WRITTEN REPRESENTATION FOR SPR EA1N and EA2 PROJECTS (DEADLINE 1)

LIGHT POLLUTION

Interested Party: SASES **PINS Refs:** 20024106 & 20024110

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Summary

1. Whilst we acknowledge that light pollution will be worse during the construction phase than the operational phase, "Obtrusive Light" from the projects in this rural, dark night sky location, with residential homes (sensitive receptors) in some cases less than 300 metres from the site, will threaten:

   - the natural environment (flora and fauna)

   - human health

   - the aesthetic enjoyment of the night sky

2. If consent is granted, then the following mitigations MUST be put in place:

   - The Code of Construction Practice must include an Artificial Light Emission Plan which is agreed with the local planning authority prior to Development Consent being granted, not as described in the draft Development Consent Order (DCO) as "prior to the commencement of the works"

   - Working Hours during construction must be tightly controlled, and be reduced from those outlined in the Applicant's Development Consent Order (DCO) and to lessen the impact of light pollution especially from September to March. Weekday 07.00 to 19.00 and Saturday 07.00 to 13.00 working hours and occasional 24 hour working days are not acceptable. The following should be agreed 08.00 – 16.00 hours weekday, no weekend or bank holiday working and no extensions to be guaranteed if the developer's works fall behind schedule.

   - The mitigation measures listed in paragraph 13 below must be adopted.

Impacts of light pollution

3. Since 2006 artificial light has been included on a list of possible 'Statutory Nuisances in England and Wales'[i]. This law makes "exterior light emitted from premises so as to be prejudicial to health a nuisance and a criminal offence". This ruling confirms research, which acknowledges the ecological and physiological impacts of 'obtrusive light'.

<u>Effect on natural environment and biodiversity:</u>

4. If granted consent the proposed development will be built on prime agricultural land supporting a range of wildlife (including 4 setts of badgers, bats, owls, great crested newts

and adders). The skies are populated by extensive birdlife some native eg skylarks, lapwing, blue tits, great tits, long-tailed tits, greenfinches, chaffinches, blackbirds, rooks, woodpeckers, buzzards, barn and little owls and migratory birds including swifts, swallows and nightingales. This is a concern too due to Friston's proximity to RSPB Minsmere and the birds' flight paths. Birds can be blinded by glare or lured by artificial lights, such lights dramatically affect migratory birds especially those that travel overnight: bats, insects, plants, fish are all affected by excess light. Bats are common in the village of Friston, artificial lighting is thought to increase the chances of predation; illuminating a bat roost can cause disturbance[ii] and this may result in the bats deserting the roost. In addition the associated flight path to and from the access point is just as valuable and vulnerable as the roost itself. Severing a key flight path some distance from the roost could cause desertion in its own right. Artificial light can also affect the feeding behaviour of bats: the attraction that light from certain types of light sources has to a range of insects and the presence of lit conditions posing a barrier to movement. (The Bat Conservation Trust Guidance note 08/18:Bats and artificial lighting in the UK gives extensive information on this issue. This document states that "if any of the following habitats occur on site, and are adjacent to or connected with any of these habitats on or off site, it is possible that the newly proposed lighting may impact local bat populations: woodland or mature trees, hedgerows and scrub, ditches…, buildings pre 1970s). Their work 'Light Pollution as a Biodiversity Threat' [iii] recognised the threat of light pollution on biodiversity through changed night habits, such as reproduction and migration, of insects, amphibians, fish, birds, bats and other animals. Light pollution, they noted, also distorts the day-night cycle of plants.

5. The cumulative effect of the energy projects which are in line for the area surrounded the proposed substation(s) site mean that the wildlife will not just be affected during a construction period of 8 years but much longer if consent is granted for further energy projects. Furthermore the Applicant's DCO Schedule 11 pages 113-115 lists the important hedgerows which will be removed and those that will be crossed using a reduced working width and is then followed by information on the removal and trimming of trees that will take place. It is clear wildlife will be impacted beyond that of light pollution.

Human Health

6. An article in National Geographic[iv] stated "…excess light we dump into the environment is endangering ecosystems by harming animals whose life cycles depend on dark ….. also endangering us by altering the biochemical rhythms that normally ebb and flow with natural light levels."

7. Research[v] details serious effects light pollution ie "obtrusive light" has on human health:

- it disrupts human circadian rhythms
- impacts on human melatonin levels (the brain hormone which resets the body's biological clock)
- and contributes to sleep disorders.
  These rhythm disruptions can result in insomnia, depression, cancer (especially breast) and cardiovascular disease. In 2012 the American Medical Association recognized light at night as a carcinogen and health risk.

The Aesthetic Enjoyment of the Night Sky:

8. Light pollution obscures views of the Milky Way. The aesthetic enjoyment of the night sky has been joined in recent years by a growing awareness of the potential effects of artificial light on human health.[vi]

9. CPRE – the Countryside Charity, believe that “darkness at night is one of the key characteristics of rural areas and it represents a major difference between what is rural and what is urban. Security lights, floodlights … all break into the darkness and create a veil of light across the night sky”. It too acknowledges the increasing awareness of the impact that light pollution can have on wildlife, by interrupting natural rhythms including migration, reproduction and feeding patterns. “Manmade light is known to cause confusion to migrating birds, often with fatal outcomes”. [vii]

Impacts on Friston

10. Friston is particularly sensitive to light pollutionis unsuitable for the development of substation(s) in the context of light pollution because the proposed development:

- **will have significant light pollution** given the “dark skies” of the present rural environment both during construction (particularly at construction compounds) and operation. During operation there will be security and car park lighting which even if “movement sensitive” will be frequently triggered by wildlife.

- **Friston and the areas along the cable route are prized for their dark skies** although not designated as a Dark Sky Site, Friston, and the local areas are locally prized for their dark skies and are just 11 miles away from two of the only three Dark Sky Discovery Sites in Suffolk: Westleton Common and Haw Wood Farm, the third, Walberswick, being 16 miles away. All three enable people to view the Milky Way with the naked eye, but this can only happen in darker rural areas. Light pollution will most definitely impact on the dark night skies resulting in the loss of this important asset and, as referred to above, will be detrimental to the well-being of residents and have an adverse effect upon the visitors to the surrounding areas who come specifically to enjoy the views of the night skies.

- **is too close to peoples’ homes** (several being Grade II listed buildings) and the Grade II* listed church. Lives and the health of residents in the village will be severely impacted, research indicates that exposure to artificial light at night can negatively affect human health increasing risks for obesity, depression, diabetes, sleep disorders and cancer. The site boundaries are only metres from homes in the village, including properties where there are elderly residents and children, this is unacceptable. The Applicant only identifies the ‘perceived anxiety’ of residents as a risk to human health! Wavelengths of LED lights which are popular with developers as they are cheaper than previous alternatives and result in less energy usage, are harmful to both humans and animals and are known to impact more dramatically than lights emitting in other parts of the spectrum. Additionally ‘percieved anxiety’ is still anxiety and a serious mental health issue.

Mitigation

11. If the Examining Authority grants consent to the Applicant to build the proposed development at Friston, the following matters must be addressed.

<u>Policy</u>

12. Measures outlined in EN-1 [viii] should be adhered to including:

- Paragraph 5.6.1 which acknowledges that “during the construction, operation and decommissioning of energy infrastructure there is potential for the release of a range of emissions such as odour, dust, steam, smoke, artificial light and infestation of insects.

All have the potential to have a detrimental impact on amenity or cause a common law nuisance or statutory nuisance under Part III, Environmental Protection Act 1990". Paragraph 5.6.2. states that "because of the potential effects of these emissions and infestation, and in view of the availability of the defence of statutory authority against nuisance claims … it is important that the potential for these impacts is considered".

- Paragraph 5.6.3 which states that in the area of dust, odour, artificial light, smoke, steam and insect infestation "that for energy NSIPs, some impact on amenity for local communities is likely to be unavoidable. The aim should be to kept impacts to a minimum, and at a level that is acceptable".
- Paragraph 5.6.7 says that "The Infrastructure Planning Commission (IPC) should satisfy itself that:

    - an assessment of the potential for artificial light, dust, odour, smoke, steam and insect infestation to have a detrimental impact on amenity has been carried out; and that
    - at all reasonable steps have been taken, and will be taken, to minimise any such detrimental impacts.

- Paragraph 5.6.9 states that "Where it believes it appropriate, the IPC may consider attaching requirements to the development consent, in order to secure certain mitigation measures".
- Paragraph 5.6.10 states that "In particular, the IPC should consider whether to require the applicant to abide by a scheme of management and mitigation concerning insect infestation and emissions of odour, dust, steam, smoke and artificial light from the development. The IPC should consider the need for such a scheme to reduce any loss to amenity which might arise during the construction, operation and decommissioning of the development. A construction management plan may help codify mitigation at that stage.
- Paragraph 5.6.11 outlines mitigation measures which may include one or more of the following:
    - **engineering**: prevention of a specific emission (in this case light pollution) at the point of generation; control, containment and abatement of emissions if generated;
    - **lay-out:** adequate distance between source and sensitive receptors; reduced transport or handling of material; and
    - **administrative:** limiting operating times; restricting activities allowed on the site; implementing management plans.

<u>Mitigation Measures</u>

13. The following mitigation measures be put in place.

- **There must be a reduction in working hours** so that residents are not impacted by 24 hour a day works needing lighting, and, especially during the winter months, the planned 12 hour a day works are shortened. The National Planning Policy Framework 2019, unfortunately makes little reference to lighting with regard to the control of obtrusive light, but it does state: "c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation".

- **The Applicant's proposed 'Operational Artificial Light Emissions Plan' and any other substation developers must conform to published standards and guidance**

for lighting eg Commission Internationale De L'Eclairage (CIE) documents[ix] which would support mitigation of aspects of intrusive lighting.

- **Any developer working on the proposed development and any other/later projects at the site** must conform to all British Standards in relation to the lighting of roads, places of work and the methods of measuring lighting performance.

- **The Local Authority must work with the Applicant and any other developer throughout the construction and working stages, in accordance with the Clean Neighbourhoods and Environment Act 2005 (CNEA),** to ensure that no light emitted from the proposed works constitutes as a statutory nuisance. [x]

- **The Local Authority must specify, to any developer working on the project, the 'environmental zone'** which incorporates the proposed development, ie. E1 would constitute a Natural zone with a dark lighting environment (eg relatively uninhabited rural areas, National parks, Areas of Outstanding Natural Beauty, IDA buffer zones), E2 would constitute a Rural zone with low district brightness (sparsely inhabited rural areas, village or relatively dark outer suburban locations). The environmental zone identified would enable the recommended 'Maximum values of vertical illuminance on properties' both Pre and Post-curfew, the 'Limits for the luminous intensity of bright luminaires Pre and Post Curfew, the 'Maximum values of upward light ratio (ULR) of luminaires', the 'Maximum permitted values of average surface luminance (cd/m2)' and the 'Maximum values of threshold increment and viewing direction in paths of travel' to be identified.

- **Obtrusive Light (whether visible from residents' homes or impeding the view of the night sky) and Sky Glow** must be substantially mitigated, there must be a guarantee of no light spill and no light intrusion causing a 'nuisance' to others and adversely affecting fauna and flora.

- **Light sources (lamps/LEDs) must be those which combat the problem of obtrusive light.** "Most night-time visual tasks are only dependent on light radiated within the visual spectrum. It is therefore not necessary for light sources to emit either ultra-violet or infra-red radiation (unless specifically required to do so). Research indicates that light from the blue end of the spectrum could have important adverse effects on fauna and flora". [xi] The blue light spectral power of the light source should be considered by SPRs designers with the needs of the task balanced with its impact on the environment including fauna and flora. Low temperature LEDs and compact fluorescents should be used. Outdoor fixtures should use longer-wave LEDs rather than bright-white lights which would limit the impact on light sensitive animals.

- **The Applicant, and any other developer on the proposed project, must thoroughly assess the use of the area by bats** (before artificially lighting in the vicinity of a bat roost or where bats may commute or forage). They must ensure that Natural England are fully aware of the full assessment any impacts and appropriate mitigation has been considered within any mitigation licence applications. The Local Authority must also ensure that its duty to ensure impacts upon legally protected species are avoided.

- **The Applicant must choose luminaire with the right optical distribution at the right mounting height** which is critical to minimizing light spill and the effects of obtrusive lighting effects. To minimize sky glow the Applicant must factor atmospheric conditions (eg humidity, clouds, atmospheric pollution etc.) in their design. The use of luminaires with asymmetric optics designed so that the front glazing is kept at or near parallel to the surface being lit, if correctly aimed, should ensure minimum obtrusive light.

- **Installation height should be that which keeps glare to a minimum** – the main beam angle of luminaires directed towards a potential observer should be no greater than 70 degrees. Shields must be used on all lighting to minimize light spill and minimize glare. All lighting must have 3000k colour temperature or below. "In rural areas the use of full horizontal cut off luminaires installed at 0 degree uplift will, in addition to reducing sky glow, help to minimize visual intrusion within the open landscape". [xii]

Comments on the Applicant's response to Relevant Representations on Light Pollution

14. The Applicant's response to the Relevant Representations [xiii] **does not eliminate any fears or anxieties people** have over the effect of light pollution.

15. Light Pollution is not mentioned in its section on Human Health – page 47ff.

16. Table 14 No 01 page 75: the Applicant's response to 'Lighting During Construction' merely re-states the working hours as outlined in the draft DCO concluding "These construction working hours will ensure that the length of the construction period is kept to a minimum." These include:

    - 24 hour working needing constant lighting for landfall trenchless operations
    - 24 hour lighting required along the on-shore cable route for trenchless technique operations and security lighting at Construction Consolidation Sites (CCS)
    - periods of 24 hour construction requiring task related flood lighting at the substation site

    and then further states the Artificial Light Emissions Plan, based on the Outline CoCP (APP-578) will only be submitted to the local planning authority prior to the commencement of the works!

17. Table 14 No 02 page 76: 'Lighting During Operations' re-states information found in the Applicant's Project Description Chapter 6.7.8.14 (APP 054) that "… some periods of 24 hour construction will be required, for which task related flood lighting will be necessary". They go on to say that their EA1 N and EA2 substation(s) would also require "security lighting around the perimeter fence of the compound, to allow CCTV coverage, possibly motion sensitive; car park lighting, possibly motion sensitive, and task related repair/maintenance flood lighting will also be necessary". It re-states that an Operational Artificial Light Emissions Management Plan would be developed and submitted to the local planning authority for approval in accordance with the requirements of the draft DCO (APP-023). Only at this point will the plan detail any sensitive receptors and describe the measures to minimise lighting which will be implemented, including lighting requirements, positioning and hours of operation, alongside any monitoring and reporting which might be required! **If consent is granted for the development these details and the Management Plan must be agreed prior to any consent being given to the Applicant.**

18. The Applicant has indicated that the construction of the project will require several years activity with 07.00 – 19.00 working. There is no acknowledgement in their documentation that this will require extensive use of artificial lighting between the months of September and March leading to light pollution from mast mounted illumination powered by generator sets. Evidence from the EA1 programme show near permanent use of similar lighting at Construction Consolidation Compounds. Aerial photographs of the comparable substation at Bramford, show extensive use of photo floodlight distributed about the site. The Applicant has only given a weak assurance that there will be no permanent use of floodlighting at the

substation site at Friston, citing use of PIR control of the sources. No such assurances are given for the construction phase which may last as much as 8 years. In addition to this, the proposed National Grid substation(s), would have "a security perimeter fence which would require lighting for access and inspection of equipment and task related flood lighting for repair/maintenance activities". There is no detail about the type of lighting this would be!

19. It is important to note that there are key differences between the Bramford and Friston sites which emphasise that there will be a greater effect from light pollution at Friston: Bramford was an existing substation location, so construction was not turning agricultural land into an industrial space and residential dwellings were further away from the construction site, whereas at Friston some residential properties are less than 300 metres away and Friston village itself is much closer to the Applicant's site than Bramford was. As a result the effect of lighting on wildlife, humans and the dark skies will be greater at the Friston location.
20. Table 14 No 03 page 77: "Impact of Lighting on Dark Skies" would indicate that the Applicant is only concerned with the skies around the AONB and is not aware of the dark skies that exist around the substation site at Friston and the effect this will have. It would seem that Dark Skies are exclusive to AONB sites! Information found in this table acknowledges:

    - the tranquillity of the AONB area will be affected by lighting during the construction of the on-shore cable route
    - that there will be a change in the special qualities of the AONB due to the trenchless technique during construction at landfall
    - that as the substation site is outside the AONB so construction lighting will have no significant effect!

21. Table 14 No 4 page 78 "Impact of Lighting on Animals" clearly acknowledges that lighting will impact on wildlife. The Applicant's response merely refers to the 'Outline Landscape and Ecological Management Strategy' (APP-584) as to various mitigation measures to reduce the impact from construction lighting. These include:

    - visual screening to minimise noise, light and disturbance on identified breeding birds
    - the closure of badger setts identified in the onshore construction footprint and the creation of artificial setts and a protection buffer zone of 30 metres around all setts outside the construction footprint using directional task lighting
    - temporary lighting to be designed with the Bat Conservation Trust (BCT) Bats and Artificial Lighting UK Guidance (2018)
    - lighting limited to permitted construction times in low light conditions, lower level security lighting at selected locations, and where possible, dark corridors provided.

22. The Applicant assures that these measures will be secured within an Artificial Light Emissions Management Plan based on the outline CoCP (APP -578), however, if consent is to be granted **this Plan should be submitted and agreed by the local planning authorities prior to consent being granted and not as the Applicant states "prior to the works commencing".**

23. In conclusion, the Applicant states that an 'Operational Artificial Lights Emissions Management Plan' will be developed for the final design of the permanent infrastructure as secured under the requirements of the draft DCO (APP-023). We ask that, if consent is to be granted, this **Operational Artificial Lights Emissions Management Plan be submitted by the Applicant and be agreed by all relevant parties prior to and development consent being given.**

References:

[i] Section 102 of the Clean Neighbourhoods and Environment Act 2005
[ii] Downs et al 2003
[iii] Holker, F.; Wolter, C.; Penkin, E.K. and Tockner,K)
[iv] April 3rd 2019
[v] eg Joshua Filmer April 8th 2013: Futurism.com
[vi] "Contrasting trends in light pollution across Europe based on satellite observed night time lights" 2014: Bennie, J.; Davies, T.W,; Duffy, J, P.; Inger, R.; and Gaston, K.J.
[vii] nightblight.cpre.org.uk
[viii] The Department of Energy and Climate Change document: "Overarching National Policy Statement for Energy (EN1) of July 2011"

[ix] CIE 150:2017 and CIE 126 – 1997
[x] Guidance Sections 101 – 103 of the CNEA 2005 by DEFRA
[xi] Guidance notes for the reduction of obtrusive light 2020, Institute of Lighting Professionals
[xii] Guidance notes for the reduction of obtrusive light 2020, Institute of Lighting Professionals
[xiii] Applicant Comments on Relevant Representations Volume 2: individual Stakeholders –June 2020