Rosefield Solar Farm

Environmental Statement

Volume 2
Chapter 13: Noise and Vibration
(Tracked)

EN010158/APP/6.2 2
Revision 2
Deadline 1

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Rosefield Energyfarm Limited

APFP Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009

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13. Noise and Vibration

13.1. Introduction

13.1.1. This document has been updated at Deadline 1 in response to the Community Relevant Representations received and the Relevant Representation from Buckinghamshire Council. The document references have not been updated from the original submission. Please refer to the **Guide to the Application [EN010158/APP/1.2.6]** for the list of current versions of documents.

~~13.1.1.~~13.1.2. This chapter presents an assessment of likely significant effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development upon noise and vibration. The full description of the Proposed Development is provided within **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**.

~~13.1.2.~~13.1.3. This chapter is supported by the following figures presented in **ES Volume 3 [EN010158/APP/6.3]**:

- **Figure 13.1: Study Area and Receptors**;
- **Figure 13.2: Baseline Survey Locations**;
- **Figure 13.3: Operational Phase Noise Contours (Without Additional Mitigation)**; and
- **Figure 13.4: Operational Phase Noise Contours (With Additional Mitigation)**.

~~13.1.3.~~13.1.4. This chapter is further supported by the following technical appendices presented in **ES Volume 4 [EN010158/APP/6.4]**:

- **Appendix 13.1: Baseline Noise Survey**;
- **Appendix 13.2: Construction Noise Plant Tables and Results**; and
- **Appendix 13.3: Operational Phase Assessment Details**.

~~13.1.4.~~13.1.5. This chapter should also be read in conjunction with the following assessment chapter(s):

- **Chapter 7: Biodiversity [EN010158/APP/6.2]**;
- **Chapter 15: Transport and Access [EN010158/APP/6.2]**; and
- **Chapter 17: Cumulative Effects [EN010158/APP/6.2]**.

13.2. Legislative framework, planning policy and guidance

13.2.1. This assessment has been undertaken with regard to the following legislation, planning policy and guidance.

13.2.2. It should be noted that this chapter does not assess the compliance of the Proposed Development against relevant planning policy. Such an assessment is presented in the **Planning Statement [EN010158/APP/5.7]**.

Legislation

- Part III of the Environmental Protection Act 1990 **[Ref. 13-1]**; and
- Control of Pollution Act 1974 **[Ref. 13-2]**.

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023) – Section 4.4 relates to health effects and Section 5.12 outlines the planning policy for noise and vibration **[Ref. 13-3]**;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023) – Section 2.10 that discusses noise and vibration arising from solar photovoltaic generation schemes **[Ref. 13-4]**;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023) – Section 2.9 discusses the assessment of noise and vibration, and Section 2.10 discusses mitigation for network infrastructure **[Ref. 13-5]**;
- National Planning Policy Framework (2024) – This sets out the UK Government's planning policies for England and how these are expected to be applied. It includes statements relating to noise and the requirement to take it into account during the planning process. **[Ref. 13-6]**; and
- Noise Policy Statement for England (Defra, 2010) – sets out the long-term vision of Government noise policy to promote good health and a good quality of life through the effective management of noise within the context of UK Government policy on sustainable development **[Ref. 13-7]**.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013 – 2033 (adopted September 2021) **[Ref. 13-8]**, specifically Policies:
  - BE3 'Protection of the amenity of residents', which states that planning permission will not be granted where the proposed development would unreasonably harm any aspect of the amenity of existing residents and would not achieve a satisfactory level of amenity for future residents.

Where planning permission is granted, the council will use conditions or planning obligations to ensure that any potential adverse impacts on neighbours are eliminated or appropriately controlled.

– NE4 'Landscape character and locally important landscape', which states that development should consider the characteristics of the landscape character area by not generating an unacceptable level and/or frequency of noise in areas relatively undisturbed by noise and valued for their recreational or amenity value.

– NE5 'Pollution, air quality and contaminated land', which states significant noise-generating development will be required to minimise the impact of noise on the occupiers of proposed buildings, neighbouring properties and the surrounding environment. Developments likely to generate more significant levels of noise will be permitted only where appropriate noise attenuation measures are incorporated which would reduce the impact on the surrounding land uses, existing or proposed and sensitive human and animal receptors, to acceptable levels in accordance with Government guidance.

– C3 'Renewable Energy', which states that planning permission will normally be granted for off-site renewable energy where it has been demonstrated that there is no significant adverse impact on local amenity, health and quality of life as a result of noise, emissions to atmosphere, electronic interference or outlook through unacceptable visual intrusion.

Guidance

- BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound **[Ref. 13-9]**;
- BS 4142:2014+A1:2019 – Technical Note (Association of Noise Consultants, 2020) **[Ref. 13-10]**;
- BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise **[Ref. 13-11]**;
- BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration **[Ref. 13-12]**;
- BS 7445-1:2003 Description and measurement of environmental noise - Guide to Quantities and Procedures **[Ref. 13-13]**;
- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings **[Ref. 13-14]**;
- BS EN IEC 60942:2018 Electroacoustics – Sound Calibrators **[Ref. 13-15]**;
- BS EN 61672-1:2013 Electroacoustics – Sound Level Meters **[Ref. 13-16]**;

- BS ISO 9613-2:2024 Acoustics. Attenuation of sound during propagation outdoors. Part 2: Engineering method for the prediction of sound pressure levels outdoors **[Ref. 13-17]**;
- Calculation of road traffic noise memorandum (CRTN), 1988 **[Ref. 13-18]**;
- Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration, 2020 **[Ref. 13-19]**;
- Institute of Environmental Management & Assessment (IEMA) Guidelines for environmental noise impact assessment, 2014 **[Ref. 13-20]**;
- Planning Practice Guidance – Noise (2019) **[Ref. 13-21]**; and
- World Health Organisation (WHO) Guidelines for community noise, 1999 **[Ref. 13-22]**.

13.3. Stakeholder engagement

13.3.1. **Table 13.1** provides a summary of the stakeholder engagement activities undertaken separate from the Environmental Impact Assessment (EIA) scoping, Phase One Consultation, Phase Two Consultation and Targeted Consultation process. This table also details the matters raised, how such matters have been addressed, and where they have been addressed within the Development Consent Order (DCO) Application documentation.

13.3.2. **ES Volume 4, Appendix 5.3: EIA Scoping Opinion Response Matrix [EN010158/APP/6.4]** presents the responses received in the EIA Scoping Opinion and the Applicant's response to each matter that has been raised.

13.3.3. **Appendices A4, J1, J2 and K3** of the **Consultation Report Appendices [EN010158/APP/5.2]**, which is submitted in support of the DCO Application, sets out the feedback received during Phase One Consultation, Phase Two Consultation and Targeted Consultation and how regard has been afforded by the Applicant to each matter raised.

Table 13.1: Summary of stakeholder engagement

Consultee	Date of engagement	Summary of matters raised	Outcome of engagement	Where this matter is addressed in the DCO Application documentation
Buckinghamshire Council	9 November 2023	The Applicant set out the proposed scope of the baseline noise survey, including monitoring locations and length of survey. Response received from Buckinghamshire Council (dated 29 November 2023), stating acceptance of the monitoring approach.	The agreed methodology for the survey was undertaken.	**ES Volume 4, Appendix 13.1: Baseline Noise Survey [EN010158/APP/6.4]**
Buckinghamshire Council	10 June 2024	The Applicant sought approval of the baseline noise data, as presented in the baseline noise survey report. No response was received from Buckinghamshire Council; however, feedback was subsequently provided during Phase Two Consultation.	The baseline survey results including statistical analysis of representative background sound levels have been included in full, accounting for feedback from Buckinghamshire Council.	**ES Volume 4, Appendix 13.1: Baseline Noise Survey [EN010158/APP/6.4]**

13.4. Approach to identifying the scope of the assessment

Study area

13.4.1. The noise and vibration study area for the assessment of the construction and decommissioning phases of the Proposed Development considers noise and vibration sensitive receptors that are located within 300m of the Order Limits. This has been determined based on the guidance set out in BS 5228-1 **[Ref. 13-11]**, BS 5228-2 **[Ref. 13-12]** and other related guidance documents, including DMRB LA 111 **[Ref. 13-19]**. The study area is shown in **ES Volume 3, Figure 13.1**: **Study Area and Receptors [EN010158/APP/6.3]**.

13.4.2. For the assessment of noise levels during operation (including maintenance) of the Proposed Development, the study area extends out to the nearest or most exposed noise-sensitive receptors to the noise-producing elements of the Proposed Development, as shown in **ES Volume 3, Figure 13.1**: **Study Area and Receptors [EN010158/APP/6.3]**.

Scope of the assessment

13.4.3. The scope of this assessment has been established throughout the EIA process and design of the Proposed Development. Further information can be found in **ES Volume 1, Chapter 5: Approach to the EIA [EN010158/APP/6.1]**.

13.4.4. This section provides an update to the scope of the assessment from that presented in **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and re-iterates/updates the evidence base for scoping receptors/matters in or out following further iterative assessment.

Receptors/matters scoped into the assessment

13.4.5. **Table 13.2** presents the receptors/matters that are scoped into the assessment reported within this ES, together with appropriate justification.

Table 13.2: Receptors/matters scoped into the assessment

Receptor/matter	Phase	Justification
Noise and vibration	Construction and decommissioning	This matter is scoped into the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and confirmed within **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**.

Receptor/matter	Phase	Justification
		Noise and vibration due to construction activities has the potential to impact sensitive receptors surrounding the Site.
Road traffic noise	Construction and decommissioning	This matter is scoped into the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and confirmed within **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**. An increase in HGV/vehicle movements in the short term has the potential to impact sensitive receptors surrounding the Site.
Noise	Operation (including maintenance)	This matter is scoped into the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and confirmed within **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**. Noise arising from the operation of Inverters, Transformers, heating ventilation and air conditioning systems, and other ancillary electrical infrastructure required for the Solar PV development/Battery Energy Storage System (BESS) infrastructure has the potential to impact sensitive receptors surrounding the Site.

13.4.6. Noise-sensitive receptors considered within this assessment are summarised in **Table 13.3**. In certain instances, the identified noise-sensitive receptors represent a number of dwellings adjacent to or within the proximity of the receptor listed in the table, as it can be reasonably assumed the baseline acoustic conditions and predicted noise levels from the Proposed Development would be similar. The receptors are shown in **ES Volume 3, Figure 13.1: Study Area and Receptors [EN010158/APP/6.3]**.

Table 13.3: Noise-sensitive receptors

Ref	Receptor	Type	Location		Justification
			Easting	Northing	
R1	Beachfield	Residential	469746	222045	Proximity to Parcel 1
R2	Bernwood Farm	Residential	473249	224289	Proximity to Parcel 1
R3	Orchard Way, Botolph Claydon	Residential	473167	224505	Proximity to Parcel 2
R4	Botyl Rd, Botolph Claydon	Residential	473373	224561	Proximity to Parcel 2
R5	Brickhill Way, Calvert	Residential	468901	224376	Proximity to Parcel 1
R6	Calvert Cottages	Residential	469607	225078	Proximity to Parcel 1
R7	Catherine Cottages	Residential	470947	224982	Proximity to Parcel 1
R8	Catherine Farm	Residential	471374	225065	Proximity to Parcel 1
R9	Claydon Rd	Residential	473726	222497	Proximity to Parcel 1
R10	Dry Leys Farmhouse	Residential	473106	221893	Proximity to Parcel 2
R11	Finmere Hill House	Residential	471539	222349	Proximity to Parcel 1
R12	Hogshaw Farm	Residential	473682	222920	Proximity to Parcel 2
R13	Knowlhill Farm	Residential	470860	223738	Proximity to Parcel 1
R14	Lower Farm	Residential	475058	224008	Proximity to Parcels 2 and 3
R15	Muxwell Farm	Residential	471903	224048	Proximity to Parcel 1
R16	Pond Farm	Residential	469670	224760	Proximity to Parcel 1
R17	The Old Dairy, Pond Farm	Residential	469717	224734	Proximity to Parcel 1
R18	Sion Hill Farm	Residential	474840	225346	Proximity to Parcel 3

Ref	Receptor	Type	Location		Justification
			Easting	Northing	
R19	Woodland Barn	Residential	471471	221338	Proximity to Parcel 2
R20	Borshaw Farm	Residential	473925	223275	Proximity to Parcel 2
R21	Brackley Ln, Calvert (A)	Residential	468818	224702	Proximity to Parcel 1
R22	Brackley Ln, Calvert (B)	Residential	468844	224621	Proximity to Parcel 1
R23	Red Kit View, Calvert	Residential	469001	224283	Proximity to Parcel 1
R24	Blackmore Hill Farm Cottages	Residential	471016	225035	Proximity to Parcel 1
R25	Woodlands Farm Fishery	Residential	471386	221604	Proximity to Parcel 2
R26	Claydon House	Residential	472037	225238	Proximity to Parcel 1
R27	Middle Farm	Residential	472885	221180	Proximity to Parcel 2
R28	Granborough	Residential	476389	225197	Proximity to Parcel 3
R29	East Claydon	Residential	473732	225406	Proximity to Parcel 3

Receptors/matters scoped out of the assessment

13.4.7. **Table 13.4** presents the receptors/matters that are scoped out of the assessment that are therefore not considered as part of this ES, together with appropriate justification.

Table 13.4: Receptors/matters scoped out of the assessment

Receptor/matter	Phase	Justification
Vibration	Operation (including maintenance)	Levels of vibration associated with the Solar PV development and BESS would be low and are highly unlikely to be perceptible over the distance ranges between the plant and the nearest residential dwelling. This matter is scoped out of the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and

Receptor/matter	Phase	Justification
		confirmed within **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**. However, **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]** requested that the ES should demonstrate that operational plant and equipment is of a type that does not generate a perceptible level of vibration or is to be used in locations unlikely to result in significant vibration impacts on both human and ecological receptors. The Applicant can confirm that operational elements, including fixed plant items/structures, would not emit discernible levels of vibration and are located at a sufficient distance away from sensitive receptors.
Road traffic noise	Operation (including maintenance)	Increase in road traffic during the operation (including maintenance) phase is likely to be negligible, with vehicles likely to be required for routine maintenance on the facility and replacement which would be significantly below the levels of road traffic during the construction phase. This matter is scoped out of the assessment, as detailed within **ES Volume 4, Appendix 5.1: EIA Scoping Report [EN010158/APP/6.4]** and confirmed within **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]**. However, **ES Volume 4, Appendix 5.2: EIA Scoping Opinion [EN010158/APP/6.4]** requested that the ES project description should confirm the anticipated trip generation (including number and type of vehicles) required for routine maintenance during operation to justify this approach. Such information is included in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**.

13.5. Environmental baseline

Establishing baseline conditions

Data sources to inform the EIA baseline characterisation

13.5.1. The following data sources have been used to understand the existing noise and vibration baseline conditions:

- Aerial photography and Ordnance Survey mapping; and
- Department for Environment, Food and Rural Affairs (Defra) Round 4 road and rail strategic noise maps and noise action plans.

Site visits/surveys

13.5.2. The following Site visits/surveys have been undertaken to understand the existing baseline noise conditions:

- Unattended noise monitoring at 10 positions (see **Table 13.5** below) representative of noise sensitive receptors in the local area, as agreed with Buckinghamshire Council, undertaken between Wednesday 06 March 2024 and Thursday 04 April 2024.

Table 13.5: Baseline noise survey locations

ID	Representative of Receptor	Location		Measurement dates
		Easting	Northing	
MP1	R18, R28, R29	475943	226058	06/03/24 – 20/03/24
MP2	R2, R3, R4	473413	224475	25/03/24 – 04/04/24
MP3	R9, R12, R14, R20	473735	223234	06/03/24 – 14/03/24
MP4	R10, R19, R27	473091	221837	06/03/24 – 18/03/24
MP5	R1, R11 and R25	471608	222451	06/03/24 – 20/03/24
MP6	R13	470837	223635	06/03/24 – 20/03/24
MP7	R7, R8, R24, R26	471005	224855	06/03/24 – 20/03/24
MP8	R16, R17	469982	224828	20/03/24 – 04/04/24
MP9	R5, R6, R21, R22, R23	468907	224367	06/03/24 – 20/03/24
MP10	R15	471694	223911	25/03/24 – 04/04/24

13.5.3. The baseline survey locations are presented in **ES Volume 3, Figure 13.2: Baseline Survey Locations [EN010158/APP/6.3]**.

Existing baseline

13.5.4. This section presents a summary of the baseline conditions for the receptors/matters scoped into the assessment, as detailed within **Table 13.5** above. The full details of the baseline conditions are presented in the following appendices presented in **ES Volume 4, Appendix 13.1: Baseline Noise Survey [EN010158/APP/6.4]**.

13.5.5. The measured baseline sound levels, and representative background sound levels as derived in accordance with BS 4142 **[Ref. 13-9]**, are presented in **Table 13.6**.

Table 13.6: Measured noise levels

ID	Period	Average measured noise levels, dB		Representative background sound level dB $L_{A90,T}$
		$L_{Aeq,T}$	$L_{A90,T}$	
MP1	Daytime	43	35	32
	Night-time	38	30	30
MP2	Daytime	49	37	34
	Night-time	51	31	30
MP3	Daytime	46	36	29
	Night-time	40	29	24
MP4	Daytime	57	43	36
	Night-time	49	35	29
MP5	Daytime	48	38	33
	Night-time	46	33	29
MP6	Daytime	47	38	32
	Night-time	41	34	30
MP7	Daytime	45	35	31
	Night-time	41	29	23
MP8	Daytime	46	36	29
	Night-time	46	31	25

ID	Period	Average measured noise levels, dB		Representative background sound level dB $L_{A90,T}$
		$L_{Aeq,T}$	$L_{A90,T}$	
MP9	Daytime	49	40	34
	Night-time	41	34	30
MP10	Daytime	48	40	29
	Night-time	44	34	27

Future baseline in the absence of the Proposed Development

13.5.6. On the basis that the majority of the Proposed Development is located within a rural setting, typically comprising agricultural land use, there are not expected to be significant changes to the baseline conditions in the future.

13.5.7. In instances where the Proposed Development is located close to transport infrastructure, such as roads and railway lines, there is potential for increased traffic flows in the future baseline scenario. In the absence of significant alterations to the wider road or rail network, the variation in traffic flows would be expected to be incremental and therefore unlikely to give rise to perceptible changes in the acoustic environment.

13.6. Approach to the assessment

Approach to design flexibility

13.6.1. The parameters, as outlined in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]** and the parameter plans presented in **ES Volume 3, Figure 3.1: Height Parameters [EN010158/APP/6.3]** and secured in **Appendix 1: Green and Blue Infrastructure Parameters** and **Appendix 3: Vegetation Removal Parameters** of the **Outline Landscape and Ecological Management Plan (Outline LEMP) [EN010158/APP/7.6]**, **Design Commitments [EN010158/APP/5.9]** and the **Works Plans [EN010158/APP/2.3]** set out the reasonable 'worst-case' parameters for the Proposed Development.

13.6.2. **ES Volume 1, Chapter 5: Approach to the EIA [EN010158/APP/6.1]** sets out those elements of the Proposed Development for which optionality is present within the design.

13.6.3. Further to the flexibility and minimum/maximum parameters under the Rochdale Envelope approach described in **ES Volume 1, Chapter 5: Approach to the EIA [EN010158/APP/6.1]** the scenarios presented in **Table 13.7** have been assessed. It is anticipated that the noise emitting

equipment will be refined as part of the detailed design. This design development may include consideration of alternative equipment specifications, locations and numbers of noise emitting equipment within the Order Limits, which will be in accordance with the parameters secured within the **Works Plans [EN010158/APP/2.3]** and **Design Commitments [EN010158/APP/5.9]**. Prospective design solutions will not be progressed if the associated noise levels post-mitigation result in any significant adverse effects i.e. no greater than the adopted criteria of 40dB L_{Ar} daytime and 35dB L_{Ar} night-time at high sensitivity receptors, as secured by a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**.

Table 13.7: Scenario assessed for noise and vibration

Project element	Scenario that has been assessed
BESS	There are two fields (D8 and D9) in Parcel 2 that are considered suitable for the siting of the BESS, as outlined within **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**. For the purposes of assessment, the BESS is assumed to be located across both Fields D8 and D9.
Rosefield Substation	The Rosefield Substation is assumed to be located within Parcel 3 across Fields E11 and E20 as indicated as 'Proposed siting zone for Rosefield Substation' (marked as S) in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**.
Balance of Solar System (BoSS)	The area for Solar PV development is shown in light blue in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**. The assessment accounts for 27 Central Inverter/ITS Stations distributed across 24 fields, and 83 String Inverters across four fields. Further information is provided in **ES Volume 4, Appendix 13.3: Operational Phase Assessment Details [EN010158/APP/6.4]**. This has been assessed as a reasonable assumption for the assessment. As detailed in **Paragraph 13.6.3** above, it is anticipated that the noise emitting equipment will be refined as part of the detailed design. Prospective design solutions will not be progressed if the associated noise levels post-mitigation result in any significant adverse effects i.e. no greater than the adopted criteria of 40dB L_{Ar} daytime and 35dB L_{Ar} night-time at high sensitivity

Project element	Scenario that has been assessed
	receptors, which is secured by a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**.
Main Collector Compound	There are four fields that are considered suitable for the Main Collector Compound, which are located in Parcel 3, as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3]**. For the purposes of assessment, the Main Collector Compound is assumed to be located in Field E21. Given the minimal noise emissions associated with the Main Collector Compound, it could be located in any of the other three fields without changing the outcome of the assessment. As detailed in **Paragraph 13.6.3** above, it is anticipated that the noise emitting equipment will be refined as part of the detailed design. Prospective design solutions will not be progressed if the associated noise levels post-mitigation result in any significant adverse effects i.e. no greater than the adopted criteria of 40dB L_{Ar} daytime and 35dB L_{Ar} night-time at high sensitivity receptors, which is secured by a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**.
Satellite Collector Compounds	There are four fields that are considered suitable for the two Satellite Collector Compounds, as shown on **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and secured in the **Works Plans [EN010158/APP/2.3].** However, it is anticipated that one Satellite Collector Compound would be required in both Parcel 1 and Parcel 2. For the purposes of assessment, the Satellite Collector Compounds are assumed to be located at the following locations: • Field B23 (South); and • Field D17. This has been assessed as a reasonable assumption for the assessment. As detailed in **Paragraph 13.6.3** above, it is anticipated that the noise emitting equipment will be refined as part of the detailed design. Prospective design solutions will not be progressed if the associated noise levels post-mitigation result in any significant adverse effects i.e.no greater than the adopted criteria of 40dB L_{Ar}

Project element	Scenario that has been assessed
	daytime and 35dB L_{Ar} night-time at high sensitivity receptors, which is secured by a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**.
Primary Construction Compounds	This assessment assumes that the Primary Construction Compounds would be located in Parcel 1 at Field B23 (South), Parcel 2 at Field D7 and Parcel 3 at Field E23, as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**.
Secondary Construction Compounds	This assessment assumes that the Secondary Construction Compounds would be located in Parcel 1 at Field B7, Parcel 2 at Field D27 and Parcel 3 at Field E10, as outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**.
Interconnecting Cable Corridor(s)	All crossings under public roads are assumed to be constructed using Horizontal Directional Drilling (HDD).
Grid Connection Cable Corridor	The construction phase assessment has accounted for an assumed Grid Connection Cable Corridor within Fields SA51, SA52 and SA57, on the basis that this is likely to result in the highest noise levels at off-site receptors.
Internal Access Corridor(s) and Indicative site access locations	This assessment has taken into account all potential Site access locations outlined in **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]**.

Assessment assumptions

13.6.4. The assessment of the noise and vibration impact has been based on the information set out in **ES Volume 1, Chapter 3: Proposed Development Description [EN010158/APP/6.1]**. Detailed list of assumptions used for the purposes of the assessment are outlined in **ES Volume 4, Appendix 13.2: Construction Noise Plant Tables and Results** and **Appendix 13.3: Operational Phase Assessment Details [EN010158/APP/6.4]**.

Construction and decommissioning phases – on-site activities

13.6.5. The specific working methodologies have not been defined at this stage, and therefore the construction activities and plant/equipment that would be utilised are based on experience of similar developments. The assumed plant lists are defined in **ES Volume 4, Appendix 13.2: Construction Noise Plant Tables and Results [EN010158/APP/6.4]**.

13.6.6. It has been assumed that HDD may be required along the Interconnecting Cable Corridor at the intersection with Claydon Road and with Granborough Road. Given the limited width of the road crossings, it is expected that the works could be carried out during normal daytime construction hours. If work is extended into periods beyond the core daytime hours, reduced threshold noise criteria will apply such as that noise levels do not exceed a level of ~~35~~45 dB ~~L~~L_{Ar} $L_{Aeq,T}$ night-time, for which separate authorisation would be secured with the Local Planning Authority, as detailed in and secured by the **Outline Construction Environmental Management Plan (Outline CEMP) [EN010158/APP/7.2]**.

13.6.7. During the decommissioning phase of the Proposed Development, it has been assumed that the resultant noise levels would be broadly similar to the construction phase.

Operation (including maintenance) phase

13.6.8. The precise details of operational plant and equipment have not been determined. This will be the subject of a future design exercise, in order to make best use of battery and solar related technology that is evolving over time. The operational assessment has therefore been based on indicative plant and equipment, as set out in **Table 13.8**, in order to carry out an assessment that is likely to be representative of the operation of the Proposed Development.

13.6.9. The operation (including maintenance) phase noise emissions that have been used to carry out the assessment are based on information that has been provided by the Applicant's engineering team.

13.6.10. It has been assumed that all operation phase plant/equipment would operate continuously during both daytime and night-time periods i.e. no allowance has been made for reduced noise emissions during the hours of darkness. This represents a worst-case scenario as the noise emissions from the BESS units and Inverters are expected to reduce during the hours of darkness.

Assessment methodology and criteria

Construction and decommissioning phases – noise from on-site construction

13.6.11. The construction phase assessment has been undertaken based on the guidance contained within BS 5228-1 **[Ref. 13-11]** and has been used to determine whether the construction phase activities are likely to result in significant adverse effects on the surrounding sensitive receptors. The prediction method considers the noise emission level of the proposed plant items, the separation distance between the source and the receptors, and the intervening ground conditions.

13.6.12. Construction activities would involve the use of a variety of working methods, with the resultant noise and vibration levels experienced by a receptor varying over time as the distances to plant items change and the type of construction activity changes.

13.6.13. Due to the nature of the land within the defined study area, soft ground attenuation has been adopted for the construction phase noise predictions. No allowance has been made for acoustic screening provided by intervening landforms or structures.

13.6.14. For the purposes of the assessment, the following primary construction activities have been considered:

- Vegetation clearance;
- Boundary fencing;
- Topsoil strip/site preparation;
- Preparation of Construction Compounds;
- Access track construction;
- Solar PV module installation works;
- Bulk earthworks to BESS, Rosefield Substation and Collector Compound sites;
- Construction of BESS, Rosefield Substation and Satellite and Main Collector Compound(s);
- Cable trenching;
- HDD;
- Use of Construction Compound(s); and
- Highway improvement works – road widening.

13.6.15. To inform the noise prediction calculations, the separation distances between the proposed construction working areas and the surrounding sensitive receptors have been derived using the **ES Volume 3, Figure 3.5: Zonal Masterplan [EN010158/APP/6.3]** and online mapping data.

13.6.16. Construction works would be undertaken during the hours of 07:00 to 19:00 Monday to Friday, and 07:00 to 12:00 on Saturday. Between 07:00 to 08:00 and 18:00 to 19:00 Monday to Friday and 07:00 to 08:00 on Saturdays, noisier activities (such as piling) would be restricted depending on the construction activity proposed to take place and its proximity to sensitive receptors. No construction works would be carried out on Sundays or Bank or Public Holidays without prior agreement with Buckinghamshire Council. This is detailed in and secured by the **Outline CEMP [EN010158/APP/7.2]**.

13.6.17. The significance criteria given in Annex E of BS 5228-1 **[Ref. 13-11]** have been used to assess the potential for noise effects during the construction phase of the Proposed Development. Section E.3.2 details the 'ABC Method' of determining the potential significance of noise effects. This method defines threshold noise levels for different time periods which are dictated by the pre-construction ambient noise levels. If the construction stage noise levels exceed the appropriate threshold value, then a potential significant effect is indicated.

13.6.18. Unless ambient noise levels within the defined study area are sufficiently high to provide masking of construction noise, the lower bound daytime cut-off value of 65dB $L_{Aeq,T}$ applies. Given the baseline acoustic conditions in the area, the lower bound 65dB $L_{Aeq,T}$ criterion has been adopted as the threshold of significance.

13.6.19. A qualitative appraisal of construction noise affecting users of public rights of way (PRoW) has been undertaken.

Construction and decommissioning phases – vibration from on-site construction

13.6.20. Certain construction works can produce ground-borne vibration, which has the potential to give rise to impacts at nearby sensitive receptors.

13.6.21. Construction induced vibration levels have been predicted using the empirical formula contained in Annex E of BS 5228-2 **[Ref. 13-12]**. The vibration levels have been assessed against the relevant Peak Particle Velocity (PPV) threshold levels within the standard.

13.6.22. The significance criteria for the construction and decommissioning phase vibration levels have been derived from Annex B of BS 5228-2 **[Ref. 13-12]**. For human receptors, a PPV vibration level of 1mm/s has been adopted as the threshold for potentially significant vibration impacts.

13.6.23. The main source of vibration associated with the Proposed Development is expected to be attributable to vibratory compaction activities. This source has therefore been considered as part of a quantitative assessment.

Construction phase – road traffic noise

13.6.24. The noise impact assessment of the construction phase beyond the Order Limits is based on the assumptions relating to routing and future baseline traffic values set out in **ES Volume 2, Chapter 15: Transport and Access [EN010158/APP/6.2]**.

13.6.25. For the purposes of the road traffic noise assessment, the following road links have been considered:

- A41 (West);

- A41 (East);
- Station Road/Dewes Lane;
- Snake Lane/Fidlers Field;
- Claydon Road; and
- Granborough Road.

13.6.26. The construction phase is anticipated to have a duration of 30 months. The peak of construction traffic will occur in the early phases of construction in 2029 (Month 8) and there would be a lower base traffic compared to 2030 or 2031. Therefore, the Proposed Development would generate a higher percentage impact compared to undertaking the assessment for later years. This has therefore been used to provide a reasonable worst-case assessment.

13.6.27. The methodology contained within CRTN **[Ref. 13-18]** has predominantly been used to calculate the noise levels associated with increased road traffic flows, with the BS 5228-1 **[Ref. 13-11]** haul road calculation formula used for local road links where the low volume of baseline traffic would mean that it would be beyond the scope of CRTN **[Ref. 13-18]**.

13.6.28. For the CRTN **[Ref. 13-18]** calculation method, 18-hour Annual Average Weekday Traffic (AAWT) flows have been used to inform the calculations, whereas hourly flows derived from the 12-hour traffic data (07:00-19:00) have been used to inform the BS5228-1 **[Ref. 13-11]** haul road calculations. The different traffic datasets reflect the assessment criteria for the two methods.

13.6.29. Both calculation methods use a number of input variables to predict road traffic noise levels, including traffic flow volume, vehicle speed and percentage of heavy goods vehicles.

13.6.30. The traffic assessment focuses on the change in noise levels that are likely to occur on road links as a result of the construction phase works. Traffic noise predictions have been carried out at notional receptors located 10m from the edge of the carriageway and 1.5m above ground level to determine the change in noise level. Notional receptors are used because it is the change in traffic noise level that is of interest, not the absolute noise levels at any given receptor. The predicted changes in noise level would occur at noise-sensitive receptors along each of the roads considered, regardless of whether they have been specifically considered or not.

13.6.31. For road links subject to low baseline traffic flows i.e. beyond the scope of CRTN **[Ref. 13-18]**, consideration has also been given to the absolute noise level criteria for general construction works.

Operation (including maintenance) phase

13.6.32. Operation (including maintenance) phase noise levels have been predicted using a computer noise model of the Proposed Development layouts, using proprietary modelling software SoundPLAN (v9.1). The model adopts the calculation method in BS ISO 9613-2 **[Ref. 13-17]**, which is suitable for a wide range of applications where the noise level outdoors is of interest. The calculation method considers the mechanisms of noise propagation, including geometrical divergence, atmospheric absorption, ground effect, reflection from surfaces and screening by obstacles, barriers and buildings.

13.6.33. The calculation method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the noise-sensitive receptor e.g. downwind propagation or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

13.6.34. The operation (including maintenance) phase noise emissions that have been used to carry out the assessment are presented in **Table 13.8**. Further information is provided in **ES Volume 4, Appendix 13.3: Operational Phase Assessment Details [EN010158/APP/6.4]**.

Table 13.8: Operation (including maintenance) phase noise emissions

Equipment	Quantity	Noise level	Notes
BESS			
BESS generic containers	500	65dB(A) at 1m distance (from the relevant kit).	Noise emitting from one side and one end. Noise emitting faces orientated inwards.
BESS Medium Voltage Station and Transformers	51	*Varying depending on unit surface:* 59dB(A) at 1m (front) 52dB(A) at 1m (right) 71dB(A) at 1m (back) 61dB(A) at 1m (left) 62dB(A) at 1m (top)	Noise emitting from all sides of unit, orientated with the front of the containing facing the north-east
BESS Auxiliary Transformers	12	40dB(A) at 1m	Noise emitting from all sides of unit – 2.4m x 2.5m x 4.0m (LxWxH)
Main Collector Compound			

Equipment	Quantity	Noise level	Notes
Auxiliary Transformers	12	40dB(A) at 1m	Noise emitting from all sides of unit – 2.4m x 2.5m x 4.0m (LxWxH)
Satellite Collector Compound			
Main Transformer	1	75dB(A) at 1m	Noise emitting from all sides of unit - 6.72m x 2.74m x 4.65m (LxWxH)
Auxiliary Transformers	1	40dB(A) at 1m	Noise emitting from all sides of unit – 2.4m x 2.5m x 4.0m (LxWxH)
Rosefield Substation			
Main Transformers	Up to 7	75dB(A) at 1m	Noise emitting from all sides of unit - 6.72m x 2.74m x 4.65m (LxWxH)
Solar PV modules			
Central Inverters/ITS Stations	27	57dB(A) at 10m per single station 60dB(A) at 10m per double station	27 Central Inverter/ITS Stations distributed across 24 fields. Each of the 27 stations includes one or two Inverters, each emitting 57 dB(A) at 10m.
String Inverters	83	75dB(A) at 1m	Distributed across four fields within Parcel 1 and Parcel 3.

13.6.35. In accordance with the BS 4142 **[Ref. 13-9]** assessment methodology, where certain features of the specific noise level can increase the significance of impact of a sound level, a character correction is applied to provide a 'Rating Level'. The characteristics of the specific sound that would attract a character correction are tonality, impulsivity, intermittency or other characteristic features that are readily discernible against the residual acoustic environment.

13.6.36. BS 4142 **[Ref. 13-9]** includes the addition of rating penalties (to the specific noise) as a factor of 'perceptibility' over the residual sound. For

the purposes of the assessment, the addition of rating penalties considers the numerical comparison of the specific noise from operational fixed plant against the baseline residual sound level at each noise-sensitive receptor in order to determine perceptibility.

13.6.37. For the purposes of assessment, either a +2dB or +3dB rating correction has been applied to the predicted specific levels. This would account for a situation either where a tone is just perceptible at the nearest noise sensitive receptor, or where specific sound is likely to be readily distinctive against the residual acoustic environment, but not tonal, respectively. The rating correction has been determined through interrogation of the noise model results including the source contributions at each individual receptor.

Value/sensitivity/importance of the receptor

13.6.38. Sensitivity classifications for human receptors have been defined for a range of receptor types, as shown in **Table 13.9**; these have been informed from guidance contained in the following documents:

- DMRB LA 111 **[Ref. 13-19]**; and
- IEMA 'Guidelines for Environmental Noise Impact Assessment' **[Ref. 13-20]**.

Table 13.9: Receptor sensitivity criteria for noise and vibration

Receptor sensitivity	Type of receptor
High	Residential properties, educational establishments, hospitals, places of worship, hotels, children's nurseries, nursing homes.
Medium	Commercial premises including offices, halls, public municipal areas, bars and restaurants, public rights of way.
Low	Industrial premises.
Negligible	All other areas that are typically unoccupied.

13.6.39. Receptor sensitivity for ecological receptors is set out in **ES Volume 2, Chapter 7: Biodiversity [EN010158/APP/6.2]**.

Magnitude of impact

13.6.40. The magnitude of the impact within this assessment has been described using the following scale:

- High;
- Medium;

- Low; and
- Negligible.

13.6.41. Although the lowest measure of magnitude of impact is defined as 'negligible', it should be noted that noise and vibration levels may still be audible/perceptible during the construction, operation (including maintenance) and decommissioning phase of the Proposed Development.

13.6.42. The criteria in **Table 13.10** have been adopted for the assessment of magnitude of impact.

Table 13.10: Magnitude of impact criteria for noise and vibration

Impact *(Relevant guidance)*	Magnitude of impact			
	Negligible	Low	Medium	High
Construction and decommissioning phases – daytime noise *(BS 5228-1)* **[Ref. 13-11]**	Less than 55dB $L_{Aeq,T}$	Between 55 and 65dB $L_{Aeq,T}$	Between 66 and 75dB $L_{Aeq,T}$	Greater than 75dB $L_{Aeq,T}$
Construction phase and decommissioning - road traffic noise *(DMRB LA 111)* **[Ref. 13-19]**	Less than 1dB increase in road traffic noise	1.0 to 2.9dB increase in road traffic noise	3.0 to 4.9dB increase in road traffic noise	Greater than or equal to 5dB increase
Construction and decommissioning phases – vibration *(BS 5228-2)* **[Ref. 13-12]**	Less than 0.3 mm/s PPV	0.3 to less than 1.0mm/s PPV	1.0 to 9.9 mm/s PPV	Greater than or equal to 10mm/s PPV
Operation phase – daytime noise *(BS 4142/BS 8233/WHO Guidelines for Community Noise)* **[Ref. 13-9, 13-14 & 13-22]**	Rating level >5dB below background sound level, or rating level ≤35dB(A)	Rating level between 5dB below and 5dB above background sound level, or rating level >35 but ≤40 dB(A)	Rating level between 5 and 10dB above background sound level, or rating level >40 but <50 dB(A)	Rating level >10dB above background sound level, or rating level ≥50dB(A)

Impact *(Relevant guidance)*	Magnitude of impact			
	Negligible	Low	Medium	High
Operation phase – night-time noise *(BS 4142/BS 8233/WHO Guidelines for Community Noise)* **[Ref. 13-9,1 3-14 & 13-22]**	Rating level >5dB below background sound level, or rating level ≤30dB(A)	Rating level between 5dB below and 5dB above background sound level, or rating level >30 but ≤35 dB(A)	Rating level between 5 and 10dB above background sound level, or rating level >35 but <45 dB(A)	Rating level >10dB above background sound level, or rating level ≥45dB(A)

Notes:

1. Daytime construction phase noise levels are based on a time period 'T' which equates to the duration of a working day on-site.
2. The construction noise impact criteria will apply if the works occur for a duration exceeding 10 or more days or nights in any 15 consecutive days or nights; or a total number of days exceeding 40 in any 6 consecutive months.
3. Operation (including maintenance) phase noise criteria are based on rating levels as defined in BS 4142 **[Ref. 13-9]** and refer to a time interval of 1-hour for the daytime period and 15-minute for the night-time period.
4. Operation phase criteria shall consider the rating noise levels relative to background sound level, but also the absolute noise levels. The criteria are based on the least onerous of the two parameters (refer to justification below for absolute levels).

13.6.43. Regarding the magnitude criteria for the operation (including maintenance) phase, BS 4142 **[Ref. 13-9]** advises that where rating levels and background levels are low, which is typically the case in rural areas, the assessment of operational noise at residential receptors should take the absolute noise level into context. The Association of Noise Consultants Guide to BS 4142 **[Ref. 13-10]** provides some clarity to this by stating:

"BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30dB L_{A90}, and low rating levels as being less than about 35dB $L_{Ar,Tr}$"

13.6.44. It goes on to suggest that:

"…similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate".

13.6.45. In this case, it is considered that a rating level of 40dB $L_{Ar,T}$ during the daytime, and 35dB $L_{Ar,T}$ at night for the low magnitude impact criteria, would align with guidance in Planning Practice Guidance **[Ref. 13-21]**, which defines noise below the lowest observed adverse effect level (LOAEL) as follows:

"Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".

13.6.46. Furthermore, BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' **[Ref. 13-14]** and the WHO 'Guidelines for Community Noise' (1999) **[Ref. 13-22]** provide guidance levels for internal noise within dwellings of 30dB $L_{Aeq,T}$ for good sleeping conditions at night. BS 8233:2014 **[Ref. 13-14]** states that building envelope attenuation reduces external noise by approximately 15dB for a partially open window. Consequently, an external high-magnitude criterion of 45dB $L_{Ar,T}$, indicating a significant observed adverse effect level (SOAEL), has been adopted for the night-time. In line with the guidance, the daytime criteria would be 5dB higher than the night-time.

13.6.47. Based on the adaptation of absolute limits, WHO 'Guidelines for Community Noise' 1999 **[Ref. 13-22]** provides its guidance on permissible levels, above which adverse effects are likely to occur. Therefore, the threshold for significant effects adopted within this assessment are considered as a design limit, above which the onset of LOAEL and potentially SOAEL may occur.

Significance of effect

13.6.48. The overall significance of an effect is determined by combining the sensitivity of the receptor and magnitude of impact (as presented in **Table 13.11**). The assessment of significance relies on best practice and the relevant published standards and guidance documents as defined in **Section 13.2**.

13.6.49. The significance of an effect is reported as either '**significant'** or '**not significant'**. Where significance of effect is assessed as '**negligible'** or '**minor'**, the effect is **not significant**. Where the significance of effect is assessed as '**moderate'** or '**major'**, the effect is **significant**.

Table 13.11: Determining significance of effects for noise and vibration

Magnitude of impact	Sensitivity of receptor/receiving environment to change			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible	Minor
Medium	Negligible	Negligible	Minor	Moderate
High	Negligible	Minor	Moderate	Major

13.7. Mitigation embedded into the design

13.7.1. This assessment has been based on the principle that measures have been 'embedded' into the design of the Proposed Development to avoid or reduce potential significant effects as far as practicable, for example by the considered placement of infrastructure. The embedded mitigation relevant to this assessment is detailed in **Table 13.12** below.

Table 13.12: Embedded mitigation relevant to noise and vibration

Embedded mitigation measures relevant to noise and vibration	Function	Securing mechanism
Rosefield Substation, BESS, Collector Compounds, Standalone Inverter, Transformer and Switchgear and ITS (part of the Balance of Solar System plant comprised in Work No. 1) will be offset a minimum distance of 50m from all existing residential properties.	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.	**Works Plans [EN010158/APP/2.3]** **Design Commitments [EN010158/APP/5.9]**
Use of equipment with low noise emissions, where feasible	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.	**Outline CEMP [EN010158/APP/7.2]** **Outline Operational Environmental Management Plan (Outline OEMP) [EN010158/APP/7.3]**

Embedded mitigation measures relevant to noise and vibration	Function	Securing mechanism
		Outline Decommissioning Environmental Management Plan (Outline DEMP) [EN010158/APP/7.4]
Orientating noise emitting equipment to reduce noise level beyond the Order Limits	Noise impact at the nearest noise sensitive receptors/residential properties is reduced.	**Outline CEMP [EN010158/APP/7.2]** **Outline OEMP [EN010158/APP/7.3]** **Outline DEMP [EN010158/APP/7.4]**

13.8. Assessment of likely effects (without additional mitigation)

Construction

Noise from on-site construction activities

13.8.1. **Table 13.13** provides indicative noise levels (in the absence of additional mitigation) that would be generated by the primary construction activities at a reference distance of 10m, together with the corresponding distance from the works beyond which the daytime 65dB $L_{Aeq,T}$ threshold criterion from BS 5228-1 **[Ref. 13-11]** is predicted to be met i.e. noise levels would be below 65dB $L_{Aeq,T}$. The corresponding plant lists are presented in **ES Volume 4, Appendix 13.2: Construction Noise Plant Tables and Results [EN010158/APP/6.4]**.

Table 13.13: Predicted construction phase noise levels

Construction activity	Indicative activity noise level at 10m distance	Approx. distance beyond which 65dB $L_{Aeq,T}$ threshold will be met
Vegetation clearance	91dB $L_{Aeq,T}$	175m
Boundary fencing	85dB $L_{Aeq,T}$	100m
Topsoil strip/site preparation	81dB $L_{Aeq,T}$	70m

Construction activity	Indicative activity noise level at 10m distance	Approx. distance beyond which 65dB $L_{Aeq,T}$ threshold will be met
Preparation of Construction Compounds	83dB $L_{Aeq,T}$	85m
Access track construction	84dB $L_{Aeq,T}$	90m
Solar PV module installation works	88dB $L_{Aeq,T}$	140m
Bulk earthworks to BESS, Rosefield Substation and Collector Compound sites	87dB $L_{Aeq,T}$	120m
Construction of BESS, Rosefield Substation, and Collector Compounds	83dB $L_{Aeq,T}$	85m
Cable trenching	83dB $L_{Aeq,T}$	85m
HDD	85dB $L_{Aeq,T}$	100m
Use of Construction Compound	77dB $L_{Aeq,T}$	50m
Highway improvement works - road widening	81dB $L_{Aeq,T}$	70m

13.8.2. Given the scale of the Site and the separation distances to surrounding receptors, it is expected that the majority of the construction works could be undertaken without causing an exceedance of the daytime 65dB $L_{Aeq,T}$ threshold criterion.

13.8.3. **Table 13.14** identifies the receptors (residential properties) that are predicted to experience daytime noise levels in excess of 65dB $L_{Aeq,T}$ as a result of the construction works.

Table 13.14: Properties predicted to exceed daytime threshold criterion

Construction activity	Receptors predicted to experience noise > 65dB $L_{Aeq,T}$	Predicted noise level dB $L_{Aeq,T}$
Vegetation clearance	R07_Catherine Cottages	67dB $L_{Aeq,T}$
	R15_Muxwell Farm	66dB $L_{Aeq,T}$
Boundary fencing	R07_Catherine Cottages	69dB $L_{Aeq,T}$
	R16_Pond Farm	69dB $L_{Aeq,T}$
	R17_The Old Dairy, Pond Farm	67dB $L_{Aeq,T}$
	R24_Blackmore Hill Farm Cottages	71dB $L_{Aeq,T}$
Topsoil strip/site prep.	R07_Catherine Cottages	66dB $L_{Aeq,T}$
	R24_Blackmore Hill Farm Cottages	67dB $L_{Aeq,T}$
Solar PV module installation works	R06_Calvert Cottages	68dB $L_{Aeq,T}$
	R07_Catherine Cottages	72dB $L_{Aeq,T}$
	R16_Pond Farm	73dB $L_{Aeq,T}$
	R17_The Old Dairy, Pond Farm	70dB $L_{Aeq,T}$
	R24_Blackmore Hill Farm Cottages	75dB $L_{Aeq,T}$

13.8.4. Where construction works are being undertaken close to the Order Limits, there is potential that the resultant noise levels (without additional mitigation) will result in an exceedance of the daytime 65dB $L_{Aeq,T}$ criterion, as indicated in **Table 13.14**. The works giving rise to exceedances are noted to be transitory in nature and would therefore only occur for a limited and temporary period of time.

13.8.5. On the basis of the assessment, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**. This would therefore require additional mitigation measures to be introduced.

Construction noise affecting PRoW

13.8.6. PRoW are by their nature transitory in use, with people typically not staying in a given location for a prolonged period of time.

13.8.7. The construction induced noise levels experienced by users of a PRoW would therefore vary depending upon the type of works being undertaken and the separation distances between the works and the PRoW.

13.8.8. It could be expected that users of PRoW within or adjacent to the Order Limits may be subject to construction noise levels which exceed the typical pre-construction ambient noise levels. However, the construction activities affecting an individual route would often be localised, and the transitory nature of PRoW users would mean that they are not exposed to construction noise for an extended period. As a result, there are not expected to be any risks of hearing damage or other noise-related adverse health effects for users of the PRoW network resulting from the construction works.

Vibration from on-site construction activities

13.8.9. **Table 13.15** presents the predicted construction induced vibration levels associated with vibratory compaction works at a range of setback distances.

Table 13.15: Vibration generated by vibratory compaction plant

Scaling factor & probability of exceedance (Ks)	PPV at a range of setback distances, mm/s				
	10m	20m	30m	40m	50m
Ks = 276 (5%)	7.5	3.1	1.7	1.2	0.8
Ks = 143 (33.3%)	3.9	1.6	0.9	0.6	0.4
Ks = 75 (50%)	2.0	0.8	0.5	0.3	0.2

Calculation Parameters

- Bomag BW 216 DH-5 single drum roller (17.9 tonne gross weight), operating at the lower range compaction amplitude, equating to an amplification value of 1.1mm.
- Calculations based on steady state compaction condition.
- No allowance made for external to internal transfer function.

13.8.10. Based on the predicted vibration levels for the most onerous scaling 5% factor, the setback distance within which a PPV level would exceed the 1 mm/s threshold criterion is 45m. There are not predicted to be any vibratory compaction works undertaken within 45m of offsite residential premises and therefore, the magnitude of impact at **high** sensitivity receptors is considered to be up to **low**. Additional mitigation measures are therefore not considered necessary.

Road traffic noise

13.8.11. The traffic data used to carry out the road traffic noise assessment is presented in **Table 13.16**.

Table 13.16: Traffic data

Road link	Traffic flow by scenario(1)			
	2029 baseline (no construction)		2029 baseline + Proposed Development	
A41 West	13,894	19% HGV	14,142	19% HGV
A41 East	12,598	21% HGV	12,710	20% HGV
Station Road/Dewes Lane	1,289	25% HGV	1,649	28% HGV
Snake Lane/Fidlers Field	103	24% HGV	462	36% HGV
Claydon Road	1,660	17% HGV	2,019	21% HGV
Granborough Road	323	25% HGV	428	26% HGV

Notes:
(1) 18-hour AAWT flows presented for the A41, Station Road and Claydon Road. 12-hour traffic flows presented for Snake Lane/Fidlers Field and Granborough Road.

13.8.12. **Table 13.17** summarises the predicted change in noise levels resulting from increased traffic flow during the construction phase of the Proposed Development.

Table 13.17: Change in road traffic noise level due to construction traffic

Road link	Predicted change in road traffic noise due to construction traffic, dB
A41 West	0.2
A41 East	0.0
Station Road/Dewes Lane	2.0
Snake Lane/Fidlers Field	7.9
Claydon Road	1.7
Granborough Road	1.5

13.8.13. The construction traffic has the potential to increase noise levels by up to 7.9dB along Snake Lane/Fidlers Field. The substantial increase in noise levels is a function of the very low volume of traffic in the baseline scenario on this road link. There are limited noise-sensitive receptors along this road, which are set back by approximately 40m and 300m from the roadside. The resultant absolute noise levels at the affected receptors are

therefore predicted to fall below the negligible criteria for the construction phase (55dB $L_{Aeq,T}$). On this basis, the magnitude of impact at **high** sensitivity receptors is considered to be **low**. Additional mitigation measures are therefore not considered necessary.

13.8.14. Noise predictions indicate that the effect of construction traffic elsewhere would increase noise levels by up to 2 dB, with the greatest change occurring on local road links e.g. Station Road/Dewes Lane, Claydon Road and Granborough Road. Where **high** sensitivity receptors are situated along these roads, the magnitude of impact would be considered **low**. Additional mitigation measures are therefore not considered necessary.

13.8.15. For the A41 road links that have been assessed, the noise levels are not likely to increase by more than 1 dB. As such, the magnitude of impact for **high** sensitivity receptors along the remaining roads considered is **negligible**. Additional mitigation measures are therefore not considered necessary.

Operation (including maintenance)

13.8.16. Predicted noise levels from the operation (including maintenance) of the Proposed Development are provided in **Table 13.18**, along with the assessment against the representative background sound levels ($L_{A90,T}$) and adopted low magnitude design criteria. Predictions are based on the modelling parameters identified in **ES Volume 4, Appendix 13.3: Operational Phase Assessment Details [EN010158/APP/6.4]**.

13.8.17. Rating levels for the Proposed Development, accounting for the cumulative impact of all operation phase plant items running concurrently, are itemised in **Table 13.18**. The corresponding noise contour plots are presented in **ES Volume 3, Figure 13.3: Operational Phase Noise Contours (Without Additional Mitigation) [EN010158/APP/6.3]**.

Table 13.18: Predicted operation phase assessment (without additional mitigation)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	21	-12	-8	-19~~-24~~	-14
R2	Bernwood Farm	37	~~8~~3	~~3~~7	-3~~-8~~	2
R3	Orchard Way, Botolph Claydon	32	~~3~~-2	2	-8~~-13~~	-3

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R4	Botyl Rd, Botolph Claydon	34	~~50~~	4	~~-6~~ -11	-1
R5	Brickhill Way, Calvert	29	-5	-1	-11 ~~-16~~	-6
R6	Calvert Cottages	34	0	4	~~-6~~ -11	-1
R7	Catherine Cottages	38	7	15	~~-2~~ -7	3
R8	Catherine Farm	34	3	11	~~-6~~ -11	-1
R9	Claydon Rd	32	3	8	~~-8~~ -13	-3
R10	Dry Leys Farmhouse	26	-10	-3	-14 ~~-19~~	-9
R11	Finmere Hill House	25	-8	-4	-15 ~~-20~~	-10
R12	Hogshaw Farm	37	8	13	~~-3~~ -8	2
R13	Knowlhill Farm	30	-2	0	-10 ~~-15~~	-5
R14	Lower Farm	32	3	8	~~-8~~ -13	-3
R15	Muxwell Farm	29	0	2	-11 ~~-16~~	-6
R16	Pond Farm	35	6	10	~~-5~~ -10	0
R17	The Old Dairy, Pond Farm	35	6	10	~~-5~~ -10	0
R18	Sion Hill Farm	40	8	10	0 ~~-5~~	5
R19	Woodland Barn	21	-15	-8	-19 ~~-24~~	-14
R20	Borshaw Farm	36	7	12	~~-4~~ -9	1
R21	Brackley Ln, Calvert (A)	30	-4	0	-10 ~~-15~~	-5
R22	Brackley Ln, Calvert (B)	29	-5	-1	-11 ~~-16~~	-6
R23	Red Kit View, Calvert	30	-4	0	-10 ~~-15~~	-5

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R24	Blackmore Hill Farm Cottages	37	6	14	-3 ~~-8~~	2
R25	Woodlands Farm Fishery	21	-12	-8	-19 ~~-24~~	-14
R26	Claydon House	28	-3	5	-12 ~~-17~~	-7
R27	Middle Farm	21	-15	-8	-19 ~~-24~~	-14
R28	Granborough	27	-5	-3	-13 ~~-18~~	-8
R29	East Claydon	28	-4	-2	-12 ~~-17~~	-7

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40dB L_{Ar} daytime, 35dB L_{Ar} night-time.

13.8.18. The noise levels without additional mitigation are predicted to be highest at receptor R18 Sion Hill Farm, with levels of 40dB L_{Ar} (exceeding the LOAEL design targets 5dB during the night-time).

13.8.19. The noise levels without additional mitigation are predicted to exceed the LOAEL design thresholds at the following sensitive receptors.

- R2 – Bernwood Farm;
- R7 – Catherine Cottages;
- R12 – Hogshaw Farm;
- R18 – Sion Hill Farm;
- R20 – Borshaw Farm; and
- R24 – Blackmore Hill Farm Cottages

13.8.20. The noise levels are not predicted to exceed the LOAEL design thresholds at the other receptors that have been considered.

13.8.21. On the basis of the predicted noise levels without additional mitigation, the magnitude of impact at **high** sensitivity receptors is considered to be up to **medium**. This would therefore require additional mitigation measures to be introduced.

Decommissioning

13.8.22. The likely noise and vibration impacts during the decommissioning phase are considered to be consistent with the construction phase, as it is envisaged that similar plant and works have the potential to be used.

13.9. Additional mitigation

Construction

Best practicable means

13.9.1. Through the implementation of the **Outline CEMP [EN010158/APP/7.2]**, and **Outline Construction Traffic Management Plan (Outline CTMP) [EN010158/APP/7.5]**, Best Practicable Means as defined by the Control of Pollution Act 1974 **[Ref. 13-2]** would be adopted, which would serve to minimise the potential noise and vibration impacts at receptors in the vicinity of the construction works.

13.9.2. A number of measures that may be employed where reasonably practicable to mitigate the noise level impact from the construction and decommissioning phases are outlined below and secured by the **Outline CEMP [EN010158/APP/7.2]**:

- Where practicable, temporary enclosures will be used to screen all static or semi-static plant from noise sensitive receptor locations;
- All engine compartments or acoustic enclosures are closed whilst engines are running;
- Minimising drop heights of materials i.e. carefully depositing materials;
- Avoiding vehicle movements over irregular surfaces (which tends to create more noise/vibration emissions);
- At all times, workers' shouting or raised voices to be kept to a minimum;
- All plant, equipment and noise control measures applied to plant and equipment to be maintained in good and efficient working order and operated such that noise emissions are minimised as far as reasonably practicable;
- Any plant, equipment or items fitted with noise control equipment found to be defective will not be operated until repaired;
- Machines in intermittent use to be shut down or throttled down to a minimum during periods between works;
- A quiet working ethic will be employed to ensure that all members of the workforce have consideration for the nearby residents;
- Prohibit sounding of vehicle horns to gain access to the Primary and Secondary Construction Compounds;

- The delivery routes set out in the **Outline CTMP [EN010158/APP/7.5]** will be communicated to and adhered to by all suppliers;
- Design the Primary Construction Compound and Secondary Construction Compound layouts to reduce the need for reversing vehicles and ensure that drivers are familiar with the worksite layout;
- Utilise reversing alarms incorporating one or more of the features listed below (or other comparable system):
  - Highly directional sounders;
  - Use of broadband sounders;
  - Self-adjusting output sounders;
  - Flashing warning lights; and
  - Reversing alarms that are set to the minimum output noise level required for health and safety compliance.
- Toolbox talks carried out by the Principal Contractor to ensure that all members of the workforce are aware of potential noise impacts on the sensitive receptors in the surrounding area.

Temporary noise barriers

13.9.3. Where there is potential for the construction works to give rise to **medium** or **high** magnitudes of impact at noise sensitive receptors, temporary noise barriers may be installed close to noise-producing plant to minimise construction induced noise levels (where practicable).

13.9.4. BS 5228-1 **[Ref. 13-11]** advises that the approximate acoustic attenuation provided by a barrier will be 5dB when the top of the plant is just visible to the receiver over the noise barrier and 10dB when the barrier completely hides the noise sources from the receiver.

13.9.5. Temporary noise barriers could comprise a well-constructed site hoarding or a proprietary temporary barrier system that can be rapidly installed and modified on-site to screen specific construction activities. In all instances, the hoarding/barrier should be free from gaps, holes, slits or cracks, with no gaps between the barrier and the ground.

13.9.6. Temporary noise barriers are secured through the **Outline CEMP [EN010158/APP/7.2]**.

Piling mitigation

13.9.7. There are mitigation measures that can be applied to minimise noise levels from piling activities in instances where the piling works are predicted to give rise to **medium** magnitudes of impact at noise sensitive receptors.

13.9.8. Mitigation measures for piling works are typically applied at the source in the form of shrouds and/or resilient pads between the pile and the driver. Noise reduction from these measures would be expected to be in the range of 10-15 dB.

13.9.9. Piling mitigation is secured through the **Outline CEMP [EN010158/APP/7.2]**.

Community liaison

13.9.10. Community liaison and communication throughout the construction phase would be undertaken to provide information to people residing in properties located in the vicinity of the Order Limits. This typically serves to understand concerns from local residents and enable them to be addressed where feasible, thereby reducing the likelihood of complaints. The community liaison would extend to landowners with livestock or other animals that may be present in fields adjacent to the construction works.

13.9.11. The level of engagement required would vary during the construction period, depending upon the likely impacts experienced by individual receptors due to the construction works.

13.9.12. Details relating to liaison with the local community would be managed by the Principal Contractor. It is envisaged that community liaison would provide local residents with the following information in relation to the construction works:

- The nature of the works being undertaken;
- The expected duration of the works and the Principal Contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration; and
- Contact details in the event of a disturbance.

13.9.13. Community liaison is secured through a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**.

Operation (including maintenance)

13.9.14. The predicted exceedances at the sensitive receptors are primarily due to noise emanating from the Rosefield Substation, Satellite Collector Compounds, BESS and Inverter Transformer Stations.

13.9.15. Strategies for noise mitigation can include the following and have formed the basis of the additional mitigation scenario:

- Addressing the noise at source – modify the source to radiate at a lower sound power level; and

- Modifying the sound pathway/transmission – deflect or block the acoustic transmission of noise.

Mitigation at source

13.9.16. In the case of the main transformers being a major component of the acoustic emissions from the Proposed Development, it is proposed that a minimum 5 dB(A) reduction is obtained at source through refinement of the engineering requirements in order to adopt lower noise emitting transformers. This is considered to be attainable and is secured through the **Outline OEMP [EN010158/APP/7.3]**.

Mitigation through transmission

13.9.17. The mitigated scenario incorporates the following barriers, which are detailed in and secured by the **Design Commitments [EN010158/APP/5.9]** and the **Outline OEMP [EN010158/APP/7.3]**:

- 3.5m high barrier around the BESS container areas;
- 5m high barrier around sections of the boundary of the Rosefield Substation;
- 3.5m high absorptive barriers around Central Inverters that are impacting upon noise-sensitive receptors; and
- Introduction of enclosures and/or barriers around the main transformers within the Rosefield Substation and Satellite Collector Compound.

13.9.18. Barriers would be constructed using a suitably dense material, with no holes or gaps around or underneath them.

13.9.19. Through the implementation of best practice measures, as detailed in and secured by the **Outline OEMP [EN010158/APP/7.3]**, and the adopted criteria of 40dB L_{Ar} daytime and 35dB L_{Ar} night-time at **high** sensitivity receptors, which is secured by a Requirement in Schedule 2 of the **Draft DCO [EN010158/APP/3.1]**, the noise impacts at these receptors in the vicinity during the operation (including maintenance) phase would be minimised.

Decommissioning

13.9.20. Additional mitigation measures for the decommissioning phase are detailed in and secured by the **Outline DEMP [EN010158/APP/7.4]**. These would serve to minimise the noise and vibration impacts at receptors in the vicinity of the decommissioning works. The mitigation measures are expected to be consistent with Best Practicable Means for the construction phase, as outlined above.

13.9.21. The additional mitigation measures considered necessary to manage construction phase traffic, as detailed in and secured by the **Outline**

CTMP [EN010158/APP/7.5], would remain valid and appropriate for the decommissioning phase. A Decommissioning Traffic Management Plan would be developed prior to decommissioning and would use, as its starting point, the measures detailed in the Construction Traffic Management Plan, which shall be in substantial accordance with the **Outline CTMP [EN010158/APP/7.5]**, updated to reflect the circumstances prevailing during the period in which decommissioning is to be carried out.

13.10. Assessment of residual effects (with additional mitigation)

Construction

Noise from on-site construction activities

13.10.1. By adopting the additional control measures outlined above, it is considered that noise levels from all construction activities would not exceed the daytime threshold criterion of 65dB $L_{Aeq,T}$ at any of the receptors considered.

13.10.2. Following the implementation of suitable additional mitigation measures, the magnitude of impact during the construction phase at **high** sensitivity receptors is considered to be up to **low**, resulting in a direct, temporary **minor adverse** effect, which is considered to be **not significant**.

Construction noise affecting PRoW

13.10.3. On the basis of the qualitative assessment presented in **Section 13.8**, construction noise affecting users of PRoW is considered to be **not significant**.

Vibration from on-site construction activities

13.10.4. The predicted construction induced vibration levels are below the 1 mm/s PPV threshold at all considered receptors. Therefore, the magnitude of impact at **high** sensitivity receptors is considered to be up to **low**, resulting in a direct, temporary **minor adverse** effect, which is considered to be **not significant**.

Road traffic noise

13.10.5. On the basis of the road traffic noise assessment presented in **Section 13.8**, the magnitude of impact at **high** sensitivity receptors is considered to be up to **low**, resulting in a direct, temporary **minor adverse** effect, which is considered **not significant**.

Operation (including maintenance)

13.10.6. Following the implementation of additional mitigation, the rating levels for the Proposed Development, accounting for the cumulative impact of all

operation phase plant/equipment items, are presented in **Table 13.19**. The corresponding noise contour plot is presented in **ES Volume 3, Figure 13.4: Operational Phase Noise Contours (with Additional Mitigation) [EN010158/APP/6.3]**.

Table 13.19: Predicted operation phase rating levels (with additional mitigation)

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R1	Beachfield	19	-14	-10	-21~~-26~~	-16
R2	Bernwood Farm	35	1~~6~~	5	-5~~-10~~	0
R3	Orchard Way, Botolph Claydon	28	-6~~-1~~	-2	-12~~-17~~	-7
R4	Botyl Rd, Botolph Claydon	33	-14	3	-7~~-12~~	-2
R5	Brickhill Way, Calvert	26	-8	-4	-14~~-19~~	-9
R6	Calvert Cottages	30	-4	0	-10~~-15~~	-5
R7	Catherine Cottages	32	1	9	-8~~-13~~	-3
R8	Catherine Farm	27	-4	4	-13~~-18~~	-8
R9	Claydon Rd	30	1	6	-10~~-15~~	-5
R10	Dry Leys Farmhouse	21	-15	-8	-19~~-24~~	-14
R11	Finmere Hill House	23	-10	-6	-17~~-22~~	-12
R12	Hogshaw Farm	35	6	11	-5~~-10~~	0
R13	Knowlhill Farm	28	-4	-2	-12~~-17~~	-7
R14	Lower Farm	31	2	7	-9~~-14~~	-4
R15	Muxwell Farm	25	-4	-2	-15~~-20~~	-10
R16	Pond Farm	32	3	7	-8~~-13~~	-3

Ref	Name	Rating level, dB $L_{Ar,Tr}$	Exceedance above representative background sound level, dB		Exceedance above LOAEL criteria, dB $L_{Ar,T}$[1]	
			Daytime	Night-time	Daytime	Night-time
R17	The Old Dairy, Pond Farm	32	3	7	-8 ~~-13~~	-3
R18	Sion Hill Farm	3~~2~~1	~~0~~-1	~~2~~1	-9 ~~-13~~	-~~4~~3
R19	Woodland Barn	17	-19	-12	-23 ~~-28~~	-18
R20	Borshaw Farm	34	5	10	-6 ~~-11~~	-1
R21	Brackley Ln, Calvert (A)	28	-6	-2	-12 ~~-17~~	-7
R22	Brackley Ln, Calvert (B)	26	-8	-4	-14 ~~-19~~	-9
R23	Red Kit View, Calvert	28	-6	-2	-12 ~~-17~~	-7
R24	Blackmore Hill Farm Cottages	31	0	8	-9 ~~-14~~	-4
R25	Woodlands Farm Fishery	17	-16	-12	-23 ~~-28~~	-18
R26	Claydon House	24	-7	1	-16 ~~-21~~	-11
R27	Middle Farm	17	-19	-12	-23 ~~-28~~	-18
R28	Granborough	24	-8	-6	-16 ~~-21~~	-11
R29	East Claydon	25	-7	-5	-15 ~~-20~~	-10

Notes:
1. LOAEL aligned with the low impact criteria i.e. 40dB L_{Ar} daytime, 35dB L_{Ar} night-time.

13.10.7. Following the application of additional mitigation measures, the predicted operation (including maintenance) phase noise levels throughout daytime and night-time periods would not exceed 35dB $L_{Ar,T}$ at any receptors. Noise levels of this magnitude are considered to successfully comply with the LOAEL criteria within Planning Practice Guidance – Noise **[Ref. 13-21]**.

13.10.8. The highest magnitude of impact during the operation (including maintenance) phase at **high** sensitivity receptors is considered **low**, resulting in a direct, permanent **minor adverse** effect, which is considered **not significant**.

Decommissioning

13.10.9. The residual effects during the decommissioning phase are unlikely to be any greater than those during the construction phase, following the implementation of appropriate additional mitigation measures. On this basis, the magnitude of impact during the decommissioning phase at **high** sensitivity receptors is considered **low**, resulting in a direct, temporary **minor adverse** effect, which is considered to be **not significant**.

13.11. Opportunities for enhancement

13.11.1. Opportunities for environmental enhancement are not considered relevant to noise and vibration.

13.12. Monitoring requirements

13.12.1. The **Outline CEMP [EN010158/APP/7.2]**, **Outline OEMP [EN010158/APP/7.3]** and **Outline DEMP [EN010158/APP/7.4]** set out the requirement for setting up and publicising a contact point for the Proposed Development to log, monitor and address any complaints associated with noise during the construction, operation (including maintenance) and decommissioning phases. A scheme to this effect is detailed in and secured by the aforementioned management plans. Provision of monthly reporting of information to local residents (including PRoW users, where practicable) to advise of potential noisy works that are due to take place has been included.

13.12.2. Noise measurements of the installed operational equipment would be undertaken to verify predicted levels at source which have been accounted for within this assessment. This is detailed in and secured by the **Outline OEMP [EN010158/APP/7.3]**.

13.12.3. Following implementation of the **Outline CEMP [EN010158/APP/7.2]** and **Outline DEMP [EN010158/APP/7.4]**, appropriate targeted monitoring would be undertaken at receptors during the construction and decommissioning phases. This will be based on the outcomes of further additional detailed construction and decommissioning phase assessments to be undertaken by the Principal Contractor, with short-term monitoring proposed as a measure to ensure noise levels remain within relevant criteria.

13.13. Difficulties and uncertainties

13.13.1. The following difficulties and uncertainties have been encountered in undertaking the noise and vibration assessment:

- To determine applicable background and residual sound levels, a noise survey has been conducted. Noise levels in the area are likely to fluctuate throughout different times of year and under varying weather conditions; however, the survey is considered to represent a typical period with no atypical events affecting the acoustic environment in the immediate area. The analysis of the data is in line with the guidance outlined within BS 4142 **[Ref. 13-9]** and follows best practice in selecting an appropriate background sound level for the assessment.
- Three of the baseline noise survey locations incorporated measurements during both school holidays and school term time (MP2, MP8 and MP10). This was necessary following equipment installed on-site being tampered with by third parties, which resulted in the survey duration being extended. Given the rural setting of the measurement locations and distance from strategic transport infrastructure, it is not considered that measurements taken during the school holiday period had an influence on the resulting dataset. This is corroborated when comparing the data with the measured noise levels at the same positions taken during school term time.
- The specific construction working methodologies have not been defined at this stage, and therefore the activities and plant/equipment that are expected to be utilised are based on experience of similar developments. The assumed plant lists are defined in **ES Volume 4, Appendix 13.2: Construction Noise Plant Tables and Results [EN010158/APP/6.4]**. It is expected that these would be refined nearer the time of construction, and suitably controlled within the Construction Environmental Management Plan, which would be in substantial accordance with the **Outline CEMP [EN010158/APP/7.2]**.
- The predicted operation phase noise levels presented in this chapter account for the use of Central and String Inverters within proposed areas of Solar PV development, in addition to other items of noise emitting equipment at the Collector Compound(s) and Rosefield Substation. It is anticipated that the noise emitting equipment will be refined as part of the detailed design. This design development may include consideration of alternative equipment specifications, locations and numbers of noise emitting equipment within the Order Limits. Prospective design solutions will not be progressed if the associated noise levels post-mitigation result in any significant adverse effects i.e. no greater than the residual significance of effects presented in this chapter.
- The assessment is based on all operation phase plant/equipment running at full duty during both daytime and night-time periods. This is

likely to overestimate the noise emissions from the Site, as a reduced operating duty would be expected during periods of the night, due to darkness and temperature fluctuations resulting in lower cooling demands.

- The details of the decommissioning phase activities are not well defined at this stage. The decommissioning phase assessment has therefore been undertaken assuming similar working methodologies to the construction phase assessment.

13.14. Summary

13.14.1. A summary of this assessment is presented in **Table 13.20**. The sensitivity of each receptor is identified alongside any relevant embedded mitigation and the likely effects that could arise on those receptors. Any proposed additional mitigation measures are stated and the residual effects then assessed. Finally, any monitoring requirements are stated where applicable.

13.14.2. There are no significant residual effects during the construction, operation (including maintenance) and/or decommissioning phases.

Table 13.20: Summary of the noise and vibration assessment

Receptor/matter	Phase	Sensitivity of the receptor	Embedded mitigation	Likely effect (without additional mitigation)	Additional mitigation	Magnitude of impact	Residual effect (with additional mitigation)	Monitoring requirement
Noise	Construction	High	Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable.	Potential for significant adverse effects.	Best practicable means, temporary noise barriers, piling mitigation and community liaison. Secured through **Outline CEMP [EN010158/APP/7.2]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	Targeted noise monitoring at sensitive receptors
Vibration	Construction	High	Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable.	No significant adverse effects.	Best practicable means and community liaison. Secured through **Outline CEMP [EN010158/APP/7.2]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	N/A
Increase in traffic flow	Construction	High	-	No significant adverse effects.	**Outline CTMP [EN010158/APP/7.5]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	N/A
Noise	Operation (including maintenance)	High	Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable. Orientating noise emitting equipment to minimise off-site emissions.	Potential for significant adverse effects.	Use of low noise units. Noise barriers around BESS container areas, Main Transformers within Rosefield Substation and Central Inverters that are impacting upon sensitive receptors. Secured through **Outline OEMP [EN010158/APP/7.3]**.	Negligible/low	**Up to minor adverse** **(-) (D) (LT) (P)** **Not significant**	Verification plant noise measurements of installed equipment.

Receptor/matter	Phase	Sensitivity of the receptor	Embedded mitigation	Likely effect (without additional mitigation)	Additional mitigation	Magnitude of impact	Residual effect (with additional mitigation)	Monitoring requirement
Noise	Decommissioning	High	Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable.	Potential for significant adverse effects.	Best practicable means, temporary noise barriers and community liaison. Secured through **Outline DEMP [EN010158/APP/7.4]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	Targeted noise monitoring at sensitive receptors
Increase in traffic flow	Decommissioning	High	-	No significant adverse effects.	**Outline DEMP [EN010158/APP/7.4]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	N/A
Vibration	Decommissioning	High	Maximising the separation distance between proposed infrastructure and surrounding sensitive receptors, where practicable.	No significant adverse effects.	Best practicable means and community liaison. Secured through **Outline DEMP [EN010158/APP/7.4]**.	Negligible/low	**Up to minor adverse** **(-) (D) (ST) (T)** **Not significant**	N/A

Key:

+ = positive or - = negative; D = direct or I = indirect; ST = short-term, MT = medium-term or LT = long-term; P = permanent or T = temporary

13.15. References

- **Ref. 13-1:** Environmental Protection Act 1990. Available online: https://www.legislation.gov.uk/ukpga/1990/43/contents
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- **Ref. 13-13:** British Standards Institution (2003) British Standard 7445:2003, Description and measurement of environmental noise (Part 1: Guide to quantities and procedures). London: British Standard Institution
- **Ref. 13-14:** British Standards Institution (2014) British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings. London: British Standard Institution
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- **Ref. 13-16:** British Standards Institution (2013) British Standard EN 61672-1:2013, Electroacoustics - Sound level meters (Part 1: Specifications). London: British Standard Institution
- **Ref. 13-17:** British Standards Institution (2024) British Standard ISO 9613-2:2024, Acoustics. Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors. London: British Standard Institution
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- **Ref. 13-19:** Highways England (2020) Design Manual for Roads and Bridges, LA 111 Noise and Vibration. Available online: https://www.standardsforhighways.co.uk/dmrb/search/cc8cfcf7-c235-4052-8d32-d5398796b364
- **Ref. 13-20:** Institute of Environmental Management & Assessment (2014) Guidelines for Environmental Noise Impact Assessment. Institute of Environmental Management & Assessment
- **Ref. 13-21:** Planning Practice Guidance – Noise (2019). Available online: https://www.gov.uk/government/collections/planning-practice-guidance
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Rosefield
Solar Farm

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