The London Resort Development Consent Order

BC080001

Lighting Statement

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Planning Act 2008
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
Regulation 5(2)(q)

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Revisions

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Executive Summary

The following Artificial Lighting Impact Assessment provides details on the artificial lighting strategy proposed for the London Resort together with the design criteria, recommendation and mitigations measure to avoid undue light pollution or adverse impact on the existing site conditions.

This document shall form the basis, of which the final designs and implementation of the artificial lighting are to be addressed. The lighting strategy sets out the recommendations, applicable regulations and best practice, to be adopted for the Proposed Development. Parameters are provided, to limit obtrusive light and light pollution onto adjacent and surrounding areas of the proposed development, together with considerations for protection of ecology and the environment.

The Proposed Development consists of two sites the Kent Project Site and the Essex Project Site (collectively referred to as the Project Site) as further described below and in section 3.1 in more detail.

Essex Project Site

The Essex Project site consisting of parking facilities within an existing area of similar usage; and additional extensive parking and industrial development for which minimal impact on the existing conditions are envisaged.

Kent Project Site

The Principle Development and Associated Development is located within the Kent Project Site and situated prominently within the Swanscombe Peninsula. The Swanscombe Peninsula is an area of existing brownfield land, which is unilluminated during the hours of darkness. Public access is provided from the east of the area adjacent the residential housing development via the riverside walkway. A network of existing pathways and vehicular access routes occur; although, these are unilluminated and signposted.

It is evident that the introduction of any form of artificial lighting into this area during hours of darkness would impact on the existing base line conditions. The introduction of artificial lighting would however be required to facilitate safe pedestrian access within this area and developments requiring exterior illumination for purposes of functionality.

It is envisaged the Proposed Development would impact on the existing conditions and, therefore, an increase from the existing Environmental lighting zone E2 to E4 (Ref: ILP GN01:20) is expected. Designated areas of brownfield within the Swanscombe Marshes are to be enhanced and maintained for the preservation of natural habitats and wildlife. A lighting strategy is proposed to ensure the lighting is managed within the Principle Development to

avoid undue light spill onto these natural areas of preservation. Illumination of pathways within these areas are kept to a minimum and where applied it shall in a considered method at low level with minimal light spill beyond the area of the pathways. The lighting within these areas re generally restricted to the main access routes connecting the Resort to the ferry port.

It is expected that the presence of the Resort would be of a noticeable visible change to existing conditions. There are prevalently visible light source emanating from the surrounding industrial developments, other than the variations in coloured lighting, with the proposed lighting strategy it is unlikely that the direct brightness of light emanating from the Principle Development would be greater than those currently present from the existing industrial developments surrounding the site.

The Proposed Development includes for a transport infrastructure route linking the Principle Development toward the south and connecting to the A2 and railway network.

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Glossary

Term	Definition
Ave	Average value
Colour Rendering (Ra)	An indicator of how accurately colours can be distinguished under different light sources. The colour rendering index (measured in Ra) compares the ability of different light sources to render colours accurately. This measures the ability of a light source to render colours naturally, without distorting the hues seen under a full spectrum radiator (like daylight). The colour rendering index (CRI) ranges from 0 to 100. Colour rendering index CRI
Colour Temperature	The colour temperature provides an indication of the light colour and is expressed in Kelvin (K). Lamps are generally rated between 2700K (warm), 4000K (neutral) and 6500K (cool). Unit: kelvin, K.
Control Gear	A 'package' of electrical or electronic components including ballast, power factor Correction capacitor and starter. High frequency electronic control gear may include other components to allow dimming, etc.
Glare	The uncomfortable brightness of a light source against a darker background which results in dazzling the observer or may cause nuisance. Condition of vision in which there is discomfort or a reduction in the ability to see significant objects, or both, due to an unsuitable distribution or range of luminance.
Glare Rating (GR)	Glare Rating values may be calculated for sports and area lighting applications to indicate the amount of glare present for an observer within the lighted area. GR values range from 10 to 90 (regardless of US or Metric units), where a value of 10 indicates unnoticeable glare and a value of 90 indicates unbearable glare. For most applications, the CIE (International Commission on Illumination) recommends that the maximum amount of glare allowed should be less than 45 to 55, depending on the application.
Horizontal Illuminance (E, Eh)	Illuminance incident on the horizontal surface. Unit: lux (lx) = lm/m^2 Symbol: E, Eh
Illuminance	The amount of light falling on a surface of unit area. The unit of illuminance is the lux, equal to one lumen per square metre. Unit: lux (lx) = lm/m^2
LED	Light Emitting Diode used as a light source. Solid-state semiconductor device that converts electrical energy directly into light of a specific colour or even white light.
Light Output Ratio (LOR)	Ratio of the total light emitted by a luminaire to the total light output of the lamp(s) it contains measured at standard operating conditions.

Light Spill	The unwanted spillage of light onto adjacent areas which may affect sensitive receptors, particularly residential properties and ecological sites.
Light Trespass	The spilling of light beyond the boundary of a property which may cause nuisance to others, particularly when spilling into windows of neighbouring properties.
Lumen	Unit of luminous flux, used to describe the amount of light produced by a lamp or falling on a surface.
Lumen Depreciation	The decline in the light output of a light source during its lifetime.
Luminaire	The correct term for a light fitting. An apparatus which controls the light from a lamp and includes all components for fixing and protecting the lamps or light source, as well as connecting them to an electrical supply.
Maintained Illuminance (luminance)	Value below which the average illuminance on the specified surface is not allowed to fall. The maintained illuminance is specified at the end of the maintenance cycle, taking into consideration the maintenance factor. It is one of the main specification elements for the lighting designer. In the various slighting standards the maintained illuminance is specified for various areas/activities. Unit: lux Symbol: Em. (Eave)
Maintenance Factor	Correction factor used in lighting design to compensate for the rate of lumen depreciation, caused by lamp ageing (lumen depreciation and lamp failure) and dirt accumulation (luminaire and environment). It determines the maintenance cycle needed to ensure that illuminance does not fall below the maintained value.
Sky Glow	The upward spill of light into the sky which can cause a glowing effect and is often seen above cities when viewed from a dark area.
Source Intensity	This is the brightness of the source of the luminaires and applies to each source in the potentially obtrusive direction, outside of the area being lit.
Uniformity Ratio	Ratio of the minimum over the average illuminance for a specified area (Emin/Eave). When defined as such, the uniformity ratio is also the ratio of the minimum over the maximum illuminance for a specified surface area (Emin/Emax).
Vertical Illuminance	Illuminance incident on the vertical surface. Unit: lux (lx) = lm/m^2 Symbol: Ev

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1 Chapter One ◆ Introduction

1.1 General

1.1.1 This Outline Lighting Strategy provides details on the artificial lighting strategy for the London Resort.

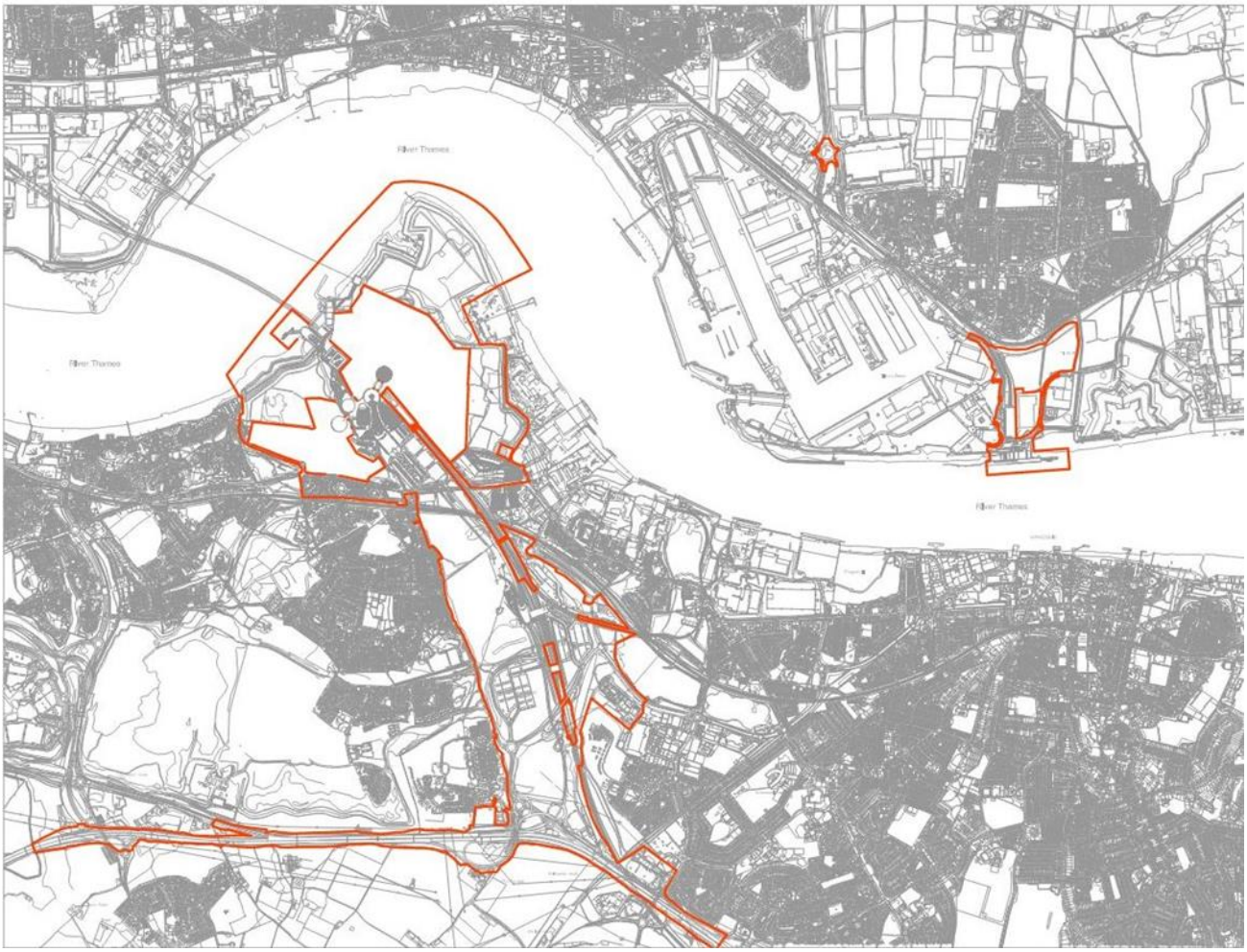
1.1.2 The document shall form the basis, of which the final designs and implementation of the artificial lighting are to be addressed. This lighting strategy sets out the recommendations, applicable regulations and best practice, to be adopted for the Proposed Development. Parameters are provided, to limit obtrusive light and light pollution onto adjacent and surrounding areas of the proposed development, together with considerations for protection of ecology and the environment.

1.1.3 This outline lighting strategy predominantly addresses the external lighting requirements, as the significant element of potrential lighting impact, with recommendations to limit the impact from the interior lighting, of which details are to be further developed during the detailed design period. The ES Appendix 12.11 Artificial Lighting Impact Assessment report provides details of the visible light sources and existing lighting conditions surrounding the Proposed Development.

1.2 Project Site Location

1.2.1 The Project Site lies approximately 30 km south-east of central London on the south and north banks of the River Thames, in the counties of Kent and Essex. On the south side of the Thames, the Kent Project Site occupies much of the Swanscombe Peninsula, formed by a meander in the river, and includes a corridor for transport connections extending generally southwards to the A2(T) trunk road. On the northern side of the river the Essex Project Site includes areas of land east of the A1089 Ferry Road and the Tilbury Ferry Terminal, which currently provides passenger services across the river to Gravesend and incorporates the London International Cruise Terminal. Further details can be obtained within the ES Appendix 14.1 Archaeological Desk-based Assessment, Ref: 6.2.13.1, December 2020 by EDP consultants.

Figure 1.2.1 – Site Location and DCO Order Limits



1.3 Project Description

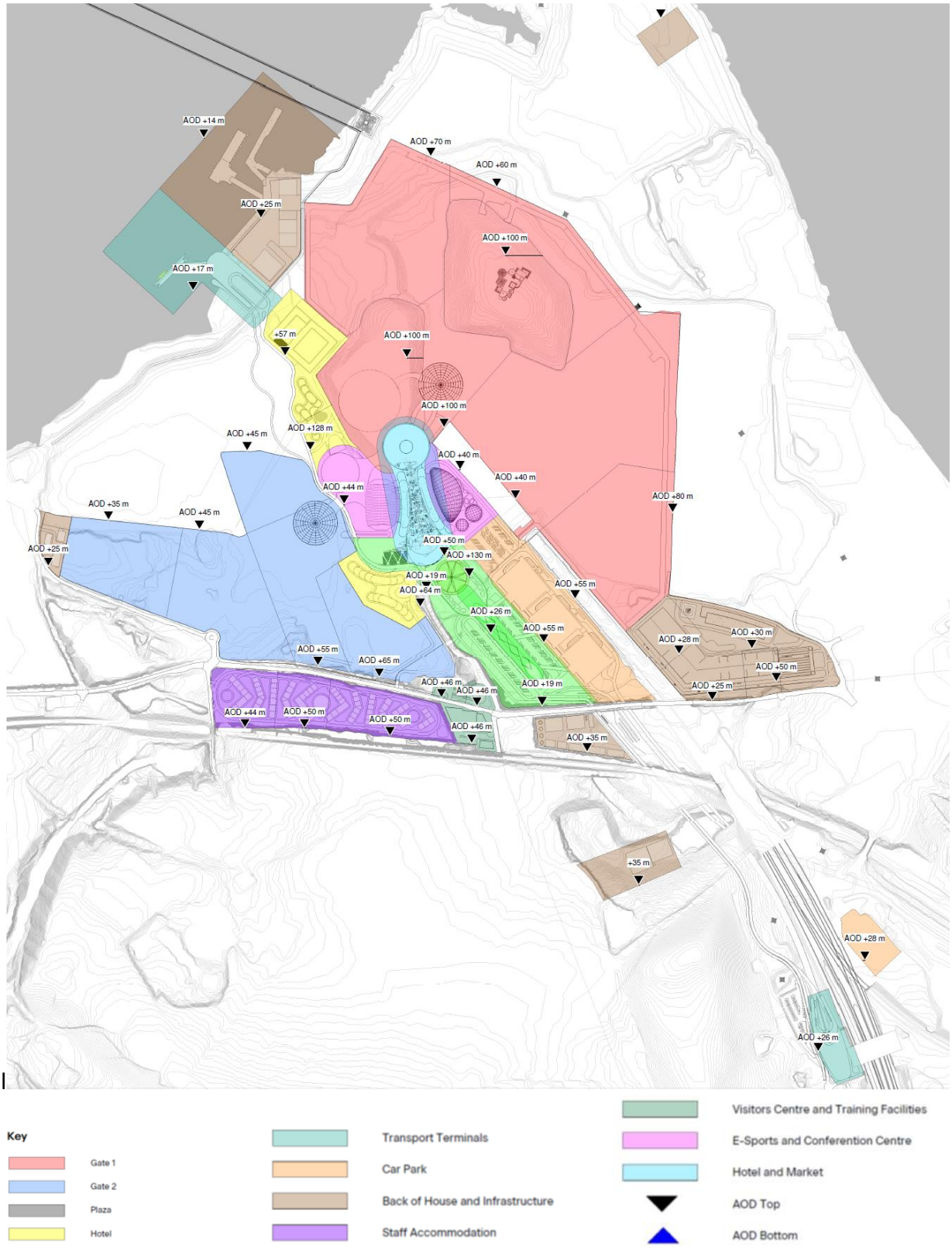
1.3.1 The Resort will be a nationally significant visitor attraction and leisure resort, built largely on brownfield land at Swanscombe Peninsula in Kent on the south bank of the River Thames and with supporting transport and visitor reception facilities on the northern side of the River Thames in Essex.

1.3.2 A distinction is made between the Principal Development, which comprises all works proposed within what would be the Entertainment Resort, and Associated Development, comprising other development that has a direct relationship with the Principal Development and is required to support its construction or operation.

1.3.3 Chapter 3 of the Environmental Statement (document ref xx) contains a full description of the Proposed Development.

Figure 1.3.1 – Illustrative Site Plan

Figure 1.3.2 – Site Plan



2 Chapter Two ◆ Lighting Standards, Legislation and Guidance

2.1 Legislative Framework

2.1.1 The Clean Neighbourhoods and Environment Act 2005, gives local authorities and the Environment Agency additional powers to deal with a wide range of issues by classifying light pollution as a statutory nuisance.

2.1.2 The statutory nuisance regime does not include light emitted from light sources which are used for transport purposes and other premises where high levels of light are required for safety and security reasons.

- It is expected that the following sources are those with greatest potential to generate issues relating to artificial lighting:
- Domestic security lights
- Commercial security lights
- External sports facilities e.g. outdoor floodlit facilities
- Domestic decorative lighting
- Exterior lighting of buildings and decorative lighting of landscapes; and
- Laser shows / sky beams / light art.

2.2 Planning Policy

2.2.1 The National Planning Policy Framework (NPPF) seeks to minimise the negative effects of artificial lighting.

2.2.2 Paragraph 180 of the NPPF states , “Planning policies and decisions should also ensure that new development is appropriate for its location considering the likely effects (including cumulative 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: (excerpt C) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation”.

2.2.3 The NPPF is supported by Planning Practice Guidance (PPG), which provides further guidance and makes the following references to light pollution:

- Paragraph 001 (Reference ID 31-001-20191101) states, “Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential to a new development. 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, undermine enjoyment of the countryside or detract from enjoyment

of the night sky. However, for maximum benefit, it is important to get the right light, in the right place and for it to be used at the right time".

- Paragraph 001 (Reference ID: 31-002-20191101) states, "Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed".

- Paragraph 002 (Reference ID: 31-001-20191101) states, "Light intrusion occurs when the light 'spills' beyond the boundary of the area being lit. These adverse effects can usually be avoided with careful lamp and luminaire selection and positioning".

- Paragraph 003 (Reference ID: 31-001-20191101) states, "The use of lighting only when the light is required can have a number of benefits, including minimising light pollution, reducing energy consumption, reducing harm to wildlife and improving people's ability to enjoy the night sky. Impacts on sensitive ecological receptors throughout the year, or at particular times (e.g. during bird migrations) may be mitigated by the design of the lighting or by turning it off or down at sensitive times".

- Paragraph 005 (Reference ID: 31-001-20191101) of the PPG considers the character of the area and surrounding environment with reference to how these may affect what is considered to be an appropriate level of lighting for that type of development proposed. It cautions to avoid glare and an appropriate selection of lighting so that it fulfils its purpose without over-lighting.

2.3 Guidance

2.3.1 The Institute of Lighting Professionals (ILP) has produced the '*Guidance Notes for the Reduction of Obtrusive Light* (Guidance Note GN01:20), along with the '*SLL Code for Lighting 2012'* provide guidance for local authorities with a recommendation that they are incorporated at the local plan level. The guidance defines various forms of light pollution and describes a series of environmental zones and how to provide external lighting in each of these zones to mitigate unwanted light. The ILP guidance notes provide suitable criteria against which the effects of artificial lighting can be assessed and have been used in this assessment.

2.4 The ILP Guidance Notes for the reduction of Obtrusive Light GN01

2.4.1 The main potential issues with artificial lighting within a site of this environmental context are:

- poorly controlled sources;
- where light is not directed into the required area to be lit and excessive amounts of light; and
- where an area is lit too brightly for its purpose and excess light is reflected upwards.

2.4.2 The preliminary lighting assessment criteria used is the 'ENV-P.1.7 Light Pollution' document, which refers to the 'Guidance Notes for the Reduction of Obtrusive Light' produced by the ILP. This document sets out the parameters and acceptable limits, for which the artificial lighting scheme for the development should be designed to and recommendations as to minimise the amount of trespass light and the spilling of light beyond the boundary of the property or the area being illuminated.

2.5 Lighting Environmental Zones

2.5.1 The classification of Lighting Environmental Zones, in the UK, are established within the documents GN01/20, 'Guidance notes for the reduction of obtrusive light' published by the Institute of Lighting Professionals (ILP).

Figure 2.5.1 – Except from ILP GN01/20 – Table 2: Environmental Zones.

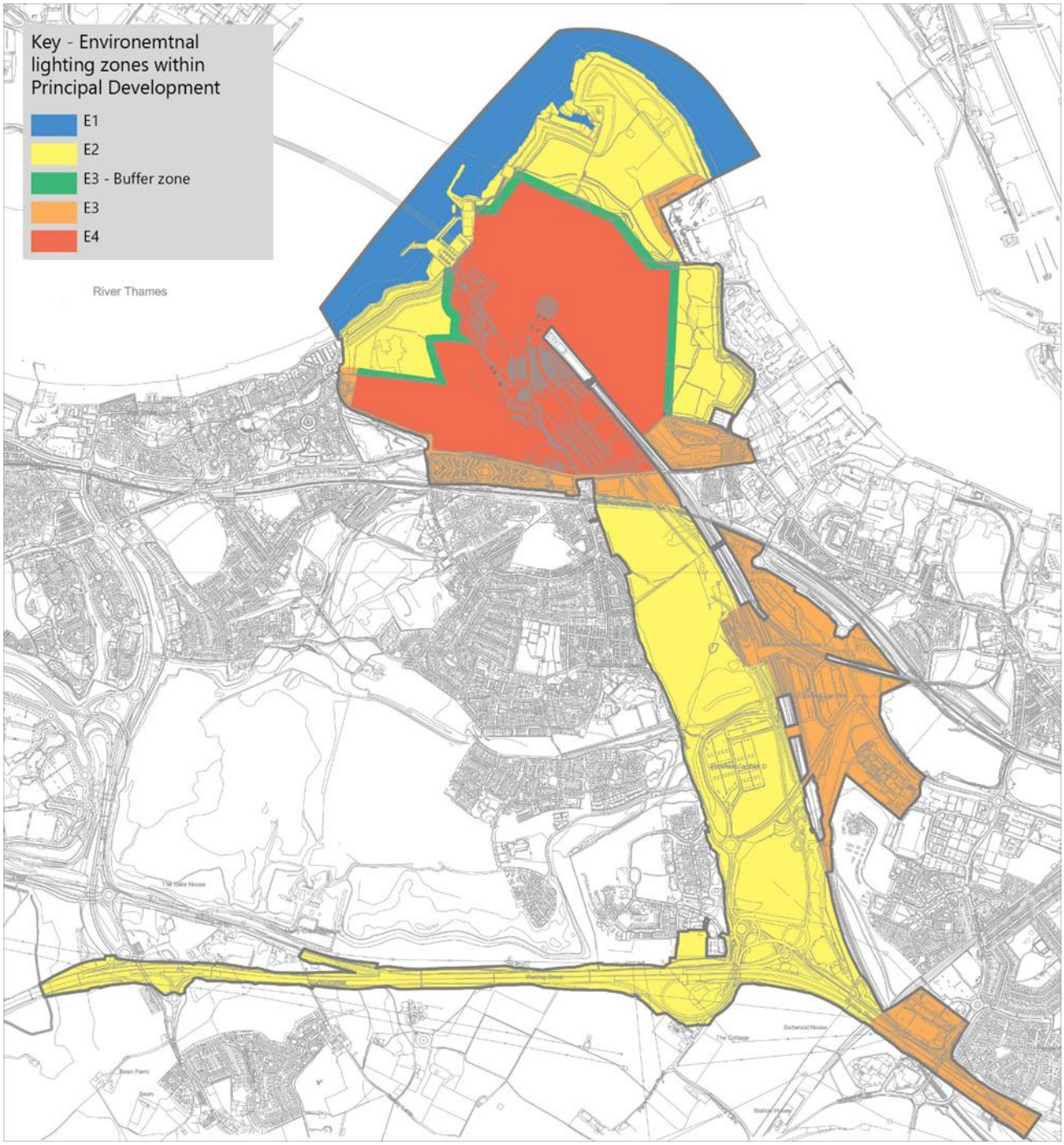
Table 2: Environmental zones

Zone	Surrounding	Lighting environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

Notes:

1. Where an area to be lit lies on the boundary of two zones the obtrusive light limitation values used should be those applicable to the most rigorous zone.
2. Rural zones under protected designations should use a higher standard of policy.
3. Zone E0 must always be surrounded by an E1 Zone.
4. Zoning should be agreed with the local planning authority and due to local requirements a more stringent zone classification may be applied to protect special/specific areas.
5. SQM (Sky Quality Measurements) referenced by the International Dark-Sky Association (IDA), the criteria for E0 being revised in mid 2019 but not retrospective.
6. Astronomical observable dark skies will offer clearer views of the Milky Way and of other objects such as the Andromeda galaxy and the Orion Nebula.
7. Although values of SQM 20 to 20.5 may not offer clear views of astronomical dark sky objects such as the Milky Way, these skies will have their own relative intrinsic value in the UK.

Figure 2.5.2 – Lighting Environmental *Zone Classification.*



2.5.2 Figure 2.5.2 above denotes the valuation of environmental zones for the Proposed Development based upon the ILP GN01:20. The final confirmation of Environmental Zones are to be determined by the Local Planning Authorities and the Port of London Authority. The above provides an indication of zone classifications based on the review of existing areas and the Proposed Development with reference to the ILP GN01:20.

2.5.3 Generally, the concentration of areas of high brightness is confined to the Principle Development with Zone 4 classification, with the Associated Development generally categorised as Zone 3.

2.5.4 The large majority of Principal Development and Associated Development areas are generally surrounded by Zone 2 rural areas. A buffer zone (Zone 3) is applied at the perimeter boundaries between high and low areas of brightness i.e. between Zone 4 areas directly adjacent to Zone 2 areas. This avoids stark contrasts between areas of high and low brightness allowing for a more seamless transition between these spaces.

2.5.5 The lighting classification for the Proposed Ferry Terminal is noted as Zone 2* to minimise light spill onto the River Thames, however additional considerations are also to be taken into account and compliance with the requirement of the Port of London Authority and the ferry operators are also required to be adhered to.

Figure 2.5.3 – Except from ILP GN01/20 – Table 2: Maximum values of vertical illumination on properties.

Table 3 (CIE 150 table 2): Maximum values of vertical illuminance on properties.

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

2.5.6 Figure 2.5.3 ILP GN01:20 Table 3, denotes the maximum permissible light intrusion onto a property beyond the boundary of the Proposed Development with values noted to correspond with the associated Environmental Zone for the areas under consideration.

2.5.7 The values noted denote two application conditions, pre-curfew and post-curfew. The timings of both pre and post curfew are dictated by the local planning authorities. As a general rule Pre-curfew timing normally falls between 23:00 to 00:00h, and post-curfew from 00:00h till dawn.

2.5.8 It is not uncommon for areas of entertainment and city centres with high night-time activity, for the pre-curfew timings to be extended in agreement with the local planning authorities. Conditions can be applied for instance for pre-curfew timings for the weekend (Friday and Saturday evenings) to be extended to 14:00h on these particular days. The finial timing of pre and post curfew for Proposed Development would be agreed with the local authorities at detailed design stage.

Figure 2.5.4 – Except from ILP GN01/20 – Table 3: Limits for the luminous intensity of bright luminaires.

Table 4 (CIE 150 table 3 (amended)): Limits for the luminous intensity of bright luminaires[4].

Light technical parameter	Application conditions	Luminaire group (projected area A_P in m^2)					
		$0<A_P \leq 0.002$	$0.002<A_P \leq 0.01$	$0.01<A_P \leq 0.03$	$0.03<A_P \leq 0.13$	$0.13<A_P \leq 0.50$	$A_p>0.5$
Maximum luminous intensity emitted by luminaire (I in cd)	E0						
	Pre-curfew	0	0	0	0	0	0
	Post-curfew	0	0	0	0	0	0
	E1						
	Pre-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	2,500
	Post-curfew	0	0	0	0	0	0
	E2						
	Pre-curfew	0.57 *d*	1.3 *d*	2.5 *d*	5.0 *d*	10 *d*	7,500
	Post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	500
	E3						
	Pre-curfew	0.86 *d*	1.9 *d*	3.8 *d*	7.5 *d*	15 *d*	10.000
	Post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	1,000
	E4						
	Pre-curfew	1.4 *d*	3.1 *d*	6.3 *d*	13 *d*	26 *d*	25,000
	Post-curfew	0.29 *d*	0.63 *d*	1.3 *d*	2.5 *d*	5.1 *d*	2,500
Aid to gauging A_p		2 to 5cm	5 to 10cm	10 to 20cm	20 to 40cm	40 to 80cm	>80cm
Geometric mean of diameter (cm)		3.2	7.1	14.1	26.3	56.6	>80
Corresponding A_p representative area (m^2)		0.0008	0.004	0.016	0.063	0.251	>0.5

2.5.9 Figure 2.5.4. IP GN01:20 Table 3 denotes the maximum permissible luminous intensity of luminaires for the relevant classification of environmental zones.

2.5.10 Artificial lighting forms an integral component for the function of the Principal Development. Generally, it is expected that the ambient levels of illumination during hours of darkness would increase within the Principal Development to those of existing conditions.

To ensure impact onto the surrounding areas and brownfield lands are minimised and natural habitats maintained, the lighting strategy provides a transition of illumination levels, tapering towards lower levels of illumination immediately surrounding perimeter of the Principal Development. Providing a gradual transition to areas natural environment, which are to be maintained unilluminated for the preservation of wildlife and the natural habitat to thrive. The boundary buffer zone surrounding the Principal Development and lighting environmental zone 2 areas assist to mitigate any issues relating to local residential and commercial properties. Appropriate mitigation measures shall be put in place to ensure ecological and areas of sensitive receptors are preserved and to control light spill and obtrusive light. The lighting strategy shall be in co-ordination with the Landscape Strategy (document ref xx) developed by EDP Consultants.

Figure 2.5.6 – Except from ILP GN01/20 – Table 5: Maximum values if upward light ration (ULR) of luminaires.

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

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

2.5.11 Figure 2.5.6 denotes the maximum values of upward light ration (ULR) of luminaires for the relevant environmental zones. The general external lighting required for function and operation of spaces shall adhere to the above values with limitation of light generally limited to not exceed above 90 degree horizontal where possible.

2.5.12 The recommendation for the International Dark Sky Association shall also be considered and recommendations adopted where possible.

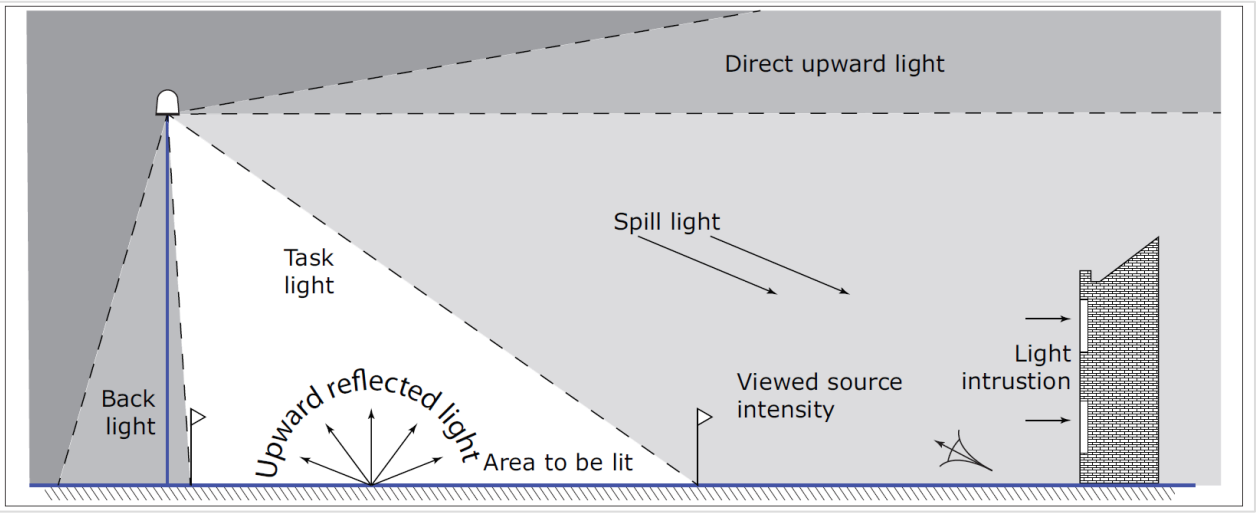
Figure 2.5.7 – Except from ILP GN01/20 – Table 6: Maximum values of upward flux ratio of installation.

Table 7 (CIE 150 table 6): Maximum values of upward flux ratio of installation (of four or more luminaires).

Light technical parameter	Type of installation	Environmental zones				
		E0	E1	E2	E3	E4
Upward flux ratio (UFR)/%	Road	n/a	2	5	8	12
	Amenity	n/a	n/a	6	12	35
	Sports	n/a	n/a	2	6	15

2.5.13 The above table in figure 2.5.7 denotes the maximum permissible of upward light for installations consisting of four or more luminaires.

Figure 2.5.8 – Except from ILP GN01/20 – Types of intrusive light.



2.5.14 Figure 2.5.8shows the key characteristics of how the artificial lighting design to a development should be developed – 'Useful Light' (as required for functional use), 'Spill Light' and 'Light Trespass' (light that is not wanted or required, this light may be a nuisance to others, a waste of energy and an unnecessary source of greenhouse gases).

2.5.15 A description of definitions is detailed below:

- Sky Glow: The upward spill of light into the sky which can cause a glowing effect and is often seen above cities when viewed from a dark area.

- Light Spill: The unwanted spillage of light onto adjacent areas which may affect sensitive receptors, particularly residential properties and ecological sites.
- Glare: The uncomfortable brightness of a light source against a dark background which results in dazzling the observer, which may cause nuisance to residents and a hazard to road users.
- Light Trespass: The spilling of light beyond the boundary of a property which may cause nuisance to others, particularly when spilling into windows of neighbouring properties.
- Source Intensity: This is the brightness of the source of the luminaires and applies to each source in the potentially obtrusive direction, outside of the area being lit.
- Luminance – this is the maximum luminance of any illuminated or self-luminous surface as seen from any potentially obtrusive direction.
- Building Luminance: This is the amount of light on the façade of the building being built with reference to the exterior luminaires used to light it. This is being measured to ensure the building suits the general district lighting and avoid over lighting and excessive visible brightness.

2.6 Port of London Authority

2.6.1 Artificial lighting application local to the riverbank, the ferry port or any lighting which may impact on the waterway and naval navigation shall be in agreement with the recommendations of the Port of London Authority (PLA) together with the recommendations of the ILP.

2.6.2 Illumination directly onto the River Thames shall be avoided and light spill limited to no more than 2lux, unless deemed required to the purposes of safety and function such as the ferry port and be in agreement with PLA.

2.6.3 As a rule, the use of red, green, and white light onto or near the waterway shall be avoided. It is however expected that the use of white light would be required for the illumination of the ferry port to ensure suitable level of illumination for safe operation.

2.6.4 The use of fireworks (especially red fireworks) and laser displays directed towards the river shall also be restricted and any usage of such nature that may impact on the waterway and naval navigation are to be agreed in advance with the relevant local authorities and the PLA.

2.7 Lighting Criteria

The external artificial lighting for the Proposed Development will be based on British design standards and the relevant guidance and codes.
These include: -

Statutory Legislation

- BS EN 5489-1:2020 Road Lighting
- BS EN 5489-2:2016 Lighting of tunnels
- BS EN 13201- 1/2/3/5 2015/2014 Road Lighting
- BS EN 12464-2: Outdoor workplaces

- BS EN 60598-1: 2004 – Luminaire General requirement
- Electricity at Work Regulations 1989
- Health and Safety at Work Act 1974

Main Building Services Related Guidance Documentations

- CIBSE Lighting Guides LG6 – The outdoor Environment
- CIBSE - Code for Lighting
- CIBSE LG14 – Control of electric lighting
- CIBSE LG17 – Transport for Buildings
- BRE DG498: Selecting lighting controls
- BRE IP2/99: Photoelectric control of lighting design
- CIE Publication 126 (1997) - Guidance for minimizing sky glow
- CIE Publication 129 (1998) - Guide for lighting exterior work areas
- CIE Publication 150 (2017) - Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting

Installation

- CIE Publication 154 (2003) - The Maintenance of outdoor lighting systems (2003)
- CIE Publication 136 (2000) – Guide to the lighting of urban areas
- CIBSE - SLL Code for Lighting
- GN01:2020 ILP Guidance Notes for reduction of obtrusive light
- Secured by Design – Guidance for lighting against crime
- PL G04 Guidance on undertaking Environmental Lighting Impact assessment
- International Dark Sky Association – Recommendation for the protection of night skies.

2.8 Construction Task Lighting

2.8.1 During construction, mobile task lighting will be used to illuminate areas under construction during the hours of darkness. Directional luminaires will be used to limit unwanted light spill. These will be directed away from sensitive residential and ecological receptors. Construction site lighting outside normal working hours will be restricted to the minimum required for safety and security:

Where work is required outside of daylight hours, temporary lighting would be directed away from retained watercourses, woodlands, mature trees and hedgerows. Appropriate shiled on light source shall be applied to limit potential light spill or obtrusive light onto surrounding areas.

3 Chapter Three ◆ Outline Lighting Strategy

3.1 Outline Design Criteria

3.1.1 The following overview of the external lighting describes the intended external lighting scheme for the Proposed Development.

3.1.2 The design will take into consideration the environmental impact of the lighting based on the relevant technical chapters of the Environmental Statement (document ref xx) and will integrate with the current lighting presidencies.

3.1.3 The river will be maintained as a dark corridor for preservation of all relevant protected wildlife. The lighting to the public realm for the London Resort, will not be done at the expense of the safety and the security of the people and navigation. Illumination of external circulation routes directly adjacent the river shall generally be addressed at low level and light distribution directed towards landside. The lighting should also be characterised for having a warm correlated colour temperature.

3.1.4 Access routes across the Project Site will be illuminated to provide a clear route through the site at night and the surrounding rural areas maintained dark with controlled low levels of illumination, however sufficient for safe usage and access within these areas. Areas dedicated for the preservation of wildlife and habitat are not to be illuminated and treated like natural trust areas of preservation, thereby allowing visitors to enjoy the benefits of wildlife in their natural habitat during the daytime and explore with use portable lights such as handheld touches during hours of darkness.

3.1.5 All proposed lighting shall comply with CCTV requirements on routes where there are cameras located.

3.1.6 The public realm lighting aims to create both a vibrant and intimate place for residents and visitors. It will strive to transform this area to a lively, vibrant destination in its own right, both day and night, whilst maintaining a considered approach to sustain ecology and the surrounding environment.

3.1.7 The unique character of the space will be emphasised through a flexible public realm lighting strategy that will promote the unique character of Proposed Development and exterior events, celebrate the architecture and create an attractive key leisure destination in Kent.

3.1.8 The main concept of the lighting is maintaining continuity with a Resort lighting strategy incorporating a new vibrant public space with the natural elements of the Resort and surrounding areas. A holistic approach is taken to the design process where the public realm lighting shall utilise variations in illumination levels to address specific requirements and incorporate textured layers of lighting, highlight the landscaping elements and various external features to create and stimulate visual interest. The Principle Resort shall include for higher illumination levels to the surrounding brownfield areas to address the functional requirements of the resort and safe use, together with use of display lighting which forms an integral component of an entertainment resort. The surrounding brownfield areas shall provide a perimeter of area with lower illumination levels and areas preserved for the wildlife and natural habit to thrive and flourish.

3.1.9 The night-time identity of the Proposed Development will contribute to the character of the entire development with external lighting schemes of each building portraying their individual identity, whilst being in co-ordination and unity to form a landmark night-time landscape in Kent. The lighting aims to activate the waterfront and existing brownfield area to create an all-day destination to visit and enjoy without interfering with the darkness of the local wildlife. This will mainly be addressed with tiers of lighting with higher levels towards the public access routes adjacent buildings and main causeways tapering to lower levels towards the waterways. A subtle approach is taken to the lighting of the landscape allowing the various plants to be illuminated with ambient lighting local to foliage to highlight the plants and avoid undue light spill or pollution.

3.1.10 The external lighting for the existing areas of brownfield areas is to be addressed in conjunction with the ES Appendix 14.1 Archaeological Desk-based Assessment, Ref: 6.2.13.1, December 2020 by EDP consultants, for which an infrastructure of circulation routes together with areas to be maintained unilluminated during hours of darkness for the preservation of ecology and wildlife. External circulation routes within the areas or close proximity to areas of reservation shall include for well control light distribution to ensure routes are adequality illuminated for safety and avoid any undue light spill onto sensitive areas. Specific areas such as routes adjacent the River Thames and waterways shall be address at low level with light distribution directed toward the areas of passage. The Illustrative Landscape Masterplan on Figure 3.1.1. denotes the Landscape Strategy developed by consultants EDP. Noted on the illustrative masterplan are circulation and access routes within the Proposed Development. Each of these routes are classified dependant on usage, traffic density and location. Routes within the areas dedicated for the preservation of wildlife and natural habitats are intended not to be illuminated, similar to natural trust trails and pathways.

Figure 3.1.1 – Illustrative Landscape Masterplan (image credit EDP).

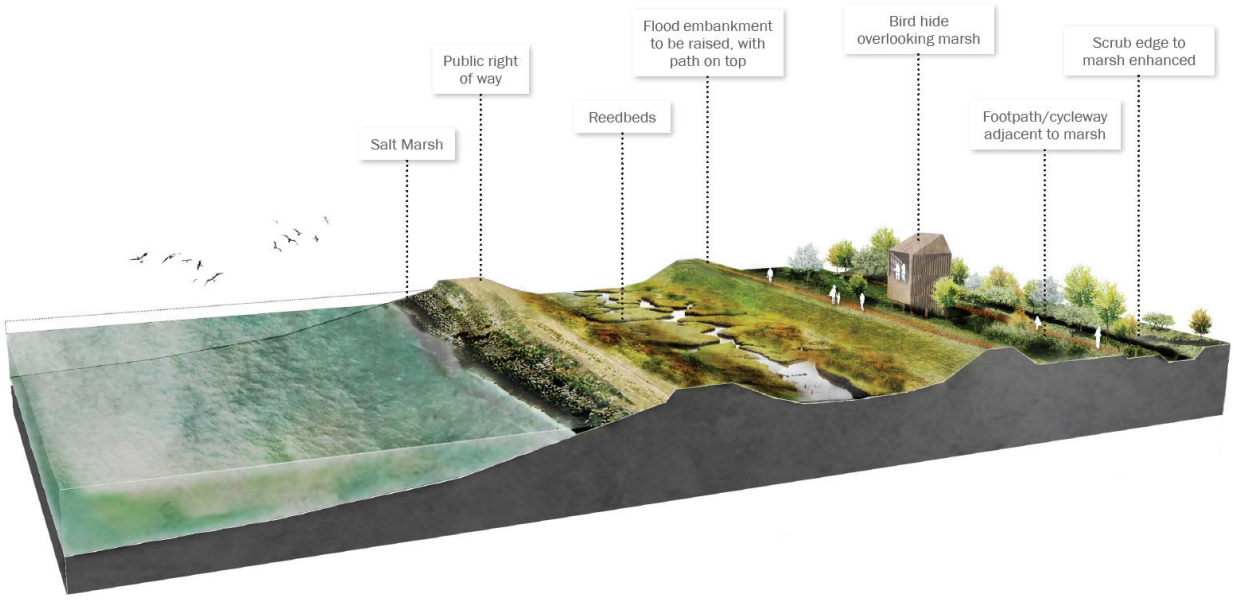
3.1.11 The illustrative masterplan (Figure 3.1.2) identifies the areas of marshland within the Swanscombe Peninsula to be retained and enhanced for the preservation of wildlife and natural habitats. The marsh areas shall be further detailed to note areas and treat in a similar lighting environmental Zone 1 category. Specific lighting treatments shall be applied within these areas where required for access to ensure minimal impact on to the surrounding areas of natural habitat. Sensitive receptors shall be identified and appropriate mitigation measure to ensure minimal impact from artificial lighting.

Figure 3.1.2 – Illustrative Masterplan (image credit APT Architects).

3.1.12 The illumination of the pedestrian path running parallel with the River Thames from both east and west providing a connection with local communities shall be addressed at low level with minimal light spill beyond the width of the path. The section of path providing access across Black Duck Marsh (Figure 3.1.3) is on a raised elevation with a natural wildlife corridor running parallel adjacent the path (scrub edge) and waterway on the other side. The lighting treatment shall therefore be located as close to floor level as possible and avoid any backward light distribution, raised sections at the rear of luminaires would assist to provide additional shielding.

3.1.13 The correlated colour temperature for the lighting in this corridor should be characterised for being warm. Any type of light could suppress the secretion of melatonin in human beings and different animals, however the exposure to blue light at night does so more powerfully as retina is more sensitive to blue light wavelength. Red light has very small impact on the melanopsin receptors, and they do no stimulate wakefulness. Warm light has higher quantities of red light, therefore is the appropriate light to generate a relaxed environment across this are, Amber and yellow light, and light up to 2700K have a shorter wavelength than 3000K, 4000K light. This is beneficial for the animals as they are less attracted to this type of light therefore generating less disturbance on the natural environment at night.

Figure 3.1.3 – Black Duck Marsh (image credit EDP).



3.1.14 Energy efficiency requirements for the exterior lighting shall utilised energy effiecnt light source with the predominant use of LED technology together with automated lighting controls to swich off lighting in areas where not required to be operational or during daytime when suitnale levels of illumination are present from daylight. Even though there is not a specific requirement related to part L document for non-dwelling building's exterior lighting, it is valuable to assume an initial luminous efficacy within each outdoor area greater than 60 Lumens luminaire /circuits watts and having connected wattage not greater than 100 luminaire watts per fitting automatically controlled when daylight is sufficient and the area is unoccupied. Other than for purposes of display the general function lighting shall be general address with the predominant use of LED light sources to maintain an energy efficient lighting scheme in conjunction with the lighting control systems.

3.1.15 The Public Realm lighting scheme is intended to be controlled via astronomical time-clock or photo sensor. In addition a centralised lighting control system shall also utilised for control of the external lighting within the Principal Resort.

3.1.16In addition, the control system shall include facilities for pre-programmed scene settings to accommodate a pre and post curfew lighting scene that will assist in optimizing energy usage in relation to site foot fall.

3.1.17Provisions are also to be provided for manual override to activate dedicated event day lighting scenes.

3.1.18All lighting to the public realm shall feature Digital Addressable Lighting Interface (DALI) dimmable control gear so as to allow individually addressable luminaires that can be grouped, through programming so as to create specific lighting scenes in any are of the site. This is to accommodate blackout or dimming for temporary events and installations where dedicated temporary lighting is provided.

3.1.19The exterior lighting scheme shall ensure compliance to Secure by Design requirements, wherever appropriate and other recommendations in accordance with the Security Planning Report (document reference 7.8). It shall also ensure that all areas requiring CCTV coverage be lit to accommodate the required level of coverage. The exterior lighting installations shall also ensure that no part of the Proposed Development be left in darkness in a manner that may cause uneasiness for night-time occupants.

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