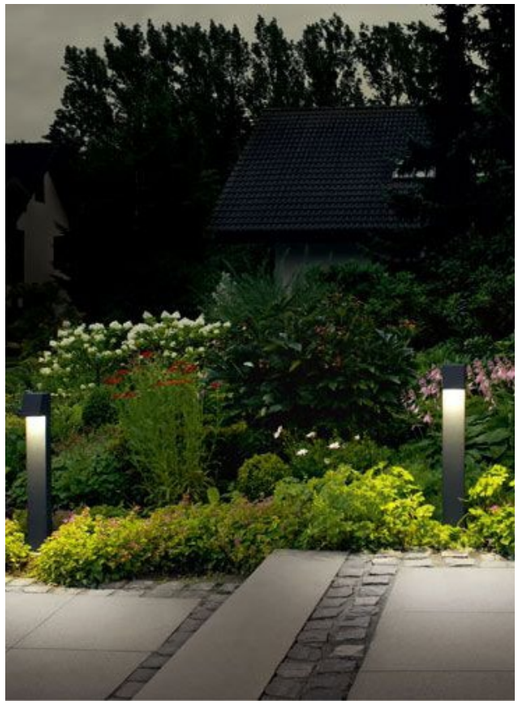
5.4 Secondary pedestrian routes.

Purpose of lighting:

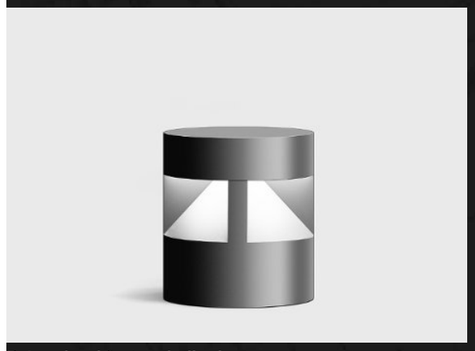
- Creating a relaxing atmosphere to promote use of the space after dark.
- Safety and security.
  - Illuminate paving and level changes to avoid trips and falls.
  - Good facial recognition to increase the appearance of safety.

Lighting characteristics:

- Low level lighting.
- Integrated lighting within landscape features (where possible).
  - Minimise requirement for additional lighting elements.
- 3000K warm white colour temperature.
- Good optical control.
  - Downward directional optic.
  - No indirect lighting component to minimise light pollution.
- Colour rendering of 80+ CRI.
- Dimmable.

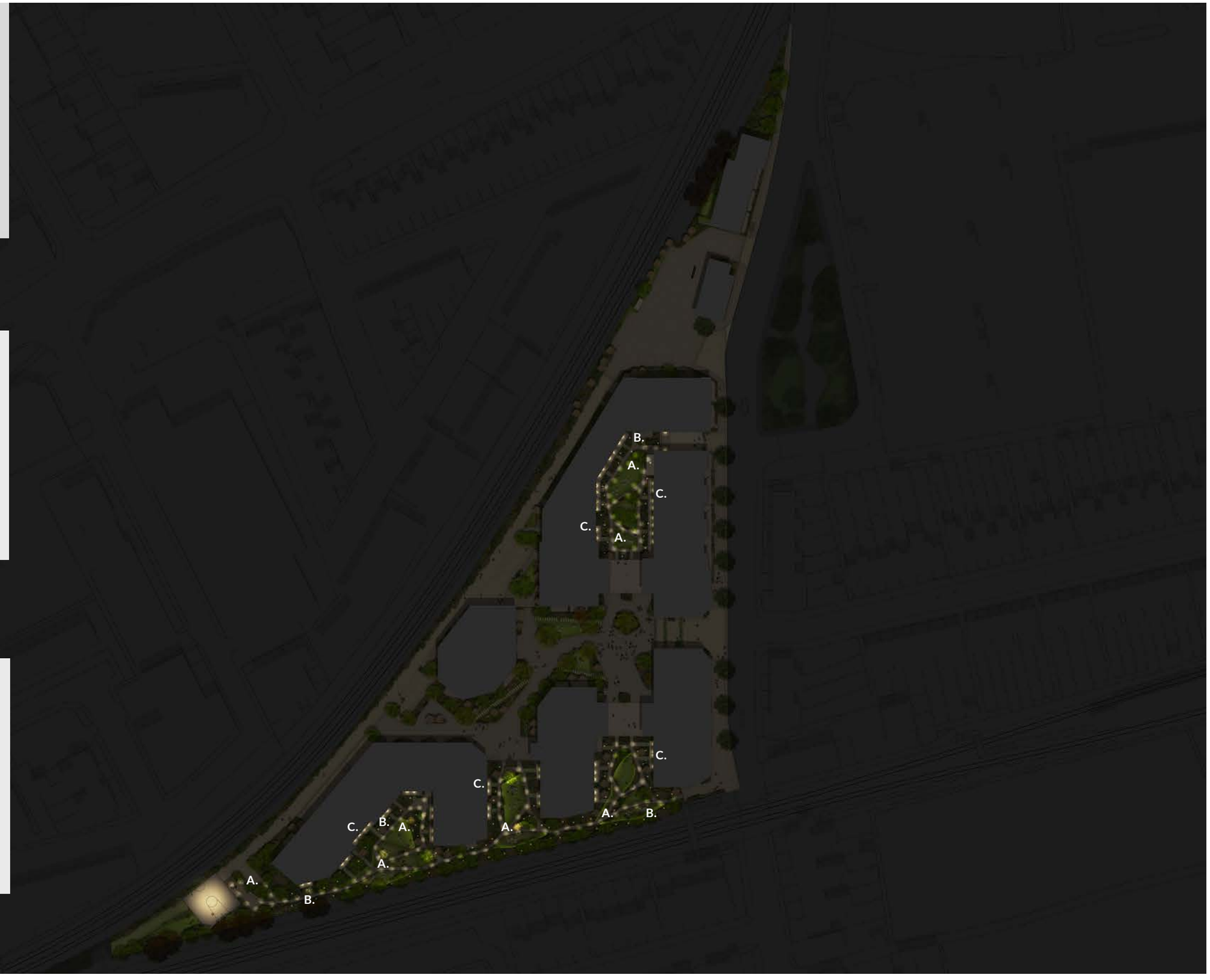


A. Low Level ambient lighting bollard
360 degree illuminated bollard to provide quality illumination to pathways
3000K.

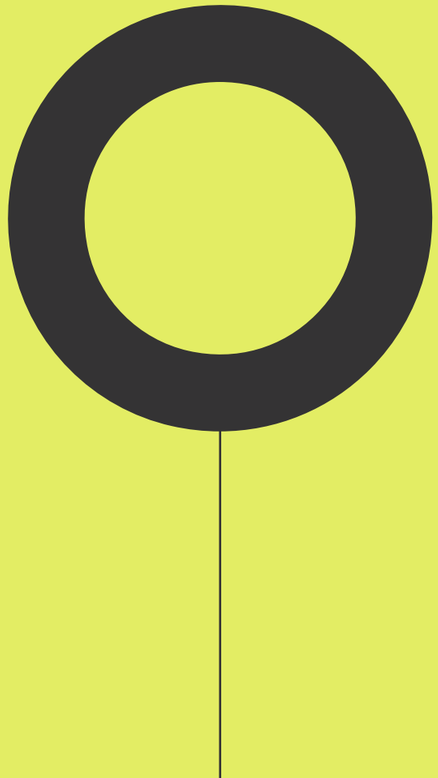


B. Low level feature bollard.
Symmetric 360 degree optic.
3000K.

C. Wall mounted external luminaire.
To provide quality diffuse illumination to entrances
High Ip and IK rating required
3000K.



Feature lighting.



6. Feature lighting.

Although the lighting to the site thoroughfares is important for a safety and security perspective, it is critical to consider the feature lighting opportunities to produce a space that is interesting, exciting and welcoming atmosphere.

Key areas for consideration:

- Main site entrance.
- Public squares.
- Building entrances.

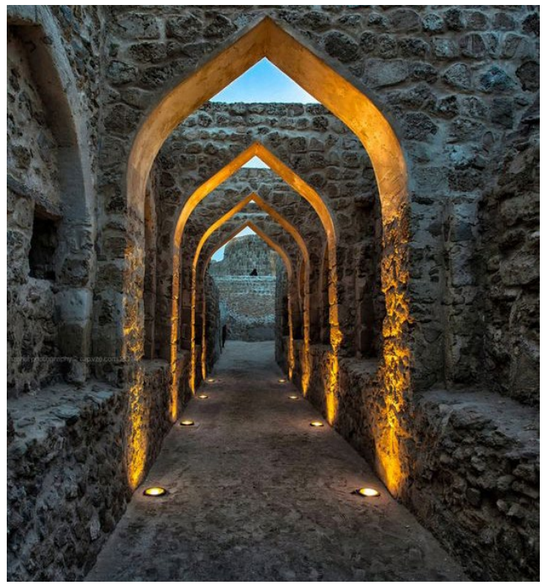
6. Feature lighting.

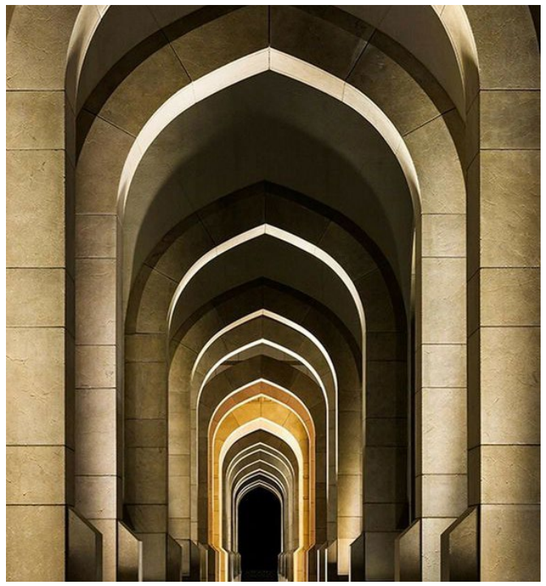
6.1 Site entrance/feature archways

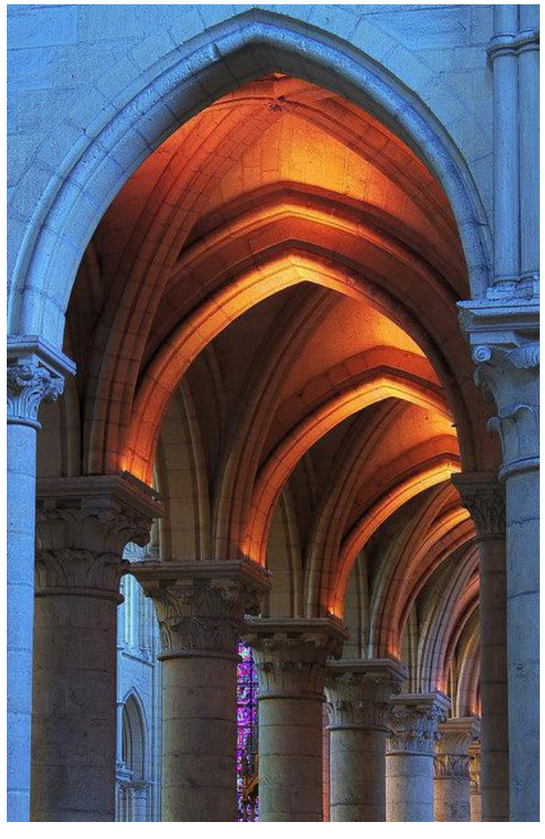
Purpose of lighting:
- Creating an introductory focal point.
- Inviting users through into the main site areas.

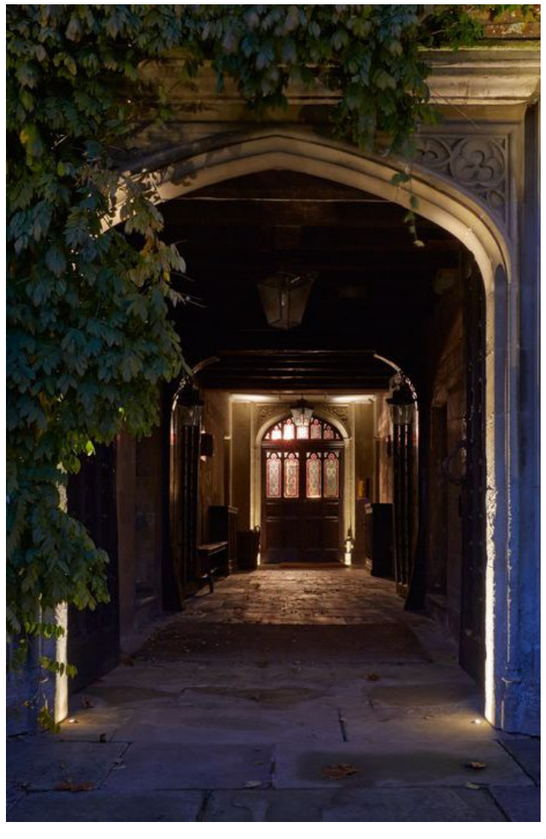
Revealing structuring in positive :
- Lighting the brick finish of the archways.
- Accentuating texture and material quality.

Luminaire characteristics:
- 3000K warm white colour temperature.
- Good optical control.
- Colour rendering of 80+ CRI.
- Dimmable.









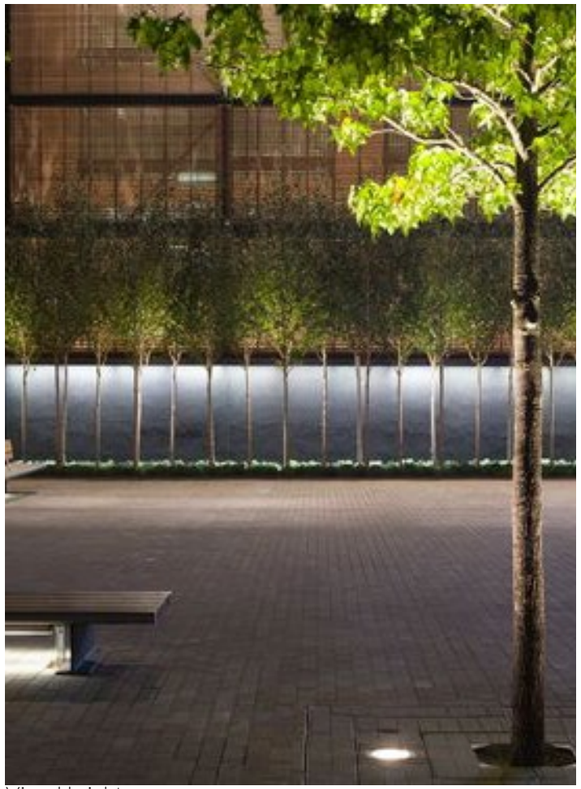
6. Feature lighting.

6.2 Public open squares.

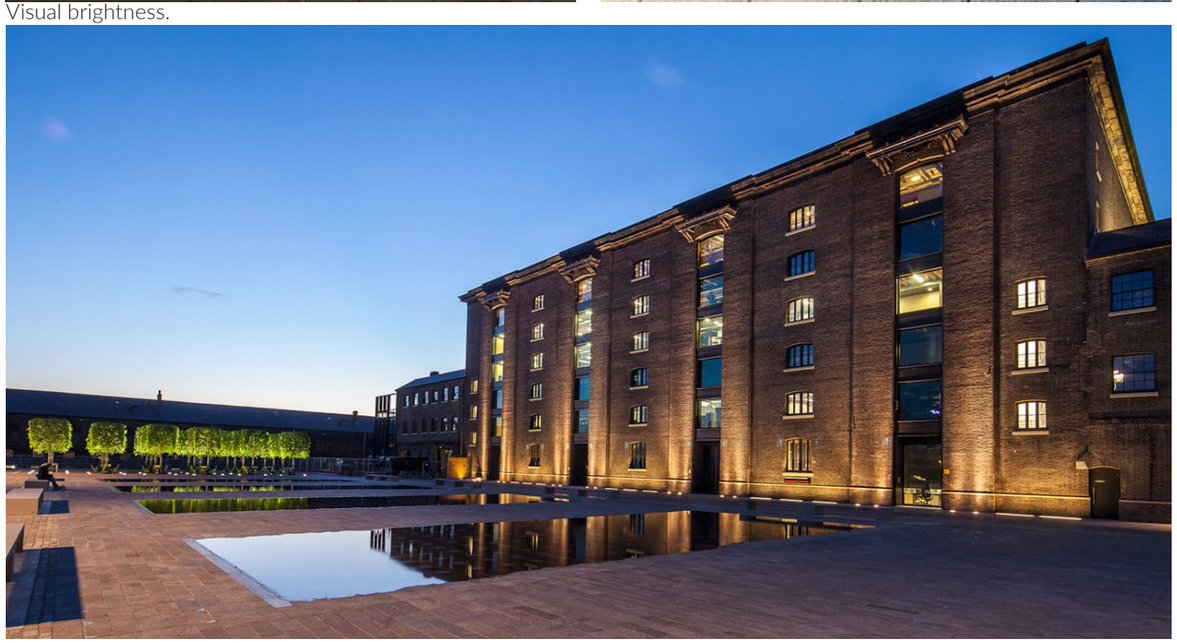
Purpose of lighting:
- Creating an inviting atmosphere.
- Promoting use after dark.
- Accentuating architectural and landscape features.

Types of lighting:
- Lighting vertical surfaces.
- Integrated lighting to landscape features.
- Accentuation colour and texture of natural features.
- Event space to have flexible lighting through the inclusion of multi optic lighting columns.

Luminaire characteristics:
- 3000K warm white colour temperature.
- Good optical control.
- Colour rendering of 80+ CRI.
- Dimmable.



Visual brightness.



Highlighting vertical surfaces.

6. Feature lighting.

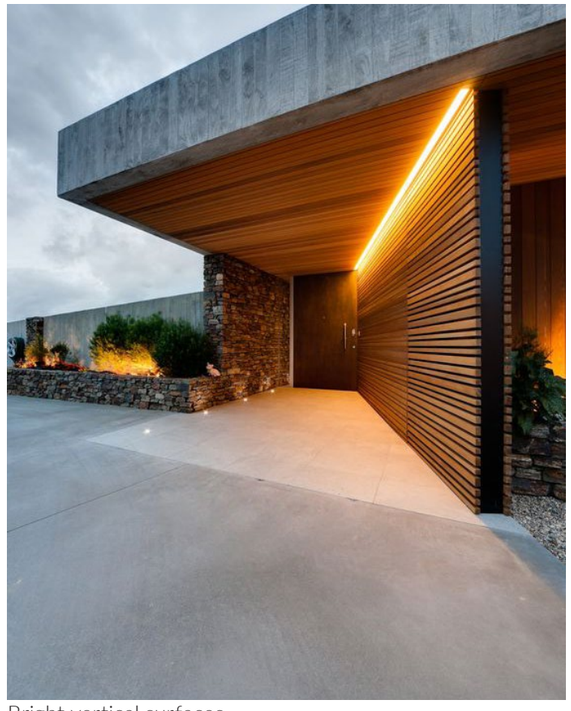
6.4 Building entrances.

Purpose of lighting:
- Highlight building entrances.
  - Photo-tropic way-finding dictating visual hierarchy
- Creating bright threshold to the building.

Types of lighting:
- Wall mounted lighting.
- Integrated concealed lighting

Luminaire characteristics:
- 3000K warm white colour temperature.
- Good optical control.
- Colour rendering of 80+ CRI.
- Dimmable.

Highlighting threshold.



Bright vertical surfaces.

Illuminated internal walkways

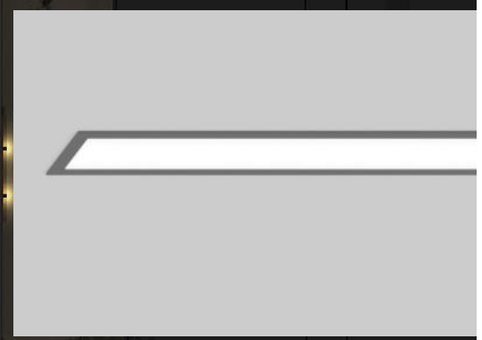
A. In-ground uplights focused towards feature arches
Narrow to wide beam recommended interchangeable optics to be provided.
Adjustable.
3000K.

B. Typical Column for event space.
Adjustable Multi-optic.
3000K.
Additional integration of media / security / electrical provisions.

C. In-ground uplights focused towards underside of tree canopies
Narrow to wide beam recommended interchangeable optics to be provided.
Adjustable.
3000K.

D. Homogeneous Linear LED to be concealed within landscape elements
High IP and IK rating required.
3000K.

E. Recessed downlighter
Recessed downlighter to provide illumination to floor
Glare control/visual comfort required.
3000K.



F. Recessed linear luminaire
To provide vertical illumination to key surfaces
High quality front face diffuser required
3000K.

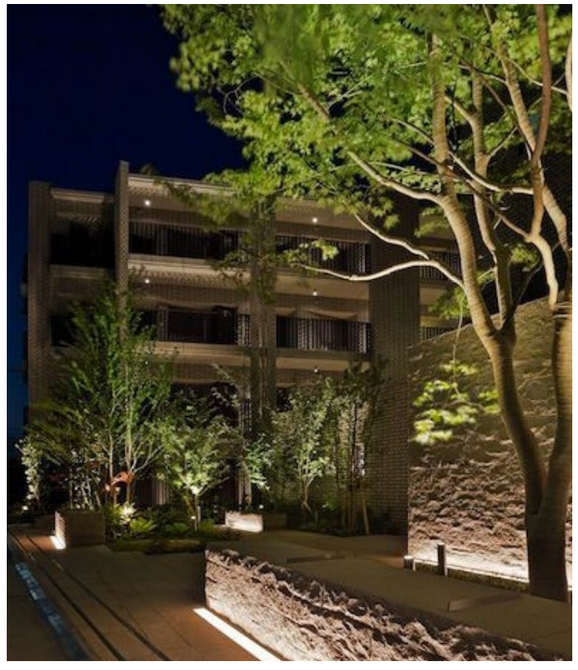
6. Feature lighting.

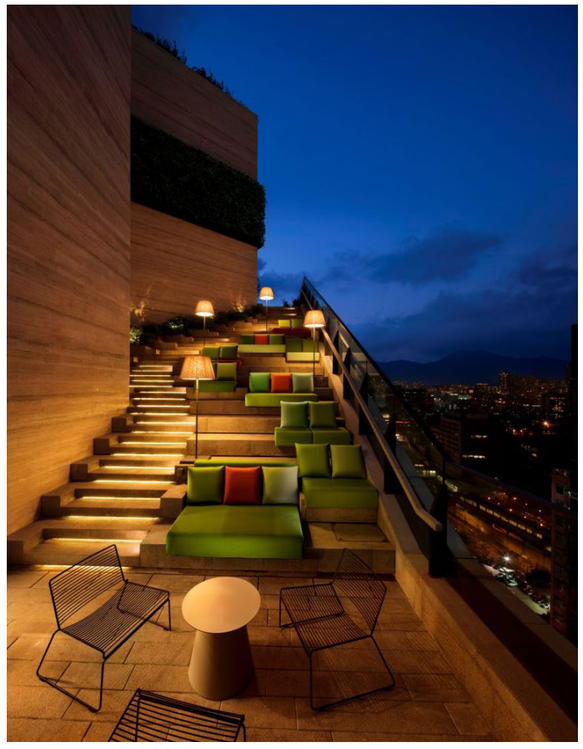
6.5 Rooftop terraces

Purpose of lighting:
- Creating a relaxing atmosphere to promote use of the space after dark.
- Creating vertical illumination for visual brightness.
- Accentuating texture and surface finish.
- Using light pattern to aid exploration
- Promotion of vistas and views

Types of lighting:
- Spot lighting / feature lighting to planting
- Integrated lighting within landscape features (where possible)

Luminaire characteristics:
- 3000K warm white colour temperature.
- Good optical control.
- Colour rendering of 80+ CRI.
- Dimmable.

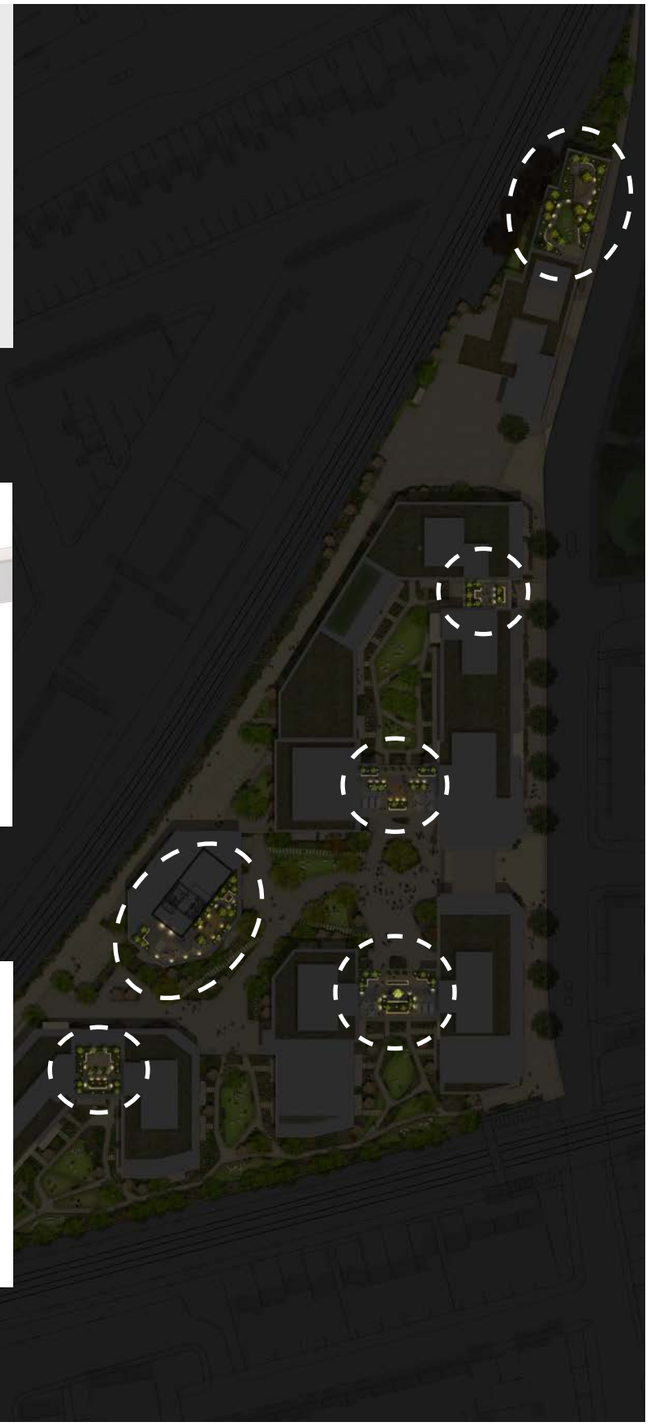




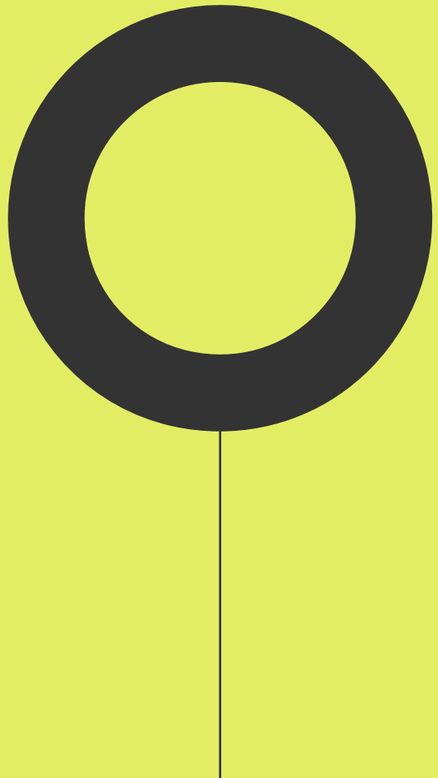
A. Low Level ambient lighting bollard or Wall light
180 degree illuminated bollard to provide quality illumination to pathways
3000K.

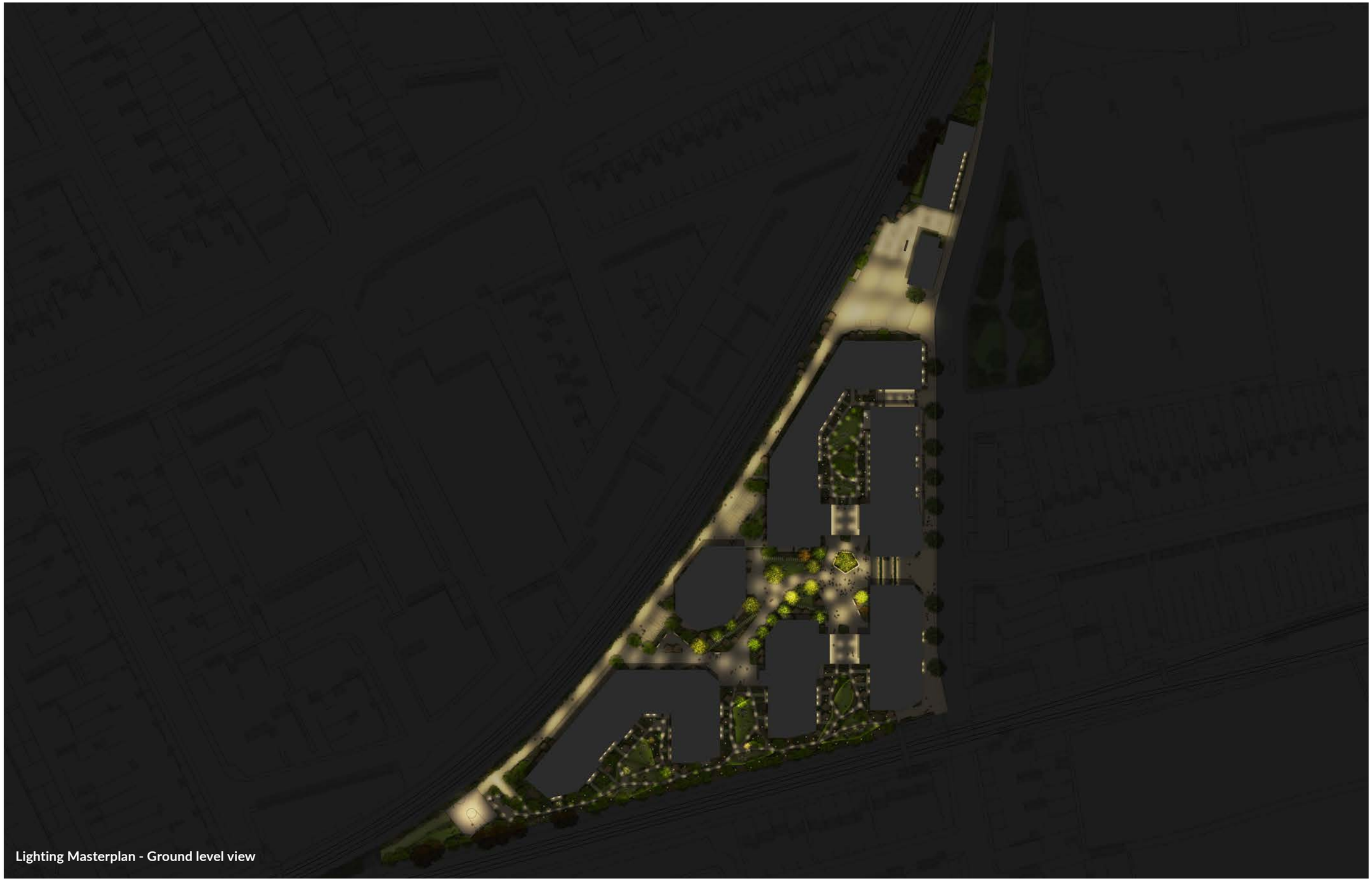
B. Homogeneous Linear LED to be concealed within landscape elements
High IP and IK rating required.
3000K.

C. In-ground uplights focused towards underside of tree canopies
Narrow to wide beam recommended interchangeable optics to be provided.
Adjustable.
3000K.

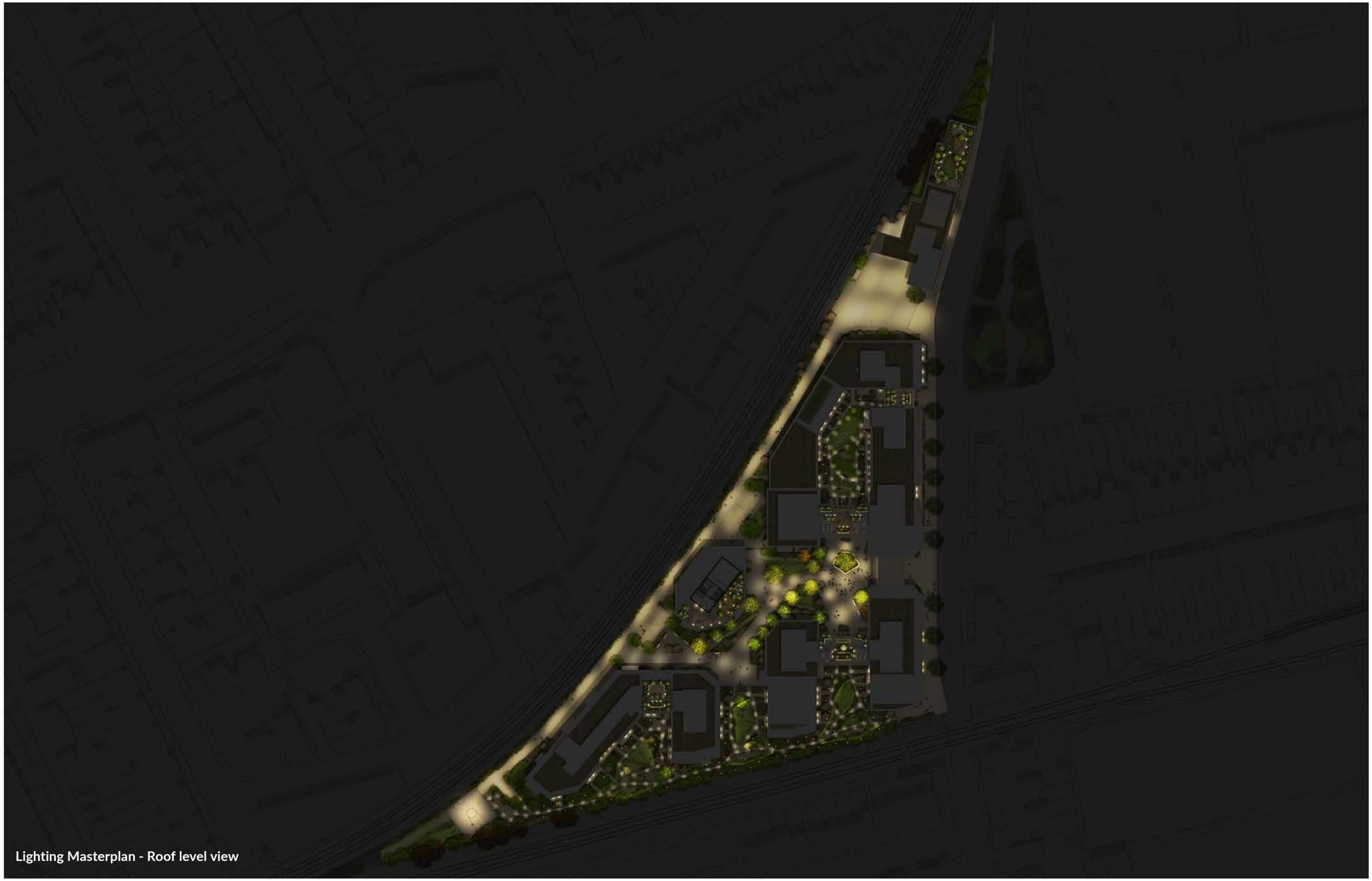


Lighting masterplan visual.





Lighting Masterplan - Ground level view



Lighting Masterplan - Roof level view

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