

# NNB GENERATION COMPANY (HPC) LTD

## TEMPORARY LIGHTING STRATEGY GUIDANCE NOTE HPC MAIN DEVELOPMENT SITE

Revision	11
Date of Issue	28/12/2022
Document No.	100760987
Status	P1 - For Implementation
Next Review Date	3 Yearly Review
Owner & Approver	██████████
Technical Reviewer	██████████
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## APPROVAL: TEMPORARY LIGHTING STRATEGY GUIDANCE NOTE

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## DOCUMENT CONTROL

Revision	Purpose	Amendment	By	Date
01	W0 - Work in Progress	First issue for review	[REDACTED]	16/09/2014
02	W0 - Work in Progress	Drawing updates and minor text changes.	[REDACTED]	03/10/2014
03	W0 - Work in Progress	Drawing updates, lighting zones defined and minor text changes.	[REDACTED]	27/10/2014
04	W0 - Work in Progress	Minor changes to section 3.2 and 3.3.	[REDACTED]	05/01/2015
05	W0 - Work in Progress	Further changes	[REDACTED]	13/01/2015
06	W0 - Work in Progress	Changes made to align with DCO MS13.	[REDACTED]	27/02/2016
07	W0 - Work in Progress	General revision, no edits to content	[REDACTED]	26/10/2021
08	P1 - For Implementation	General revision to update in line with site progress and clarify the notification process and change to a guidance note	[REDACTED] [REDACTED]	19/07/2022

HPC Company Document  
TEMPORARY LIGHTING STRATEGY GUIDANCE NOTE

**NOT PROTECTIVELY MARKED**

Revision	Purpose	Amendment	By	Date
09	P1 – For implementation	Update in line with comments made by SNC. Updates made to sections – 1.1, 1.4, section 3 – Zone C & Zone F.		28/12/2022
10	P1 – For implementation	Update in line with comments made by SNC. Updates made to sections – 1.1, 1.4, section 3 – Zone C & Zone F.		20/01/2023
11	P1 – For implementation	Update in line with comments made by SNC. Updates made to sections – 1.1, 1.4, section 3 – Zone C & Zone F.		23/01/2023

A - APPROVED

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# 1 INTRODUCTION

## 1.1 Purpose

This Lighting Strategy Guidance Note (LSGN) document has been written to support the practical implementation of the Construction Lighting Strategy (CLS) (Reference: 5) approved through DCO Requirement MS13 within the Development Consent Order (DCO).

The CLS describes the requirements for managing construction lighting within the HPC development site in accordance with Development Consent Order (DCO) condition MS13:

**MS13 Construction Lighting:**

*Installation of external construction lighting shall be carried out in accordance with the Construction Lighting Strategy, Appendix A3 of the Construction Method Statement submitted on the 31<sup>st</sup> October 2011."*

Note: External means external to buildings.

NNB Generation Company (HPC) Limited (NNB HPC) requires contractors to comply with this document and the CLS for construction work activities on the HPC Main Site.

The purpose of this LSGN is to set out the controls and mitigations to be applied by contractors in relation to lighting and to enable work activities to be undertaken in compliance with the CLS. This now includes planning for the extension of K28, for the use of the K28 stockpiles as construction compounds. This LSGN is an internal document to communicate with contractors and cannot be submitted externally to Local Authorities.

## 1.2 Scope

This LSGN applies to the HPC development construction area where the main HPC construction activities are taking place, as illustrated by the area in white surrounded by a red line boundary in Figure 1.

A number of light mitigation measures which reflect best practice techniques shall be employed during the undertaking of construction activities; to design out the risk of light pollution where possible or to mitigate to an acceptable level, where elimination of risk is not possible. This will ensure works are carried out in accordance with the Construction Lighting Strategy (October 2011), specifically Appendix A3 of the Construction Method Statement (Ref. 5).

Exclusions: this Lighting Strategy applies to the use of temporary lighting only; it does not apply to lights on site vehicles, headlamps or flashing safety features, warning lights.

This LSGN has been produced to support the construction phase of the project and does not cover works that form part of the operation or post-operational phases. There is an

Operational Lighting Strategy which is approved through DCO Requirement MS29, and details the arrangements that will apply operationally.

This Lighting Strategy will remain a live document and as such will be reviewed every 3 years or if changes are implemented, whichever is sooner, being updated or amended as required.

## 1.3 Roles and Responsibilities

The roles and duties of those involved in the implementation of this strategy and to the minimisation of light pollution from construction work activities on site are detailed below.

### 1.3.1 NNB HPC Site Environment & Sustainability Manager

The Site Environment and Sustainability Manager is responsible for:

- Management and implementation of the HPC Environmental Management System, including the provision of environmental training;
- coordination between client and contractors and the external stakeholders as appropriate;
- reviewing and agreement contractor submitted Construction Environmental Management Plan (CEMP);
- reviewing and agreeing the environmental sections of contractor issued method statements;
- investigating complaints received by the project in relation to light pollution issues;
- ensuring site inspections are conducted producing reports and for communications with relevant parties within HPC project management team, the contractor's project management team and the internal / external stakeholders as required.

### 1.3.2 Contractor Organisation

The Contractor Organisation is responsible for:

- management and implementation of works on-site in accordance with the requirements of this LSGN;
- provision of appropriate and sufficient Contractor Environmental Representative resource;
- ensuring that agreed requirements set out in this Lighting Strategy are communicated to and implemented by sub-contractors;
- monitoring and evaluating compliance with the requirements of this Lighting Strategy within their own organisation and that of their sub-contractors;
- preparing the contractor's (and their sub-contractors') relevant environmental documentation (e.g., CEMPs and Risk Assessment Method Statements (RAMS) and

providing appropriate internal review, to ensure that all the requirements of this Lighting Strategy are met;

- provision of necessary documentation to NNB HPC via the approved electronic document and records management system (EDRMS) process and procedure, especially where there has been or there exists a risk of non-compliance with the requirements identified in this Lighting Strategy;
- providing or arranging specific training in relation to Lighting in construction management, to all levels of the contractor's personnel where appropriate;
- undertaking inspections of their work areas and the implementation of remedial measures in the event of an improvement being identified; and
- coordinating with NNB HPC Environment Team on all issues pertaining to Lighting.

## 1.4 References and Definitions

Ref	Title	Location	Document No.
1	Guiding Principles for Contractors – Lighting	EDRMS	HPC-NNBPCP-XX-000-REP-000166
2	Hinkley Point C Guidance Note Artificial Lighting Requirements During Site Preparation Works	EDRMS	HPC-NNBPCP-XX-000-DRW-000234
3	Bats and Lighting in the UK	Bat Conservation Trust	NA
4	Construction Method Statement Appendix A3; Construction Lighting Strategy	EDRMS	Environmental Statement, 4.14 October 2011
5	EDF Energy, 2011. Development Consent Order Application, Environmental Statement Annex 2: Construction Method Statement; Appendix A3 Construction Lighting Strategy.	<a href="https://webarchive.nationalarchives.gov.uk/ukgwa/20190919100903mp_/https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010001/EN010001-005088-4.14%20-%20Annex%20%20-%20Construction%20Method%20Statement%201.pdf">https://webarchive.nationalarchives.gov.uk/ukgwa/20190919100903mp_/https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010001/EN010001-005088-4.14%20-%20Annex%20%20-%20Construction%20Method%20Statement%201.pdf</a>	NA
6	Planning permission for K28 stockpiles.	Teamcenter	<b>Reference - 101074080</b>



## 2 CONSIDERATIONS FOR LIGHTING

### 2.1 Environmental

Nearby residents and bats are sensitive to light emissions, these 'receptors' are identified in Figure 1 and Figure 2. Receptors include ecological mitigation areas (most importantly the dark corridor at Green Lane) and the boundary of the site (in particular the southern boundary Bum Brook, Benhole Lane, including the bat house, and the foreshore). Residential properties (particularly those close to the southern boundary in Shurton) could also be affected by light spill from HPC construction work activities. Lighting into all areas of the site will be designed and implemented to minimise impacts to these sensitive receptors.

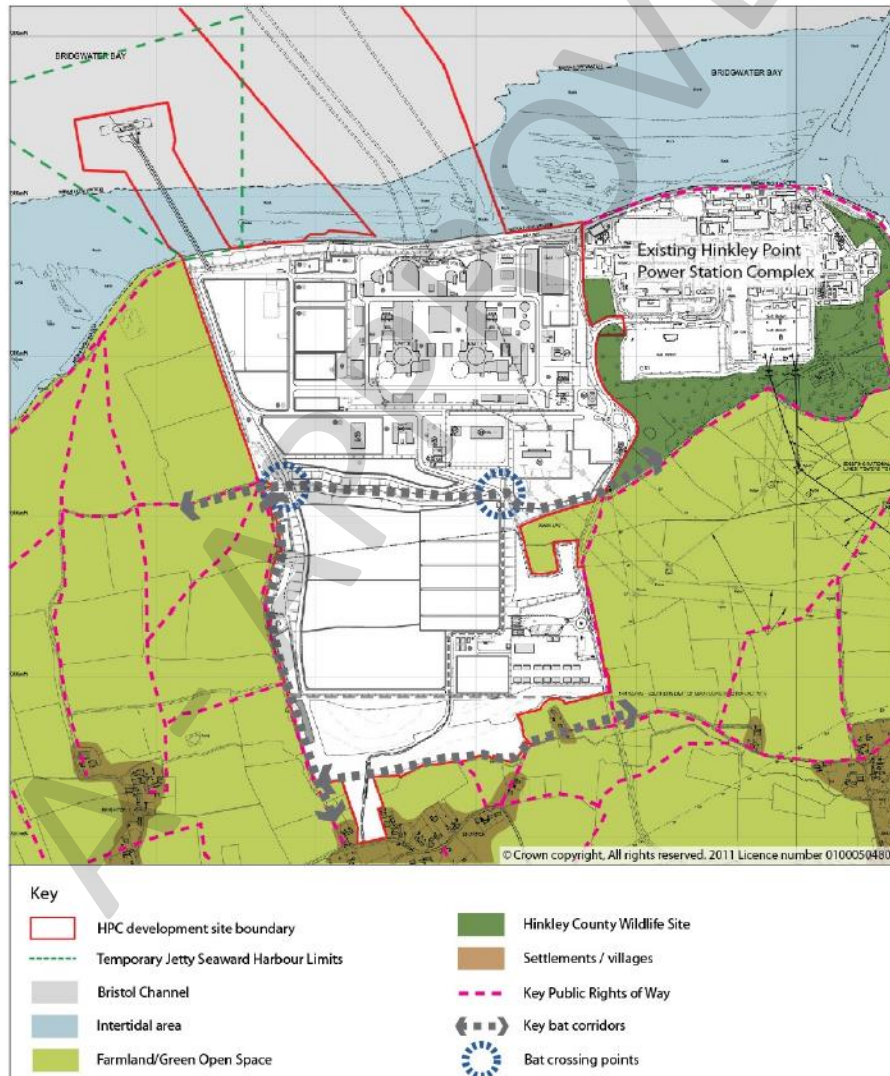
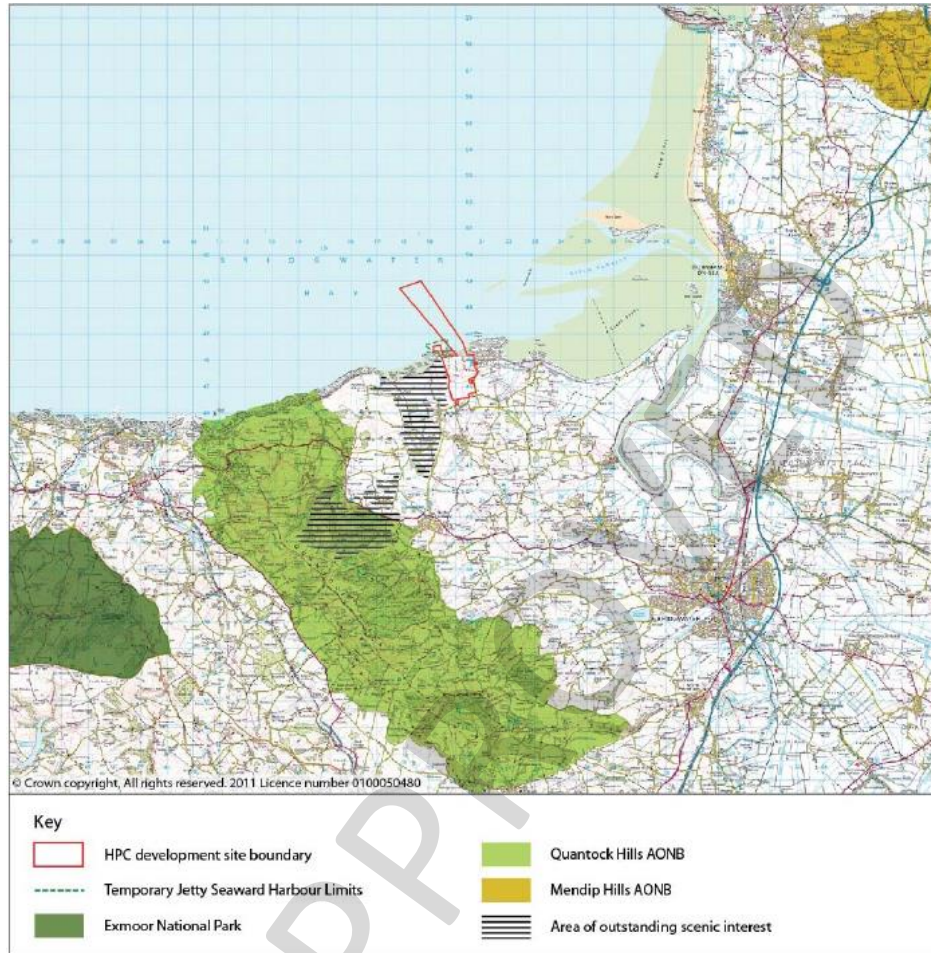


Figure 1: Key Local Lighting Receptors [5]





**Figure 2: Key Lighting Receptors (Wide Site Context)**

## 2.2 Safety

The working hours (24 hours a day, seven days a week) and nature of the works mean that lighting is needed to ensure construction activities can be carried out safely. In general, the following principles shall be followed:

- suitable and sufficient lighting shall be provided in every place of work and every traffic route, so far as reasonably practicable, by natural light.
- The 'colour' of artificial lighting provided shall not adversely affect or change the perception of any sign or signal in place for the purposes of health and safety.
- Suitable and sufficient lighting shall be provided in any place where there would be a risk to the health or safety of any person in the event of failure of primary artificial lighting.

- The table below gives average illuminance and minimum measured illuminance for different types of work (Health and Safety Executive 2013, Guidance on Lighting).

General Activity	Typical locations/types of work	Average illuminance Lux (lx)	Minimum measures illuminance
Movement of people, machines and vehicles. <sup>1</sup>	Lorry parks, ecological corridors, circulation routes	20	5
Movement of people, machines and vehicles in hazardous areas; rough work not requiring any perception of detail. <sup>1</sup>	Construction site clearance, excavation and soil work, docks, loading bays, bottling and canning plants	50	20
Work requiring limited perception of detail. <sup>2</sup>	Kitchens, factories assembling components, potteries large	100	50
Work requiring perception of detail. <sup>2</sup>	Offices, sheet metal work, bookbinding	200	100
Work requiring perception of fine detail. <sup>2</sup>	Drawing factories assembling offices, electronic components	500	200

Notes:

- Only safety has been considered, because no perception of detail is needed and visual fatigue is unlikely. However, where it is necessary to see detail to recognise a hazard or where error in performing the task could put someone else at risk, for safety purposes as well as to avoid visual fatigue the figure should be increased to that for work requiring the perception of detail.
- The purpose is to avoid visual fatigue; the illuminance will be adequate for safety purposes. Recommended lighting levels for a wide variety of situations are contained in the CIBSE Code for Interior Lighting 1994. (See Reference/Further Details)

### 3 CONSTRUCTION ZONE LIGHTING REQUIREMENTS

The HPC construction site has been divided into several lighting zones, as illustrated in Appendix A. A description of the lighting and control measures at each HPC construction zone is summarised in the following subheadings. Notwithstanding this, reference should be made to the detailed information on the lighting requirements outlined within the Construction Lighting Strategy technical requirements (Ref: 5).

#### 3.1 Zone A – Permanent development construction area

To meet the challenging engineering requirements, Zone A must be very well lit, and would be characterised by various illumination levels. Illumination in this area may be 24 hours a day, and light spill onto neighbouring areas should be minimised by using available light control measures.

In addition to task lighting the permanent construction development area will comprise a number of tower and mobile cranes which will be equipped with lighting.

### 3.2 Zone B – K5a and K5b (Jetty, Concrete Batching Plant, Laydown area)

Lighting in this area should be limited to the task lighting required to provide an appropriately lit and safe environment to undertake operations in Zone B.

The following control measures will apply in this area:

- Column heights to be less than 8m;
- Light levels to be between 5 and 50 lux to be determined by the task undertaken, except for short duration operations where a higher level of 100 lux may be applied;
- Design features should utilise features which minimise obtrusive light;
- Lighting to be aligned to avoid upward light and light spill onto sensitive areas.

### 3.3 Zone C – Contractors' areas

Exact lighting specifications should conform to the standard control / mitigation measures in Section 3.2.

The Contractor's areas are divided into 3 zones, and have distinct lighting requirements:

C1 – located North of Green Lane	Due to the proximity to Green Lane, light spill must be prevented from entering the Green Lane area.
C2 – located South of Green Lane. Includes K28 extension	Due to the proximity to Green Lane, light spill must be prevented from entering the Green Lane area. Including additional compound on K28 extension.
C3 – located South of Green Lane	No additional controls apply.

### 3.4 Zone D – NG Substation area

Lighting in this area should be limited to the task lighting required to provide an appropriately lit and safe environment to undertake operations in Zone D.

The following control measures will apply in this area:

- Column heights to be less than 8m;
- Due to the anticipated working hours, it is envisaged that the use of mobile lighting towers would be necessary during winter months only;
- Design features should utilise features which minimise obtrusive light;
- Lighting to be aligned to avoid upward light and light spill onto sensitive areas, especially Green Lane.

### 3.5 Zone E – Green Lane Crossings

Due to the presence of a key bat migration corridor in this area, lighting should only be used where necessary.

If required, low-level, cowled lighting can be used to encourage the bats to fly over the heavy haul road crossings, however it is important that the extent of Green Lane is maintained as a dark corridor.

The following control measures will apply in this area:

- Column heights to be a minimum of 1m below the level of the bat gantry;
- Design features should utilise features which minimise obtrusive light;
- Lighting to be aligned to avoid upward light and light spill onto sensitive areas, especially Green Lane.

### 3.6 Zone F – Stockpiles South of Green Lane

No permanent lighting will be installed in this area, although some task lighting may be required for specific operations, lighting columns will not exceed 8m, lamps with lower UV emissions will be used to assist minimising light spill.

Additional control measures must conform to those in Zone B.

Zone F now includes the K28 extension construction compound; Upon the use of this compound, lighting shall be directed downward and inward to reduce the risk of light spillage towards sensitive receptors outside the compound.

### 3.7 Zone G – On-site mitigation areas

Task lighting is prohibited in these areas, except during the construction of the Southern Landscape area where the following additional controls would apply:

- Lighting to be used only between 07:00 and 23:00, and not at all on Sundays and Bank Holidays.
- Task lighting in this area must conform to those in Zone B.

### 3.8 Zone H – On-site accommodation campus

Upward light spill is to be minimised and light distribution cut offs from campus luminaires do not result in severe lighting contrast on light receiving surfaces such as floors and walls. All luminaires, lamps, optics and equipment is to be specified and located to minimise any direct upward light component in order to reduce light pollution. In addition, light trespass and light spill will be minimised. The following additional controls apply:

- The lighting columns at the perimeter of the accommodation campus (Zone H, Appendix A) would typically be 5m high and equipped with 45 W lanterns. Lighting in



the middle section of this zone could vary from LEDs mounted on 0.9m columns up to 90W lanterns mounted on 8m columns.

- The operational design criteria for the external lighting stipulate a minimum lighting level of 1 lux horizontal and vertical illuminance, to ensure that the CCTV cameras can operate effectively and maintain efficacy of the site security.
- Areas of parking, roads, amenity, and football pitches would require lighting in accordance with standards and specific design guidance. Further details are provided in the Construction Lighting Strategy (Ref: 5).

### 3.9 Zone I – Green Lane

Green Lane is to be maintained as a dark corridor. It is possible that light spill from Zone B may impact on Green Lane, however this is to be kept to a minimum through design and use of the control measures outlined in Section 3.2.

If light spill into Green Lane is considered to be excessive then further mitigation measures would be required.

### 3.10 Zone J – Security Fence

Lighting around the perimeter fence would have the following controls applied:

- Column heights to be self standing and typically 4m in height;
- Light levels to be restricted to 10 lux except in Security work areas (for example the MEP) where lighting should be limited to 20 lux;
- Design features should utilise features which minimise obtrusive light;
- Lighting to be aligned to avoid upward light and light spill onto sensitive areas;
- Lighting to be positioned to minimise light spill outside the perimeter fence – particularly in the areas adjacent to the Southern Landscape area.

### 3.11 Zone K – Roundabouts on the C-182

The site entrances and associated roundabouts on the C-182 will have lighting installed to Highways specification. In particular, the following controls will be applied:

- Column heights to be no higher than the existing highway illuminations (8m);
- Light levels to be restricted to 20 lux;
- Design features should utilise features which minimise obtrusive light;
- Lighting to be aligned to avoid upward light and light spill onto sensitive areas.

### 3.12 Temporary Jetty

During operation of the jetty flood lighting would be required for safe vessel movement. Off-shore lighting would consist of navigational lights, lighting around the jetty head, and lighting on the jetty itself. The standard control measures in Section 3.2 will apply to lighting required for the temporary jetty.

## 4 CONTROL / MITIGATION MEASURES FOR TEMPORARY LIGHTING

No light spill shall occur within 15 metres of the Ecological Onsite Mitigation Areas (Areas E, G and I in Appendix A) or the boundary of the Development site, with the target being a minimum of 25m where practicable.

In conjunction with the Guiding Principles during preparation works document in Appendix B, the following measures shall be implemented:

- Lighting shall only be used where and when required, ie. during natural light limiting times of the year/day (typically in the early mornings and evenings during November-February) and at locations which demand it in order to provide a safe working environment.
- Contractor Risk Assessments and Method Statements (RAMS) shall be reviewed prior to works commencement by the HPC environment team to ensure compliance with this strategy.
- Use design features that limit obtrusive light.
- Implement the HPC Sustainability Plan to reduce the energy requirement, through connecting to the mains, utilising renewable energy technologies (such as solar or wind) or low energy technologies (such as LEDs). Only if these options are not available shall fossil fuel energy be used.
- Light shall be directed downwards and away (using shields, baffles, cowls, etc.) from all residential properties and ecological sensitive areas (ie. hedgerows, bat corridors, ecological mitigation zones, boundaries of the site and the foreshore). The direction of light shall follow that indicated within the purple areas on the drawing attached as Appendix A.
- No lights shall be placed in or angled onto any dark green shaded areas as shown on Appendix A, except in exceptional circumstances or where it is agreed to in advance by NNB.

Details, including positions of temporary lights, shall not be provided when the lights are sited within the purple areas and angled towards the centre of the site as shown on Appendix A. Should lighting be required outside of the site boundary shown on Appendix A (other than in exceptional circumstances), then information (including the number of lights, location of the lights and duration of the lights being used) shall be provided to NNB, in advance of the temporary lights being brought into use.



- In the event of exceptional circumstances arising, temporary lights shall be used anywhere on site where the exceptional circumstance occurs (including to areas outside of the site boundary shown on Appendix A).
- The height of the lighting columns will be a maximum height of 8 meters.
- Lamp types for temporary lighting shall be either low or absent UV content (for example, LED or low UV Ceramic Metal Halide).
- Light brightness level shall be kept to the minimum required level to achieve a safe working environment – not exceeding the lux levels stated in the Table within Section 2.2 of this strategy, for the type of work activity referenced.
- In the event of a light pollution complaint being received relating to work activities being undertaken on the HPC site, the HPC Site Environmental Team shall undertake an investigation of work activities to determine if the complaint a) relates to work activities associated with the HPC project and b) if the temporary lighting deployed conformed to the requirements of this Lighting Strategy, responses to complaints received shall comply with the requirements of approved complaints handling procedure.

## 5 MONITORING AND REVIEW

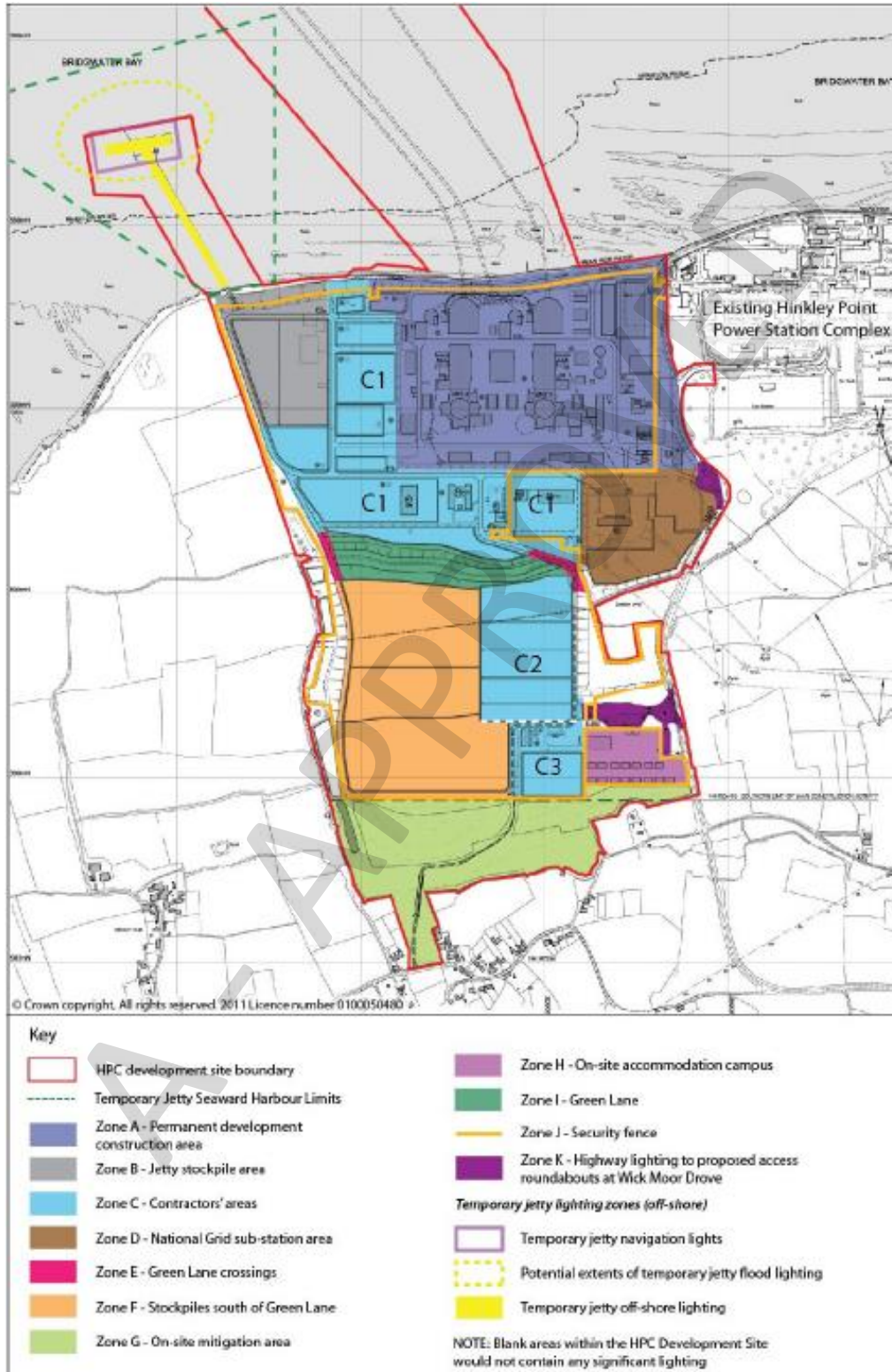
In order to ensure compliance with the strategy, an assessment at the time of the light set up shall be made to determine whether or not further mitigation measures are required. Routine inspections of the lighting arrangements will be conducted by the HPC Site Environment Team. A review of the monitoring information shall indicate if any improvements can be made to any of the lighting arrangements.

The contractor must report any incident or observation to NNB. For all lighting incidents/observations, the NNB Environment & Sustainability Manager/Lead should also be informed. The incident/observation must also be reported via the NNB Reporting Tool, as soon as possible as per reporting requirements.

The NNB Reporting Tool will be used to monitor incidents and corrective actions. Corrective actions will be based on trends in reliability and analysis of the nature of reported faults.

Further monitoring will be conducted by the Site Controls team to ensure compliance with DCO requirements at intervals set out in the Development Consent Order Planning Conditions Compliance document [5].

## APPENDIX A TEMPORARY LIGHTING REQUIREMENTS DRAWING



**APPENDIX B GUIDING PRINCIPLES FOR CONTRACTORS (100750780)**

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Template NNB-PCP-TEM-000126 V 5.0  
Parent document UKX-NNBPCP-XX-000-SPE-000005

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HPC-NNBPCP-XX-000-REP-000166

**Guiding Principles For Contractors- Final****HPC Guidance Note: Artificial Lighting Requirements at HPC During Site Preparation Works**

The ecological mitigation areas (most importantly Green Lane) and the boundary of the site (in particular the southern boundary, Benhole Lane, including the bat house, and the foreshore) support environmental receptors and residential properties which could be significantly affected by light spill from EDF HPC construction work activities. Therefore, planning permission for Site Preparation Works was granted subject to specific planning conditions designed to mitigate the impact of both temporary and permanent lighting of the site. Comparable conditions will apply to the Development Consent Order.

The introduction of lighting into all areas of the site will, therefore, need to be carefully considered and designed prior to installation (to minimise both point source and cumulative affects). Particular attention will need to be paid in the vicinity of sensitive environmental receptors and residential properties.

The general principles (refer also to drawing HPC-NNBPCP-XX-000-DRW-000234) which the Contractor should use to guide them in designing the lighting for their work sites, access routes, compounds and storage areas are as follows. This guidance note covers both onshore and offshore environments. In the event that there is a conflict between the requirements set out as mitigation for ecology and those required to satisfy Health and Safety this will be managed through collaborative efforts between EDF and its contractors.

**Health and Safety considerations**

General guidance is available within the Approved Code of Practice on the Workplace Regulations, whilst more detailed considerations can be found in HS (G) 38 Lighting at Work. In general:

- Every place of work and approach thereto and every traffic route shall be provided with suitable and sufficient lighting, which shall be, so far as is reasonably practicable, by natural light.
- The 'colour' of artificial lighting provided shall not adversely affect or change the perception of any sign or signal provided for the purposes of health and safety.
- Suitable and sufficient secondary lighting shall be provided in any place where there would be a risk to the health or safety of any person in the event of failure of primary artificial lighting
- Implement a suitable maintenance and monitoring regime that will ensure that you remain compliant with these principles.

The table below gives average illuminance and minimum measured illuminance for different types of work.

Figure 1- Average illuminance and minimum measured illuminance for different types of work

General Activity	Typical locations/types of work	Average illuminance lux (lx)	Minimum measured illuminance lux (lx)
Movement of people, machines and vehicles <sup>1</sup>	Lorry parks, corridors, circulation routes	20	5
Movement of people, machines and vehicles in hazardous areas; rough work	Construction site clearance, excavation and soil work, docks, loading bays,	50	20

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Template: 100178899

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Revision: 11

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General Activity	Typical locations/types of work	Average illuminance lux (lx)	Minimum measured illuminance lux (lx)
not requiring any perception of detail <sup>1</sup>	bottling and canning plants		
Work requiring limited perception of detail <sup>2</sup>	Kitchens, factories assembling components, potteries large	100	50
Work requiring perception of detail <sup>2</sup>	Offices, sheet metal work, bookbinding	200	100
Work requiring perception of fine detail <sup>2</sup>	Drawing factories assembling offices, electronic components, textile production	500	200

Health and Safety Executive 2013, Guidance on Lighting  
Notes

<sup>1</sup> Only safety has been considered, because no perception of detail is needed and visual fatigue is unlikely. However, where it is necessary to see detail to recognise a hazard or where error in performing the task could put someone else at risk, for safety purposes as well as to avoid visual fatigue the figure should be increased to that for work requiring the perception of detail.

<sup>2</sup> The purpose is to avoid visual fatigue; the illuminances will be adequate for safety purposes. Recommended lighting levels for a wide variety of situations are contained in the CIBSE Code for Interior Lighting 1994. (See Reference/Further Details)

### Environmental considerations

- The energy hierarchy (below) should be taken into account in the design and operation of lighting:
  - Minimise energy requirement- either through avoiding the need for artificial lighting (i.e. where it is safe to do so, minimise the inclusion of features which require greater lighting for example stairways, steps or sharp corners) or through the use of low energy technologies such as LEDs (preferably emitting light within the 590-600nm wavelength range<sup>1</sup>).
  - Connect to the site mains supply- this is the most energy and cost effective power source on site.
  - Where the site mains supply is not available, alternative sustainable energy sources should be employed- this includes, for example, stand alone wind turbines or photo voltaic panels.
  - Where the above options are not feasible, fossil fuel powered energy sources can be utilised (e.g. diesel generators)
- Lighting should be directed away from all residential properties, ecological mitigation areas, boundaries of the site and the foreshore (where possible, taking into account the need to light the jetty and marine work areas).
- All lighting within 50m of the ecological mitigation areas and the boundary of the site will be subject to the strictest design controls to ensure that light spill is kept to the minimum possible within current technological limits.
- Set lighting back from the ecological mitigation areas and the boundary of the site by a minimum of 25m (where practicable).
- The use of lights with a low or absent UV content should be employed across the site.
- Strict adherence to the principles set out in the HPC Lighting Strategy for Site Preparations Works (November 2010). A summary of these are:
  - Consider type of lamp to minimise UV content (general);
  - Manage light spill (using shields, baffles and cowls etc) to avoid obtrusive light;
  - Height of lighting columns to be considered to reduce risk of light spill;

<sup>1</sup> NB: This provision is specifically designed to minimise impacts to bats. This specification for LEDs will therefore be more stringently anticipated in lighting closest to the ecological mitigation areas and the boundaries of the site.

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- Lighting levels to be kept to the minimum required to achieve a safe working environment; and
  - Control of lighting to ensure light is only provided when required.
- A completely dark corridor through the centre of the Green Lane ecological mitigation area must be maintained with minimised light spill into the adjust buffer zone (i.e. the rest of the Green Lane ecological mitigation area). Dark is taken to mean no-more than (+/- 5% variance) the lux levels recorded at Headweir House environmental monitoring station (approximately 1lux). The dark corridor is taken to mean 5m either side of hedgerows that bound Green Lane (from the base of each side). Similarly, dark corridors will be maintained along Benhole Lane, at the bat house and along Bum brook.
- Lighting within 250m of the foreshore, or to illuminate a foreshore or marine environment work area, will be kept to a minimum and at a constant level i.e. lighting will not flicker, come on and off with movement and remain (as far as possible) in a fixed/static position.

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