EAST PARK ENERGY

East Park Energy

EN010141

Environmental Statement
Volume 1 – Main Report

Chapter 10: Noise and Vibration

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Environmental Statement
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Chapter 10: Noise and Vibration

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10.0 NOISE AND VIBRATION

10.1 Introduction

10.1.1 This chapter of the Environmental Statement (ES) presents the findings of an assessment of the likely significant environmental effects of the Scheme with regard to noise and vibration.

10.1.2 The chapter describes the methods used to assess the effects, the baseline conditions that currently exist, the potential future baseline in the vicinity of the Site, and the potentially affected Noise Sensitive Receptors (NSR). The chapter also sets out direct and indirect likely significant effects arising from the construction, operation and decommissioning of the Scheme and provides details of any additional mitigation measures required beyond those which have been embedded into the design of the Scheme.

10.1.3 The assessment includes:

- A description of the existing sound environment;
- An outline of the likely evolution of the future baseline sound levels;
- An identification of construction / decommissioning and operational activities that may cause noise effects;
- Predictions of noise and vibration levels during the construction / decommissioning and operational phases upon the nearest NSR;
- Predictions of noise impacts for the construction and decommissioning of the grid connection; and
- Likely residual significant effects taking account additional mitigation

10.1.4 **ES Vol 1 Chapter 2: The Scheme [EN010141/DR/6.1]** provides a description of the Scheme setting out the Order Limits, the design parameters, the key components of the operational development, and the construction, operational and decommissioning phases of the works.

10.1.5 This chapter is supported by the following appendices in **ES Volume 2 [EN010141/DR/6.2]**:

- **ES Vol 1 Appendix 10-1: Noise and Vibration Terminology [EN010141/DR/6.2]**;
- **ES Vol 1 Appendix 10-2: Baseline Noise Survey [EN010141/DR/6.2]**;
- **ES Vol 1 Appendix 10-3: Construction Plant Data [EN010141/DR/6.2]**;
- **ES Vol 1 Appendix 10-4: Noise Contour Mapping – Operational Phase [EN010141/DR/6.2]**; and
- **ES Vol 1 Appendix 10-5: Low Frequency Noise Analysis and Sample Plant Frequency Spectra [EN010141/DR/6.2]**.

10.1.6 This chapter is supported by the following figures in **ES Volume 3 [EN010141/DR/6.3]**:

- **ES Vol 3 Figure 10-1: Noise Monitoring Positions and NSR [EN010141/DR/6.3]**.

10.1.7 For reference, **ES Vol 2 Appendix 10-1: Noise and Vibration Terminology [EN010141/DR/6.2]** provides details of the technical terms used within the chapter along with a chart illustrating typical everyday noise levels to assist with understanding noise levels in terms of decibels (dB).

Statement of Competence

10.1.8 This chapter has been prepared by Noise and Vibration Consultants Ltd (NVC) who have over 40 years' experience in the field of industrial and environmental acoustics. The lead author holds a Masters' Degree in Acoustics and is a Member of the Institute of Acoustics, Member of the Association of Noise Consultants, Member of the Academy of Experts, and an Incorporated Engineer.

10.2 Legislation, Policy and Guidance

Legislation

10.2.1 Statutory legislation with regards to the control of noise and vibration is provided for by the following Acts:

- Control of Pollution Act 1974 (Part III Noise: Control of noise on construction site); and
- Environmental Protection Act 1990 (Part III Statutory Nuisances).

Policy

National Policy

10.2.2 The following National Policy Statements set out national planning policies in relation to nationally significant solar photovoltaic generation developments:

- Overarching National Policy Statement (NPS) for Energy (EN-1)[1];
- NPS for Renewable Energy Infrastructure (EN-3)[2]; and
- NPS for Electricity Networks Infrastructure (EN-5) [3]

10.2.3 The National Planning Policy Framework (NPPF)[4], and the accompanying online Planning Practice Guidance (PPG)[5] Noise guidance (July 2019) are also important and relevant considerations.

10.2.4 In addition, the Noise Policy Statement for England (NPSE)[6] is relevant to this assessment.

10.2.5 Relevant national policies from the above documents are summarised in Table 10.1.

Table 10.1 – Summary of National Planning Policy

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
NPS EN-1	Paragraph 5.11.15	Developments should contribute to and enhance the natural and local environment by preventing new and existing developments from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.	An assessment of the effect of the Site operation on the existing noise climate at NSR is detailed in Section 10.8. The magnitude of impact and the significance of effect are identified in EIA terms.
	Paragraph 5.12.6	Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: a. a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any temporal characteristics of the noise; b. identification of noise sensitive receptors and noise sensitive areas that may be affected;	Paragraphs 10.5.6 to 10.5.9 provides information on the operational noise generating sources. The expert opinion in terms of noise character for the Site plant operation is provided in paragraph 10.8.41. The current evidence indicates tonal noise character is not an issue from inverter and battery storage plant. The peak Low Frequency Noise (LFN) from HV transformers is addressed in paragraphs 10.8.57 to 10.8.59 and **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]**. Sample 1/3 octave band centre frequency spectra from Battery Energy Storage System (BESS), Solar and HV Transformer are provided in **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]** which show no significant tonal character. Paragraph 10.4.2 identifies the different types of receptor. Section 10.6 provides details of the baseline sound levels.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		c. the characteristics of the existing noise environment; d. prediction of how the noise environment will change with the proposed development; i. in the shorter term, such as during the construction period; ii. in the longer term, during the operating life of the infrastructure; iii. at particular times of the day, evening and night (and weekends) as appropriate, and at different times of year. e. an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and quality of life/well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas; f. if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and g. all reasonable steps taken to	Tables 10.26 & 10.27 provide the results of the impact during daytime, night-time and sunrise night-time operations at receptors. Paragraph 10.8.52 concludes that the noise level change to the measured baseline ambient levels at receptors would be a negligible impact and a neutral level of effect in accordance with IEMA guidelines. The assessment of construction noise and vibration is provided within paragraphs 10.8.1 to 10.8.38. The assessment of operational noise and vibration is provided within paragraphs 10.8.39 to 10.8.56. The baseline sound survey was undertaken over a weekday and weekend period as detailed in Section 10.6. Measurements are undertaken under appropriate weather conditions to avoid any change at times of the year. Operational noise has considered daytime, night-time and sunrise operating period as detailed in Tables 10.26 and Table 10.27. Mitigation measures to minimise construction noise levels are provided in Section 10.7. Operational noise controls are highlighted in paragraph 10.7.6 to 10.7.11 which sets out the approach that has been taken within the assessment to establish what would be acceptable in terms of noise generation.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		mitigate and minimise potential adverse effects on health and quality of life	
	Paragraph 5.12.7	The nature and extent of the noise assessment should be proportionate to the likely noise impact	A study area has been defined within which noise effects have been assessed. The nearest receptors to the noise sources are considered which will experience the highest impact as defined in paragraphs 10.6.2 to 10.6.8 and Table 10.17
	Paragraph 5.12.8	Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation.	The noise impact of additional road traffic movement during construction phase works is provided in paragraphs 10.8.9 to 10.8.20. The magnitude of impact would be negligible to slight adverse and a neutral to minor level of effect in EIA terms. Comment on operational road traffic is provided in 10.8.55. The magnitude of impacts during the operational phase would be negligible and a neutral level of effect and therefore not significant in EIA terms.
	Paragraph 5.12.9	Operation and maintenance noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5)	All relevant British Standards have been referenced in the assessment of construction, operation and maintenance, and decommissioning noise. Construction mitigation measures are provided in Section 10.7. Operational noise controls are highlighted in paragraph 10.8.36 to 10.8.37 which sets out the approach that has been taken within the assessment to establish what would be acceptable in terms of noise generation. British Standard BS5228:2009+A1:2014

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies.	(BS5228) and Design Manual for Roads & Bridges (DMRB) LA111 `Noise & Vibration': 2020 are referred to in paragraphs 10.4.3 to 10.4.19 for the assessment of impact and effect and examples of mitigation strategies.
	Paragraph 5.2.13	The Secretary of State should consider whether mitigation measures are needed both for operation and maintenance and construction noise over and above any which may form part of the project application. In doing so the Secretary of State may wish to impose mitigation measures. Any such mitigation measures should take account of the National Planning Policy Framework (NPPF) or any successor to it and the Planning Practice Guidance on Noise	An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures. The requirements of the draft DCO will secure that these outline management plans will be developed into full management plans and implemented.
	Paragraph 5.2.14	Mitigation measures may include one or more of the following: a. engineering: reducing the noise generated at source and/or containing the noise generated b. lay-out: where possible, optimising	An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental**

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose-built barriers, or other buildings. c. administrative: using planning conditions/ obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise limits/ noise levels, differentiating as appropriate between different times of day, such as evenings and late at night, and taking into account seasonality of wildlife in nearby designated sites. d. insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building	**Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures. The requirements of the draft DCO will secure that these outline management plans will be developed into full management plans and implemented.
	Paragraph 5.12.15	The project should demonstrate good design through selection of the quietest or most acceptable cost-effective plant available; containment of noise within buildings wherever possible, taking into account any other adverse	Operational noise controls are highlighted in paragraph 10.7.6 to 10.7.9 which sets out the approach that has been taken within the assessment to establish what would be acceptable in terms of noise generation. An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline**

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		impacts that such containment might cause (e.g. on landscape and visual impacts; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission)	**Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures. The requirements of the draft DCO will secure that these outline management plans will be developed into full management plans and implemented.
	Paragraph 5.12.17	The Secretary of State should not grant development consent unless they are satisfied that the proposals will meet the following aims, through the effective management and control of noise: a. avoid significant adverse impacts on health and quality of life from noise; b. mitigate and minimise other adverse impacts on health and quality of life from noise; and c. where possible, contribute to improvements to health and quality of life through the effective management and control of noise	Section 10.7 provides the embedded mitigation measures and Section 10.9 refers to additional mitigation considerations. Section 10.10 provides conclusion on residual effects and advises no significant noise or vibration effects have been identified. An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures. The requirements of the draft DCO will secure that these outline management plans will be developed into full management plans and implemented.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
	Paragraph 5.12.18	When preparing the Development Consent Order, the Secretary of State should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent. These requirements or mitigation measures may apply to the construction, operation and maintenance, and decommissioning of the energy infrastructure development.	Details of the agreed noise limits with the Environmental Protection Officer (EPO) are provided within paragraphs 10.6.15 to 10.6.16 and Table 10.20 which ensure protection of amenity for receptors during the operational phase. An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures.
NPS EN-3	**Section 2.5** **Section 2.10**	**Consideration of good design for energy infrastructure:** 2.5.1 Section 4.7 of EN-1 sets out the criteria for good design that should be applied to all energy infrastructure. 2.5.2 Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and	Refer to NPS EN-1 above for further detail on design. For example, operational noise controls are highlighted in paragraph 10.7.6 to 10.7.11 which sets out the approach that has been taken within the assessment to establish what would be acceptable in terms of noise generation. In terms of any ecological receptors, we are not aware of any statutory designated sites for nature conservation within approximately 1km of the Scheme and therefore due to the separation distance and predicted noise levels at identified NSR no

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
	Paragraphs 2.10.120 to 2.10.121	effects on ecology and heritage. **Solar Photovoltaic Generation** 2.10.120 Modern solar farms are large sites that are mainly comprised of small structures that can be transported separately and constructed on-site, with developers designating a compound on-site for the delivery and assemblage of the necessary components. 2.10.121 Many solar farms will be sited in areas served by a minor road network. Public perception of the construction phase of solar farms will derive mainly from the effects of traffic movements, which is likely to involve smaller vehicles than typical onshore energy infrastructure but may be more voluminous.	assessment of effects on this type of receptor are deemed to be required. The magnitude of impacts and significance of effects from construction road traffic noise & vibration is detailed and assessed in paragraphs 10.8.9 to 10.8.29. In terms of EIA, the impact magnitude is shown to be a negligible to slight adverse impact and a neutral to minor significance effect and not significant. Section 10.7 provides the embedded mitigation measures with detailed mitigation measures provided in paragraphs 10.7.2 to 10.7.5 for the construction phase activities. An **outline Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** have been provided with the application and contain further detail relating to mitigation measures. The requirements of the draft DCO will secure that these outline management plans will be developed into full management plans and implemented. **ES Vol 1 Chapter 17: Cumulative and In-**
	Paragraphs 2.10.139 to 2.10.142	**Mitigations:** Construction including traffic and transport noise and vibration: 2.10.139 In some cases, the local highway authority may request that the Secretary of State impose controls on the number of	

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
	Secretary of State decision making Technical considerations **Impacts** Paragraphs 2.10.152 to 2.10.153Paragraphs 2.10.161 & 2.10.162	vehicle movements to and from the solar farm site in a specified period during its construction and, possibly, on the routeing of such movements particularly by heavy vehicles. 2.10.140 Where the Secretary of State agrees that this is necessary, requirements could be imposed on development consent. 2.10.141 Where cumulative effects on the local road network or residential amenity are predicted from multiple solar farm developments, it may be appropriate for applicants for various projects to work together to ensure that the number of abnormal loads and deliveries are minimised, and the timings of deliveries are managed and coordinated to ensure that disruption to residents and other highway users is reasonably minimised. 2.10.142 It may also be appropriate for the highway authority to set limits for, and coordinate these deliveries through, active management of the delivery schedules through	**Combination Effects [EN010141/DR/6.1]**considers any potential cumulative effects from construction traffic. The **Construction Environmental Management Plan [EN010141/DR/7.3], outline Operational Environmental Management Plan [EN010141/DR/7.5]** and an **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** would include traffic management plans which will be developed into full management plans and implemented. Refer to NPS EN-1 comments addressed earlier to comply with National Policy requirements in respect of noise and vibration impacts for development. Section 10.10 provides conclusion on residual effects and advises no significant noise or vibration effects have been identified. Paragraph 10.8.55 and 10.8.56 deals with operational traffic and

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		the abnormal load approval process. 2.10.152 The impacts identified in Part 5 of EN-1 and below, are not intended to be exhaustive. 2.10.153 The Secretary of State should consider any impacts which it determines are relevant and important to its decision. 2.10.161 Once solar farms are in operation, traffic movements to and from the site are generally very light, in some instances as little as a few visits each month by a light commercial vehicle or car. Should there be a need to replace machine components, this may generate heavier commercial vehicle movements, but these are likely to be infrequent. 2.10.162 The Secretary of State is unlikely to give any more than limited weight to traffic and transport noise and vibration impacts from the operational phase of a project.	operational vibration which concludes that the magnitude of impact would be negligible and a neutral level of effect and therefore not significant in terms of EIA.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
	Paragraph 2.9.37	Audible noise effects can also arise from substation equipment such as transformers, quadrature boosters and mechanically switched capacitors.	Paragraph 10.5.10 confirms no perceptible tonal character & paragraphs 10.8.41 to 10.8.42 deals with the likely masking of noise character and proposed noise mitigation measures would provide control.
NPS EN-5	Paragraph 2.9.38	Transformers are installed at many substations and generate low frequency hum. Whether the noise can be heard outside a substation depends on a number of factors, including transformer type and the level of noise attenuation present (either engineered intentionally or provided by other structures).	LFN from BESS & Solar plant is dealt with in paragraphs 10.8.57 **to** 10.8.59 and **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]** in accordance with NANR45 guidance.
	Paragraph 2.9.39	For the assessment of noise from substations, standard methods of assessment and interpretation using the principles of the relevant British Standards (for example BS4142) are satisfactory.	Paragraph 10.2.18 confirms the use of BS4142. Paragraphs 10.2.19 to 10.2.21 provides details in respect of the Standard. Table 10.11 provides the assessment of impact using this standard and paragraph 10.6.9 confirms the baseline survey in accordance with BS4142. The Impact conclusion for daytime and night-time operating periods are provided at paragraphs 10.8.47 & 10.8.52 which concludes no significant effects.
	Paragraph 2.9.40	For the assessment of noise from overhead lines, the	Not applicable

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors.	
	Paragraph 2.9.41	For instance, the applicant may use an appropriate noise modelling tool or tools for the prediction of overhead line noise and its propagation over distance, such as an ISO 9613-2 or Technical Report TR(T)94.	Not applicable.
	Paragraph 2.10.9 & 2.10.10	The Applicant must consider the following measures: • the selection of quieter cost-effective plants. In addition, the ES should Include: information on planned maintenance arrangements.	Paragraphs 10.5.8 to 10.5.11 provides detail on plant noise level assumptions for the operational stage. Section 10.7 provides detail of the embedded mitigation measures for the construction phase works. Paragraph 10.7.2 confirms management plans which will include planned maintenance
	Para 2.19 to 2.25	Specifies the long-term vision and aims for noise for Government policy and development. Sets out the concepts of effect of levels of noise and details the aims	

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
NPSE	Para. 187e	Includes aim to prevent new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise.	Paragraph 10.2.7 to 10.2.12 provides detail of the aims of NPSE. Section 10.12 concludes no significant effects would occur.
NPPF	Para. 198	Planning decisions should ensure new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health. In doing so, they should mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life. They should also identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.	Section 10.12 concludes no significant effects would occur. Section 10.11 deals with cumulative effects from other development in the local area. Section 10.12 provides the assessment conclusion which shows no significant effects. Paragraph 10.8.52 concludes that the noise level change to the measured baseline ambient levels at receptors would produce a negligible impact and neutral level of effect in accordance with IEMA guidelines.
	Para 003 to 005	Provides advice on how planning can manage potential impacts in new development. This includes `how noise impacts can be determined', `what are the observed effect levels' and	Tables 10.13 and Table 10.14 provides semantic tables with the impact magnitude and effect level relative to baseline sound levels and increase in ambient sound levels together with the description of effect on the NSR.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		`how can it be established whether noise is likely to be a concern'. This includes a table summarising the noise exposure hierarchy.	Tables 10.26 & 10.27 provide the results of the impact during daytime & night-time operations at receptors, which shows No Observed Effect Level (NOEL) to the Lowest Observable Adverse Effect Level (LOAEL) which concludes `no discernible effect' to non-intrusive effect on NSR.
PPG	Para 006 to 008	Further advice is provided in respect of `what factors influence whether noise could be a concern', `can planning policies include noise standards' and `what factors are relevant if seeking to identify areas of tranquility'.	Table 10.12 provides the impact scale table which provides the observed effect levels. Tables 10.26 & 10.27 provide the results of the impact during daytime & night-time operations at receptors, which shows NOEL to below LOAEL which concludes `no discernible effect' to non-intrusive effect on NSR. Paragraph 10.2.19 to 10.2.21 provides details regarding the use of Standard BS4142. This assesses the measured representative background sound level at each receptor with the predicted highest likely noise level from the Scheme. Table 10.12 provides the assessment of impact using this standard. Table 10.13 provides further assessment methodology to assess any likely change in ambient noise levels at receptors and together with Table 10.12 establishes any likely effects on the existing noise climate including any tranquil areas. The assessment concludes that impacts would be negligible and a neutral level of effect.
	Para. 187e	Includes aim to prevent new and existing development from contributing to,	Paragraph 10.2.7 to 10.2.12 provides detail of the aims of NPSE.

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise.	Section 10.12 concludes no significant effects would occur.

Noise Policy Statement for England

10.2.6 The Noise Policy Statement for England (NPSE) was published in March 2010. It specifies the following long-term vision and aims:

"Noise Policy Vision: Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This long-term vision is supported by the following aims:

Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life."*

10.2.7 The NPSE introduced three concepts to the assessment of noise, as follows:

- **NOEL – No Observed Effect Level**: This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

- **LOAEL – Lowest Observable Adverse Effect Level**: This is the level above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level**: This is the level above which significant adverse effects on health and quality of life occur.

10.2.8 The above categories are undefined in terms of noise levels and for the SOAEL the NPSE indicates that the noise level will vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research is therefore required to establish what may represent a SOAEL. It is acknowledged in the NPSE that not stating specific SOAEL levels provides policy flexibility until there is further evidence and guidance.

10.2.9 The NPSE indicates how the LOAEL and SOAEL relate to the three aims listed above. The first aim of NPSE requires that: "*significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development*."

10.2.10 The second aim of the NPSE (mitigating and minimising adverse impacts on health and quality of life) refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur, as there may be situations where there is a limit to the effect of mitigation to try and minimise impacts, due to other essential operational requirements.

10.2.11 The third aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development.

Local Policy

10.2.12 The Scheme lies within the administrative boundaries of Bedford Borough Council (BBC) and Huntingdonshire District Council (HDC), with HDC being

a two-tier authority with Cambridgeshire County Council. Planning policy of relevance to the assessment that will be considered includes:

- Bedford Borough Local Plan 2030[7]; and
- Huntingdonshire Local Plan to 2036[8].

10.2.13 Only the relevant local planning policies that are relevant to noise and vibration from the above documents have been included and summarised in Table 10.2.

Table 10.2– Summary of Local Planning Policy

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
Bedford Borough Local Plan 2030	Policy 32	The impact of development proposals should ensure they minimise and take account of the effects of noise.	Paragraph 10.5.6 to 10.5.10 provides detail on plant noise level assumptions for operational stage. Section 10.7 provides detail of the embedded mitigation measures for construction
	Policy 47S	Avoid noise giving rise to significant adverse impacts on health and quality of life or, where appropriate, mitigate and reduce its impact. Development appropriate for their location.	Section 10.12 provides the assessment conclusion which shows no significant effects at NSR.
	Policy 57	Should consider amenity noise impacts from solar energy schemes.	Noise impacts on amenity are dealt with in: PPG: paragraphs 10.2.15 to 10.2.17 and Table 10.3. Section 10.4 provides the assessment methodology, Section 10.7 provides the embedded mitigation measures. Section 10.12 provides the assessment conclusions.
	Policy LP10	The Countryside: `should not give rise to noise, odour, obtrusive light or	Details of the impact on Public Rights of Way (PRoW) are provided in

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
Huntingdonshire Local Plan to 2036		other impacts that would adversely affect the use and enjoyment of the countryside by others'.	paragraphs 10.8.9 and 10.8.34 for construction phase works and paragraph 10.8.53 for the operational phase.
	Policy LP14	Amenity: should ensure `that predicted adverse noise impacts, including internal and external levels, timing, duration and character, will be acceptable'.	Section 10.12 provides the assessment conclusion which shows no significant effects at NSR.
	Para 5.28	Where appropriate should have regard to NPSE.	NPSE considered at paragraphs 10.2.7 to 10.2.12 provides detail of the aims of NPSE. Table 10.3 of PPG provides the noise exposure hierarchy, based on the likely average response and provides the perception, example of outcome, effect and action required relative to noise.
	Policy LP29 Para 7.57	Health Impact Assessment should include noise.	This chapter includes an assessment of noise on human receptors and concludes no adverse or significant adverse effects at receptors. A specific assessment of impacts on human health was scoped out of the ES, as set out in **ES Vol 2 Appendix 4-2: EIA Scoping Opinion [EN010141/DR/6.2]**. A high level assessment of the impacts of the Scheme on human health is provided in **ES Vol 1 Chapter 16: Other Environmental Topics [EN010141/DR/6.1]**.
	Policy LP35 Para 8.52	Renewable and Low Carbon Energy	Any adverse impacts are determined using BS4142 and IEMA guidance. Section 10.12 provides the assessment conclusion

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph	Where addressed in the ES?
		Should identify any adverse impacts on amenity.	which shows no significant effects at NSR.

Guidance

Planning Practice Guidance

10.2.14 On March 6th, 2014, the Government published the National Planning Practice Guidance ("PPG") on noise[9], which provides further information in respect of new developments which may be sensitive to the prevailing noise environment.

10.2.15 The PPG refers to the NPPF and NPSE documents and under the heading 'How to determine the noise impact?' it states: "*Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved."*

10.2.16 The PPG includes a table summarising the noise exposure hierarchy, based on the likely average response. Table 10.3 below provides the perception, example of outcome, effect and action required relative to noise.

Table 10.3: Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level (NOEL)			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect (NOEL)	No Specific Measures Required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect (NOAEL)	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent

British Standards and other Guidance

10.2.17 The following British Standards and other guidance documents are relevant to the assessment of noise and vibration effects:

- BS4142: 2014+A1:2019 `Methods for rating and assessing industrial and commercial sound'[10];
- BS8233: 2014 `Guidance on sound insulation and noise reduction for buildings'[11];
- BS5228: 2009+A1:2014 `Code of practice for noise and vibration control on construction and open sites'[12];
- BS 7445: 2003 `Description and measurement of environmental noise'[13];
- World Health Organisation (WHO) `Guidelines for Community Noise': April 1999[14]
- Night Noise Guidelines for Europe: 2009 – WHO[15];
- DMRB, LA 111 `Noise and Vibration' (formerly HD 213/11) Rev 2: May 2020[16];
- The Institute of Acoustics (IOA) and the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Noise Impact Assessment' 2014;
- ISO 9613-2: 2024 Acoustics – `Attenuation of Sound During Propagation Outdoors';

- Environment Agency – H3 Guidance: Noise and Vibration Management: Environmental Permits (January 2022)[17]; and
- DEFRA NANR45 University of Salford University `Proposed criteria for the assessment of low frequency noise disturbance' Revision 1 – December 2011[25].

BS4142: 2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'

10.2.18 BS4142: 2014+A1:2019 is based on the measurement of background sound using L_{A90} noise measurements, compared to source noise levels measured in L_{Aeq} units. Once any corrections have been applied for source noise tonality, distinct impulses etc., the difference between these two measurements (i.e. known as the 'rating' level) determines the impact magnitude.

- Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact (although this can be dependent on the context).
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact (although this can be dependent on the context).

10.2.19 In order to establish the rating level, corrections for the noise character need to be taken into consideration. BS4142:2014+A1:2019 states that when considering the perceptibility: "*Consider the subjective prominence of the*

character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention."

10.2.20 The subjective method adopted includes the character corrections set out in Table 10.4.

Table 10.4: BS4142: 2014+A1:2019 Character Corrections

Level of Perceptibility	Correction for Tonal Character dB	Correction for Impulsivity dB	Correction for Intermittency dB	Correction for 'Other Character' dB
Not perceptible	0	0	0	0
Just perceptible	+2	+3	0	0
Clearly perceptible	+4	+6	+3*	+3*
Highly perceptible	+6	+9	+3*	+3*

*Standard defines this should be readily distinctive against the residual acoustic environment, it is interpreted therefore to be either clearly or highly perceptible as a character. If characteristics likely to affect perception and response are present in the specific sound, within the same reference period, then the applicable corrections ought normally to be added arithmetically. However, if any single feature is dominant to the exclusion of the others then it might be appropriate to apply a reduced or even zero correction for the minor characteristics

BS8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

10.2.21 BS8233 provides additional guidance on noise levels within buildings. These are based on the WHO recommendations and the criteria given in BS8233 for unoccupied spaces within residential properties.

10.2.22 The guidance provided in section 7.7 of BS8233 provides recommended internal ambient noise levels for resting, dining and sleeping within residential dwellings. Table 10.5 provides detail of the levels given in the standard.

Table 10.5: BS8233: 2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting Dining Sleeping (daytime resting) Study and work requiring concentration	Living Room Dining room/area Bedroom Staff/Meeting Room, Training Room Executive Office	35 dB $L_{Aeq,16hours}$ 40 dB $L_{Aeq,16hours}$ 35 dB $L_{Aeq,16hours}$ 35-45dB $L_{Aeq8hours}$ 35-45dB $L_{Aeq8hours}$	- - 30 dB $L_{Aeq,8hours}$

10.2.23 This standard would be appropriate to apply to existing or proposed residential development. The Site noise contribution should be within the proposed internal noise levels, which would include the following noise limits:

- Living room areas: <=35dB $L_{Aeq,16hours}$ (0700-2300 hours) [equivalent to an external level of approximately 65dB $L_{Aeq,16hours}$ based on typical standard double- glazed units in the closed position and approximately 50dB $L_{Aeq,16hours}$ in the open position].
- Bedrooms: <=30dB $L_{Aeq,8\ hours}$ (2300-0700 hours) [equivalent to an external level of approximately 60dB $L_{Aeq,8hours}$ based on typical standard double-glazed units in the closed position and approximately 45dB $L_{Aeq,8hours}$ in the open position].
- Offices: <=35dB $L_{Aeq,\ 8hours}$ [equivalent to an external level of approximately 65dB $L_{Aeq,\ 8hours}$ based on typical standard double-glazed units in the closed position].

10.2.24 The above internal bedroom limits would comply with sleep disturbance criteria defined by WHO. The WHO night noise guidelines for Europe refers to sleep disturbance limit of 42dB-45dB L_{Amax} for regular peak events within bedrooms (which is approximately 57dB-60dB L_{Amax} external to the bedroom window in the open position).

WHO Guidelines for Community Noise: April 1999

10.2.25 This document provides further updated information on noise and its effects on the community. Within the document for noise 'In Dwellings' it states that

"*To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35dB L_{Aeq}. To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50dB L_{Aeq}. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development*."

WHO (2009) – `Night noise guidelines for Europe'

10.2.26 The WHO regional office for Europe set up a working group of experts to provide scientific advice to the Member States for the development of future legislation and policy action in the area of assessment and control of night noise exposure. Considering the scientific evidence on the thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002/49/EC), an $L_{night,outside}$ of 40dB should be the target of the night noise guidance (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. $L_{night,outside}$ value of 55dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.

WHO 'Environmental Noise Guidelines for the European Region': 2018

10.2.27 The objective of the 'Environmental Noise Guidelines for the European Region' is stated in the Executive Summary of the report: "*The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. Leisure noise in this context refers to all noise sources that people are exposed to due to leisure activities, such as attending nightclubs, pubs, fitness classes, live sporting events, concerts or live music venues and*

listening to loud music through personnel listening devices. The guidelines focus on the WHO European Region and provide policy guidance to Member States that is compatible with the noise indicators used on the European Union's END."

BS 5228-1:2009+A1:2014 `Code of Practice for Noise and Vibration Control on Construction and Open Sites'

10.2.28 BS5228 refers to: "*the need for the protection against noise and vibration of persons living and working in the vicinity of, and those working on, construction and open sites. It recommends procedures for noise and vibration control in respect of construction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners*."

10.2.29 Part 1 deals with noise in terms of background legislation and gives recommendations for basic methods of noise control relating to construction and open sites where significant noise levels may be generated. The guidance is aimed at giving advice on achieving 'best practice' in controlling noise and vibration from construction and open sites. There is an example of noise limits given in Annex E, which sets out cut-off limits between 65dB(A) and 75dB(A), or 5dB(A) above the ambient noise, whichever is the greater. Part 2 of BS 5228 deals specifically with vibration control and provides the legislative background to the control of vibration and recommendations for controlling vibration at source and management controls (e.g. liaison with communities, supervision, preparation and choice of plant etc.).

Environment Agency – H3 Guidance: Noise and Vibration Management: Environmental Permits (January 2022)

10.2.30 As stated within the above guidance, "*Environmental permits have conditions that require operators to control pollution – this includes controlling noise and vibration*".

10.2.31 This guidance covers:

- *"how the environment agencies will assess noise from certain industrial processes*
- *what the law says you must do to manage noise and vibration*
- *advice on how to manage noise – in particular, how to carry out a noise impact assessment and what operators should include in a noise management plan."*

10.2.32 Operators (or permit applicants) must consider the potential noise impact of their site. They may need to carry out noise impact assessments:

- At the permit application stage;
- When applying to vary a permit; and
- To comply with specific permit conditions.

10.2.33 The guidance advises on four steps that are required when carrying out a noise impact assessment, these include:

- Desktop risk assessment – identification of any audible noise plant or operations, identification of NSR, description and ranking of noise sources in terms of potential off-site impact, description of land between site and NSR.
- Off-site monitoring survey – for new development this would relate to a study of the existing baseline sound conditions.
- Source assessment – noise modelling of plant or operations, and if industrial source, using BS4142 and ISO9613 for prediction.
- Best Available Techniques (BAT) or appropriate measures justification – measures to be adopted to avoid unacceptable noise pollution and demonstrate that BAT or appropriate measures would be introduced to prevent, or where that is not practicable, minimise noise impact.

10.3 Consultation and Engagement

Scoping

10.3.1 Scoping of this noise and vibration assessment was undertaken as part of a wider EIA scoping exercise, the findings of which were recorded in **ES Vol 2 Appendix 4-1: EIA Scoping Report [EN010141/DR/6.2]** that was submitted in October 2023.

10.3.2 A Scoping Opinion was received in December 2023 as presented in **ES Vol 2 Appendix 4-2: EIA Scoping Opinion [EN010141/DR/6.2]**. The feedback received from PINS and stakeholders within the Scoping Opinion has been reviewed and the points relating to this chapter are summarised in Table 10.6 below.

10.3.3 Table 10.6 sets out a record of relevant scoping responses.

Table 10.6: Scoping responses with respect to noise and vibration

Consultee	Summary of Comments	Response to Consultation
Planning Inspectorate ID 3.6.1	The Inspectorate notes that vibration from the construction phase is scoped into the ES. However, vibration from construction traffic has been scoped out. Paragraph 12.5.14 of the Scoping Report states that "vibration from HGV movements even when very close to properties does not tend to produce any measurable vibration unless the road condition is very poor, and the intensity of movement is significant." The condition of the road has not been assessed, nor has the anticipated number and type of construction vehicles been provided within this chapter to justify why vibration from construction traffic should be scoped out.	Vibration from construction traffic has been included in the assessment. Comments on construction HGV vibration are presented in paragraphs 10.8.24 to 10.8.26. Studies of measured vibration in close proximity to HGVs on local roads in the UK carried out by the author of this assessment show no significant levels of vibration.

Consultee	Summary of Comments	Response to Consultation
	The ES should provide evidence to confirm that ground-borne vibration generated from HGV movements (including along access routes) during construction and decommissioning would not result in significant effects on sensitive receptors or include an assessment of the LSE, unless otherwise agreed with relevant consultation bodies.	Refer to Appendix 10-3 Construction Plant Data which includes a section on sample test data from vibration measurements from HGVs and other vehicles on local roads and access roads in the UK. The results show no significant vibration levels are likely and no exceedance of nuisance thresholds or cosmetic damage criteria and therefore no significance effect.
Planning Inspectorate ID 3.6.2	The Scoping Report states that the type of equipment present during the operational phase is of a type that does not generate a perceptible level of vibration. The Inspectorate is in agreement that an assessment of operational vibration can be scoped out of further assessment.	Scoped out as no perceptible vibration would occur at NSR. Paragraph 10.4.24 provides comment.
Planning Inspectorate ID 3.6.3	The Applicant proposes to scope out an assessment of decommissioning phase effects as these are likely to be similar or less significant than effects during construction. Limited information is provided regarding the activities proposed for the decommissioning phase. As noted in ID 3.6.1 above, indicative traffic numbers are not Scoping Opinion for East Park Energy 34 ID Ref Applicant's proposed matters to scope out Inspectorate's comments provided for either the construction or decommissioning phases in relation to noise and vibration, and so there is little evidence to support the claim that the decommissioning phase impacts would be less significant than during construction.	Comments are provided in paragraphs 10.8.57 to 10.8.59. When decommissioning occurs, it is reasonable to assume that similar techniques and mitigation measures would be used, and the outcome of the construction phase assessment remains a reasonable proxy for the assessment of decommissioning. Impacts would be expected to be equivalent or less than those associated with the Construction Phase. An **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** has been provided with further detail relating to mitigation measures.

Consultee	Summary of Comments	Response to Consultation
	In the absence of information such as evidence demonstrating that decommissioning activities would not result in noise and vibration effects greater than construction or clear agreement with relevant statutory bodies, the Inspectorate is not in a position to agree to scope these matters from the assessment. Accordingly, the ES should include an assessment of these matters or provide information demonstrating agreement with the relevant consultation bodies and the absence of LSE.	
Planning Inspectorate ID 3.6.4	The Scoping Report does not identify any NSRs within the grid connection route or state that any baseline monitoring would be undertaken within this area. In the absence of information such as a justification as to why LSE would not arise or clear agreement with relevant statutory bodies, the Inspectorate is not in a position to agree to scope this matter out from further assessment. Accordingly, the ES should include an assessment of this matter or provide information demonstrating agreement with the relevant consultation bodies and the absence of LSE.	The grid connection assessment is provided in paragraphs 10.8.25 to 10.8.35. The assessment references the guidance found within BS5228 Part 1 for Noise which sets out specific absolute noise limits (we have used the lowest required limit for daytime operations for robustness) and therefore establishment of baseline levels are not required.
Planning Inspectorate ID 3.6.5	The ES should include a plan based on Figure 12-2 showing the 500m buffer from the noise sources, along with noise contours to confirm how the noise sensitive receptors (NSR) have been determined. A figure should also be provided showing the final study area; the Applicant is advised to seek to agree the	**ES Vol 3 Figure 10-1 [EN010141/DR/6.3]** shows the NSR relative to the overall Site and the location of baseline sound monitoring positions, which were agreed with the Local Planning Authority (LPA) EPO. Noise contours across the Site have been provided in **ES Vol 2 Appendix 10-4 [EN010141/DR/6.2]**.

Consultee	Summary of Comments	Response to Consultation
	study area with the relevant Environmental Health Officers.	
Planning Inspectorate ID 3.6.6	The Scoping Report states that noise data was collected in July and October 2022 and August 2023. The ES should provide confirmation of the dates and whether these dates fell within school holidays. If these dates are within school holidays, then justification is required to confirm why these dates represent a suitable baseline. Further consideration to include another comparative survey data not within school holidays may be required to provide a robust dataset.	The original survey data was undertaken and used to provide indicative levels for design constraints and for review and optimisation of the design. Further detailed surveys outside of school holidays have been undertaken in 2024 which covered a weekend period to cover the lowest likely background sound levels for robustness. Refer to section 10.6 for further information.
Planning Inspectorate ID 3.6.7	Within Section 12.5 of the Scoping Report, vibration is specifically mentioned as being scoped in or out at various stages, however the summary of the scope for the noise and vibration assessment in Table 12.3 does not include reference to vibration. The scope of the ES should be consistent and clear.	The assessment of construction vibration has been included including plant vibration and HGV vibration. Operational vibration is stated at paragraph 10.4.24 as being imperceptible.
Planning Inspectorate ID 3.6.8	The Inspectorate notes that not all of the identified NSRs are subject to noise monitoring in a nearby location. The Applicant should ensure that the noise monitoring provides sufficient coverage across the entire study area to ensure a robust baseline has been assessed. Efforts should be made to agree the noise monitoring locations with the Local Planning Authorities	Baseline monitoring positions were considered to ensure sufficient coverage and positions were agreed with the LPA EPO.
Planning Inspectorate ID 3.6.9	The criteria for assessing the significance of noise and vibration effects should be clearly set out in the ES with reference to established guidance. Consistency with the	The criteria have been clearly set out in the assessment with reference to noise and vibration and cross referencing of noise effect levels as defined in NPSE. Refer to section 10.3 and Tables 10.6 to 10.12.

Consultee	Summary of Comments	Response to Consultation
	Noise Policy Statement for England, the Significant Observed Adverse Effect Level (SOAEL) and Lowest Observed Adverse Effect Level (LOAEL) should be defined for all of the construction, operational and decommissioning noise matters assessed.	

10.3.4 Following receipt of the scoping opinion, the Applicant engaged with the host authorities to agree matters relevant to the noise and vibration assessment.

10.3.5 Under the terms of a Planning Performance Agreement (PPA) between the Applicant, BBC, HDC and Cambridge County Council (CCC), the Councils have a memorandum of understanding that the EPO at HDC can act on behalf of each Council as a 'single voice' with regards the East Park Energy project.

10.3.6 A meeting was therefore held in March 2024 where the following matters were agreed:

- **Proposed Zone of Influence (ZoI)** – Following a review of the ZoI across the Site, the nearest NSR were identified as being representative of the nearest residential properties to the Scheme's associated noise sources. Properties at greater distance than the closest would experience lower noise levels and therefore impacts similar or lower and therefore the NSR with the highest impact is considered. The noise mapping would however extend beyond the NSR for information on predicted noise levels.
- **Proposed baseline sound monitoring and methodology and NSR positions** – The LPA EPO agreed to the baseline monitoring proposals, noise model prediction range, grid connection assessment methodology and proposed noise limit strategy.
- **Noise assessment guidance and standards that would be considered** – The LPA EPO agreed that the list was appropriate.

- **Advice on noise limits and whether the proposed noise limits would be acceptable for the Scheme** – The LPA EPO agreed the proposed noise limits would be acceptable.

Statutory Consultation

10.3.7 Statutory consultation on the project took place between September 2024 and October 2024. This included consultation on the Preliminary Environmental Information Report (PEIR) which contained a preliminary assessment of noise and vibration effects. The feedback received from statutory consultees is summarised within Table 10.7.

Table 10.7 – PEIR consultation responses with respect to noise and vibration

Consultee	Summary of Comments	Response
BBC	4. BBC are support of the detailed comments made by Huntingdonshire District Council (HDC).	Refer to response provided below for the HDC comments.
BBC	5. In respect of the predicted night-time contribution (night-time 23:00 – 05:00 & sunrise night-time 05:00 to 07:00) further justification is required to explain why character correction for site noise should be excluded.	The expert opinion in terms of noise character for the Site plant operation is provided in paragraph 10.8.30. The current technology indicates tonal noise character is not an issue from solar and BESS inverter, transformer and battery storage plant.
BBC	6. Promotor notes that tonality correction should not be applied in terms of tonality from transformers or fan assisted cooling systems, given the separation distance to noise sensitive receptor (NSR). It states that predicted noise levels which are relatively low at NSR and the existing residual sound levels at NSR being much higher (to provide effective masking) any tonal noise is not predicted to be perceptible at the NSR and therefore a tonal character penalty would not be required. BBC do not consider that sufficient justification has been given noting that a tonal sound may be audible if distinctive from the existing residual sound and what components of	The expert opinion in terms of noise character for the Site plant operation is provided in paragraph 10.8.30. The current technology indicates tonal noise character is not an issue from solar and BESS inverter, transformer and battery storage plant. The peak LFN from HV transformers is addressed in paragraphs 10.8.56 to 10.8.58 and **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]**. Sample 1/3 octave band centre frequency spectra from BESS, Solar and HV Transformer are provided in **ES Vol 2 Appendix 10-**

Consultee	Summary of Comments	Response
	sound form that residual sound environment. BBC assume form locality that distance road traffic may be present as well as biphonic environmental sound, e.g. birdsong. However plant noise which will be electrical in nature may emit prominent low frequency sound resulting in a distinctive hum and so is in contrast to the residual sound environment.	**5 [EN010141/DR/6.2]** which show no significant tonal character. As advised above in terms of LFN this has been assessed based on the `worst case' NSR and result show no exceedance of guidance.  Additionally, the EPO agreed noise limits at paragraph 10.6.15 includes the `rating' level as part of the limits, which means that any perceptible noise character at NSR, including tonality, would be included as part of any Site noise assessment and as such provides protection against its existence relative to the representative background sound level.
BBC	7. Similarly, BBC would query whether equipment would have potential to emit any pulsing sound and further subjective description around plant and equipment would be advantageous in supporting the conclusion that adverse impact from this development would be unlikely.	In terms of pulsing sound, the type of plant that generates noise from the solar & BESS plant is not a character that presents itself under witness load tests. The battery storage & battery/solar inverter plant is experienced as a relatively steady state noise source. The author's experience over the last 10-15 years dealing with Solar & BESS shows that the technology is rapidly changing and through research and development noise levels are reducing and mitigation measures improved to control noise character.
BBC	8. BBC would advise that if the site is likely to be associated with emission of low frequency sound which is outside the scope of BS4142, then additional assessment for low frequency noise (LFN) needs to considered and scoped out if not relevant.	The peak LFN from HV transformers is addressed in paragraphs 10.8.56 to 10.8.58 and **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]**. As advised above in terms of LFN this has been assessed based on the `worst case' NSR and results show no exceedance of guidance.
BBC	9. BBC acknowledge that BS 4142 does specify that where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. This appears to have been agreed in methodology with South	Details of the agreed noise limits with the EPO are provided within paragraphs 10.6.15 to 10.6.16 and Table 10.20. It was understood that Huntingdonshire District Council EPO would take the lead on the formal discussion and agreement on methodology and noise limits that

Consultee	Summary of Comments	Response
	Cambridgeshire DC, but no record of this being agreed with BBC.	would be adopted by SCDC and BBC for the purpose of continuity. It was also understood that HDC were in contact with all relevant Council parties in respect of this.
BBC	10. BS 4142 does not define low in the context of background or rating levels and so the assessor should make a judgement and justify where appropriate, for example where sound is regarded as steady and continuous (benign) and absent any correction for character then absolute levels may be relevant. The report does propose a criteria based on emergence above background or absolute levels based on background.	The author's experience over the last 10-15 years dealing with Solar & BESS shows that the technology is rapidly changing and through research and development noise levels are reducing and mitigation measures improved to control noise character. The EPO agreed noise limits, which is detailed at paragraph 10.6.15 and includes the `rating' level as part of the limits, which means that any perceptible noise character at NSR, would be included as part of any Site noise assessment and as such provides protection against its existence relative to the representative background sound level.
BBC	11. Based on predicted levels, BBC would agree with the current assessment of adverse impact being unlikely or negligible, subject to additional detail around character correction and absence of any low frequency components.	The expert opinion in terms of noise character for the Site plant operation is provided in paragraph 10.8.30. The current technology indicates tonal noise character is not an issue from solar and BESS inverter, transformer and battery storage plant. Sample 1/3 octave band centre frequency spectra from BESS, Solar and HV Transformer are provided in **ES Vol 2 Appendix 10-5 [EN010141/DR/6.2]** which show no significant tonal character. As advised above in terms of LFN this has been assessed based on the `worst case' NSR and result show no exceedance of guidance.
HDC	This chapter has been reviewed by the HDC's Environmental Health Officer who has the following comments to make: "We largely agree with the content of Chapter 10 in relation to noise and vibration.	Table 5.6 has been amended but it is important to note that this is the lowest level required and, in the scenario, where the ambient level at NSR is at 65dB or higher, the noise threshold limit would increase up to 75dB. The table heading has been

Consultee	Summary of Comments	Response
	In relation to the Main Report p10-21, Table 10.6 – "Construction Time Period LOAEL and SOAEL" – we would prefer the threshold to be a single figure rather than a range of dB values, and would prefer the lowest value. Section 10.6.15 identifies the noise limits derivation method as agreed, however, Table 10.18: "NSR Locations" lists the "Baseline Noise Location and Background dB" as a range of dB values but we would prefer to use the single lowest value rather than the highest value when transposing to Table 10.29 "NSR Noise Limits" on p10-50."	changed to the `lowest threshold level'. Table 10.18 gives a range of background sound levels as the range refers to different times of the day (i.e. daytime, night-time and sunrise) and so the range is correct. Reference to Table 10.29 must actually mean Table 10.19. This shows the relevant background that is relevant to the time of day. Using the lowest value is an incorrect application and misleading in respect of the correct baseline as it need to be applied to daytime and sunrise operating periods.
CCC	The Council is not the statutory consultee for this subject area and so would expect the promoter to consult Huntingdonshire District Council and Bedford Borough Council on this matter regarding the site and any associated infrastructure that falls within the relevant council's boundary. Cambridgeshire County Council would defer to Huntingdonshire District Council and Bedford Borough Council for a detailed response.	Noted

10.4 Assessment Methodology

10.4.1 The significance of effect is a function of the sensitivity or importance of the receiver, or receptor, and the scale or magnitude of the impact. In the case of this assessment, the level of the effect has been determined by reference to existing guidance and standards that are explained in Section 10.2.

10.4.2 Three types of effects at receptors have been identified:

- Residents of existing houses adjacent to the Site who could experience temporary construction plant noise or vibration during the daytime;
- Residents of existing houses who could experience additional temporary vehicle noise during the construction (and decommissioning) phase from the Scheme; and
- Residents of existing houses in proximity to the Site who could experience operational noise during the daytime and night-time.

Construction Phase

Construction Noise

10.4.3 The assessment of construction noise uses the methodology presented in the Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration guidance. This document sets out the requirements for assessing, reporting and management of environmental effects, specifically from the changes in noise and vibration from construction, operation and maintenance projects.

10.4.4 The DMRB LA 111 guidance provides a means of determining the magnitude of the impact, the observed effect level and the resultant significance of construction noise.

10.4.5 For the prediction of construction noise, the DMRB LA 111 guidance refers to BS5228. For residents of houses that could be exposed to construction noise, BS5228 is therefore considered to be the appropriate standard. This standard requires ‘best practicable means’ (BPM) to be employed to control noise generation.

10.4.6 At this stage it is not possible to identify precise detail of what plant would be required and where it would be sited and for how long. As a consequence, an indicative range of levels of noise and vibration from specific types of task at the closest and most distant approach to the site have been used to calculate the range of highest likely noise and vibration conditions relative to the NSR.

10.4.7 The construction impact semantic scale is set out in DMRB LA 111 and provided in Table 10.6 (i.e. ref. Table 3.12 of LA 111). We have added in column 4 to show the range of threshold levels for ease of reference, which is referred to in column 3 of Table 10.6 and taken from BS5228 Annex E.3.2. The threshold level is determined by measuring typical ambient noise at the NSR and comparing this with three threshold limits between the stated range (e.g. daytime weekday would be 65dB, 70dB or 75dB L_{Aeq}). The specific limit for the project is determined by establishing whether the baseline noise level (rounded to the nearest 5dB) at NSR is either lower, equal to or higher than the three limits.

10.4.8 In order to relate the threshold level in terms of an effect level and an impact magnitude, the guidance compares the calculated noise level at the NSR with the measured baseline and the determined threshold limit. For example, if the calculated level is lower than the baseline level then it is considered to be a negligible impact (i.e. below the Lowest Observable Adverse Effect Level LOAEL). If the level is equal to or greater than +5dB above the threshold limit then it is considered to be a major impact (i.e. 5dB or greater than the Significant Observable Adverse Effect Level SOAEL). Table 10.8 provides the relative impact magnitude and how this is defined relative to the construction noise level.

Table 10.8: Construction Time Period – LOAEL and SOAEL

Time Period	LOAEL	SOAEL	Lowest Threshold Level $LAeq_{1hr}$ dB
Day (0700-1900 hours. Weekday and 0700-1200 Saturdays)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table	65

Time Period	LOAEL	SOAEL	Lowest Threshold Level $LAeq_{1hr}$ dB
		E.1 BS 5228-1:2009+A1:2014	
Night (2300-0700 hours)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table E.1 BS 5228-1:2009+A1:2014	45
Evening and weekends (time periods not covered above)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS5228-1:2009+A1:2014 Section E3.2 and Table E.1 BS 5228-1:2009+A1:2014	55

10.4.9 The magnitude of impact for construction noise is outlined in Table 10.9 (as defined in DMRB LA 111). A significant effect would be considered where the threshold level occurred under a Major impact (i.e. above or equal to the threshold level +5dB).

Table 10.9: Magnitude of Impact for Construction Noise

Magnitude of Impact	Construction noise level
Negligible	Below LOAEL
Minor (Slight)	Above or equal to LOAEL and below SOAEL
Moderate	Above or equal to SOAEL and below SOAEL +5dB
Major (Substantial/Severe)	Above or equal to SOAEL +5dB

Construction Road Traffic Noise

10.4.10 According to the DMRB LA 111 guidelines, the magnitude of impact at NSR from construction traffic is set out in Table 10.10. The magnitude of impact is

determined by establishing how much the existing baseline levels would increase by as a result of the temporary activity.

Table 10.10: Magnitude of Impact for Construction Road Traffic Noise

Magnitude of Impact	Increase in Basic Noise Level of Closest Public Road used for Construction Traffic (dB)
Negligible	Less than 1.0
Minor (Slight)	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major (Substantial/Severe)	Greater than or equal to 5.0

10.4.11 As this is a temporary activity, to establish whether a significant effect would occur at the NSR, the activity would have to be equal to or greater than an increase in 3dB and also occur for a relatively long period of time.

10.4.12 According to DMRB LA 111 (ref. paragraph 3.19 of the guidance) the period of time that this would occur is defined below:

"Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1) 10 or more days or nights in any 15 consecutive days or nights;

2) a total number of days exceeding 40 in any 6 consecutive months."

Construction Vibration

10.4.13 In order to establish whether or not vibration generated by vibratory plant used during the construction phase would be significant it is necessary to predict the likely vibration level at the NSR.

10.4.14 The DMRB LA 111 guidance provides a means of determining the magnitude of the impact, the observed effect level and the resultant significance of construction vibration.

10.4.15 In order to relate the threshold level in terms of an effect level and an impact magnitude, the guidance compares the calculated noise level at the NSR with two threshold limits. The first threshold [i.e. 0.3mm/sec Peak Particle Velocity (PPV)] is the level at which vibration is said to be just perceptible and the threshold of LOAEL. At a vibration level below 0.3mm/sec would represent a negligible impact and the second threshold (i.e. 1mm/sec PPV) was set as the level at which construction vibration can be tolerated with prior warning and the threshold of SOAEL. Below this level would be a minor impact. At levels above 1mm/sec and below 10mm/sec PPV would relate to a moderate impact and above 10mm/sec PPV a major impact.

10.4.16 For construction phase vibration the LOAEL and SOAEL is set out in DMRB LA 111 and provided in Table 10.11.

Table 10.11: Construction Vibration LOAELs and SOAELs

Time Period	LOAEL	SOAEL
All time periods	0.3mm/sec PPV	1.0mm PPV

10.4.17 The magnitude of impact for construction vibration, shall be determined in accordance with Table 10.12 (as defined in DMRB LA 111).

Table 10.12: Magnitude of Impact at Receptors

Magnitude of Impact	Vibration Level
Negligible	Below LOAEL
Minor (Slight)	Above or equal to LOAEL and below SOAEL
Moderate	Above or equal to SOAEL and below 10mm/s PPV

Magnitude of Impact	Vibration Level
Major	Above or equal to 10mm/s PPV

10.4.18 As this is a temporary activity, to establish whether a significant effect would occur at the NSR, the activity would have to be equal to or greater than 1mm/sec and also occur for a relatively long period of time.

10.4.19 According to DMRB LA 111 (ref. paragraph 3.34) the period of time that this would occur is defined below:

> *"Construction vibration shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:*
>
> *1) 10 or more days or nights in any 15 consecutive days or nights;*
>
> *2) a total number of days exceeding 40 in any 6 consecutive months."*

Operational Phase

Operational Noise

10.4.20 The assessment considers both string inverters and centralised inverters options (as set out in **ES Vol 1 Chapter 2: The Scheme [EN010141/DR/6.1]**).

10.4.21 Table 10.13 below shows the proposed impact magnitude methodology considering the guidance contained within BS4142: 2014+A1:2019 for plant and vehicle noise within the Site boundary.

Table 10.13: Impact Magnitude Scale – Future Noise against Existing in accordance with BS4142: 2014+A1:2019 (Operational Phase)

Rating Level above Background Noise dB(A) as BS4142: 2014+A1:2019	Description of Effect	Impact Magnitude	PPG Effect Level
-10 to 0	No discernible effect on the receptor	Negligible	NOEL to NOAEL
+0.1 to +4.4	Non-intrusive – Noise impact can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Slight	LOAEL
+4.5 to +9.4	Intrusive – Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate	LOAEL to SOAEL
+9.5 or greater	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life diminished due to change in character of the area.	Substantial	SOAEL
Undefined**	Physically Harmful – Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm.	Severe	UOAEL

Note: The 'rating' level is the difference between the noise contribution from site and the existing background sound level allowing for any adjustments required for noise characteristics (i.e. tonal, impulsive or intermittent noise character). The standard advises that rounding of numbers to one decimal place should relate to levels of 0.5dB or above, which is reflected in the table limits. The impact magnitude scales in Tables 10.12 to 10.13 are used in the assessment of operational noise impacts. *The intrusiveness depends on the context of the residual environment and therefore may fall into SOAEL if background and residual levels are similar. **Difficult to define physical harmful effect as this depends on numerous site-specific factors which may include type and character of noise source, location, human sensitivities, duration and receptor experiences etc.

10.4.22 In order to provide some context of the predicted noise levels from the Scheme (provided in terms of the L_{Aeq} assessment index) relative to the existing residual L_{Aeq} at NSR (i.e. ambient level without the Site in operation), we have provided the semantic table taken from the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment'.

10.4.23 The guidelines set out an example of how changes in noise level may be assessed in terms of residual L_{Aeq}. This assists in determining the impact of Site operational noise relative to the context of the noise climate, which is detailed in Table 10.14.

Table 10.14: Impact Magnitude Scale – General Site Noise

Change in sound levels LAeq dB	Description of Effect	Impact Magnitude	PPG Effect Level
< +2.9	No discernible effect on the receptor	Negligible	NOEL
+3.0 to +4.9 (some receptor sensitivity)	Non-intrusive – Noise impact can be heard but does not cause any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Slight	NOAEL
+3.0 to +4.9 (high receptor sensitivity) +5 to +9.9 (some receptor sensitivity)	Intrusive – Noise impact can be heard and causes small changes in behaviour and/or attitude. Affects the character of the area such that there is a perceived change in the quality of life. Potential for non-awakening sleep disturbance.	Moderate	LOAEL
+5 to +9.9 (high receptor sensitivity)	Disruptive – Causes a material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty getting to sleep. Quality of life diminished due to change in character of the area.	Substantial	SOAEL
+10 and above (high receptor sensitivity)	Physically Harmful – Significant changes in behaviour and/or inability to mitigate effect of noise leading to psychological stress or physiological effects e.g. regular sleep	Severe	UOAEL

Change in sound levels LAeq dB	Description of Effect	Impact Magnitude	PPG Effect Level
	deprivation/awakening; loss of appetite, significant, medically definable harm		

Operational Vibration

10.4.24 Vibration from the type and nature of plant proposed would be imperceptible at close range positions (i.e. within a few metres of the plant) and in view of the separation distance to the NSR, vibration would be not significant. The Planning Inspectorate have agreed that the assessment of operational vibration can be scoped out.

Significance of Effect

10.4.25 To determine the significance of an impact, the magnitude of this impact and the sensitivity of the receptors likely to experience the impact must be determined. For this assessment, the categories presented in Table 10.15 have been adopted.

Table 10.15: Receptor Sensitivity

Receptor Sensitivity	Type of Receptor
High	Dwellings/residential properties including houses, flats, old people's homes, hospitals, schools, churches, caravans and open spaces/conservation areas.
Moderate	Commercial premises including retails and offices etc.
Low	Industrial premises including warehouses and distribution etc.

10.4.26 Based upon the assessment of impact magnitude and the sensitivity of individual receptors, the matrix shown in Table 10.16 has been developed to provide an indication of the possible level of effect for each predicted noise impact. Given that there are many factors which may affect the level of the

effect of an impact, not least, the character of the noise and timescales over which the noise operates, the overall level of effect must be assessed on an individual basis using professional judgement and experience. However, the matrix provides a useful indication of the likely significance.

Table 10.16: Level of Effect Matrix

Impact Magnitude	Receptor Sensitivity		
	High	**Moderate**	**Low**
Severe	Major	Major/Moderate	Moderate/Minor
Substantial	Major/Moderate	Moderate	Minor
Moderate	Moderate	Moderate/Minor	Minor/Neutral
Slight	Minor	Minor/Neutral	Neutral
No significant impact (negligible)	Neutral	Neutral	Neutral

10.4.27 Where a level of effect is defined as Major or Major/Moderate then the effect is likely to be considered significant in EIA term i.e. an impact that is likely to be a key material factor in the decision-making process.

10.5 Assumptions and Limitations

General

10.5.1 The overall approach to the use of the Rochdale Envelope and the parameters that have been assumed for the assessment of likely significant environmental effects arising from the Scheme are set out in **ES Volume 1 Chapter 2: The Scheme [EN010141/DR/6.1]**.

10.5.2 The technology associated with solar and BESS development is advancing rapidly, and it is anticipated that this technological progression will continue at pace over the coming years as current research and development in the manufacturing sector yields new technologies. It is therefore essential to provide a degree of flexibility within the DCO to allow for such changes prior to the detailed design being undertaken, once a contractor is appointed.

10.5.3 The approach that has been taken within the assessment has been to establish what would be acceptable in terms of noise generation as a result of the Scheme relative to existing baseline conditions at the nearest NSR. From this, it has been possible to establish a series of noise limits at the NSR that comply with relevant standards and guidance to protect amenity and sleep disturbance. Compliance with the noise limits would ensure that there would be no adverse impacts and no significant effects at NSR, as a result of the Scheme.

10.5.4 **ES Vol 3 Figure 2-1: Illustrative Environmental Masterplan [EN010141/DR/6.3]** provides a robust approach to the likely final positioning of equipment based upon experience of building similar facilities. This approach has formed the basis of the operational phase noise assessment.

10.5.5 For the avoidance of doubt this approach has not been applied to the construction (and decommissioning) phase assessment on the basis that this temporary phase of work has specific guidance relating to the application of BPM to minimise noise and vibration (i.e. BS5228 Parts 1 & 2). The construction phase mitigation and monitoring measures would be referenced

within a Noise & Vibration Management Plan within an approved Construction Environmental Management Plan (CEMP) for the Site. An **outline Construction Environmental Management Plan [EN010141/DR/7.3]** has been provided which sets out this commitment. In respect of the decommissioning phase, mitigation and monitoring measures would be referenced within a final Decommissioning Environmental Management Plan (DEMP). An **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** has been provided.

Equipment

10.5.6 Both string inverters and centralised inverters have been assessed in the ES. The illustrative layout shown on the **ES Vol 3 Figure 2-1: Illustrative Environmental Masterplan [EN010141/DR/6.3]** shows both string inverters and centralised inverters. In a scenario where string inverters are utilised, the centralised inverters shown on the drawing would not be required. Conversely, in the scenario where centralised inverters are utilised, the string inverters would not be required. In both scenarios the transformers indicated on the drawings would be required.

10.5.7 The assumed source noise levels upon which the assessment has been based and that demonstrate the Scheme would comply with acceptable noise levels at NSR, include the following:

- String inverters would be mounted on the mounting structure underneath the rear of the solar panels would produce a noise level of 75dB $L_{Aeq15mins}$ @ 1m. Associated and separate transformer units housed in containers that also include control equipment, would be distributed throughout the Solar Photovoltaic panel (PV) areas and an assumed sound power level of 67dB(A); and
- Centralised solar inverter units would be co-located with a transformer and the combined skid having a sound power level of 87dB(A). Where required by the noise assessment, an acoustic screen will be provided around the centralised inverters. The acoustic screen will be positioned 2m away from

the centralised inverters and solar transformers, around three sides of the co-located centralised inverters and solar transformers. The maximum height of the acoustic screen will be 4m. It is assumed that six of the units would require acoustic screens. The above measures are set out in the **outline Operational Environmental Management Plan (oOEMP) [EN010141/DR/7.5]**.

10.5.8 The following noise levels have been applied for the East Park BESS and East Park Substation for the noise assessment:

- Battery Storage Units with inverters would be enclosed in containers at a noise level of 67dB $L_{Aeq15mins}$ @ 1m.
- Battery Storage Transformers would be mounted on skids within the BESS area. The noise level for the units would be 71dB $L_{Aeq,15mins}$ @ 1m.
- Auxiliary Transformer would be located within the BESS compound area and assumed to have a sound power level of 90dB(A).
- Substation 400kV transformer assumed sound power level of 95dB(A).

10.5.9 All plant will be designed to ensure no tonal character is perceptible at NSR in accordance with BS4142:2014+A1:2019.

10.6 Baseline Conditions

Data Sources

10.6.1 The following sources of data have been used in order to support and undertake analysis of baseline levels and noise predictions:

i) An initial baseline sound survey was undertaken by NVC Ltd (and the author of this assessment) over 24-hour periods at 16 positions during July 2022 and October 2022 within the western development area of the Site. Further monitoring was carried out during August 2023 at 5 additional positions, within the eastern development area of the Site. This information was used to provide an indication of noise levels across the Scheme to inform the realistic worst-case scenario in which the assessment is based.

ii) To comply with the Planning Inspectorate request to avoid school holiday periods and provide a robust dataset of baseline levels a further detailed survey was undertaken over a weekend period (i.e. Friday to Monday) during March, May and June 2024 to achieve a total of 22 fixed position monitoring locations around the Site at key NSR locations.

Baseline Noise Survey

Noise Monitoring Positions

10.6.2 In addition to the data sources listed above a sound survey has been carried out in the vicinity of the Site to determine the existing representative background sound level (using the L_{A90} index) and the residual sound levels (i.e. ambient noise without the Site in operation, based on the equivalent continuous sound level measurement index L_{Aeq}). The aim of the sound survey was to:

- Identify the existing baseline sound levels for use as a reference for background and residual sound levels in the assessment of impacts relating to the construction and operation of the Scheme;

- Enable the assessment baseline to be established to understand the effects of existing developments on the future baseline; and
- Characterise the NSR or noise sensitive sites.

10.6.3 Following an update to the layout of the Site and review of NSR areas, a number of additional sound surveys were undertaken during March, May and June 2024 over a four-day period including a weekend at a total of 22 monitoring positions spread across the Scheme.

10.6.4 The background sound surveys were carried out in accordance with the advice given in BS4142: 2014+A1:2019 and the methodology agreed with the EPO.

10.6.5 Following consultation with Huntingdonshire District Council EPO, the areas within the Zone of Influence (ZoI) surrounding the Site were examined and the following suitable Noise Monitoring Positions ('NMP's) were identified and agreed. Refer to **ES Vol 3 Figure 10-1: Noise Monitoring Positions and NSR [EN010141/DR/6.3]** for NMP locations.

Table 10.17: Baseline Monitoring Locations

Location	Grid Reference (X, Y)	Description	East Park Site
NMP1: Swineshead Road	506927, 265925	Monitoring in the field to south-east of receptor R1 (40m Swineshead Rd). Noise climate formed by intermittent & regular road traffic & farm fixed plant noise.	Site A
NMP2: Off Swineshead Road	505228, 264254	Monitoring undertaken in the field south-west of receptor R3 (20m Swineshead Rd). Noise climate generally formed by intermittent & regular road traffic noise.	Site A
NMP3: East of Swineshead Rd	505637, 263975	Monitoring in the field to the east of Swineshead Rd (circa 530m). Noise climate generally formed by distant road traffic noise & birdsong.	Site A

Location	Grid Reference (X, Y)	Description	East Park Site
NMP4: Pertenhall	508094, 265127	Monitoring field to west of Kimbolton Rd (circa 220m). Noise climate generally formed by distant road traffic noise & birdsong. Farm activities would occur at certain times of the year.	Site A
NMP5: College Cottage	508326, 264701	Baseline measured at rear of property boundary in field to east. Noise climate generally formed by local road traffic noise & birdsong. Farm activities may occur at certain times of the year.	Site A
NMP6: Pertenhall Road	507997, 263746	Monitoring in field to east of properties off Pertenhall Rd. Noise climate generally formed by intermittent local road traffic noise & birdsong. Farming activities may occur at certain times of the year.	Site B
NMP7: Pertenhall Road	507886, 263536	Baseline measured in field to east of Pertenhall Rd and east of Walnut Tree Farm. Noise climate formed by local road traffic noise. Farm activities may occur at certain times of the year.	Site B
NMP8: Mill Lane	507873, 262617	Monitoring position in field to north of Mill Lane and east of properties off Mill Lane & northwest of Temple Farm. Noise climate formed by distant road traffic noise and birdsong. Farm activities may occur at certain times of the year.	Site B
NMP9: Little Staughton	510098, 262613	Monitoring in field to the north of West End & northeast of The Bungalow. Noise climate generally formed by local road traffic noise and birdsong. Occasional light aircraft noise occurs from the local airfield.	Site B
NMP10: Green End	509463, 263589	Baseline noise levels recorded in the field to the west of Green End & north of Lodge Farm. Noise climate formed by local road traffic noise. Local farm activities may occur at certain times of the year.	Site B

Location	Grid Reference (X, Y)	Description	East Park Site
NMP11: Green End	509859, 263325	Monitoring in the field east of Green End and to the west of Green End Farm. The local noise climate is formed by local road traffic noise. Local farm activities may occur at certain times of the year.	Site B
NMP12: Green End	509708, 263723	Baseline measured in the field to the west of Green End and south of Rectory Farm. The local noise climate is formed generally by local road traffic noise. Local farm activities may occur at certain times of the year.	Site B
NMP13: Little Staughton Road	509630, 264448	Monitoring undertaken In field east of Little Staughton Road and north of The Kangaroo. Noise climate formed in general terms by local road traffic noise and distant dog barking from the local kennels.	Site B
NMP14: Great Staughton Road	510279, 264253	Monitoring in the field west of New Farm and south of Great Staughton Road. Noise climate formed in general by local road traffic noise and birdsong.	Site B
NMP15: Staughton Manor	512458, 264445	Monitoring position located north of Staughton Manor and west of The Town road and south-west of the village of Great Staughton. The local noise climate is generally formed by local road traffic noise and occasional distant farm activities.	Site C
NMP16: Moor Road (North)	513702, 264091	Monitoring of baseline levels to the south of Mill View. The local noise climate is generally formed by local road traffic noise and birdsong. Local farm activities may occur at certain times of the year.	Site C
NMP17: Moor Road (Rushey Farm)	513550, 263534	Baseline monitoring undertaken west of Rushey Farm and to the west of Moor Road (circa 25m from the road). The noise climate formed by local road traffic, birdsong and occasional distant farm activities.	Site C

Location	Grid Reference (X, Y)	Description	East Park Site
NMP18: Moor Road	513548, 263285	Monitoring position located north-east of the property south of Rushey Farm and in the field just north of Moor Road. The noise climate is formed in general by local road traffic noise. Local farm activities may occur at certain times of the year.	Site C
NMP19: Moor Road (South)	513077, 262884	Monitoring position located northwest of Moor Farm Cottages and west of Moor Road. The noise climate is formed generally by local road traffic and birdsong.	Site C
NMP20: Kimbolton Road (20m)	515110, 263506	Baseline monitoring undertaken just south of Wood View property off Kimbolton Road. The noise climate general formed by local road traffic noise off Kimbolton Road.	Site D
NMP21: Kimbolton Road (230m)	515228, 263265	Monitoring position circa 200m south of Kimbolton Road to be representative of Wood Farm receptor further to the southeast. Noise climate formed by distant road traffic noise.	Site D
NMP22: Pastures Farm	541831, 262889	Sound monitoring undertaken in the field to the south of The Cottage located on Pastures Fam. The local noise climate is formed by distant road traffic noise, birdsong and distant farm activities.	Site D

10.6.6 The above monitoring positions represent the nearest NSR to the Scheme in different directions from the Site within the ZoI and as noise levels reduce relative to increasing distance (under normal environmental and assessment conditions) then impacts at other more distant NSR will experience a similar or lower impact.

10.6.7 Although ambient noise levels can vary depending on weather conditions, the purpose of the baseline survey was to monitor sound levels under suitable

weather conditions. This then provides a typical and representative indication of ambient conditions.

10.6.8 In considering that monitoring was undertaken at NSR positions or locations that are deemed to be the closest to Site plant and levels recorded over a weekend period to enable consideration of the lowest likely background sound levels (due to lower road traffic movements) the results represent a robust assessment of baseline levels.

Noise Survey Results

10.6.9 The background sound surveys were carried out in accordance with the advice given in BS4142: 2014+A1:2019 and the baseline methodology was agreed with the EPO and deemed to be a reasonable assessment of representative sound levels at receptors.

10.6.10 The Site is located in a general rural area adjacent to the local road network, residential development within villages and hamlets, local farms and existing solar array development.

10.6.11 The local sound environment is therefore generally formed by a mixture of noise from transport links, occasional farming activities, local residential amenity activities, occasional aircraft noise, and birdsong.

10.6.12 For detail on the NMPs and NSR refer to paragraphs 10.6.2 to 10.6.8.

10.6.13 The results of measurements taken at the NMPs are presented in Table 10.18 and detailed measurements are provided in **ES Vol 2 Appendix 10-2: Baseline Noise Survey [EN010141/DR/6.2]**.

Table 10.18: Baseline Survey Summary Results

Noise Monitoring Position (NMP)	Date	Time Period	Average $L_{Aeq,T}$ dB	Average $L_{A90,T}$ dB	Representative L_{A90} dB
NMP1: Swineshead Road	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	48 39 46	40 36 39	39 37 39
NMP2: Off Swineshead Road	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	55 46 54	44 40 44	43 36 41
NMP3: East of Swineshead Rd	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	50 41 46	38 33 35	35 31 34
NMP4: Pertenhall	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	47 48 49	36 28 33	31 26 32
NMP5: College Cottages	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	46 41 46	38 33 35	36 32 34
NMP6: Pertenhall Road	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	55 41 53	37 30 36	36 29 36
NMP7: Pertenhall Road	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	45 35 42	36 28 33	36 24 33
NMP8: Mill Lane	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	45 37 42	34 26 30	33 24 30

Noise Monitoring Position (NMP)	Date	Time Period	Average $L_{Aeq,T}$ dB	Average $L_{A90,T}$ dB	Representative L_{A90} dB
NMP9: Little Staughton	07/06/24 - 10/06/24	0700-2300 2300-0500 0500-0700	50 45 51	41 32 36	37 29 36
NMP10: Green End	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	46 39 41	33 25 30	32 22 30
NMP11: Green End	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	53 44 48	33 26 30	33 22 29
NMP12: Green End	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	45 44 48	35 26 30	33 23 30
NMP13: Little Staughton Road	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	55 46 49	38 32 35	36 31 36
NMP14: Great Staughton Road	17/05/24 - 20/05/24	0700-2300 2300-0500 0500-0700	52 41 48	30 24 29	30 23 29
NMP15: Staughton Manor	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	48 40 52	40 34 38	40 32 38
NMP16: Moor Road (North)	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	60 49 56	42 33 40	39 30 39

Noise Monitoring Position (NMP)	Date	Time Period	Average $L_{Aeq,T}$ dB	Average $L_{A90,T}$ dB	Representative L_{A90} dB
NMP17: Moor Road (Rushey Farm)	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	54 46 53	45 40 42	42 35 39
NMP18: Moor Road	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	53 43 51	40 33 36	37 31 34
NMP19: Moor Road (South)	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	53 44 52	40 36 39	37 31 39
NMP20: Kimbolton Road (20m from road)	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	58 51 52	49 40 42	48 30 40
NMP21: Kimbolton Road (230m from road)	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	55 48 50	47 39 40	47 32 40
NMP22: Pastures Farm, The Cottage	22/03/24 - 25/03/24	0700-2300 2300-0500 0500-0700	59 51 49	44 38 40	39 35 39

Identification of NSR

Residential Receptors

10.6.14 Following a review of the ZoI across the Site, the following NSR were identified as being representative of the nearest residential properties to the

Scheme associated noise sources. Whilst it is appreciated that this does not cover all NSR, those that are at similar or greater distance than the NSR selected would not receive any greater impact from noise. The noise contour maps in **ES Vol 1 Appendix 10-4: Noise Contour Mapping – Operational Phase [EN010141/DR/6.2]** provide an indication of noise levels at other NSR at greater distance.

Table 10.19: NSR Locations

NSR	Grid Reference X Y	Baseline Noise Location & Background (L_{A90}) dB	NMP
R1: Sunny Farm	506873 266029	Swineshead Rd – 37 to39dB	NMP1
R2: Brook Farm	506125 265817	Swineshead Rd – 37 to39dB	NMP1
R3: Millers Cottage	505350 264436	Swineshead Rd – 36dB to43dB	NMP2
R4: Coldham Cottages	505180 263409	Off Swineshead Rd – 31dB to 35dB	NMP3
R5: Dumpling Lodge	506011 264346	Off Swineshead Rd – 31dB to 35dB	NMP3
R6: Orchard Barn	507840 265037	Green End – 26dB to 32dB	NMP4
R7: Hall Farm	508161 265232	Chadwell End – 26dB to 32dB	NMP4
R8: Chadwell End	508143 265425	Chadwell End – 26dB to 32dB	NMP4
R9: Fuchsia Cottage	508223 265709	Chadwell End – 26dB to 32dB	NMP4
R10: College Cottages	508457 264690	Great Staughton Road – 32dB to 36dB	NMP5
R11: The Grange	507982 263943	Bedford Road – 29dB to 36dB	NMP6

NSR	Grid Reference X Y	Baseline Noise Location & Background (L_{A90}) dB	NMP
R12: The Manor	507815 263747	Pertenhall Road – 29dB to 36dB	NMP6
R13: Walnut Tree Farm	507738 263480	Pertenhall Road – 24dB to 36dB	NMP7
R14: Brook Farm	507613 263165	Pertenhall Road – 29dB to 36dB	NMP6
R15: Mill Hill	507668 262835	Mill Hill - 29dB to 36dB	NMP6
R15A: Mill Lane	507738 262679	Mill Lane – 24dB to 33dB	NMP8
R16: Temple Farm	508111 262512	Mill Lane – 24dB to 33dB	NMP8
R17: The Bungalow	509974 262516	West End – Little Staughton 29dB to 37dB	NMP9
R18: The Lodge	509423 263442	Green End – 22dB to 32dB	NMP10
R19: Green End	509818 263269	Green End – 22dB to 33dB	NMP11
R20: Green End	509963 263258	Green End – 22dB to 33dB	NMP11
R21: Green End Farm	510055 263328	Green End – 22dB to 33dB	NMP11
R22: Spring Hill	510277 263280	Spring Hill, Little Staughton – 22dB to 33dB	NMP11
R23: Spring Hill	510492 262641	West End – Little Staughton - 29dB to 37dB	NMP9
R24: Home Close	509686 263949	Green End, Little Staughton – 23dB to 33dB	NMP12

NSR	Grid Reference X Y	Baseline Noise Location & Background (L_{A90}) dB	NMP
R24A: Rectory Farm	509699 263791	Green End, Little Staughton – 23dB to 33dB	NMP12
R25: The Kangaroo	509732 264305	Little Staughton Road – 31dB to 36dB	NMP13
R26: New Farm	510431 264284	Great Staughton Rd – 23dB to 30dB	NMP14
R27: Newpond Farm	510961 264455	The Town - 23dB to 30dB	NMP14
R28: Gunnersbury Cottage	509284 264994	Little Staughton Road – 31dB to 36dB	NMP13
R29: Manor Farm	511419 264108	Great Staughton Rd – 23dB to 30dB	NMP14
R30: Garden Farm	512135 264201	Off Great Staughton Rd – 32dB to 40dB	NMP15
R31: Staughton Manor	512350 264346	The Town, Great Staughton – 32dB to 40dB	NMP15
R32: Staughton Highway	513090 264441	The Highway, Staughton Highway – 32dB to 40dB	NMP15
R33: Mill View	513692 264183	Mill View, Moor Rd – 30dB to 39dB	NMP16
R34: Rushey Farm	513668 263547	Moor Road – 35dB to 42dB	NMP17
R35: Roman Field Cottage	513634 263253	Moor Road – 31dB to 37dB	NMP18
R36: Moor Farm Cottages	513239 262667	Moor Road – 31dB to 39dB	NMP19
R37: Wood View	515126 263531	Kimbolton Rd (B645) Hail Weston – 30dB to 47dB	NMP20

NSR	Grid Reference X Y	Baseline Noise Location & Background (L_{A90}) dB	NMP
R38: The Cottage	514840 262912	Pastures Farm, Hail Weston – 35dB to 39dB	NMP22
R38A: Wood Farm	515372 262568	Wood Farm, Hail Weston – 32dB to 47dB	NMP21
R39: Bungalow	515510 263087	Kimbolton Rd (B645) Hail Weston – 30dB to 48dB	NMP20
R40: Cancroft	515870 262356	Kimbolton Rd (B645) Hail Weston – 30dB to 48dB	NMP20
R41: High Street	516055 262303	High Street, Hail Weston – 30dB to 48dB	NMP20
R42: Sharps Barn	516621 261619	Kimbolton Rd (B645) Hail Weston – 30dB to 48dB	NMP20

Grid Connection

Residential Receptors

10.6.15 **ES Vol 1 Chapter 2: The Scheme [EN010141/DR/6.1]** details the associated work involved in the connection to the national grid at the Eaton Socon substation. This chapter has given consideration to the likely impacts associated with the installation of the grid connection.

10.6.16 The Scheme would be connected to the Eaton Socon substation via an underground connection that would run from Site D in a south-easterly direction to the substation to the west of Eaton Socon and the A1.

10.6.17 The assessment considers the potentially significant environmental effects associated with construction and decommissioning of the route.

10.6.18 The additional NSR relative to the grid connection would include:

- R43: Duloe Road, Duloe (grid reference: 516605 260569)

- R44: Manor Farm, Duloe (grid reference: 516166 260607)
- R45: Field Farm/Cobholden Farm, off Bushmead Road, Eaton Socon (grid reference: 515653 259252)
- R46: Northfield Road, Wyboston (grid reference: 516126 258333)
- R47: East of Great North Road (Cornwall's Drive, Cunningham Way) (grid reference: 516398 258783 & 516313 259185)

Future Baseline

10.6.19 The Scheme is in a rural environment and it is assumed that the baseline noise data is representative of both current and future conditions at the Site. Any possible future changes such as increases in traffic are unlikely to be perceptible.

10.6.20 Cumulative effects of the Scheme with other emerging developments are assessed separately in Section 10.11 and **ES Vol 1 Chapter 17: Cumulative and Intra-Project Effects [EN010141/DR/6.1]**.

10.7 Embedded Mitigation and Enhancement Measures

Embedded Mitigation

General

10.7.1 The assessment considers the likely realistic worst-case variations to ensure that all foreseeable significant environmental effects of the Scheme are assessed. The design parameters have been clearly defined in sufficient detail to enable the project to evolve and to enable an accurate prediction of resultant noise levels at NSR to be undertaken and provide a good level of confidence in the likely noise contribution to show that no significant effects would occur.

10.7.2 Outline management plans are included with the application for development consent as part of the embedded mitigation measures:

- **outline Construction Environmental Management Plan [EN010141/DR/7.3]**;
- **outline Construction Traffic Management Plan [EN010141/DR/7.4]**;
- **outline Operational Environmental Management Plan [EN010141/DR/7.5]**; and
- **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]**.

Construction Phase

10.7.3 Construction hours for noise generating activity would be limited to 0800-1800 Monday to Friday and 0800-1300 hours on Saturdays. No construction work would be undertaken on Sundays or Bank Holidays. The construction hours would be secured in the DCO.

10.7.4 In accordance with BS5228, BPM would be employed to control the noise generation (e.g. using equipment that is regularly maintained, where practicable use equipment fitted with silencers or acoustic hoods).

10.7.5 In consideration of the likely highest levels of construction noise, the following measures are set out in the **outline Construction Environmental Management Plan [EN010141/DR/7.3]:**

- Restriction of construction hours to non-sensitive times of day;
- Community Relations – where noise levels are likely to impact on existing residual sound levels at receptor positions, this is one of the most important aspects of mitigation, as providing the NSR with clear information about the activities that would be taking place and the length of time that any peak noise levels may occur will assist in allaying people's fears. BS 5228 states "*It is suggested that good relations can be developed by keeping people informed of progress and by treating complaints fairly and expeditiously. The person, company or organisation carrying out the work on site should appoint a responsible person to liaise with the public*.";
- Sensible routing of the construction plant to minimise the effect on NSR (where practicable);
- Use of vehicle sharing for construction workers to minimise vehicle movements to and from Site;
- Careful choice of piling rigs to minimise noise and vibration at NSR (e.g. non-percussive mini piling rigs, hire of fixed plant with acoustic enclosures etc.);
- Ensure all plant is regularly maintained and correctly fitted with effective silencers / any relevant acoustic hoods etc;
- Maximise distance between any significant noise source and NSR locations;
- Plant switched off when not in use;
- Use of boundary hoarding screening when plant is in close proximity to NSR (e.g. where noise sources occur within 50m of residential boundaries) to an appropriate height and location to minimise noise towards sensitive receptors (e.g. 2.4m to 3m height);
- Use of broadband noise reverse alarms (where practicable) on mobile plant; and

- Avoidance of reversing alarm near to NSR.

Operational Phase

Noise Limits

10.7.6 For the purposes of the assessment, noise limits have been identified in relation to specific NSR against which the assessment is undertaken. Following formal consultation with the Local Authority EPO, the following approach to noise limits in order to protect residential amenity and sleep disturbance at NSR has been agreed. These noise limits are in context with BS4142:2014+A1:2019 to ensure noise levels are below an adverse impact and in terms of a `rating' level this protects against perceptible noise character.

- During DAY-TIME (0700-2300 hours): The Site Rating Level (i.e. including any noise character) does not exceed the established representative background sound level by more than +4dB (i.e. below an adverse impact according to BS4142:2019) or 35dB $L_{Aeq,1hr}$ whichever is the higher.
- During NIGHT-TIME (2300-0700 hours): Where representative background sound levels => 35dB L_{A90}, the Site Rating Level should not exceed the representative background sound level by +0dB.
- During NIGHT-TIME: Where representative background sound levels are between 30dB to 34dB L_{A90}, the Site Rating Level should not exceed the representative background sound level by +4dB or 35dB $L_{Aeq,15mins}$ whichever is the lower (for example L_{A90} is 30dB the limit would be 34dB L_{Aeq}, LA90 is 31dB to 34dB the limit would be 35dB).
- During NIGHT-TIME: Where representative background sound levels are <30dB L_{A90} the Site Rating Level should not exceed the representative background sound level by +4dB or 30dB $L_{Aeq,15mins}$, whichever is the higher (for example L_{A90} is 29dB the limit would be 33dB L_{Aeq}, L_{A90} is 25dB the limit would be 30dB).

10.7.7 Based on the above agreed noise limits, the noise limits detailed in Table 10.20 would apply to the identified NSR:

Table 10.20: NSR Noise Limits

NSR	Rating Noise Limits $L_{Aeq,1hr}$ (Daytime 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Night-time 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Sunrise 0500-0700 hrs)
R1: Sunny Farm	43	37	39
R2: Brook Farm	43	37	39
R3: Millers Cottage	47	36	41
R4: Coldham Cottages	39	35	35
R5: Dumpling Lodge	39	35	35
R6: Orchard Barn	35	30	35
R7: Hall Farm	35	30	35
R8: Chadwell End	35	30	35
R9: Fuchsia Cottage	35	30	35
R10: College Cottages	40	35	35
R11: The Grange	40	33	36
R12: The Manor	40	33	36
R13: Walnut Tree Farm	40	30	35
R14: Brook Farm	40	33	36

NSR	Rating Noise Limits $L_{Aeq,1hr}$ (Daytime 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Night-time 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Sunrise 0500-0700 hrs)
R15: Mill Hill	40	33	36
R15A: Mill Lane	37	30	34
R16: Temple Farm	37	30	34
R17: The Bungalow	41	33	36
R18: The Lodge	36	30	34
R19: Green End	37	30	33
R20: Green End	37	30	33
R21: Green End Farm	37	30	33
R22: Spring Hill	37	30	33
R23: Spring Hill	41	33	36
R24: Home Close	37	30	34
R24A: Rectory Farm	37	30	34
R25: The Kangaroo	40	35	36
R26: New Farm	34	30	33
R27: Newpond Farm	34	30	33
R28: Gunnersbury Cottage	40	35	36

NSR	Rating Noise Limits $L_{Aeq,1hr}$ (Daytime 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Night-time 0700-2300 hrs)	Rating Noise Limits $L_{Aeq,15mins}$ (Sunrise 0500-0700 hrs)
R29: Manor Farm	34	30	33
R30: Garden Farm	44	35	38
R31: Staughton Manor	44	35	38
R32: Staughton Highway	44	35	38
R33: Mill View	43	34	39
R34: Rushey Farm	46	35	39
R35: Roman Field Cottage	41	35	35
R36: Moor Farm Cottages	41	35	39
R37: Wood View	52	34	40
R38: The Cottage	43	35	39
R38A: Wood Farm	51	35	40
R39: Bungalow	52	34	40
R40: Cancroft	52	34	40
R41: High Street	52	34	40
R42: Sharps Barn	52	34	40

10.7.8 The design and selection of plant would enable the Scheme to operate within the agreed noise limits.

10.7.9 During the operational phase, equipment will be regularly inspected and checked for signs of disrepair or other problems that are creating an increase in volume or change in tonality. Where complaints are received then these will be investigated, where required by a suitably qualified practitioner working to the latest version of BS 4142, to identify the source of any issue. Where an issue is found action will be taken to resolve it within a reasonable timeframe.

10.7.10 The above measures are set out in the **outline Operational Environmental Management Plan [EN010141/DR/7.5]**. A final OEMP is secured by a Requirement of the **draft DCO [EN010141/DR/3.1]**. This will ensure that there would be no significant adverse effects arising from the operation of the Scheme.

10.7.11 The following measures are set out in the **outline Operational Environmental Management Plan [EN010141/DR/7.5]**:

- Best practical measures will be employed in accordance with BS5228 to control noise generation (e.g. using equipment that is regularly maintained, where practicable use equipment fitted with silencers or acoustic hoods).
- Operational maintenance will take place only during daytime hours, except in emergencies.
- Routing of plant and vehicles will be optimised to minimise noise at sensitive locations.
- Acoustic hoods and silencers will be fitted to noisy plant where required.
- Non-tonal 'broadband noise' reversing alarms will be used instead of tonal beepers.
- Local residents will be informed in advance of any planned noisy maintenance works.

Decommissioning Phase

10.7.12 As set out in the **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]**, a Decommissioning Noise Management Plan (DNMP), which will be prepared as part of, or to accompany the final DEMP. Best practical measures will be employed in accordance with BS5228 (or any subsequent applicable and relevant standard) to control noise generation (e.g. using equipment that is regularly maintained, where practicable use equipment fitted with silencers or acoustic hoods).

10.8 Assessment of Likely Impacts and Effects

Construction Phase

Plant Noise

10.8.1 Typical vehicles, plant and machinery that are assumed to be required during the construction phase will likely include:

- Articulated Lorries;
- Low Loaders;
- Tipper Trucks;
- Concrete Mixer Lorries;
- 40 tonne mobile cranes;
- Fuel Tankers;
- Water Tankers;
- Vacuum Tankers;
- Excavators;
- Telehandlers;
- Push press piling rigs;
- Power generators;
- Vibrating rollers;
- Cable pullers;
- Horizontal Directional Drilling rigs; and
- Skips.

10.8.2 The above noise sources and their associated activities would vary from day to day, may be in use at different stages of the construction period, and for relatively short durations. The noisiest activities are expected to be generated during soil movement, drilling and piling work during the initial stages of construction when excavators, piling rigs, drilling rigs and wheeled loaders or similar may be in use.

10.8.3 The actual noise level produced by construction work would vary at the nearest property boundary at any time depending upon a number of factors including the plant location, duration of operation, hours of operation, intervening topography and type of plant being used (see **ES Vol 2 Appendix 10-3: Construction Plant Data [EN010141/DR/6.2]** for details of the construction plant inventory that has been used to inform the assessment).

10.8.4 Construction works would take place during normal daytime operating hours. The daytime construction activities (i.e. ground preparation works, piling, general works, infrastructure, PV and BESS installation and grid connection works) and associated noise levels are summarised in Table 10.21 and Table 10.23 (further detail relating to the construction plant inventory is provided in **ES Vol 2 Appendix 10-3: Construction Plant Data [EN010141/DR/6.2**), which is based on the ABC method of assessment and library data provided within BS5228 (Annex E.3.2. and Annex C).

Table 10.21: Daytime Construction Noise Predictions at NSR

NSR	Sensitivity of NSR	Approximate Distance Range to NSR (m)	Residual Noise Levels L_{Aeq} dB	Predicted Noise Level range at receptor, $LAeq_{1hr}$ dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R1: Sunny Farm	High	100-2300	48	29-52	65	Slight (Minor)
R2: Brook Farm	High	800-1800	48	23-45	65	Negligible (Neutral)
R3: Millers Cottage	High	700-2600	55	24-35	65	Negligible (Neutral)
R4: Coldham Cottages	High	800-3200	50	24-35	65	Negligible (Neutral)
R5: Dumpling Lodge	High	200-2000	50	23-40	65	Negligible (Neutral)
R6: Orchard Barn	High	100-2200	47	32-58	65	Slight (Minor)

NSR	Sensitivity of NSR	Approximate Distance Range to NSR (m)	Residual Noise Levels L_{Aeq} dB	Predicted Noise Level range at receptor, $LAeq_{1hr}$ dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R7: Hall Farm	High	320-2500	47	20-50	65	Slight (Minor)
R8: Chadwell End	High	320-2600	47	13-50	65	Slight (Minor)
R9: Fuchsia Cottage	High	480-2800	47	13-47	65	Slight (Minor)
R10: College Cottages	High	700-2500	46	24-52	65	Slight (Minor)
R11: The Grange	High	70-2100	55	15-58	65	Slight (Minor)
R12: The Manor	High	140-2100	55	33-56	65	Slight (Minor)
R13: Walnut Tree Farm	High	160-2150	45	32-55	65	Slight (Minor)
R14: Brook Farm	High	370-2200	55	32-48	65	Negligible (Neutral)
R15: Mill Hill	High	300-2200	55	31-49	65	Negligible (Neutral)
R15A: Mill Lane	High	220-2100	45	32-52	65	Slight (Minor)
R16: Temple Farm	High	220-1900	45	31-53	65	Slight (Minor)
R17: The Bungalow	High	120-2200	50	27-59	65	Slight (Minor)
R18: The Lodge	High	35-1200	46	33-64	65	Slight (Minor)

NSR	Sensitivity of NSR	Approximate Distance Range to NSR (m)	Residual Noise Levels L_{Aeq} dB	Predicted Noise Level range at receptor, $LAeq_{1hr}$ dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R19: Green End	High	100-1800	53	33-57	65	Slight (Minor)
R20: Green End	High	100-1900	53	28-60	65	Slight (Minor)
R21: Green End Farm	High	60-2000	53	28-61	65	Slight (Minor)
R22: Spring Hill	High	60-2200	53	25-61	65	Slight (Minor)
R23: Spring Hill	High	400-2200	50	27-49	65	Negligible (Neutral)
R24: Home Close	High	75-1800	45	33-59	65	Slight (Minor)
R24A: Rectory Farm	High	35-1800	45	33-64	65	Slight (Minor)
R25: The Kangaroo	High	60-1800	55	33-64	65	Slight (Minor)
R26: New Farm	High	100-2500	52	23-59	65	Slight (Minor)
R27: Newpond Farm	High	400-2400	52	26-50	65	Negligible (Neutral)
R28: Gunnersbury Cottage	High	470-2000	55	30-46	65	Negligible (Neutral)
R29: Manor Farm	High	150-2000	52	24-55	65	Slight (Minor)
R30: Garden Farm	High	100-1400	48	20-57	65	Slight (Minor)

NSR	Sensitivity of NSR	Approximate Distance Range to NSR (m)	Residual Noise Levels L_{Aeq} dB	Predicted Noise Level range at receptor, $LAeq_{1hr}$ dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R31: Staughton Manor	High	270-1400	48	22-48	65	Slight (Minor)
R32: Staughton Highway	High	600-1400	48	28-47	65	Negligible (Neutral)
R33: Mill View	High	700-2000	60	13-46	65	Negligible (Neutral)
R34: Rushey Farm	High	360-1700	54	12-53	65	Negligible (Neutral)
R35: Roman Field Cottage	High	360-1700	53	12-55	65	Slight (Minor)
R36: Moor Farm Cottages	High	450-1700	53	27-47	65	Negligible (Neutral)
R37: Wood View	High	270-1500	58	34-52	65	Negligible (Neutral)
R38: The Cottage	High	150-950	59	34-55	65	Negligible (Neutral)
R38A: Wood Farm	High	350-1500	55	31-48	65	Negligible (Neutral)
R39: Bungalow	High	600-1700	58	33-46	65	Negligible (Neutral)
R40: Cancroft	High	870-2000	58	29-41	65	Negligible (Neutral)
R41: High Street	High	1200-2400	58	32-39	65	Negligible (Neutral)

NSR	Sensitivity of NSR	Approximate Distance Range to NSR (m)	Residual Noise Levels L_{Aeq} dB	Predicted Noise Level range at receptor, $LAeq_{1hr}$ dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R42: Sharps Barn	High	1800-3000	58	33-35	65	Negligible (Neutral)

10.8.5 The noise of activities during the construction of the site would vary throughout the construction phase and would depend on the particular work being undertaken. The highest noise levels are likely to be created during site preparation, piling, infrastructure activities and the PV installation. At all residential NSR this level of noise would be within the BS5228 threshold values.

10.8.6 The levels of noise, as a result of construction in EIA terms, would range between negligible to slight adverse impact at residential receptors and a negligible to minor effect and therefore not significant.

10.8.7 On the basis of the above predictions and the embedded mitigation measures, the level of noise, as a result of construction, is not predicted to exceed guidance thresholds at residential NSR and would be not significant.

Construction Noise Effects on Public Rights of Way (PRoW)

10.8.8 During the construction phase works noise levels would vary from day to day and at different times and different locations along the PRoW. During some peak noise activity periods, levels along some sections of the PRoW may temporarily impact users, however, given the size of the Site and network of paths, this would be a short transitory experience and additionally, the PRoW can be exposed to other noise sources (e.g. local road network, farming activities, light aircraft movement etc). BPM would be employed in accordance with BS5228 guidance to minimise noise and in consideration of the temporary noise activities the magnitude of impacts are expected to be in

EIA terms a negligible to slight adverse impact and neutral to minor level of effect and not significant. .

Construction Road Traffic onto Local Road Network

10.8.9 **ES Vol 1 Chapter 9: Traffic and Transport [EN010141/DR/6.2]** outlines the potential temporary construction phase activities and the level of staff and HGV traffic that could arise during peak stages of the construction period. The construction delivery hours would be generally limited to 08.00 to 18.00hrs Monday to Friday, and 08.00 to 13.00hrs on Saturday. There would be no construction work on Sundays or Bank Holidays. Where possible, construction deliveries would be co-ordinated to avoid HGV movements during the traditional highway AM and PM peak hours (i.e. 08.00 to 09.00 and 17.00 to 18.00 hours respectively).

10.8.10 Tables 10.22 and 10.23 provides details of predicted highest likely temporary impacts due to the increased traffic flow along the local road network. The ZoI is deemed to extend from B660 to the A1(M) covering around 10.5km distance. Roads beyond this ZoI will experience an increase in road noise which is similar or lower.

10.8.11 The main site access will be from the B645 into Site D, with all HGVs arriving into the Site from this point, and the majority of daily staff movements arriving into Site D. A small number of daily staff movements would access Sites A and B without passing through the main site access.

10.8.12 The construction access strategy has been designed to avoid vehicles using the public highway as far as practicable. Once vehicles arrive in Site D from the main site access at the B645, a temporary access road will connect westward across fields to Site C, avoiding the use of Moor Road. From Site C, access will be taken north-west via an existing HGV access to Great Staughton Road where vehicles will follow the public highway to access Site B, thus avoiding large volumes of traffic passing through Great Staughton. Vehicles would be routed through Site B crossing Little Staughton Road close to Lodge Farm before continuing west towards the B660. At the B660 vehicles

would follow the public highway for a short section before accessing Site A using an existing access at Manor Farm.

10.8.13 There are existing access tracks through the Site that will be utilised as far as practicable, as will existing agricultural access points from the public highway. It will be necessary to upgrade or restore sections of the existing access track in order to provide safe and suitable access for vehicles. It is also likely that passing places will need to be established at intermittent positions along these tracks in order to manage vehicle movements during the construction phase.

10.8.14 According to the TA, on average across the full 30-month construction period there is expected to be a total of approximately 18 two-way delivery-related movements per day on weekdays (comprising 16 two-way HGV movements and 2 two-way LGV movements), and 9 two-way movements on Saturdays, on average (comprising 8 two-way HGV movements and 1 two-way LGV movement).

10.8.15 Construction HGV movements are forecast to peak during month 2, when there is expected to be up to 64 two-way delivery-related movements per day on weekdays (60 two-way HGV movements and 4 two-way LGV movements), and 32 two-way delivery-related movements on Saturdays, on average (30 two-way HGV movements and 2 two-way LGV movements).

10.8.16 This level of traffic generation is considered to be de minimis in nature, equating to 2 two-way HGV movements per hour, on average, across the full 30-month construction period. During the peak period in month 2 there would be a maximum of approximately 10 two-way HGV movements per hour.

10.8.17 In addition to the above HGV and LGV movements associated with deliveries of materials, around 496 construction-related staff would require access to the Site per day, on average, across the full 30-month construction programme.

10.8.18 The predicted noise level increase along the local road network is provided below in Table 10.22. The three scenarios that have been assessed include:

- Maximum HGV - Maximum HGV movements during a single month.
- Maximum Staff – Maximum staff movements during a single month.
- Average - The total number of construction traffic movements (HGV and staff) averaged over a 30-month construction period.

Table 10.22: Predicted change in road traffic noise on local road network due to construction works (weekday)

Local Road	Scenario	Time Period (hours)	Baseline noise (`do nothing') L_{A101hr} (dB)	Baseline +Construction noise (`do something') L_{A101hr} (dB)	Change compared to baseline L_{A101hr} (dB)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.8)
1. B660 Road	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	54.5 54.5 54.5	55.1 55.5 55.0	+0.6 +1.0 +0.5	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
2. Great Staughton Road (to Little Staughton Rd)	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	49.8 49.8 49.8	50.1 50.0 49.9	+0.3 +0.2 +0.1	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
3. Green End	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	52.4 52.4 52.4	52.7 52.9 52.7	+0.3 +0.5 +0.3	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
4. Great Staughton Road (to Little Staughton Rd)	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	53.3 53.3 53.3	53.4 53.5 53.4	+0.1 +0.2 +0.1	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
5. Great Staughton Road to Zantra Business Park	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	55.7 55.7 55.7	56.9 57.6 56.9	+1.2 +1.9 +1.2	Slight (Minor) Slight (Minor) Slight (Minor)

Local Road	Scenario	Time Period (hours)	Baseline noise (`do nothing') L_{A101hr} (dB)	Baseline +Construction noise (`do something') L_{A101hr} (dB)	Change compared to baseline L_{A101hr} (dB)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.8)
6. Moor Road	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	52.5 52.5 52.5	52.5 52.5 52.5	0 0 0	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
7. B645 to High Street	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	62.2 62.2 62.2	62.9 62.9 62.7	+0.7 +0.7 +0.5	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
8. B645 to A1 slip road	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	63.0 63.0 63.0	63.5 63.6 63.4	+0.5 +0.6 +0.4	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)
9. A1 slip road	Max HGV Max Staff Average	0700-1900 0700-1900 0700-1900	64.4 64.4 64.4	64.6 64.6 64.5	+0.2 +0.2 +0.1	Negligible (Neutral) Negligible (Neutral) Negligible (Neutral)

Note: The predicted noise levels are based on a notional 10m distance from the kerbside

10.8.19 The impact due to the Scheme during peak vehicle movement during the construction phase along the local road network has been calculated using Calculation of Road Traffic Noise (CRTN) methodology and impact methodology using DMRB LA 111.

10.8.20 According to DMRB LA 111 (Table 10.9), impact assessment for NSR is shown in EIA terms to be a negligible to slight adverse impact at all receptors (which are of high sensitivity) on local roads. In consideration of the temporary nature of the impact and relatively short period of peak staff traffic flow, this effect would be neutral to minor and not significant.

Vibration Effects

10.8.21 The closest separation distance between the residential NSR and nearest likely vibratory plant is circa 30m to 100m.

Typical Vibration Levels

10.8.22 The highest levels of vibration generated by construction plant is likely to include the following:

- non-percussive Piling;
- vibratory rollers and compactors;
- material offloading onto hard surfaces;
- concrete vibratory plant; and
- horizontal drilling/directional drilling.

10.8.23 BS5228 Part 2 deals with vibration from construction and open sites and provides information on the effects of the levels of vibration, human and structural response, response limits of structures and practical measures to reduce vibration.

10.8.24 Table 10.23 outlines the highest likely vibration levels that could be experienced during construction at the NSR (i.e. during use of vibratory plant).

Table 10.23: Daytime Construction Vibration at NSR without mitigation

NSR	Approximate Nearest Distance to Receptor (m)	Receptor Sensitivity	Range of highest likely vibration (mm/sec)	Perceptible levels of vibration for residential receptors (mm/sec)	Cosmetic damage limits (mm/sec)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.9 and 10.10)
R1: Sunny Farm	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R6: Orchard Barn	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R11: The Grange	70	High	0.04 – 0.1	0.3	5	Negligible (Neutral)

NSR	Approximate Nearest Distance to Receptor (m)	Receptor Sensitivity	Range of highest likely vibration (mm/sec)	Perceptible levels of vibration for residential receptors (mm/sec)	Cosmetic damage limits (mm/sec)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.9 and 10.10)
R18: The Lodge	30	High	0.08 – 0.25	0.3	5	Negligible (Neutral)
R19: Green End	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R20: Green End	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R21: Green End Farm	60	High	0.05 – 0.15	0.3	5	Negligible (Neutral)
R24: Home Close	75	High	0.04 – 0.08	0.3	5	Negligible (Neutral)
R24A: Rectory Farm	35	High	0.08 – 0.25	0.3	5	Negligible (Neutral)
R25: The Kangaroo	60	High	0.05 – 0.15	0.3	5	Negligible (Neutral)
R26: New Farm	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R30: Garden Farm	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)

*Note: Closest vibratory activity is likely to be the use of a mini-piler and a compactor during the Solar panel installation.

10.8.25 The above results show no significant vibration levels during construction and the highest likely vibration levels at residential receptors are below the level at which vibration is perceptible (refer to Tables 10.10 and 10.11). The closest approach to the Scheme when using non-percussive piling techniques would produce vibration levels just below perceptibility of 0.3mm/sec.

10.8.26 The levels of vibration, as a result of construction in EIA terms, would be a negligible impact magnitude and neutral level of effect at NSR of high

sensitivity and therefore not significant and `best practicable means' would be applied according to BS5228 Part 2.

HGV Vibration Effects

10.8.27 In terms of HGV movement on access roads passing receptors, a number of noise and vibration studies of the movement of HGVs along local roads adjacent to residential properties in the UK have been undertaken by the author of this assessment. This has included a study where monitoring has taken place within 1m of the kerbside. The results show at positions close to the pavement edge this only just triggers the seismograph and at levels below or just around perceptibility. The vibration levels from vehicle movements are well below cosmetic damage levels and highly unlikely to generate vibration that would constitute a nuisance according to BS6472: 2008.

10.8.28 If vibration levels from HGVs were an issue relative to residential properties, there would be definitive evidence of its' effect as the movement of HGVs occurs constantly across the road network in the UK through villages and towns. It is the experience of the author of this assessment and evidence collated over the years, that under normal road conditions (i.e. maintained roads) there is no likely perceptible vibration at property facades. At close range to kerbside the only likely perceptible vibration would be due to `pot-holes' and even under these conditions, the likely level of vibration within close proximity (i.e. within a metre distance) would not be significant in terms of nuisance or cosmetic damage. Refer to **ES Vol 2 Appendix 10-3: Construction Plant Data [EN010141/DR/6.2]**.

10.8.29 The vibration from this source at NSR of high sensitivity is therefore expected to produce a negligible impact magnitude and neutral level of effect in EIA terms and therefore not significant.

Grid Connection

10.8.30 This section assesses the potential construction and decommissioning phase impacts of the proposed grid connection route on the noise environment.

Grid Connection Plant Noise Effects

10.8.31 Table 10.24 provides predicted noise levels at the closest grid connection between the plant Site areas and the grid connection point at Eaton Socon Substation. The NSR at other positions will be at greater distance from the cable trench activities and therefore having a lower impact than those references. The grid connection working areas within the solar array and BESS facilities at NSR have been assessed within Table 10.21.

10.8.32 The 400 kV connection from the East Park Substation to the Eaton Socon Substation will comprise a single electrical circuit that will be below ground along its full length between the two substations. The cables will be trenched in an open cut trench along the majority of the length, with horizontal drilling or horizontal directional drilling used to cross beneath certain watercourses, vegetation, areas of archaeological constraint, and roads.

10.8.33 The trenching would involve the use of an excavator to create the trench and concrete mixer, excavator, roller or earth compactor used to infill and restore the opening with the retained soils. Horizontal drilling or horizontal directional drilling plant would be used, where required (as indicated on **ES Vol 3 Figure 2-3: Indicative Crossing Plans [EN010141/DR/6.3]**).

Table 10.24: Daytime Grid Connection Construction Noise Predictions at NSR

NSR	Sensitivity of NSR	Approximate Distance to receptor (m)	Residual Noise Levels L_{Aeq} dB	Noise Level range at receptor, L_{Aeq1hr} dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R29: Manor Farm	High	130	52	51-55	65	Slight (Minor)
R30: Garden Farm	High	200	48	43-53	65	Slight (Minor)
R34: Rushey Farm	High	200	54	45-57*	65	Slight (Minor)

NSR	Sensitivity of NSR	Approximate Distance to receptor (m)	Residual Noise Levels L_{Aeq} dB	Noise Level range at receptor, L_{Aeq1hr} dB	BS5228 Threshold Value L_{Aeq} dB Daytime	Magnitude of Impact (Significance of Effect) (Refer to Tables 10.6 and 10.7)
R35: Roman Field Cottage	High	100	53	52-64*	65	Slight (Minor)
R38: The Cottage	High	170	55	45-50	65	Negligible (Neutral)
R38A: Wood Farm	High	300	55	39-47*	65	Negligible (Neutral)
R39: Bungalow	High	750	58[1]	35-44*	65	Negligible (Neutral)
R40: Cancroft	High	450	58[1]	33-43*	65	Negligible (Neutral)
R41: High Street	High	670	58[1]	38-39*	65	Negligible (Neutral)
R42: Sharps Barn	High	750	58[1]	36-37	65	Negligible (Neutral)
R43: Duloe Road, Duloe	High	150-260	58[1]	42-62*	65	Slight (Minor)
R44: Manor Farm, Duloe	High	280	58[1]	47-49*	65	Negligible (Neutral)
R44: Field/Cobholden Farm	High	330	58[1]	44-51*	65	Negligible (Neutral)
R45: Northfield Road	High	270	58[1]	38-54*	65	Negligible (Neutral)
R46: Cornwall's Drive	High	230	60[1]	48-55*	65	Negligible (Neutral)

[1]Estimated at this stage based on proximity to local road network and measurements at other similar locations to local road. *Includes estimated noise level from Horizontal Directional Drilling.

10.8.34 The grid connection route extends over a relatively long distance and the level of noise and vibration would vary depending on the separation distance from the excavation to the NSR along the route. The highest level of noise and vibration is likely to occur where the grid route is nearest to NSR. However, the works would only be carried out over a short duration and would be temporary at each location as the cable is laid and moved along the route.

10.8.35 Based on typical noise levels from associated plant including the use of excavators, concreting, compacting and horizontal directional drilling during drilling and the excavation of trenches and laying of cables the results presented in Table 10.24 shows that the magnitude of impact in terms of EIA would be negligible to slight adverse impact and a neutral to minor significance effect at NSR of high sensitivity. The effects would be not significant in EIA terms and any effects would also be short in duration. The application of BPM would be applied in accordance with BS5228 methodology.

Grid Connection Vibration Effects

10.8.36 Table 10.25 outlines the highest likely vibration levels that could be experienced during the grid connection construction works at the NSR (i.e. during use of vibratory plant).

Table 10.25: Daytime Construction Vibration at NSR without mitigation

NSR	Approximate Nearest Distance to Receptor (m)	Receptor Sensitivity	Range of highest likely vibration (mm/sec)	Perceptible levels of vibration for residential receptors (mm/sec)	Cosmetic damage limits (mm/sec)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.9 and 10.10)
R29: Manor Farm	130	High	0.05	0.3	5	Negligible (Neutral)
R30: Garden Farm	200	High	0	0.3	5	Negligible (Neutral)
R34: Rushey Farm	200	High	0	0.3	5	Negligible (Neutral)

NSR	Approximate Nearest Distance to Receptor (m)	Receptor Sensitivity	Range of highest likely vibration (mm/sec)	Perceptible levels of vibration for residential receptors (mm/sec)	Cosmetic damage limits (mm/sec)	Magnitude of Impact (Significance of Effect) (Refer to Table 10.9 and 10.10)
R35: Roman Field Cottage	100	High	0.03 – 0.06	0.3	5	Negligible (Neutral)
R38: The Cottage	170	High	0	0.3	5	Negligible (Neutral)
R38A: Wood Farm	300	High	0	0.3	5	Negligible (Neutral)
R39: Bungalow	750	High	0	0.3	5	Negligible (Neutral)
R40: Cancroft	450	High	0	0.3	5	Negligible (Neutral)
R41: High Street	670	High	0	0.3	5	Negligible (Neutral)
R42: Sharps Barn	750	High	0	0.3	5	Negligible (Neutral)
R43: Duloe Road, Duloe	150-260	High	0	0.3	5	Negligible (Neutral)
R44: Manor Farm, Duloe	280	High	0	0.3	5	Negligible (Neutral)
R44: Field/Cobholden Farm	330	High	0	0.3	5	Negligible (Neutral)
R45: Northfield Road	270	High	0	0.3	5	Negligible (Neutral)
R46: Cornwall's Drive	230	High	0	0.3	5	Negligible (Neutral)

*Note: Closest vibratory activity is likely to be the use of a mini-piler and a compactor during the Solar panel installation.

10.8.37 The above results show no significant vibration levels during grid connection construction works and the highest likely vibration levels at NSR are below

the level at which vibration is perceptible (refer to Tables 10.10 and 10.11). The closest approach to the cable laying activities would produce no vibration or below vibration perceptibility (i.e. less than 0.3mm/sec).

10.8.38 The levels of vibration, as a result of the grid connection, would be a negligible impact magnitude and neutral level of effect in terms of EIA at NSR of high sensitivity and therefore not significant and BPM would be applied according to BS5228 Part 2.

Operational Phase

Assessment of Effects

10.8.39 As described in the Assumptions and Limitations section and noise limits section (refer to paragraph 10.6.15) in order to provide a robust assessment, the following approach has been adopted:

- Assumptions have been made in respect of the noise levels for the associated plant and design options considered for plant locations (which provide scope in the Scheme to be flexible).
- The technology associated with solar development is advancing rapidly, and it is anticipated that this technological progression will continue at pace over the coming years as current research and development in the manufacturing sector yields new technologies. There is a degree of flexibility within the DCO to allow for such changes prior to the detailed design being undertaken, once a contractor is appointed.
- The approach that has been taken within the assessment has been to establish what would be acceptable in terms of noise generation as a result of the Scheme relative to existing baseline conditions at the nearest. From this, it has been possible to establish a series of noise limits at the NSR that comply with relevant standards and guidance to protect amenity and sleep disturbance. Compliance with the noise limits would ensure that there would be no adverse impacts and no significant effects at NSR, as a result of the Scheme.

- Operational noise limits are included in the **outline Operational Environmental Management Plan [EN010141/DR/7.5]** and the final OEMP is secured by a Requirement of the **draft DCO [EN010141/DR/3.1]**. This will ensure that there would be no significant adverse effects arising from the operation of the Scheme.

10.8.40 The following section provides an assessment of predicted noise levels from the operation of the Scheme. The design of the Scheme has been developed in sufficient detail to enable an accurate prediction of resultant noise levels at NSR to be undertaken and provide a good level of confidence in the likely noise contribution and to show that the noise limits can be achieved in practice.

Plant Noise

10.8.41 The following noise characteristics need to be considered in the assessment of operational noise in accordance with BS4142: 2014+A1:2019 to establish if any noise level penalties are necessary:

- **Tonality –** In terms of tonality from transformers or fan assisted cooling systems, given the separation distance to NSR, predicted noise levels which are relatively low at NSR and the existing residual sound levels at NSR being much higher (to provide effective masking) any tonal noise is not predicted to be perceptible at the NSR and therefore a tonal character penalty would not be required.
- **Impulsivity –** In terms of impulsivity, empirical on-site noise monitoring of similar sites indicates no perceptible impulse noise during Site operations due to the fairly constant nature of the associated plant noise. For the Scheme it has been assumed that an impulse noise character penalty is not required.
- **Intermittency –** In terms of intermittency, the plant would work for reasonable long periods of time once demand requires use of its power and by its nature it does not tend to operate intermittently. The intermittency is therefore highly unlikely to be distinctive.

10.8.42 In conclusion, with the design layout, application of design parameters for the key components of the scheme, assumed noise levels for the associated plant and masking feature of the existing noise climate no noise character penalty is assessed to be required.

Daytime Operations

10.8.43 Table 10.27 provides information on the predicted noise levels during daytime operations from the Scheme (i.e. in accordance with section 7.2 Note 1 of BS4142: 2014+A1:2019 07.00 to 23.00 hours). The table below provides details of the established representative baseline levels in terms of L_{A90} (i.e. index used for background sound levels) and L_{Aeq} (i.e. index used for residual sound levels) together with the predicted noise from Site and a comparison of these predictions with background sound levels and rating level limit which prevents adverse impacts occurring at NSR. The final column shows what the increase in residual levels would be as a result of the Scheme.

Design Options

10.8.44 The assessment considers two design options for the type of solar inverter, which gives a total of two scenarios having been assessed:

- **Scenario A** – Solar, BESS and Substation layout with string inverters; and
- **Scenario B** – Solar, BESS and Substation layout with centralised inverters.

10.8.45 For the purpose of the noise assessment, the highest predicted rating level at any given NSR from either of the Scenarios has been used to ensure a worst-case assessment. **ES Vol 2 Appendix 10-4: Noise Contour Mapping – Operation Phase [EN010141/DR/6.2]** provides noise contour mapping for each Scenario and operational period (i.e. daytime 0700-2300 hours, night-time 2300-0500 hours and sunrise 0500-0700 hours).

Table 10.26: Predicted daytime noise contribution from the Scheme with embedded mitigation

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Daytime)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R1: Sunny Farm	43	39 [48]	**29**	-10	-14	+0.1
R2: Brook Farm	43	39 [48]	**24**	-15	-19	0
R3: Millers Cottage	47	43 [55]	**17**	-26	-30	0
R4: Coldham Cottages	39	35 [50]	**14**	-21	-25	0
R5: Dumpling Lodge	39	35 [50]	**27**	-8	-12	0
R6: Orchard Barn	35	31 [47]	**31**	0	-4	+0.1
R7: Hall Farm	35	31 [47]	**29**	-2	-6	+0.1
R8: Chadwell End	35	31 [47]	**29**	-2	-6	+0.1
R9: Fuchsia Cottage	35	31 [47]	**27**	-4	-8	0
R10: College Cottages	40	36 [46]	**31**	-5	-9	+0.1
R11: The Grange	40	36 [55]	**34**	-2	-6	0
R12: The Manor	40	36 [55]	**31**	-5	-9	0
R13: Walnut Tree Farm	40	36 [45]	**29**	-7	-11	+0.3

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Daytime)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R14: Brook Farm	40	36 [55]	**26**	-10	-14	0
R15: Mill Hill	40	36 [55]	**24**	-12	-16	0
R15A: Mill Lane	37	33 [45]	**24**	-9	-13	0
R16: Temple Farm	37	33 [45]	**25**	-8	-12	0
R17: The Bungalow	41	37 [50]	**27**	-10	-14	0
R18: The Lodge	36	32 [46]	**33**	+1	-3	+0.2
R19: Green End	37	33 [53]	**31**	-2	-6	0
R20: Green End	37	33 [53]	**31**	-2	-4	0
R21: Green End Farm	37	33 [53]	**32**	-1	-5	0
R22: Spring Hill	37	33 [53]	**32**	-1	-5	0
R23: Spring Hill	41	37 [50]	**26**	-11	-15	0
R24: Home Close	37	33 [45]	**32**	-1	-5	+0.2
R24A: Rectory Farm	37	33 [45]	**33**	0	-4	+0.3

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Daytime)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R25: The Kangaroo	40	36 [55]	**33**	-3	-7	0
R26: New Farm	34	30 [52]	**33**	+3	-1	+0.1
R27: Newpond Farm	34	30 [52]	**27**	-3	-7	0
R28: Gunnersbury Cottage	40	36 [55]	**27**	-9	-13	0
R29: Manor Farm	34	30 [52]	**26**	-4	-8	0
R30: Garden Farm	44	40 [48]	**32**	-8	-12	+0.1
R31: Staughton Manor	44	40 [48]	**30**	-10	-14	+0.1
R32: Staughton Highway	44	40 [48]	**28**	-12	-16	0
R33: Mill View	43	39 [60]	**29**	-10	-14	0
R34: Rushey Farm	46	42 [54]	**36**	-6	-10	+0.1
R35: Roman Field	41	37 [53]	**35**	-2	-6	+0.1
R36: Moor Farm	41	37 [50]	**28**	-9	-13	0
R37: Wood View	52	48 [58]	**34**	-14	-18	0

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Daytime)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R38: The Cottage	43	39 [59]	**36**	-3	-7	0
R38A: Wood Farm	51	47 [55]	**26**	-21	-25	0
R39: Bungalow	52	48 [58]	**27**	-21	-25	0
R40: Cancroft	52	48 [58]	**22**	-26	-30	0
R41: High Street	52	48 [58]	**19**	-29	-33	0
R42: Sharps Barn	52	48 [58]	**16**	-32	-36	0

Note 1: Noise characteristics at receptor locations do not include a penalty. This would be controlled by design.

Note 2: Based on representative LA90 baseline results at NSRs over a weekend period.

Note 3: Column 7 is calculated by the logarithmic addition of columns 4 and column 3 **Leq** level in brackets [ ] and subtraction of the background **Leq** noise level (i.e. column 3 in brackets [ ]).

10.8.46 The fifth column in Table 10.26 shows the difference between the predicted rating noise level and the baseline sound level at the receptor positions. The rating level in column 5 is therefore in accordance with the methodology found within BS 4142: 2014+A1:2019 which is the most relevant applicable noise assessment guidance.

10.8.47 According to BS4142: 2014+A1:2019, the rating level relative to the assessment baseline noise would indicate a negligible to slight adverse impact magnitude at all receptors, which are of high sensitivity (refer to Table 10.12). The operational noise impacts from the Scheme are therefore considered to represent a neutral to minor level of effect in terms of EIA and therefore would be not significant.

10.8.48 In relation to the IEMA guidelines (which considers the increase in existing residual noise and therefore the context of the impact, reference Table 10.13), it can be seen that the magnitude of the impact during daytime periods (final column of table) shows that there is a maximum change of +0.3dB in noise level, which indicates a negligible magnitude impact. The predicted level of effect that would be experienced by residential receptors of high sensitivity would therefore be a neutral level of effect in terms of EIA and therefore not significant.

Night-time Operations

10.8.49 During the night-time period the BESS would operate between 2300-0700 hours. During the period between May and September when the sun rises earlier, the solar plant could also operate at the same time between circa 0500 to 0700 hours i.e. in conjunction with the BESS facility plant. To assess the `worst case' scenario it has been assumed that the BESS plant operates between 2300 to 0500 hours and the BESS & solar plant operates between 0500 to 0700 hours relative to the appropriate baseline levels during sunrise periods between May and September.

10.8.50 The predicted noise levels for these operating hours are based on maximum noise conditions, which is considered to be a conservative representation as the solar load at sunrise is unlikely to produce maximum noise levels from the associated plant.

10.8.51 Table 10.27 provides information on the predicted noise levels during night-time from the Scheme (i.e. 2300 to 0700 hours according to BS4142: 2014+A1:2019 section 7.2 Note 1). The table below provides details of the established representative baseline levels in terms of L_{A90} (i.e. index used for background sound levels) and L_{Aeq} (i.e. index used for residual sound levels) together with the predicted noise from Site and a comparison of these predictions with background and the established noise limits. The final column shows what the increase in residual levels would be as a result of the Scheme.

Table 10.27: Predicted night-time noise contribution from the Scheme with embedded mitigation (night-time 2300-0500 hours & sunrise night-time 0500-0700 hours)

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Night-time)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R1: Sunny Farm	37 (night) 39 (sunrise)	37 [39] 39 [46]	**0** **29**	-37 -10	-37 -10	0 +0.1
R2: Brook Farm	37 (night) 39 (sunrise)	37 [39] 39 [46]	**0** **24**	-37 -15	-37 -15	0 0
R3: Millers Cottage	36 (night) 41 (sunrise)	36 [46] 41 [54]	**0** **17**	-36 -24	-36 -24	0 0
R4: Coldham Cottages	35 (night) 35 (sunrise)	31 [41] 34 [46]	**0** **14**	-311 -20	-35 -21	0 0
R5: Dumpling Lodge	35 (night) 35 (sunrise)	31 [41] 34 [46]	**0** **27**	-31 -7	-35 -8	0 +0.1
R6: Orchard Barn	30 (night) 35 (sunrise)	26 [48] 32 [49]	**0** **31**	-26 -1	-30 -4	0 +0.1
R7: Hall Farm	30 (night) 35 (sunrise)	26 [48] 32 [49]	**0** **29**	-26 -3	-30 -6	0 0
R8: Chadwell End	30 (night) 35 (sunrise)	26 [48] 32 [49]	**0** **29**	-26 -3	-30 -6	0 0
R9: Fuchsia Cottage	30 (night) 35 (sunrise)	26 [48] 32 [49]	**0** **27**	-26 -5	-30 -8	0 0
R10: College Cottages	35 (night) 35 (sunrise)	32 [41] 34 [46]	**0** **31**	-32 -3	-35 -4	0 +0.1

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Night-time)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R11: The Grange	33 (night) 36 (sunrise)	29 [41] 36 [53]	**0** **34**	-29 -2	-33 -2	0 +0.1
R12: The Manor	33 (night) 36 (sunrise)	29 [41] 36 [53]	**0** **31**	-29 -5	-33 -5	0 0
R13: Walnut Tree Farm	30 (night) 35 (sunrise)	24 [35] 33 [42]	**0** **29**	-24 -4	-30 -6	0 0
R14: Brook Farm (Keysoe)	33 (night) 36 (sunrise)	29 [41] 36 [53]	**0** **26**	-29 -10	-33 -10	0 0
R15: Mill Hill	33 (night) 36 (sunrise)	29 [41] 36 [53]	**0** **24**	-29 -12	-33 -12	0 0
R15A: Mill Lane	30 (night) 34 (sunrise)	24 [37] 30 [42]	**0** **24**	-24 -6	-30 -10	0 +0.1
R16: Temple Farm	30 (night) 34 (sunrise)	24 [37] 30 [42]	**0** **25**	-24 -5	-30 -9	0 +0.1
R17: The Bungalow	33 (night) 36 (sunrise)	29 [45] 36 [51]	**0** **27**	-29 -9	-33 -9	0 0
R18: The Lodge	30 (night) 34 (sunrise)	22 [39] 30 [41]	**0** **33**	-22 +3	-30 -1	0 +0.6
R19: Green End	30 (night) 33 (sunrise)	22 [44] 29 [48]	**0** **30**	-22 +1	-30 -3	0 +0.1

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Night-time)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R20: Green End	30 (night) 33 (sunrise)	22 [44] 29 [48]	**0** **31**	-22 +2	-30 -2	0 +0.1
R21: Green End Farm	30 (night) 33 (sunrise)	22 [44] 29 [48]	**0** **32**	-22 +3	-30 -1	0 0
R22: Spring Hill	30 (night) 33 (sunrise)	22 [44] 29 [48]	**10** **32**	-12 +3	-20 -1	0 +0.1
R23: Spring Hill	33 (night) 36 (sunrise)	29 [45] 36 [51]	**11** **26**	-18 -10	-22 -10	0 0
R24: Home Close	30 (night) 34 (sunrise)	23 [44] 30 [48]	**0** **32**	-23 +2	-30 -2	0 +0.1
R24A: Rectory Farm	30 (night) 34 (sunrise)	23 [44] 30 [48]	**0** **33**	-23 +3	-30 -1	0 +0.1
R25: The Kangaroo	35 (night) 36 (sunrise)	31 [46] 36 [49]	**0** **33**	-31 -3	-35 -3	0 +0.1
R26: New Farm	30 (night) 33 (sunrise)	23 [41] 29 [48]	**10** **33**	-13 +4	-20 0	0 +0.1
R27: Newpond Farm	30 (night) 33 (sunrise)	23 [41] 29 [48]	**13** **27**	-10 -2	-17 -6	0 0
R28: Gunnersbury Cottage	35 (night 36 (sunrise)	31 [46] 36 [49]	**0** **27**	-19 -9	-23 -9	0 0

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Night-time)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R29: Manor Farm	30 (night) 33 (sunrise)	23 [41] 29 [48]	**15** **26**	-8 -3	-15 -7	0 0
R30: Garden Farm	35 (night) 38 (sunrise)	32 [40] 38 [52]	**19** **31**	-13 -7	-16 -7	0 0
R31: Staughton Manor	35 (night) 38 (sunrise)	32 [40] 38 [52]	**19** **30**	-13 -8	-16 -8	0 0
R32: Staughton Highway	35 (night) 38 (sunrise)	32 [40] 38 [52]	**23** **28**	-9 -10	-12 -10	+0.1 +0
R33: Mill View	34 (night) 39 (sunrise)	30 [49] 39 [56]	**28** **29**	-2 -10	-6 -10	0 0
R34: Rushey Farm	35 (night) 39 (sunrise)	35 [46] 39 [53]	**35** **36**	0 -3	0 -3	+0.3 +0.1
R35: Roman Field Cottage	35 (night) 35 (sunrise)	31 [43] 34 [51]	**34** **35**	+3 +1	-1 0	+0.5 +0.1
R36: Moor Farm Cottages	35 (night) 39 (sunrise)	31 [44] 39 [52]	**25** **28**	-6 -11	-10 -11	+0.1 0
R37: Wood View	34 (night) 40 (sunrise)	30 [51] 40 [52]	**33** **34**	+3 -6	-1 -6	+0.1 +0.1
R38: The Cottage	35 (night) 39 (sunrise)	35 [51] 39 [49]	**33** **36**	-2 -3	-2 -3	+0.1 +0.2

NSR Position (Refer to Figure 10-1)	Established Rating Noise Limit (Night-time)	Assessment[2] Baseline Sound Level L_{A901hr} dB [L_{Aeq}]	Highest Predicted Rating[1] Noise Level from Site L_{Aeq1hr} dB	Rating[1] compared to Baseline Sound L_{Aeq1hr} dB	Rating compared to Noise Limit L_{Aeq1hr} dB	Noise Change[3] L_{Aeq} dB
R38A: Wood Farm	35 (night) 40 (sunrise)	32 [48] 40 [50]	**25** **26**	-7 -14	-10 -14	0 0
R39: Bungalow	34 (night) 40 (sunrise)	30 [51] 40 [52]	**26** **27**	-4 -13	-8 -13	0 0
R40: Cancroft	34 (night) 40 (sunrise)	30 [51] 40 [52]	**21** **22**	-9 -18	-13 -18	0 0
R41: High Street	34 (night) 40 (sunrise)	30 [51] 40 [52]	**18** **19**	-12 -21	-16 -21	0 0
R42: Sharps Barn	34 (night) 40 (sunrise)	30 [51] 40 [52]	**15** **16**	-15 -24	-19 -24	0 0

10.8.52 According to BS4142: 2014+A1:2019, the night-time rating level relative to the assessment baseline noise indicates a negligible to slight adverse impact magnitude (refer to Table 10.11) at NSR of high sensitivity. The operational noise impacts from the Scheme are therefore considered to represent a negligible to minor level of effect in EIA terms and not significant.

10.8.53 In relation to the IEMA guidelines and making reference to Table 10.13, it can be seen that the magnitude of the impact during night-time periods (final column of table) shows that the change in noise level ranges between 0dB and +0.6dB L_{Aeq} which indicates negligible impact at NSR of high sensitivity. The predicted level of effect would therefore be neutral in terms of EIA and not significant for all NSR.

Operation Phase Effects on Public Rights of Way (PRoW)

10.8.54 During the operational phase, noise levels would vary at locations along the PRoW. Whilst there is no specific guidance on PRoW levels, for amenity purposes noise levels up to circa 55dB L_{Aeq} within garden areas is considered acceptable (and has been used on other solar schemes). A level of 55dB L_{Aeq} would be reached at a distance of circa 17m from a centralised inverter and circa 9m from a string inverter. Based on **ES Vol 3 Figure 2-1: Illustrative Environmental Masterplan [EN010141/DR/6.3]** there are only two centralised inverters within this distance (both in Site A) and the extent of any operational noise is relatively short in terms of time and experience as this is a transient event. In respect of the BESS, the closest PRoW is indicated to be up to 53dB L_{Aeq} and therefore not significant. This would only be relevant to daytime periods and therefore considered less sensitive than a permanent resident. As this is a short-term transitionary impact along a short section of a footpath within a large footpath footprint, the effect is not deemed to be significant.

Road Traffic Noise

10.8.55 The Scheme will attract negligible operational traffic demand and therefore the magnitude of impacts would be negligible and the significance of effect neutral in EIA terms and therefore not significant.

Vibration Levels

10.8.56 There is no likely vibration expected from this type of plant and therefore the magnitude of impacts would be negligible, and significance of effect would be neutral in EIA terms. The Planning Inspectorate agreed that operational vibration can be scoped out of the assessment, as set out in **ES Vol 2 Appendix 4-2: EIA Scoping Opinion [EN010141/DR/6.2]**.

Low Frequency Noise (LFN)

10.8.57 In terms of the LFN on receptors, the Site has been assessed in terms of the appropriate guidance for LFN which would be NANR45 `Proposed criteria for

the assessment of LFN disturbance' as produced for DEFRA via Salford University.

10.8.58 This refers to LFN limits when measured within a sensitive room rather than externally. This can be difficult to undertake in practice, where properties are occupied and therefore this may need to be proven by external measurement and calculation. The criterion curve is provided in NANR45 Table 2 and in Figure 1 of the document (this table is represented as Table 10.28 below for ease of reference). The guidance states:

> *"If the noise occurs only during the day, then 5dB relaxation may be applied to all third-octave bands."*

Table 10.28: NANR45 Night-time Noise Limits

Hz		10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB Leq	Night	92	87	83	74	64	56	49	43	42	40	38	36	34
dB Leq	Day	97	92	88	79	69	61	54	48	47	45	43	41	39

10.8.59 An assessment of the predicted one-third octave band frequency analysis is provided within **ES Vol 2 Appendix 10-5: Low Frequency Noise (LFN) Analysis & Sample Plant Frequency Spectra [EN010141/DR/6.2]** to show compliance with the NANR45 criteria at the NSR with the highest noise level relative to the BESS and the East Park Substation transformer plant at low frequency. The results of the LFN analysis show that the Scheme would comply with the guidance. The magnitude of impact would be negligible and the level of effect neutral in EIA terms and therefore not significant.

Decommissioning Phase

10.8.60 For the purpose of this assessment, it has been assumed that similar techniques and / or approaches would be used as the construction phase. Thus, the impacts from decommissioning would be equivalent or less than those associated with the construction phase.

10.8.61 When decommissioning occurs, it is reasonable to assume that similar construction techniques and mitigation measures would be applied, and that the outcome of the construction phase assessment remains a reasonable proxy for the assessment of decommissioning phase effects.

10.8.62 The assessment of construction phase effects has concluded that for plant noise the magnitude of impact would be negligible and neutral level of effect and for road traffic noise the magnitude of impact would be negligible to slight adverse and the significance of effect neutral to minor at all NSR and would be not significant in EIA terms. The effects of decommissioning are assumed to be similar and would, therefore, not be significant in EIA terms.

10.9 Additional Mitigation, Enhancement and Monitoring

10.9.1 The embedded mitigation measures described previously adequately address the need to avoid, reduce and compensate for any significant effects of the Scheme. The results of the assessment show compliance with relevant guidance and standards for noise and vibration and therefore no additional measures are required.

10.9.2 Following commissioning of the Scheme, the site generated noise levels can be monitored under load conditions to show compliance with any agreed noise limits. This is included in the **outline Operational Environmental Management Plan [EN010141/DR/7.5]** and the final OEMP is secured by a Requirement of the **draft DCO [EN010141/DR/3.1]**. This will ensure that there would be no significant adverse effects arising from the operation of the Scheme.

10.10 Residual Effects

10.10.1 As there are no additional mitigation measures or monitoring measures required and therefore residual effects will remain unchanged as detailed in this assessment.

10.10.2 In summary, no significant noise or vibration effects have been identified by the noise assessment in relation to construction or operation of the Scheme. Table 10.29 below summarises the predicted effects of the construction / decommissioning, and operation of the Scheme.

Table 10.29: Residual Impact at Nearest Receptor after Mitigation Measures

Source	Time Period	Effect	Proposed Mitigation	Residual Effect	Residual Impact Magnitude
Construction / Decommissioning noise	Daytime	Neutral to Minor	CEMP/DEMP	Neutral to Minor	Negligible to Slight
Road traffic noise (construction / decommissioning)	Daytime	Neutral to Minor	Use of vehicle sharing techniques for staff	Neutral to Minor	Negligible
Construction / Decommissioning Plant Vibration	Daytime	Neutral	CEMP/DEMP	Neutral	Negligible
Construction Road Traffic Vibration	Daytime	Neutral	None required	Neutral	Negligible
Operational noise	Daytime Night	Neutral to Minor Neutral to Minor	Design & Plant selection	Neutral to Minor Neutral to Minor	Negligible to Slight Negligible to Slight

10.11 Cumulative Effects

10.11.1 The cumulative assessment has considered the potential for cumulative noise and vibration impacts to receptors as a result of the Scheme in combination with the cumulative schemes set out in **ES Vol 2 Appendix 4-5: Short List of Other Development [EN010141/DR/6.2]**.

10.11.2 The cumulative schemes that have the potential to result in significant cumulative noise and vibration impacts:

- High Wood Solar Farm;
- Cobholden Solar Farm; and
- Cobholden Farm BESS.

10.11.3 Each of these cumulative schemes are located to the east of the Site, located south of Site D and along the southern end of the Scheme's grid connection to the Eaton Socon substation. The following receptors have the potential for an increased impact should the phasing of construction works overlap; however the residual cumulative effects have been assessed as negligible, or negligible to minor:

- R36: Moor Farm Cottages
- R38: The Cottage
- R38A: Wood Farm
- R43: Duloe Road, Duloe
- R44: Manor Farm, Duloe

10.11.4 The cumulative assessment is reported in **ES Vol 1 Chapter 17: Cumulative and In-Combination Effects [EN010141/DR/6.1]** and concludes that there would be no significant cumulative effects as a result of the Scheme in combination with any cumulative scheme. The residual effects of the Scheme would not be changed as a result of any of the cumulative schemes.

10.11.5 An assessment of the in-combination effects arising from the interaction and combination of different residual environmental effects of the Scheme

affecting a single receptor is reported in Section 17.5 of **ES Vol 1 Chapter 17: Cumulative and In-Combination Effects [EN010141/DR/6.1]**.

10.12 Conclusions

10.12.1 Noise and vibration levels have been considered and assessed during the construction (and decommissioning) and operational Phases of the Scheme (refer to assessment methodology). Relevant and appropriate noise and vibration guidance and standards have been used to determine the impact.

10.12.2 Assumptions have been made in respect of the design noise levels for the associated plant and design options considered for plant locations (which provide scope in the Scheme to be flexible).

10.12.3 To establish any likely impact from noise a robust assessment of baseline sound levels has been considered by undertaking fixed position noise monitoring at twenty-two NSR areas around the Site. This was carried out over three weekend periods in March, May and June 2024 to establish the lowest likely representative background levels.

10.12.4 In accordance with appropriate standards, best practical means would be employed to control the noise generation during the construction and decommissioning period. The assessment provides mitigation measures which are set out in the **outline Construction Environmental Management Plan [EN010141/DR/7.3]**, the **outline Operational Environmental Management Plan [EN010141/DR/7.5]**, and the **outline Decommissioning Environmental Management Plan [EN010141/DR/7.6]** which are secured by Requirements of the **draft DCO [EN010141/DR/3.1]**.

10.12.5 For the purposes of the assessment, noise limits have been identified in relation to specific NSR against which the assessment is undertaken. The limits are based upon the results of baseline sound monitoring and are set at a level that would ensure (in accordance with relevant policy and guidance) that no significant effects would occur as a consequence of the Scheme. Based on the assessment 'Scenarios' for the operational Scheme, the assessment has demonstrated that no significant impacts in EIA terms would occur.

10.12.6 The assessment shows that there would be no significant impacts in EIA terms during the construction, operation or decommissioning of the Scheme following the implementation of the embedded mitigation measures.

10.13 References

[1] Department for Energy Security and Net Zero (November 2023). Overarching National Policy Statement for Energy (EN-1). Available at: https:// assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf [Last Accessed: 17 July 2025]

[2] Department for Energy Security and Net Zero (November 2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf [Last Accessed: 11 September 2024]

[5] Department for Energy Security and Net Zero: National Policy Statement for electricity networks infrastructure (EN-5) November 2023. Available at: https:// assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf [Last Accessed: 17 July 2025]

[6] Department for Levelling Up, Housing and Communities (2023). National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.pdf [Last Accessed: 11 September 2024]

[7] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2023). Planning practice guidance (PPG). Available at: https://www.gov.uk/government/collections/planning-practice-guidance [Last Accessed: 11 September 2024]

[8] Department for Environment, Food & Rural Affairs (2010). Noise policy statement for England. Available at: https://www.gov.uk/government/publications/noise-policy-statement-for-england [Last Accessed: 13 September 2024]

[9] Bedford Borough Council (2020). Bedford Borough Local Plan 2030. Available at: https://www.bedford.gov.uk/planning-and-building-control/planning-policy/local-plan-2030/local-plan-2030-overview [Last Accessed: 11 September 2024]

[13] Huntingdonshire District Council (2019). Huntingdonshire Local Plan to 2036. Available at: https://huntingdonshire.gov.uk/planning/local-plan-to-2036/ [Last Accessed: 11 September 2024]

[16] Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities (2019). Planning Practice Guidance - Noise. https://www.gov.uk/guidance/noise--2 [Last Accessed: 13 September 2024]

[17] British Standards Institute (2019). BS4142: 2014+A1:2019 `Methods for rating and assessing industrial and commercial sound'. BSI

[18] British Standards Institute (2014). BS8233: 2014 `Guidance on sound insulation and noise reduction for buildings'. BSI

[19] British Standards Institute (2009). BS5228: 2009+A1:2014 `Code of practice for noise and vibration control on construction and open sites' BSI

[20] British Standards Institute (2003). BS 7445: 2003 Description and measurement of environmental noise. BSI

[21] World Health Organization (1999) Guidelines for Community Noise. Available at: https://www.who.int/publications/i/item/a68672 [Last Accessed: 13 September 2024]

[22] World Health Organization (2009). Night noise guidelines for Europe. Available at: https://iris.who.int/handle/10665/326486 [Last Accessed: 13 September 2024]

[23] Highways England, Transport Scotland, Welsh Government and Department for Infrastructure Northern Ireland (2020), Design Manual for Roads and Bridges, LA104 Environmental Assessment and Monitoring, Revision 1. Available at: https://www.standardsforhighways.co.uk/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a [Last accessed: 12 September 2024]

[24] Environment Agency (2022). Noise and vibration management: environmental permits. Available at: https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits [Last Accessed: 13 September 2024]

[25] DEFRA NANR45 University of Salford University `Proposed criteria for the assessment of low frequency noise disturbance' Revision 1 – December 2011 Dr Andy Moorhouse, Dr David Waddington, Dr Mags Adams