

Springwell Solar Farm

Preliminary Environmental Information Report

Volume 1
Chapter 11: Noise and Vibration

Phase 2 consultation
Springwell Energyfarm Ltd



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11. Noise and Vibration

11.1. Introduction

11.1.1. This chapter presents the preliminary environmental information and a preliminary assessment of the potential likely significant environmental effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development on noise and vibration.

11.2. Consultation, scope and study area

Consultation undertaken to date

11.2.1. An EIA Scoping Report, as provided in **Appendix 4.1**, setting out the proposed noise and vibration assessment scope and methodology for the Proposed Development, was submitted to the Planning Inspectorate in March 2023. A Scoping Opinion, as provided in **Appendix 4.2**, was issued by the Planning Inspectorate on behalf of the Secretary of State in May 2023. **Appendix 4.3** provides responses to comments relating to noise and vibration in the Scoping Opinion and details how these have been addressed in this preliminary assessment.

11.2.2. **Table 11.1** provides a summary of the consultation activities undertaken in support of the preparation of this preliminary assessment, alongside the EIA Scoping process.

Table 11.1 Summary of consultation undertaken

Consultee	Key matters raised	Actions in response to consultee comments
North Kesteven District Council	Email sent (dated 18.05.23) which outlined the scope of the baseline noise monitoring, proposed monitoring locations and length of survey. Response received from North Kesteven District Council (dated 19.05.23), stating acceptance of the survey monitoring approach with a request to ensure that the proposed baseline monitoring locations are considered in the context of potentially noisy ancillary equipment.	Matters raised by North Kesteven District Council taken into account during baseline noise survey. Locations either at or representative of those nearest sensitive receptors to the Proposed Development adopted for the survey.
North Kesteven	Email sent (dated 18.05.23) which outlined the proposed scope of the noise and	Operational noise requirements taken into account for the initial assessment. The relevant BS

Consultee	Key matters raised	Actions in response to consultee comments
District Council	<p>vibration assessment. Response received from North Kesteven District Council (dated 19.05.23), stating acceptance of the assessment approach, but provided the following supplementary comments:</p> <ul style="list-style-type: none"> • For operational noise, North Kesteven District Council would require rating noise levels to be a maximum 5 dB above measured background levels; • The requirement for a Construction Environmental Management Plan, following the outcomes of the construction assessment, in order to outline the Site’s approach to dealing with potential complaints and opportunities for mitigation. 	<p>4142:20114+A1:2019 also adopts context, utilising the existing baseline environment and absolute noise limits into the assessment. This has also been accounted for in this case.</p> <p>An Outline Construction Environmental Management Plan will be submitted in support of and secured by the DCO.</p>

11.2.3. It is anticipated that further consultation would be required with North Kesteven District Council to review the results of the baseline noise monitoring and seek agreement on appropriate design targets at sensitive receptors during the operational phase.

Scope of the assessment

11.2.4. This section updates the scope of assessment and confirms, and where necessary updates, the evidence base for scoping out receptors/matters following further iterative assessment and consideration of the Scoping Opinion.

Receptors/matters scoped out of further assessment

11.2.5. **Table 11.2** presents the receptors/matters that are scoped out of further assessment, together with appropriate justification. Where a change has occurred to the approach proposed within the EIA Scoping Report, this is clearly stated and justified.

Table 11.2 Receptor/matters scoped out of further assessment

Receptor/ matter	Phase	Justification	Change to the approach proposed in the EIA Scoping Report
Vibration	Operation	Operational elements including fixed plant items/structures would not emit discernible levels of vibration	No change – this matter was proposed to be scoped out of further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.
Road traffic	Operation	The increase in road traffic during operation is likely to be negligible, with vehicles only likely to be required for routine maintenance	No change – this matter was proposed to be scoped out of further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.
Ecological receptors	Construction, operation and decommissioning	Review of online data sources indicates that there are no Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA), or Ramsar sites adjacent to or at closer distance to the residential locations considered in this preliminary assessment. Therefore, an assessment of noise and vibration impacts on potential ecological receptors has not been considered.	No Change - these receptors were not considered within the EIA Scoping Report, but the Scoping Opinion has requested they be considered. However, the Applicant is of the opinion that these receptors do not need to be considered for further assessment for the reasons outlined in the 'Justification' column.

Receptors/matters scoped into further assessment

11.2.6. **Table 11.3** presents the receptors/matters that are scoped into further assessment, together with appropriate justification. Where a change has occurred to the approach proposed within the EIA Scoping Report, this is clearly stated and justified.

Table 11.3 Receptor/matters scoped into further assessment

Receptor/ matter	Phase	Justification	Change to the approach proposed in the EIA Scoping Report
Noise	Construction and decommissioning	Activities likely to involve large earthmoving/lifting plant items with the potential for significant effects to occur.	No change – this matter was proposed to be scoped into further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.
Noise	Operation	Operational plant items are likely to have an impact on the existing noise environment and affect local amenity.	No change – this matter was proposed to be scoped into further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.
Road traffic	Construction and decommissioning	Potential increase in HGV/vehicle movements may cause significant effects in the short term.	No change – this matter was proposed to be scoped into further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.
Vibration	Construction and decommissioning	Activities likely to involve large earthmoving/piling/lifting plant items with the potential for significant effects to occur.	No change – this matter was proposed to be scoped into further assessment within the EIA Scoping Report and the Scoping Opinion has agreed with this approach.

Extent of the study area

11.2.7. The study area for the construction and decommissioning phase assessments considers noise and vibration sensitive receptors that are located within 300 metres of the Site boundary. This has been determined based on relevant guidance as set out in **Section 11.3** below.

- 11.2.8. For the assessment of operational phase noise levels, the study area extends out to the nearest or most effected noise sensitive receptors for a single or closely located group of receptors to the Site boundary. Where sensitive receptors are located within a cluster of adjacent properties at similar distance to the Proposed Development, the sensitive receptor position adopted for assessment purposes is considered representative of all the receptors within that cluster.

11.3. Legislative framework, planning policy and guidance

Relevant legislation

11.3.1. Legislation relevant to noise and vibration comprises the following:

- Environmental Protection Act (1990)¹ - Part III of the Environmental Protection Act 1990 contains the mandatory powers available to local authorities within England and Wales in respect of any noise which either constitutes or is likely to cause a statutory nuisance.
- Control of Pollution Act (1974)² - The Control of Pollution Act 1974 and the Environmental Protection Act 1990 give local authorities powers for controlling noise and vibration from construction sites and other similar works.

Relevant planning policy

11.3.2. Planning policy relevant to noise and vibration comprises the following:

- Overarching National Policy Statement for Energy (NPS EN-1) (2011)³ provides the basis for decisions regarding nationally significant energy infrastructure. Section 5.11 outlines the planning policy for noise and vibration, including the adoption of relevant standards, the decision making process and opportunities for mitigation.
- Draft Overarching National Policy Statement for Energy (NPS EN-1) (2023)⁴ - Section 5.12 outlines the planning policy for noise and vibration, including the adoption of relevant standards, the decision making process and opportunities for mitigation.

¹ Environmental Protection Act (1990). Available online:

<https://www.legislation.gov.uk/ukpga/1990/43/contents>

² Control of Pollution Act (1974). Available online: <https://www.legislation.gov.uk/ukpga/1974/40>

³ Overarching National Policy Statement for Energy (EN-1) (2011). Available online:

<https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure>

⁴ Draft National Policy Statement for Energy (EN-1) (2023). Available online:

<https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements>

- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2011)⁵ sets out the policies relating to electricity generation from renewable sources of energy. However, solar farms are not explicitly included within this document.
- Draft National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (2023)⁶ - Section 3.10 gives specific consideration to solar development including assessment of noise and vibration impacts.
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2011)⁷ - Section 2.9 gives specific consideration for the assessment of noise and vibration impacts.
- Draft National Policy Statement for Electricity Networks Infrastructure (NPS EN-5) (2023)⁸ - Section 2.10 gives specific consideration to the assessment of noise and vibration impacts, and consideration to mitigation.
- National Planning Policy Framework (NPPF) (September 2023). The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The NPPF includes statements relating to noise and the requirement to take it into account during the planning process.
- Noise Policy Statement for England (NPSE) (Defra, 2010). The NPSE 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 Government policy on sustainable development.
- Planning Practice Guidance – Noise (2019). The Department for Communities and Local Government 'Planning Practice Guidance' (PPG) was published on 6 March 2014 and updated in July 2019. The PPG on Noise expands upon the NPPF and NPSE and sets out more detailed guidance on noise assessment. Like the NPPF and NPSE, the guidance does not include any specific noise levels but sets out further principles that should underpin an assessment.

⁵ National Policy Statement for Renewable Energy (EN-3) (2011). Available online:

<https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure>

⁶ Draft National Policy Statement for Renewable Energy (EN-3) (2023). Available online:

<https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements>

⁷ National Policy Statement for Electrical Networks Infrastructure (EN-5) (2011). Available online:

<https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure>

⁸ Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023). Available online:

[Planning for new energy infrastructure: revisions to National Policy Statements - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements)

- Central Lincolnshire Local Plan – Adopted April 2023. The following policies outlined in **Table 11.4** are applicable to noise.

Table 11.4 Central Lincolnshire Local Plan Adopted April 2023, Noise Policies

Relevant Planning Policy	Policy Clauses
Section 1.5 Objectives	8. “Pollution: To minimise pollution (air, noise and light) and improve air quality.
Policy S14: Renewable Energy	Proposals for renewable energy schemes, including ancillary development, will be supported where the direct, indirect, individual and cumulative impacts on the following considerations are, or will be made, acceptable. To determine whether it is acceptable, the following tests will have to be met: ... iii. The impacts are acceptable on the amenity of sensitive neighbouring uses (including local residents) by virtue of matters such as noise, dust, odour, shadow flicker, air quality and traffic;
8.2 Accessibility and Transport	Theme 4 – Supporting safety, security and a healthy lifestyle ... C) reduce the impacts of air quality, noise and light pollution
Policy S53: Design and Amenity	C) Not result in adverse noise and vibration taking into account surrounding uses nor result in adverse impacts upon air quality from odour, fumes, smoke, dust and other sources

Applicable guidance

11.3.3. The following guidance documents have been used during the preparation of this preliminary assessment:

BS 4142:2014+A1:2019 - Methods for Rating and Assessing Industrial and Commercial Sound

11.3.4. BS 4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing processes and other associated operational activities.

11.3.5. The rating method takes into account specific source characteristics, such as tonality, impulsivity and intermittency which are more likely to give rise to disturbance. The impact assessment

procedure described in BS 4142 is based on the comparison of the rating sound level with the background sound level prevailing at the assessment locations.

[BS 5228-1:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise](#)

11.3.6. BS 5228-1 gives recommendations for basic methods of noise control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and assessing its impact on those exposed to it. The prediction method considers the noise emission level of the plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.

[BS 5228-2:2009+A1:2014 - Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration](#)

11.3.7. BS 5228-2 provides guidance on vibration levels that can be used to assess the likely impacts of construction activities. The standard gives guidance on the significance of vibration effects in terms of human response to vibration and the structural response from affected buildings.

[BS 7445-1:2003 - Description and measurement of environmental noise - Guide to Quantities and Procedures](#)

11.3.8. BS 7445 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

[BS EN 60942:2018 - Electroacoustics – Sound Calibrators](#)

11.3.9. BS EN 60942 specifies the acoustic performance requirements for sound calibrators deployed during noise surveys.

[BS EN 61672-1:2013 - Electroacoustics – Sound Level Meters](#)

11.3.10. BS EN 61672 specifies the electroacoustic performance specifications for sound measuring instruments deployed during noise surveys.

[Calculation of Road Traffic Noise Memorandum, 1988](#)

11.3.11. Calculation of Road Traffic Noise (CRTN) sets out standard procedures for calculating noise levels from road traffic. The calculation method uses a number of input parameters, including traffic flow volume, average vehicle speed and percentage of heavy duty vehicles, to predict the $LA_{10,18\text{hour}}$ or $LA_{10,1\text{hour}}$ noise level.

[Design Manual for Roads and Bridges, LA 111 Noise and Vibration \(2019\)](#)

11.3.12. The Design Manual for Roads and Bridges (DMRB) LA 111 'Noise and Vibration' provides guidance on the assessment of noise and

vibration impacts due to road traffic. LA 111 includes an impact magnitude criteria for changes in road traffic noise occurring during construction and operational phases, which is applicable across a range of projects.

Institute of Environmental Management & Assessment (IEMA), Guidelines for Environmental Impact Assessment

11.3.13. The IEMA Guidelines for Environmental Impact Assessment address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessment fits within the EIA process.

ISO 9613-2:1996 - Acoustics. Attenuation of Sound During Propagation Outdoors. Part 2: General Method of Calculation

11.3.14. ISO 9613-2 specifies an engineering method for calculating the attenuation of sound during outdoor propagation conditions. The methodology accounts for a number of physical effects including geometrical divergence, atmospheric absorption, ground effects, reflections from surfaces, and screening by obstacles.

World Health Organisation (WHO), Guidelines for Community Noise

11.3.15. The WHO Guidelines for Community Noise provide general guidance and guidelines which have been set for different health effects, using the lowest noise level that produces an adverse health effect in specific human environments.

World Health Organisation (WHO), Night Noise Guidelines for Europe

11.3.16. The WHO Night Noise Guidelines were published in 2009 and present the conclusions of the WHO working group responsible for preparing guidelines for exposure to noise during sleep to protect the public from adverse health effects.

11.4. Methodology

Data sources to inform baseline characterisation

11.4.1. The baseline conditions of the Site have been established via the following sources which determined the scope of the baseline noise monitoring and location of those nearest noise sensitive receptors to the Site boundary:

- Aerial photography and mapping; and
- Project plans (**Figure 2.3**).

Surveys to inform baseline characterisation

11.4.2. A baseline noise survey has been undertaken to establish the prevailing acoustic environment at noise sensitive receptors

situated at representative positions within the Site boundary and at off-site positions. The results of the noise survey have been used to inform the preliminary construction and operational phase assessments for the Proposed Development.

- 11.4.3. The baseline noise survey comprised unattended noise monitoring at 24 locations, as defined in **Table 11.5** and outlined in **Figure 11.1**, which accounted for the surrounding noise sensitive receptors in the vicinity of the Proposed Development. Where field IDs are noted, these are provided in **Figure 2.3**.
- 11.4.4. Monitoring positions were chosen based on the location of the nearest sensitive receptors to the Site boundary. Where positions are located adjacent to a cluster of properties, the monitoring data is considered representative of all the receptors within that cluster. This is considered based on the existing noise environment. The baseline noise survey was undertaken between 6 June 2023 and 19 July 2023.

Table 11.5 Baseline noise measurement locations

Reference	Grid reference	Description
P1	501375E 356226N	North-west of field ID Tb1 - situated ~190 metres from Gorse Hill Farm, off Gorse Hill Lane
P2	502111E 355010N	West of field ID Bcd098 - situated ~230 metres from No. 1 Thompson’s Bottom
P3	501953E 353815N	West of field ID Tb3 - situated ~1.1km from Roadside Cottages, Brauncewell
P4	503616E 352045N	East of field ID W2 - situated ~60m from School Row, Brauncewell
P5	504562E 352652N	East of field ID E1a - situated ~190m from Manor House, Brauncewell
P6	504300E 353894N	East of field ID Bcd120 – situated ~340m from Mount Farm, Ashby de la Launde
P7	503763E 354142N	East of field ID Bcd118 – situated ~10m from Slate House Cottages, Ashby de la Launde
P8	502914E 355244N	North-east of field ID Bcd099 – situated ~20m from Ashby Lodge Cottages, Ashby de la Launde
P9	504528E 356393N	South-east of field ID Bcd076 – situated ~20m from Linnet Court, Ashby de la Launde
P10	505027E 356240N	North-east of field ID Bcd079 – situated ~10m from Howard Road, Ashy de la Launde
P11	505276E 356809N	West of field ID Bk01 – situated ~ 40m from Digby Lodge, Ashby de la Launde
P12	505574E 356421N	North-east of field ID Rw12 – situated ~ 230m from The Hayloft, Ashby de la Launde

Reference	Grid reference	Description
P13	505199E 355578N	South of field ID Rw10 – situated ~100m from The Garden House, Ashby de la Launde
P14	505779E 357404N	North-east of field ID Bk03 – situated ~215m from Scopwick Mill, Scopwick
P15	506701E 358119N	South of field ID B1 – situated ~35m from The Granaries, Scopwick
P16	506930E 357670N	East of field ID Bk17 – situated ~260m from Almonds Green, Scopwick
P17	507084E 356951N	South-east of field ID Bk10 – situated ~120 from Westfield Cottage, Scopwick
P18	506975E 358325N	South-east of field ID Md05 – situated ~140m from Vicarage Lane, Scopwick
P19	506955E 359792N	East of field ID C1 – situated ~70m from Hall Gardens Cottage, Blankney
P20	507242E 360414N	North-west of field ID By01 - situated ~45m from Lane Cottages, Blankney
P21	508383E 360403N	South of field ID By05 – situated ~180m from Brickyard Farm, Blankney
P22	508497E 358982N	North of field ID Lf09 - situated ~15m from Scopwick Low Field Farm, Scopwick
P23	509222E 358029N	South of field ID Lf10 – situated 20m from Sandbach Cottage, Kirkby Green (off Scargate Lane)
P24	508392E 358139N	South of field ID C10 – situated ~200m from Main Street, Kirkby Green

11.4.5. The noise surveys were carried out using Class 1 sound level meters and calibrator conforming to the requirements of BS EN 61672 and BS EN 60942 respectively. The meters had been calibrated to traceable standards within the preceding two years and the calibrator within the previous 12 months. The sound level meters were field calibrated once set up in the measurement positions and on completion of the survey. No significant calibration drift was observed, i.e. within a +/- 0.5 dB tolerance.

11.4.6. The noise monitoring equipment at all positions was located at least 3.5 metres from any significant reflective surfaces, other than the ground. All measurements were taken with the microphone situated approximately 1.5 metres above the local ground level.

Design Assumptions - Operational Phase

11.4.7. **Chapter 2: Description of the Proposed Development** details the preliminary design principles of the Proposed Development components as they are currently known. Preliminary parameter

plans, which define the broad extents within which development can take place, are presented in the following figures within **Volume 2**:

- **Figure 2.3** – Zonal Masterplan;
- **Figure 2.4** – Indicative Height Parameters Plan;
- **Figure 2.5** – Indicative Green Infrastructure Parameters Plan; and
- **Figure 2.6** – Indicative Operational Access & Movement Parameters Plan.

- 11.4.8. The preliminary design principles and preliminary parameter plans set out the reasonable ‘worst case scenario’ for noise emissions that has been assessed in this chapter.
- 11.4.9. A series of design assumptions have been adopted within this preliminary assessment, accounting for those proposed items of plant as detailed within **Chapter 2** and provided in the zonal parameter plan provided in **Figure 2.3**. The design assumptions, in noise terms, relate to the location of fixed plant (where different items of infrastructure will be located within different zones, rather than a specified location), the number of plant items and source noise level for each item of plant. At this stage, the engineering approach is one which allows for maximum flexibility within the design, one which currently accounts for the maximum number of fixed plant items. It is likely that the design would be refined post PEIR submission however, by adopting this approach and using the maximum number of plant items, the parameters considered in this preliminary assessment are considered to represent a reasonable worst case scenario in terms of noise levels. In addition, all items of plant have been considered as being fully operational during both daytime and night-time periods; again, this approach is likely to be conservative compared to the actual noise levels associated with the Proposed Development. The operational regime is not finalised and will be defined and assessed within the ES.
- 11.4.10. Potential screening of the BESS has been modelled as part of the optioneering but found to have negligible effect at this stage; it is expected that further mitigation options, discussed in **Table 11.20**, would be refined in detail at a later stage.
- 11.4.11. **Table 11.7** below provides the reference noise levels, numbers and positioning of plant items utilised within the noise model for the operational phase.

Embedded mitigation measures

- 11.4.12. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of the Proposed Development to remove potential significant effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of the

Proposed Development are detailed within **Table 4.4** of **Chapter 4: Approach to EIA**.

11.4.13. Those embedded mitigation measures relevant to this preliminary noise and vibration assessment comprise the following:

- The location of infrastructure within separate fields;
- The positioning of equipment away from receptors as far as is reasonably practicable; and
- There will be a minimum 250m offset of central inverters from residential properties.

Assessment Methodology

Construction and decommissioning phase

11.4.14. At this stage, detailed construction and decommissioning methodologies, and plant lists, have not been defined. The detail of noise emitting plant/equipment suitable to inform a full assessment is therefore not available to the extent needed to quantify impacts (and their significance). A qualitative approach has therefore been undertaken, based on experience of similar projects and noise limits (and temporal thresholds) within BS 5228-1:2009+A1: 2014.

11.4.15. Similarly, construction vibration has been assessed in qualitative terms, accounting for the distance between the Site boundary and those nearest sensitive receptors.

11.4.16. Information provided by the project transport team regarding construction traffic flows has been provided. Annual average weekday traffic (AAWT) data has been provided assuming a 2026 construction year; the short-term impact can therefore be derived. Opening year 2026 data is without development, opening year 2026 + construction is inclusive of the development traffic.

11.4.17. Construction traffic count data is provided below:

Table 11.6 Construction traffic count data

Road Link	Road Name	Opening Year 2026		Opening Year 2026 + Construction	
		Flow – AAWT 18hr	%HGV	Flow – AAWT 18hr	%HGV
1	A15 (north of B1191)	14305	10.0	14945	10.1
2	A15 (south of B1191)	15914	9.7	16554	9.8
3	B1191 (between RAF Digby and Ashby de la Launde)	2828	15.4	3708	13.9

Road Link	Road Name	Opening Year 2026		Opening Year 2026 + Construction	
		Flow – AAWT 18hr	%HGV	Flow – AAWT 18hr	%HGV
4	B1191 (between Scopwick and RAF Digby)	2091	16.3	2971	14.1
5	B1188 (north of Scopwick)	5871	15.1	6511	14.9
6	B1188 (south of Digby)	5042	18.5	5682	17.8
7	A15 (south of Metheringham Heath Lane)	9998	7.2	10638	7.5
8	A15 (north of Leasingham)	11761	7.5	12401	7.8
9	B1188 (south of Scopwick)	4186	4.9	4826	5.9
10	A153 (directly north of junction with A17)	14132	6.2	14772	6.5
11	A17 (between A15 and A153)	22308	16.3	22948	16.2

Operational phase

11.4.18. Operational phase impacts have been predicted using a computer noise model of the Proposed Development layout in **Chapter 2: Description of the Proposed Development**, using SoundPLAN v8.2. The model adopts the calculation method in ISO 9613-2. The noise source(s) may be moving or stationary and the method considers the following major mechanisms of noise attenuation, including geometrical divergence (also known as distance loss or geometric damping), atmospheric absorption, ground effect, reflection from surfaces and screening by obstacles, barriers and buildings.

11.4.19. The ISO 9613-2 method predicts noise levels under meteorological conditions favourable to noise propagation from the sound source to the receptor, downwind propagation or, equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

11.4.20. Initial details of noise emitting plant/equipment associated with the operational phase fixed plant has been provided by the project team. It should be noted that the final equipment supplier and selection has not yet been confirmed. However, those inputs

currently available are sufficient to inform potential impacts for the purposes of this preliminary assessment.

11.4.21. It is anticipated that different plant items would have varying operational regimes, dependent on the level of daylight. For the purposes of this preliminary assessment, plant items have assumed to be 100% operational at all times as a reasonable worst-case.

11.4.22. Noise inputs for the preliminary operational assessment account for the following items:

Table 11.7 Reference noise levels

Equipment	Location	Assumptions	Reference noise level
BESS containers	BESS compound	1150 no. in total	70 dB(A) at 1 metre
BESS transformers	BESS compound	385 no. in total	70 dB(A) at 1 metre
Main transformers	Collector compounds and Springwell substations	4 no. in collector compound areas, 6 no. in Springwell substation	80 dB(A) at 1 metre
Central inverters (ITS)	Within each PV field	5 no. per PV field	65 dB(A) at 10 metres
ITS transformers	Within each PV field	5 no. per PV field	70 dB(A) at 1 metre
String inverters	Within each PV field	44 no. per PV field (with ITS transformer option)	69 dB(A) at 1 metre

11.4.23. It is expected that operation of the Site would likely emit tonal components that may be audible at sensitive receptors, particularly at those sensitive receptors located at nearest distance to the BESS and substation areas. Appropriate tonal corrections have been applied based on the audibility of the source against the residual noise levels. Corrections have been applied:

- +2 dB applied where the specific noise source increases the residual noise level by up to and including 2 dB (classified as ‘just perceptible’);
- +4 dB applied where the specific noise source increases the residual noise level by 3 to 4 dB (classified as ‘clearly perceptible’);
- +6 dB applied where the specific noise source increases the residual noise level by 5 dB or more (classified as ‘highly perceptible’).

- 11.4.24. This approach complies with the requirements of BS 4142:2014+A1:2019.
- 11.4.25. Based on experience with similar projects, it is envisaged that the plant items would not emit impulsive or intermittent components.
- 11.4.26. At this stage, flexibility on the location of the BESS is retained. One option is to position the BESS within the northern fields of Springwell West (adjacent to the Springwell Substation). The second option is to position the BESS within the southern fields of Springwell West, adjacent to Bloxholm Woods. Both options have been assessed for purposes of this preliminary assessment.
- 11.4.27. The preliminary assessment accounts for the BESS positioned within either the northern or southern fields, plus inclusion of both inverter options. The inverter options include either the use of the string inverters or central inverters. The scenarios within the assessment are as follows:
- Option 1a – Northern BESS + string inverters + ITS transformers;
 - Option 1b – Northern BESS + central inverters + ITS transformers;
 - Option 2a – Southern BESS + string inverters + ITS transformers;
 - Option 2b – Southern BESS + central inverters + ITS transformers.

Receptor sensitivity

- 11.4.28. Receptor sensitivity has been categorised for a range of receptor types, which has been informed from guidance contained in the following documents:
- DMRB LA 111 ‘Noise and Vibration’; and
 - IEMA document ‘Guidelines for Environmental Noise Impact Assessment’.
- 11.4.29. Receptors will remain within their designated classification regardless of the distance away from the Proposed Development.

Table 11.8 Receptor sensitivity

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.
Low	Industrial premises.

Receptor Sensitivity	Type of Receptor
Negligible	All other areas such as those used primarily for agricultural purposes.

Magnitude of impact

11.4.30. The magnitude of the impact has been described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

11.4.31. 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 and operational phases.

11.4.32. The criteria in **Table 11.9** have been adopted for the assessment of magnitude of impact. The criteria have been developed based on the guidance referenced within **Section 11.3**.

Table 11.9 Magnitude of impact criteria

Impact	Magnitude Criteria			
	Negligible	Low	Medium	High
Construction and decommissioning phases – daytime noise (BS 5228-1:2009+A1: 2014)	Less than 55 dB LAeq,T	Between 55 and 65 dB LAeq,T	Between 66 and 75 dB LAeq,T	Greater than 75 dB LAeq,T
Construction and decommissioning phases – night-time noise (BS 5228-1:2009+A1: 2014)	Less than 40 dB LAeq,T	Between 40 and 45 dB LAeq,T	Between 46 and 55 dB LAeq,T	Greater than 55 dB LAeq,T
Construction phase and decommissioning - road traffic noise (DMRB LA 111 ‘Noise and Vibration’)	Less than 1 dB increase in road traffic noise	1.0 to 2.9 dB increase in road traffic noise	3.0 to 4.9 dB increase in road traffic noise	Greater than or equal to 5 dB increase
Construction and decommissioning phases – vibration (BS	Less than 0.3 mm/s PPV	0.3 to less than 1.0 mm/s PPV	1.0 to 9.9 mm/s PPV	Greater than or

Impact	Magnitude Criteria			
	Negligible	Low	Medium	High
5228-2:2009+A1: 2014)				equal to 10 mm/s PPV
Operational phase – daytime noise (BS 4142: 2014 + A1: 2019 / WHO, 1999 / BS 8233: 2014)	Rated noise level equal to or less than 35 dB $L_{Ar, T}$	Rated noise level between 36 and 40 dB $L_{Ar, T}$	Rated noise level between 41 and 50 dB $L_{Ar, T}$	Rated noise level greater than 50 dB $L_{Ar, T}$
Operational phase – night-time noise (BS 4142: 2014 + A1: 2019 / WHO, 1999 / BS 8233: 2014)	Rated noise level equal to or less than 30 dB $L_{Ar, T}$	Rated noise level between 31 and 35 dB $L_{Ar, T}$	Rated noise level between 36 and 45 dB $L_{Ar, T}$	Rated noise level greater than 45 dB $L_{Ar, T}$

Notes:

1. *Operational phase noise criteria are based on rated noise levels as defined in BS 4142: 2014+A1: 2019.*

11.4.33. With regards to the operational magnitude criteria, BS 4142 advises that where rating levels and background levels are low, which is typically the case in rural areas, the assessment of operational noise should take into context the absolute noise level. The ANC Guide to BS 4142 provides context 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 30 dB LA_{90} , and low rating levels as being less than about 35 dB $L_{Ar, Tr}$ ”.

11.4.34. The ANC Guide suggests 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”.*

11.4.35. In this case, it is considered that a minimum rating level of 40 dB $L_{Ar, Tr}$ during the daytime, and 35 dB $L_{Ar, Tr}$ for the low magnitude impact criteria, would align with guidance in PPG, 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”.

11.4.36. Based on the measured baseline noise levels, residual noise levels ($L_{Aeq, T}$) are equal to or less than the applied rating level design targets applied to the low magnitude criteria. This is

considered to successfully apply the concepts of a lowest observed adverse effect level (LOAEL) within PPG and ‘context’ within BS 4142.

- 11.4.37. Furthermore, BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ and the World Health Organisation (WHO) ‘Guidelines for Community Noise’ (1999) provide guidance levels for internal noise within dwellings of 30 dB $L_{Aeq,T}$ for good sleeping conditions at night. However, residents are likely to be inside their properties at night. BS 8233:2014 states that building envelope attenuation would be reduced by approximately 15 dB for a partially open window. Consequently, an external high magnitude criteria, indicating a significantly adverse effect level (SOAEL) of 45 dB $L_{A,r,Tr}$ has been adopted for the night-time.
- 11.4.38. Based on the adaptation of absolute limits, WHO 1999 provides their guidance on permissible levels above which adverse effects are likely to occur. Therefore, the criteria for LOAEL and SOAEL adopted within this assessment are considered as a design limit, above which the onset of LOAEL and SOAEL would occur.

Significance of effects

- 11.4.39. The overall significance of an effect is determined by combining the sensitivity of the receptor and the magnitude of impact (as presented in **Table 11.9**). The assessment of significance relies on best practice, the relevant published standards and guidance documents, and professional judgement.
- 11.4.40. The significance of an effect is reported as either ‘significant’ or ‘not significant’. Where effect is assessed as ‘Negligible’ or ‘Minor’, this is considered to achieve the lowest observed adverse effect level (LOAEL) within NPSE and is considered not significant. Where the effect is classed as ‘Moderate’ or ‘Major’, this is considered to apply achieve the significant observed adverse effect level (SOAEL) and is classed as significant.

Table 11.10 Determining significance of effects

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

11.5. Summary of baseline conditions

- 11.5.1. **Table 11.11** presents the results of the baseline noise survey undertaken at representative positions, indicative of those nearest receptors to the Proposed Development. **Table 11.11** also provides the representative background sound level for the daytime and night-time periods following a statistical analysis undertaken in accordance with BS 4142.
- 11.5.2. The data is presented for both daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods. Representative background sound levels incorporate the time periods derived from BS 4142, specifically 1-hour for daytime (dB LA90, 1hr) and 15-minutes for night-time (dB LA90, 15min).
- 11.5.3. Weather conditions for the monitoring period have been analysed for the nearest weather station to the Proposed Development, located 1.6km to the south-west of Ashby de la Launde (Wunderground ID – ILINCO209). Where the weather conditions are considered outside of the parameters for environmental noise monitoring (in accordance with the requirements of BS 7445-1:2003), the corresponding noise data has been discarded from the resultant analysis.

Table 11.11 Measured noise levels

Ref.	Time period	Measured levels		Representative background sound level, dB LA90, T
		dB LAeq, T	dB LA90, T	
MP1	Daytime	46	39	34
MP1	Night-time	43	33	29
MP2	Daytime	49	44	40
MP2	Night-time	45	36	30
MP3	Daytime	49	40	35
MP3	Night-time	48	33	26
MP4	Daytime	53	47	43
MP4	Night-time	50	34	26
MP5	Daytime	44	34	31
MP5	Night-time	35	28	22

Ref.	Time period	Measured noise levels		Representative background sound level, dB LA90, T
		dB LAeq, T	dB LA90, T	
MP6	Daytime	45	38	35
MP6	Night-time	41	31	24
MP7	Daytime	44	35	30
MP7	Night-time	43	29	22
MP8	Daytime	52	43	37
MP8	Night-time	53	35	27
MP9	Daytime	43	33	31
MP9	Night-time	38	28	20
MP10	Daytime	50	34	30
MP10	Night-time	43	28	21
MP11	Daytime	51	39	36
MP11	Night-time	48	33	26
MP12	Daytime	48	33	32
MP12	Night-time	40	27	22
MP13	Daytime	46	37	33
MP13	Night-time	41	29	23
MP14	Daytime	44	31	28
MP14	Night-time	36	26	22
MP15	Daytime	60	43	38
MP15	Night-time	53	31	25
MP16	Daytime	50	40	36

Ref.	Time period	Measured levels dB LAeq, T	noise dB LA90, T	Representative background sound level, dB LA90, T
MP16	Night-time	42	32	24
MP17	Daytime	47	37	33
MP17	Night-time	41	28	22
MP18	Daytime	50	39	35
MP18	Night-time	48	29	22
MP19	Daytime	51	40	36
MP19	Night-time	42	30	23
MP20	Daytime	52	39	37
MP20	Night-time	45	31	24
MP21	Daytime	49	35	33
MP21	Night-time	39	27	20
MP22	Daytime	47	35	31
MP22	Night-time	45	26	20
MP23	Daytime	53	34	33
MP23	Night-time	47	25	19
MP24	Daytime	44	33	31
MP24	Night-time	35	25	19

11.5.4. Baseline monitoring positions are provided in **Figure 11.1**.

Sensitive receptors

11.5.5. The following sensitive receptors have been scoped into this preliminary assessment. In most cases, those identified receptors represent a number of dwellings adjacent or within close proximity to one another. It can therefore be reasonably assumed that impacts on the identified receptors will be consistent with that likely

to be experienced at those dwellings at a similar distance to the Proposed Development.

11.5.6. Given all receptors are residential, these are considered of **high** sensitivity.

Table 11.12 Sensitive receptors

Ref.	Receptor name	Grid reference	Type	Representative baseline monitoring location
R1	Gorse Hill Farm	501142E 356220N	Residential	MP1
R2	The Bungalow, Gorse Hill Road	501187E 356279N	Residential	MP1
R3	14 Martin Court, Mallory Road, RAF Digby	504548E 356395N	Residential	MP9
R4	13 Howard Road, RAF Digby	504935E 356264N	Residential	MP10
R5	Rowston Cottages, Digby	505134E 356539N	Residential	MP10
R6	The Lodge, Digby	505230E 356823N	Residential	MP11
R7	Scopwick Mill	505726E 357614N	Residential	MP15*
R8	Mill Cottages, Scopwick	506022E 357800N	Residential	MP15*
R9	52 Heath Road, Scopwick	506333E 357975N	Residential	MP15
R10	52 Heath Road, Scopwick	506536E 357992N	Residential	MP15
R11	1 Vicarage Lane, Scopwick	506762E 358170N	Residential	MP15
R12	Scopwick House, Scopwick	506654E 358356N	Residential	MP15
R13	The Old Rectory, Blankney	506498E 359782N	Residential	MP19
R14	The Hall Cottage, Blankney	506961E 359869N	Residential	MP19

Ref.	Receptor name	Grid reference	Type	Representative baseline monitoring location
R15	Hall Farm, Blankney	507194E 359883N	Residential	MP19
R16	Staging Post, Blankney	507085E 360293N	Residential	MP20
R17	Brickyard Farm, Blankney	508565E 360433N	Residential	MP21
R18	Scopwick Low Field Farm, Kirkby Green	508483E 359008N	Residential	MP22
R19	The Mills, Kirkby Green	508935E 358036N	Residential	MP23
R20	Harefield, Kirkby Green	508412E 357924N	Residential	MP24
R21	Braemar Residential Park, Kirkby Green	508129E 358088N	Residential	MP24
R22	Longfields, Scopwick	507524E 358118N	Residential	MP24
R23	4 Springfield Estate, Scopwick	507164E 358213N	Residential	MP18
R24	1 Glebe Close, Scopwick	506911E 358169N	Residential	MP18
R25	6 Farriers Court, Scopwick	506749E 358097N	Residential	MP15
R26	35 Beckside, Scopwick	506505E 357912N	Residential	MP15
R27	4 Almonds Court, Scopwick	506799E 357910N	Residential	MP15
R28	Sheffield House, Scopwick	506855E 356719N	Residential	MP17
R29	The Hayloft, Rowston Top	505677E 356209N	Residential	MP13**
R30	Glebe Farm, Digby	504951E 355916N	Residential	MP10
R31	The Garden House, Digby	505312E 355565N	Residential	MP13
R32	The Lodge, Ashby de la Launde	504842E 355323N	Residential	MP13

Ref.	Receptor name	Grid reference	Type	Representative baseline monitoring location
R33	Slate House, Ashby de la Launde	503882E 354330N	Residential	MP7
R34	Mount Farm, Ashby de la Launde	504627E 353753N	Residential	MP6
R35	Peacock Lodge Cottages, Ashby de la Launde	503975E 353647N	Residential	MP6
R36	Hill Farm Cottages, Braucewell	505570E 353213N	Residential	MP5
R37	Manor House, Braucewell	504643E 352461N	Residential	MP5
R38	Church House, Braucewell	504342E 352505N	Residential	MP5
R39	School Row, Braucewell	503629E 352118N	Residential	MP4
R40	7 Thompson's Bottom, Ashby de la Launde	501857E 354947N	Residential	MP2
R41	1 Thompson's Bottom, Ashby de la Launde	501880E 355053N	Residential	MP2
R42	Ashby Lodge, Ashby de la Launde	502886E 355273N	Residential	MP8
R43	Toll Bar Cottages, Ashby de la Launde	502694E 355720N	Residential	MP8

* Sound level meter at nearest baseline monitoring position 14 found to be on its side on retrieval. Alternative monitoring position used and considered representative;
** Sound level meter at nearest baseline monitoring position 12 found to be on its side on retrieval. Alternative monitoring position used and considered representative.

11.5.7. The respective locations of the sensitive receptors adopted for the purposes of this preliminary assessment are shown on **Figure 11.2**.

Future baseline

11.5.8. On the basis that the majority of the Proposed Development is located within a rural setting, typically comprising agricultural land

use and not located close to major transport infrastructure, there is generally not expected to be significant changes to the baseline conditions in the future.

- 11.5.9. Regarding transport infrastructure, such as roads and rail lines, there is potential for growth in the 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.

11.6. Likely effects, additional mitigation and residual effects

Construction phase

- 11.6.1. **Table 11.13** below summarises the potential impacts of construction phase traffic associated with the Proposed Development.

Table 11.13 Construction traffic – noise level change

Road Link	Road name	Short term noise level change, dB LA10,18hr
1	A15 (north of B1191)	0.2
2	A15 (south of B1191)	0.2
3	B1191 (between RAF Digby and Ashby de la Launde)	1.0
4	B1191 (between Scopwick and RAF Digby)	1.2
5	B1188 (north of Scopwick)	0.4
6	B1188 (south of Digby)	0.4
7	A15 (south of Metheringham Heath Lane)	0.3
8	A15 (north of Leadingham)	0.3
9	B1188 (south of Scopwick)	0.8
10	A153 (directly north of junction with A17)	0.2
11	A17 (between A15 and A153)	0.1

- 11.6.2. Noise predictions indicate that the effect of construction traffic would increase noise levels by a maximum of 1.2 dB LA10, 18hr in the short term along B1191 (between Scopwick and RAF Digby); the

magnitude of impact would be **low**, resulting in a temporary **minor adverse** effect, which is considered **not significant**.

11.6.3. **Table 11.14** below summarises the potential effects during the construction phase.

Table 11.14 Assessment of likely effects, additional mitigation and residual effects during construction

Receptor/Matter	Likely Effects/Additional Mitigation/Residual Effects	(Secondary and Tertiary)
Construction noise	Likely effects	Construction activities could lead to noise levels generated by the construction phase activities resulting in potential disturbance or interference with activities. It is noted that such activities are likely considered transient due to the movement of plant and machinery.
	Additional (secondary and tertiary) mitigation	<p>Best Practicable Means (BPM) as defined by the Control of Pollution Act 1974 will be implemented which will serve to minimise the noise and vibration impacts at receptors in the vicinity of the construction phase works. These include (amongst others):</p> <ul style="list-style-type: none"> • Careful selection of plant and construction methods. Only plant conforming to relevant national, EU or international standards, directives and recommendations on noise and vibration emissions shall be used; • Design and use of site enclosures, housing and temporary stockpiles, where practicable and necessary, to provide acoustic screening at the earliest opportunity; • Plant and equipment liable to create noise and/or vibration whilst in operation will, as far as reasonably practicable, be located away from sensitive receptors and away from walls reflecting towards sensitive receptors. <p>In addition, noise and vibration management measures would be prescribed in the Outline Construction Environmental Management Plan, will be submitted in support of the DCO application and based on the results of the ES (once plant/programme have been defined).</p>

Receptor/Matter	Likely Effects/Additional Mitigation/Residual Effects	(Secondary and Tertiary)
	Likely residual effects	Based on the application of suitable control measures and given the distance between source and receiver, the magnitude of impact at receptors is considered low , resulting in a temporary minor adverse effect, which is considered not significant .
Construction vibration	Likely effects	Vibration generated by certain construction activities, such as impact piling, breaking and/or vibratory compaction, may result in potential disturbance or interference with activities.
	Additional (secondary and tertiary) mitigation	BPM as defined by the Control of Pollution Act 1974 will be implemented which will serve to minimise the noise and vibration impacts at receptors in the vicinity of the construction phase works. These include (amongst others): <ul style="list-style-type: none"> • Low vibration working methods employed; • Controlling vibration at source; • Apply appropriate offset to building locations.
	Likely residual effects	Based on the application of suitable control measures and given the distance between source and receiver, the magnitude of impact at receptors is considered low , resulting in a temporary minor adverse effect, which is considered not significant .
Construction traffic noise	Likely effects	Increase in daytime noise levels generated by construction traffic resulting in potential disturbance or interference with activities.
	Additional (secondary and tertiary) mitigation	BPM as defined by the Control of Pollution Act 1974 will be implemented which will serve to minimise the noise impacts at receptors in the vicinity of the construction routes and use of proposed compound areas. Traffic routes to be designed as to avoid, where practicable, residential properties situated along minor roads.
	Likely residual effects	The magnitude of impact at receptors is considered low , resulting in a temporary minor adverse effect, which is considered not significant .

Operational phase

- 11.6.4. As stated in **Section 11.4** above, at this stage, flexibility on the location of the BESS is retained alongside operation of the Springwell Substation.
- 11.6.5. The assessment accounts for the BESS positioned within either the northern or southern fields, plus inclusion of both inverter options (central or string), as follows:
- Option 1a – Northern BESS + string inverters + ITS transformers;
 - Option 1b – Northern BESS + central inverters + ITS transformers;
 - Option 2a – Southern BESS + string inverters + ITS transformers;
 - Option 2b – Southern BESS + central inverters + ITS transformers.

Predicted Operational Noise Levels – Northern BESS

- 11.6.6. Rated noise levels, accounting for Options 1a and 1b, are itemised in **Tables 11.15** and **11.16**, with the BESS positioned within the northern fields of Springwell West as detailed in **Figure 2.3**.

Table 11.15 Rated noise levels – Option 1a (Northern BESS + String Inverters + ITS Transformers)

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R1	Gorse Hill Farm	36	38	2	9	-4	3	-14	-7
R2	The Bungalow, Gorse Hill Road	36	38	2	9	-4	3	-14	-7
R3	14 Martin Court, Mallory Road, RAF Digby	37	41	6	21	-3	6	-13	-4
R4	13 Howard Road, RAF Digby	34	38	4	17	-6	3	-16	-7
R5	Rowston Cottages, Digby	38	42	8	21	-2	7	-12	-3
R6	The Lodge, Digby	40	44	4	18	0	9	-10	-1

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R7	Scopwick Mill	35	37	-3	12	-5	2	-15	-8
R8	Mill Cottages, Scopwick	34	36	-4	11	-6	1	-16	-9
R9	52 Heath Road, Scopwick	32	34	-6	9	-8	-1	-18	-11
R10	29 Heath Road, Scopwick	32	33	-6	8	-8	-2	-18	-12
R11	1 Vicarage Lane, Scopwick	31	33	-7	8	-9	-2	-19	-12
R12	Scopwick House, Scopwick	31	33	-7	8	-9	-2	-19	-12
R13	The Old Rectory, Blankney	29	31	-7	8	-11	-4	-21	-14

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R14	The Hall Cottage, Blankney	32	36	-4	13	-8	1	-18	-9
R15	Hall Farm, Blankney	35	38	-1	15	-5	3	-15	-7
R16	Staging Post, Blankney	32	33	-5	9	-8	-2	-18	-12
R17	Brickyard Farm, Blankney	35	38	2	18	-5	3	-15	-7
R18	Scopwick Low Field Farm, Kirkby Green	40	41	9	21	0	6	-10	-4
R19	The Mills, Kirkby Green	28	30	-5	11	-12	-5	-22	-15
R20	Harefield, Kirkby Green	30	33	-1	14	-10	-2	-20	-12

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R21	Braemar Residential Park, Kirkby Green	32	38	1	19	-8	3	-18	-7
R22	Longfields, Scopwick	32	38	1	19	-8	3	-18	-7
R23	4 Springfield Estate, Scopwick	32	34	-3	12	-8	-1	-18	-11
R24	1 Glebe Close, Scopwick	31	33	-4	11	-9	-2	-19	-12
R25	6 Farriers Court, Scopwick	31	33	-7	8	-9	-2	-19	-12
R26	35 Beckside, Scopwick	32	34	-6	9	-8	-1	-18	-11
R27	4 Almonds Court, Scopwick	32	33	-6	8	-8	-2	-18	-12

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R28	Sheffield House, Scopwick	35	38	2	16	-5	3	-15	-7
R29	The Hayloft, Rowston Top	39	43	6	20	-1	8	-11	-2
R30	Glebe Farm, Digby	32	36	2	15	-8	1	-18	-9
R31	The Garden House, Digby	30	34	-3	11	-10	-1	-20	-11
R32	The Lodge, Ashby de la Launde	29	31	-4	8	-11	-4	-21	-14
R33	Slate House, Ashby de la Launde	37	39	7	17	-3	4	-13	-6
R34	Mount Farm, Ashby de la Launde	30	31	-5	7	-10	-4	-20	-14
R35	Peacock Lodge	38	40	3	16	-2	5	-12	-5

Ref.	Receptor name	Rated noise level, dB L _{Ar} [*]		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB ^{**}		Exceedance above SOAEL, dB ^{***}	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
	Cottages, Ashby de la Launde								
R36	Hill Farm Cottages, Brauncewell	20	22	-11	0	-20	-13	-30	-23
R37	Manor House, Brauncewell	25	29	-6	7	-15	-6	-25	-16
R38	Church House, Brauncewell	27	31	-4	9	-13	-4	-23	-14
R39	School Row, Brauncewell	29	30	-14	4	-11	-5	-21	-15
R40	7 Thompson's Bottom, Ashby de la Launde	43	43	3	13	3	8	-7	-2
R41	1 Thompson's Bottom,	44	44	4	14	4	9	-6	-1

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
	Ashby de la Launde								
R42	Ashby Lodge, Ashby de la Launde	40	41	3	14	0	6	-10	-4
R43	Toll Bar Cottage, Ashby de la Launde	45	44	8	17	5	9	-5	-1

* Inclusive of rating penalties for potential audible tonal components;
** LOAEL aligned with the low magnitude impact criteria i.e 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time
*** SOAEL aligned with the high magnitude impact criteria i.e 50 dB L_{Ar} daytime, 45 dB L_{Ar} night-time

Table 11.16 Rated noise levels – Option 1b (Northern BESS + Central Inverters + ITS Transformers)

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R1	Gorse Hill Farm	36	38	2	9	-4	3	-14	-7
R2	The Bungalow, Gorse Hill Road	37	39	3	10	-3	4	-13	-6
R3	14 Martin Court, Mallory Road, RAF Digby	39	43	8	23	-1	8	-11	-2
R4	13 Howard Road, RAF Digby	36	39	6	18	-4	4	-14	-6
R5	Rowston Cottages, Digby	39	42	9	21	-1	7	-11	-3
R6	The Lodge, Digby	40	45	4	19	0	10	-10	0
R7	Scopwick Mill	35	38	-3	13	-5	3	-15	-7

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R8	Mill Cottages, Scopwick	36	38	-2	13	-4	3	-14	-7
R9	52 Heath Road, Scopwick	35	37	-3	12	-5	2	-15	-8
R10	29 Heath Road, Scopwick	34	36	-4	11	-6	1	-16	-9
R11	1 Vicarage Lane, Scopwick	34	36	-4	11	-6	1	-16	-9
R12	Scopwick House, Scopwick	35	36	-3	11	-5	1	-15	-9
R13	The Old Rectory, Blankney	31	32	-5	9	-9	-3	-19	-13
R14	The Hall Cottage, Blankney	34	37	-2	14	-6	2	-16	-8
R15	Hall Farm, Blankney	37	40	1	17	-3	5	-13	-5

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R16	Staging Post, Blankney	34	35	-3	11	-6	0	-16	-10
R17	Brickyard Farm, Blankney	38	44	5	24	-2	9	-12	-1
R18	Scopwick Low Field Farm, Kirkby Green	43	47	12	27	3	12	-7	2
R19	The Mills, Kirkby Green	33	35	0	16	-7	0	-17	-10
R20	Harefield, Kirkby Green	37	41	6	22	-3	6	-13	-4
R21	Braemar Residential Park, Kirkby Green	39	45	8	26	-1	10	-11	0
R22	Longfields, Scopwick	38	41	7	22	-2	6	-12	-4

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R23	4 Springfield Estate, Scopwick	35	38	0	16	-5	3	-15	-7
R24	1 Glebe Close, Scopwick	33	35	-2	13	-7	0	-17	-10
R25	6 Farriers Court, Scopwick	34	36	-4	11	-6	1	-16	-9
R26	35 Beckside, Scopwick	36	37	-2	12	-4	2	-14	-8
R27	4 Almonds Court, Scopwick	35	37	-3	12	-5	2	-15	-8
R28	Sheffield House, Scopwick	42	45	9	23	2	10	-8	0
R29	The Hayloft, Rowston Top	41	45	8	22	1	10	-9	0
R30	Glebe Farm, Digby	35	38	5	17	-5	3	-15	-7

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R31	The Garden House, Digby	33	37	0	14	-7	2	-17	-8
R32	The Lodge, Ashby de la Launde	33	37	0	14	-7	2	-17	-8
R33	Slate House, Ashby de la Launde	42	46	12	24	2	11	-8	1
R34	Mount Farm, Ashby de la Launde	35	39	0	15	-5	4	-15	-6
R35	Peacock Lodge Cottages, Ashby de la Launde	42	45	7	21	2	10	-8	0
R36	Hill Farm Cottages, Brauncewell	26	30	-5	8	-14	-5	-24	-15
R37	Manor House, Brauncewell	31	34	0	12	-9	-1	-19	-11

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R38	Church House, Brauncewell	32	37	1	15	-8	2	-18	-8
R39	School Row, Brauncewell	34	36	-9	10	-6	1	-16	-9
R40	7 Thompson's Bottom, Ashby de la Launde	43	43	3	13	3	8	-7	-2
R41	1 Thompson's Bottom, Ashby de la Launde	44	47	4	17	4	12	-6	2
R42	Ashby Lodge, Ashby de la Launde	41	42	4	15	1	7	-9	-3
R43	Toll Bar Cottage, Ashby de la Launde	45	46	8	19	5	11	-5	1

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night

* Inclusive of rating penalties for potential audible tonal components;
** LOAEL aligned with the low magnitude impact criteria i.e 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time
*** SOAEL aligned with the high magnitude impact criteria i.e 50 dB L_{Ar} daytime, 45 dB L_{Ar} night-time

- 11.6.7. Predicted noise levels accounting for Option 1a do not exceed the adopted SOAEL criteria at all sensitive receptors considered. Highest rated noise levels (L_{Ar}) are predicted at R43 – Toll Bar Cottages, daytime noise levels of 45 dB L_{Ar} and night-time levels of 44 dB L_{Ar} .
- 11.6.8. Predicted noise levels accounting for Option 1b are likely to remain below the adopted SOAEL criteria at all sensitive receptors considered during the daytime, with four exceedances predicted during the night-time. Highest rated noise levels (L_{Ar}) are predicted at R43 – Toll Bar Cottages, daytime noise levels of 45 dB L_{Ar} and night-time levels of 46 dB L_{Ar} .
- 11.6.9. The results of this preliminary assessment will inform the iterative design and mitigation strategy to be developed with the intention that the Proposed Development will not exceed the adopted LOAEL criteria at sensitive receptors.
- 11.6.10. **Table 11.17** below summarises the potential noise effects during the operational phase, with the northern BESS options.

Table 11.17 Assessment of likely effects, additional mitigation and residual effects during operation – Northern BESS

Receptor/Matter	Likely Effects/Additional Mitigation/Residual Effects	(Secondary and Tertiary)
Option 1a	Likely effects	Noise from operational plant items likely to exceed the LOAEL.
	Additional (secondary and tertiary) mitigation	Implementation/adoption of further acoustic mitigation measures as part of the ongoing design, to include: <ul style="list-style-type: none"> • Reducing the number of plant items (following engineering review); • Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; • Increasing the distance between source and receiver; • Use of barriers and/or enclosures where possible; and • Refinement of operational regimes to reduce noise impact during the quietest parts of the day (i.e those periods with the lowest residual noise/criteria).
	Likely residual effects	Based on the application of suitable control measures, the magnitude of impact at receptors accounting for Option 1a is considered low ,

Receptor/Matter	Likely Mitigation/Residual Effects	Effects/Additional (Secondary and Tertiary)
Option 1b	Likely effects	resulting in a long term minor adverse effect, which is considered not significant .
Option 1b	Additional (secondary and tertiary) mitigation	<p>Noise from operational plant items likely to exceed the LOAEL for the majority of the receptors considered, with exceedances of the SOAEL during the night at four of the sensitive receptors considered.</p> <p>Implementation/adoption of further acoustic mitigation measures as part of the ongoing design, to include:</p> <ul style="list-style-type: none"> • Reducing the number of plant items (following engineering review); • Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; • Increasing the distance between source and receiver; • Use of barriers and/or enclosures where possible; and • Refinement of operational regimes to reduce noise impact during the quietest parts of the day (i.e those periods with the lowest residual noise/criteria).
Option 1b	Likely residual effects	Based on the application of suitable control measures, the magnitude of impact at receptors accounting for Option 1b is considered low , resulting in a long term minor adverse effect, which is considered not significant .

Predicted Operational Noise Levels – Southern BESS

11.6.11. Rated noise levels, accounting for Options 2a and 2b, are itemised in **Tables 11.18** and **11.19**, with the BESS positioned within the southern fields of Springwell West as detailed in **Figure 2.3**.

Table 11.18 Rated noise levels – Option 2a (Southern BESS + String Inverters + ITS Transformers)

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R1	Gorse Hill Farm	28	28	-6	-1	-12	-7	-22	-17
R2	The Bungalow, Gorse Hill Road	28	28	-6	-1	-12	-7	-22	-17
R3	14 Martin Court, Mallory Road, RAF Digby	37	40	6	20	-3	5	-13	-5
R4	13 Howard Road, RAF Digby	34	38	4	17	-6	3	-16	-7
R5	Rowston Cottages, Digby	38	42	8	21	-2	7	-12	-3
R6	The Lodge, Digby	40	44	4	18	0	9	-10	-1
R7	Scopwick Mill	35	37	-3	12	-5	2	-15	-8

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R8	Mill Cottages, Scopwick	34	36	-4	11	-6	1	-16	-9
R9	52 Heath Road, Scopwick	32	34	-6	9	-8	-1	-18	-11
R10	29 Heath Road, Scopwick	32	33	-6	8	-8	-2	-18	-12
R11	1 Vicarage Lane, Scopwick	31	33	-7	8	-9	-2	-19	-12
R12	Scopwick House, Scopwick	31	33	-7	8	-9	-2	-19	-12
R13	The Old Rectory, Blankney	29	31	-7	8	-11	-4	-21	-14
R14	The Hall Cottage, Blankney	32	36	-4	13	-8	1	-18	-9
R15	Hall Farm, Blankney	35	38	-1	15	-5	3	-15	-7

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R16	Staging Post, Blankney	32	33	-5	9	-8	-2	-18	-12
R17	Brickyard Farm, Blankney	35	38	2	18	-5	3	-15	-7
R18	Scopwick Low Field Farm, Kirkby Green	40	41	9	21	0	6	-10	-4
R19	The Mills, Kirkby Green	28	30	-5	11	-12	-5	-22	-15
R20	Harefield, Kirkby Green	30	33	-1	14	-10	-2	-20	-12
R21	Braemar Residential Park, Kirkby Green	32	38	1	19	-8	3	-18	-7
R22	Longfields, Scopwick	32	38	1	19	-8	3	-18	-7

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R23	4 Springfield Estate, Scopwick	32	34	-3	12	-8	-1	-18	-11
R24	1 Glebe Close, Scopwick	31	33	-4	11	-9	-2	-19	-12
R25	6 Farriers Court, Scopwick	31	33	-7	8	-9	-2	-19	-12
R26	35 Beckside, Scopwick	32	34	-6	9	-8	-1	-18	-11
R27	4 Almonds Court, Scopwick	32	33	-6	8	-8	-2	-18	-12
R28	Sheffield House, Scopwick	35	38	2	16	-5	3	-15	-7
R29	The Hayloft, Rowston Top	39	43	6	20	-1	8	-11	-2
R30	Glebe Farm, Digby	32	36	2	15	-8	1	-18	-9

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R31	The Garden House, Digby	30	34	-3	11	-10	-1	-20	-11
R32	The Lodge, Ashby de la Launde	31	34	-2	11	-9	-1	-19	-11
R33	Slate House, Ashby de la Launde	41	42	11	20	1	7	-9	-3
R34	Mount Farm, Ashby de la Launde	42	45	7	21	2	10	-8	0
R35	Peacock Lodge Cottages, Ashby de la Launde	50	53	15	29	10	18	0	8
R36	Hill Farm Cottages, Brauncewell	31	34	0	12	-9	-1	-19	-11
R37	Manor House, Brauncewell	38	41	7	19	-2	6	-12	-4

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R38	Church House, Brauncewell	41	46	10	24	1	11	-9	1
R39	School Row, Brauncewell	35	36	-8	10	-5	1	-15	-9
R40	7 Thompson's Bottom, Ashby de la Launde	33	35	-7	5	-7	0	-17	-10
R41	1 Thompson's Bottom, Ashby de la Launde	34	36	-6	6	-6	1	-16	-9
R42	Ashby Lodge, Ashby de la Launde	37	38	0	11	-3	3	-13	-7
R43	Toll Bar Cottage, Ashby de la Launde	34	36	-3	9	-6	1	-16	-9

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night

* Inclusive of rating penalties for potential audible tonal components;
** LOAEL aligned with the low magnitude impact criteria i.e 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time
*** SOAEL aligned with the high magnitude impact criteria i.e 50 dB L_{Ar} daytime, 45 dB L_{Ar} night-time

Table 11.19 Rated noise levels – Option 2b (Southern BESS + Central Inverters + ITS Transformers)

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R1	Gorse Hill Farm	28	28	-6	-1	-12	-7	-22	-17
R2	The Bungalow, Gorse Hill Road	28	28	-6	-1	-12	-7	-22	-17
R3	14 Martin Court, Mallory Road, RAF Digby	39	43	8	23	-1	8	-11	-2
R4	13 Howard Road, RAF Digby	36	39	6	18	-4	4	-14	-6
R5	Rowston Cottages, Digby	39	42	9	21	-1	7	-11	-3
R6	The Lodge, Digby	40	45	4	19	0	10	-10	0

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R7	Scopwick Mill	35	38	-3	13	-5	3	-15	-7
R8	Mill Cottages, Scopwick	36	38	-2	13	-4	3	-14	-7
R9	52 Heath Road, Scopwick	35	37	-3	12	-5	2	-15	-8
R10	29 Heath Road, Scopwick	34	36	-4	11	-6	1	-16	-9
R11	1 Vicarage Lane, Scopwick	34	36	-4	11	-6	1	-16	-9
R12	Scopwick House, Scopwick	35	36	-3	11	-5	1	-15	-9
R13	The Old Rectory, Blankney	31	32	-5	9	-9	-3	-19	-13

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R14	The Hall Cottage, Blankney	34	37	-2	14	-6	2	-16	-8
R15	Hall Farm, Blankney	37	40	1	17	-3	5	-13	-5
R16	Staging Post, Blankney	34	35	-3	11	-6	0	-16	-10
R17	Brickyard Farm, Blankney	38	44	5	24	-2	9	-12	-1
R18	Scopwick Low Field Farm, Kirkby Green	43	47	12	27	3	12	-7	2
R19	The Mills, Kirkby Green	33	35	0	16	-7	0	-17	-10
R20	Harefield, Kirkby Green	37	41	6	22	-3	6	-13	-4

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R21	Braemar Residential Park, Kirkby Green	39	45	8	26	-1	10	-11	0
R22	Longfields, Scopwick	38	41	7	22	-2	6	-12	-4
R23	4 Springfield Estate, Scopwick	35	38	0	16	-5	3	-15	-7
R24	1 Glebe Close, Scopwick	33	35	-2	13	-7	0	-17	-10
R25	6 Farriers Court, Scopwick	34	36	-4	11	-6	1	-16	-9
R26	35 Beckside, Scopwick	36	37	-2	12	-4	2	-14	-8
R27	4 Almonds Court, Scopwick	35	37	-3	12	-5	2	-15	-8

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
R28	Sheffield House, Scopwick	42	45	9	23	2	10	-8	0
R29	The Hayloft, Rowston Top	41	45	8	22	1	10	-9	0
R30	Glebe Farm, Digby	35	38	5	17	-5	3	-15	-7
R31	The Garden House, Digby	33	37	0	14	-7	2	-17	-8
R32	The Lodge, Ashby de la Launde	34	38	1	15	-6	3	-16	-7
R33	Slate House, Ashby de la Launde	44	47	14	25	4	12	-6	2
R34	Mount Farm, Ashby de la Launde	43	46	8	22	3	11	-7	1
R35	Peacock Lodge	51	54	16	30	11	19	1	9

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
	Cottages, Ashby de la Launde								
R36	Hill Farm Cottages, Brauncewell	32	37	1	15	-8	2	-18	-8
R37	Manor House, Brauncewell	39	44	8	22	-1	9	-11	-1
R38	Church House, Brauncewell	41	46	10	24	1	11	-9	1
R39	School Row, Brauncewell	37	39	-6	13	-3	4	-13	-6
R40	7 Thompson's Bottom, Ashby de la Launde	34	35	-6	5	-6	0	-16	-10
R41	1 Thompson's Bottom,	34	38	-6	8	-6	3	-16	-7

Ref.	Receptor name	Rated noise level, dB L _{Ar} *		Exceedance above representative background sound level, dB		Exceedance above LOAEL, dB**		Exceedance above SOAEL, dB***	
		Daytime	Night	Daytime	Night	Daytime	Night	Daytime	Night
	Ashby de la Launde								
R42	Ashby Lodge, Ashby de la Launde	39	40	2	13	-1	5	-11	-5
R43	Toll Bar Cottage, Ashby de la Launde	36	38	-1	11	-4	3	-14	-7
<p>* Inclusive of rating penalties for potential audible tonal components; ** LOAEL aligned with the low magnitude impact criteria i.e 40 dB L_{Ar} daytime, 35 dB L_{Ar} night-time *** SOAEL aligned with the high magnitude impact criteria i.e 50 dB L_{Ar} daytime, 45 dB L_{Ar} night-time</p>									

11.6.12. Predicted noise levels accounting for Option 2a are likely to remain below the adopted SOAEL criteria at all sensitive receptors considered during the daytime, with two exceedances predicted during the night-time. Highest rated noise levels (L_{Ar}) are predicted at R35 – Peacock Lodge Cottages, daytime noise levels of 50 dB L_{Ar} and night-time levels of 53 dB L_{Ar} .

11.6.13. Predicted noise levels accounting for Option 2b are likely to exceed the adopted SOAEL criteria during both daytime and night-time periods, with one exceedance predicted during the daytime and five exceedances at sensitive receptors during the night. Highest rated noise levels (L_{Ar}) are predicted at R35 – Peacock Lodge Cottages, daytime noise levels of 51 dB L_{Ar} and night-time levels of 54 dB L_{Ar} .

11.6.14. **Table 11.20** below summarises the potential noise effects during the operational phase, with the southern BESS options.

Table 11.20 Assessment of likely effects, additional mitigation and residual effects during operation – Southern BESS

Receptor/Matter	Likely Effects/Additional Mitigation/Residual Effects	(Secondary and Tertiary)
Option 2a	Likely effects	Noise from operational plant items likely to exceed the SOAEL.
	Additional (secondary and tertiary) mitigation	<p>Implementation/adoption of further acoustic mitigation measures as part of the ongoing design, to include:</p> <ul style="list-style-type: none"> • Reducing the number of plant items (following engineering review); • Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; • Increasing the distance between source and receiver; • Use of barriers and/or enclosures where possible; • Refinement of operational regimes to reduce noise impact during the quietest parts of the day (i.e those periods with the lowest residual noise/criteria).
	Likely residual effects	Based on the application of suitable control measures, the magnitude of impact at receptors accounting for Option 2a is considered high , resulting in a long term

Receptor/Matter	Likely Mitigation/Residual Effects	Effects/Additional (Secondary and Tertiary)
		major adverse effect, which is considered significant .
Option 2b	Likely effects	Noise from operational plant items likely to exceed the SOAEL.
	Additional (secondary and tertiary) mitigation	Implementation/adoption of further acoustic mitigation measures as part of the ongoing design, to include: <ul style="list-style-type: none"> • Reducing the number of plant items (following engineering review); • Reducing noise at source through refinement of the engineering requirements in order to adopt lower noise emitting operational plant items; • Increasing the distance between source and receiver; • Use of barriers and/or enclosures where possible; • Refinement of operational regimes to reduce noise impact during the quietest parts of the day (i.e those periods with the lowest residual noise/criteria).
	Likely residual effects	Based on the application of suitable control measures, the magnitude of impact at receptors accounting for Option 2b is considered high , resulting in a long term major adverse effect, which is considered significant .

11.6.15. Based on the results of the noise modelling, it is recommended that the ongoing design and mitigation of the Proposed Development utilise the optioneering of the BESS within the north fields of Springwell West. The rationale for this is the larger areas of the northern fields with which to position/re-orientate plant and equipment, increased options for potential noise barriers and an increase in distance between source and sensitive receptors.

Decommissioning phase

11.6.16. The likely noise and vibration impacts during the decommissioning phase are considered to be similar to the

construction phase, as it is envisaged that similar plant and works would be used.

Assessment against future baseline

11.6.17. Given the Site's location within a largely rural setting, the future noise and vibration baseline would not significantly change in the absence of the Proposed Development.

11.7. Opportunities for environmental enhancement

11.7.1. Opportunities for environmental enhancement would not be relevant for the purposes of noise and vibration.

11.8. Intra-project combined effects

11.8.1. The effect of construction noise has been found to be of low impact based on current predicted trip generations, such that there is not considered to be a potential for significant in-combination effects associated with this aspect of the Proposed Development. Similarly, the positioning of plant/equipment during the operational phase would not significantly impact the design considerations accounted for within the landscape and visual assessment (**Chapter 9**).

11.8.2. Inter-project effects are assessed and presented in **Chapter 15: Cumulative Effects**.

11.9. Difficulties and uncertainties

11.9.1. The information provided in this PEIR is preliminary and is based on the information available at the time of writing. The final assessment of likely significant effects will be reported in the ES.

11.9.2. Two of the survey positions utilised for the baseline monitoring were found to be tampered with on arrival. It has been considered that alternate positions, adjacent to the same likely noise source(s), would be appropriate for purposes of assessment. Discussions with North Kesteven District Council are proposed regarding this approach.

11.9.3. Details of plant/equipment during the construction and decommissioning stages have not been defined. This preliminary assessment of likely effects has therefore been considered in qualitative terms. The final techniques, plant selection and programme are expected to be defined during the preparation of the ES, as further information becomes available.

11.9.4. Details of the noise emitting plant/equipment, their operating scenarios and location, associated with the operational phase have not been finalised at this stage. Further refinement of the design of

the Proposed Development would be undertaken in order to ensure compliance with the appropriate design targets.

- 11.9.5. Consultation has been undertaken with North Kesteven District Council concerning the application of the relevant standards, pertinent to the initial assessment of operational noise. As expected, baseline noise monitoring identified the residual noise environment to be of 'low' order. Further consultation is proposed with North Kesteven District Council to confirm the contextual assessment and application of absolute limits to define the LOAEL and SOAEL, as identified within this preliminary assessment.

11.10. Further work to inform the ES

Surveys

- 11.10.1. At this stage, no further surveys are anticipated subject to responses received from North Kesteven District Council.

Construction and decommissioning assessment

- 11.10.2. The following construction and decommissioning phase elements will either be undertaken or refined for the ES:

- Assessment of noise and vibration levels generated by the construction works in accordance with BS 5228. If appropriate, this will include an assessment of construction activities of an impulsive nature against shorter $L_{Aeq,T}$ averaging periods in line with Section 8.5.2.5 of BS 5228-1.
- Further detailed assessment of construction traffic flow fluctuations on the public highway (and private roads) during the various construction phases of the Proposed Development. This will be calculated using the methodology set out in the CRTN publication, using flow data provided by the traffic consultant.
- Assessment of construction traffic on the various temporary site access routes where practicable, using the haul route method outlined in Section F.2.5 of BS 5228-1. The assessment will consider the flow data provided by the traffic consultant.
- Consideration of potential cumulative effects as a result of the Proposed Development in combination with other existing development and/or approved developments.
- The outline scope of construction phase compliance monitoring.

Operational assessment

11.10.3. The following operational phase elements will be undertaken as part of the ES:

- Refinement of the noise prediction model for the operational fixed plant which will account for the proposed and/or revised site layout, noise emitting plant/equipment (preferably in octave bands) to be introduced and any embedded acoustic mitigation measures.
- An operational phase noise assessment for the operational fixed plant undertaken in accordance with the methodology outlined in BS 4142. This will identify the requirement for additional mitigation measures.
- Consideration of potential cumulative effects as a result of the Proposed Development in combination with existing development and/or approved developments, where applicable.



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