HELIOS RENEWABLE ENERGY PROJECT

Preliminary Environmental Information Report

Volume 2: Main Text and Figures

Chapter 11: Noise & Vibration

October 2023

11. Noise and Vibration

11.1. Introduction

11.1.1. This chapter of the PEIR reports on the preliminary assessment of the likely significant effects of the Proposed Development on the environment with respect to noise and vibration.

11.1.2. This chapter is supported by the following Figures:

- Figure 11.1 Study Area;
- Figure 11.2 Noise Measurement Location;
- Figure 11.3 Noise Sensitive Receptors; and
- Figure 11.4 Noise Contour Map.

11.1.3. This chapter is supported by the following Appendices:

- Appendix 11.1 Time History and Statistical Analysis Graphs;
- Appendix 11.2 Correspondence with Selby District Council Senior Environmental Health Officer; and
- Appendix 11.3 Traffic Flow Data.

11.2. Planning Policy Context

Legislation

Control of Pollution Act 1974[1]

11.2.1. The Control of Pollution Act, 1974, Part III - Noise ('the 1974 Act') enables a local planning authority to serve a notice on a person (this includes a company) who is carrying out, or who are planning to carry out, works of construction, demolition, road works, railway maintenance etc. in order to control the noise from those operations. Section 61 of the Act also enables such a person to apply to the local authority for consent in respect of such works.

[1] Accessed at: https://www.legislation.gov.uk/ukpga/1974/40/part/III/enacted Accessed May 2023

11.2.2. Section 72 of the 1974 Act introduces the concept of using 'Best Practicable Means' ('BPM') to control the impact of noise, where significant impacts are likely to occur. BPM is defined as; "practicable" meaning reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications. The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures.

11.2.3. BPM essentially means selection of the quietest techniques and equipment, in addition to considering factors such as timing, duration, location and opportunities for acoustic screening or separation, to ensure that impacts are controlled in so far as is reasonably practicable.

National Planning Policy

11.2.4. National planning policy that has been considered comprises the following designated and draft National Policy Statements ('NPS'):

- Overarching NPS for Energy (EN-1) (July 2011) ('NPS EN-1'[2]);
- Revised (Draft) Overarching NPS for Energy (EN-1) (March 2023) ('Revised (Draft) NPS EN-1'[3]);
- NPS for Renewable Energy Infrastructure (EN-3) (July 2011) ('NPS EN-3'[4]);
- Revised (Draft) NPS for Renewable Energy Infrastructure (EN-3) (March 2023) ('Revised (Draft) NPS EN-3'[5]); and
- NPS for Electricity Networks Infrastructure (EN-5) (September 2021) ('NPS EN-5'[6]).

11.2.5. The relevant text from each NPS is presented below.

[2] Accessed at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf Accessed August 2023
[3] Accessed at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf Accessed August 2023
[4] Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147382/NPS_EN-3.pdf Accessed August 2023
[5] Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf Accessed August 2023
[6] Accessed at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf Accessed August 2023

11.2.6. NPS EN-1 states where noise impacts are likely to arise from a proposed development, the applicant should include the following in the noise assessment:

'a. a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;

b. identification of noise sensitive premises and noise sensitive areas that may be affected;

c. the characteristics of the existing noise environment;

d. a prediction of how the noise environment will change with the proposed development;

e. in the shorter term such as during the construction period;

f. in the longer term during the operating life of the infrastructure;

g. at particular times of the day, evening and night as appropriate;

h. an assessment of the effect of predicted changes in the noise environment on any noise sensitive receptors; and

i. measures to be employed in mitigating noise. The nature and extent of the noise assessment should be proportionate to the likely noise impact.'

11.2.7. NPS EN-3 with particular reference to Paragraphs 2.4.2, states the following in relation to the design of a project to mitigate noise impacts:

'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.'

11.2.8. With relation to noise, the Draft NPS EN-1 2021 repeats the three aims for decision makers from the NPS EN-1 2011. Key additional points that expand on requirements in NPS EN-1 and are relevant to the Scheme are referenced from paragraph 5.12.4 and require:

'an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely

impact on health and well-being where appropriate, and noise-sensitive areas'

…

'measures to be employed in mitigating the effects of noise - applicants should consider using best available techniques to reduce noise impacts'

11.2.9. Additionally, the draft NPS EN-1 allows for some flexibility in design, stating that:

'Some noise impacts will be controlled through environmental permits and parallel tracking is encouraged where noise impacts determined by an environmental permit interface with planning issues (i.e. physical design and location of development)'.

11.2.10. The draft EN-3 includes the consideration of transport noise and vibration associated with solar photovoltaic generation schemes. While no specific guidance is provided in the draft EN-1 of EN-3 for assessment of these noise impacts, these issues have been addressed in this chapter. NPPF, with particular reference to Paragraph 174 and 185, states the following relevant to noise:

a. 174: 'Planning policies and decisions should contribute to and enhance the natural and local environment by:…e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.'

b. 185: 'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…'

11.2.11. NPS EN-5 sets out specific considerations which apply to electricity network infrastructure. Noise can be generated by high-voltage transmission lines under certain conditions due to corona discharge.

National Planning Policy Framework, 2021

11.2.12. The National Planning Policy Framework ('NPPF')[7] sets out the Government's planning policies for England.

11.2.13. The NPPF is used as a source of relevant policy to inform in planning decisions. It sets out the Government's requirements for the planning system and how these are expected to be addressed.

11.2.14. Under Section 15; *Conserving and Enhancing the Natural Environment*, in Paragraph 174, the following is stated:

> *'Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> - *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability'.*

11.2.15. Paragraph 185 of the document goes on to state:

> *'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> - *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
> - *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity*

[7] Ministry of Housing, Communities and Local Government (MHCLG), July 2021. National Planning Policy Framework. HMSO. London. **https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf** accessed May 2023

value for this reason'

National Planning Practice Guidance in England: Noise, 2019

11.2.16. The National Planning Practice Guidance ('PPG Noise') has been revised and updated to be easily accessible and available online.

11.2.17. The Noise Guidance advises on how planning can manage potential noise impacts in new developments. It sets out when noise is relevant to planning and outlines the following Observed Effect Levels to determine the noise impact:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

11.2.18. The document recognises the subjective relationship between noise levels and the impact on those affected, and advises on factors, which may influence on whether noise could be a concern.

11.2.19. Paragraph: 002 of the PPG Noise states the following:

'Can noise override other planning concerns?

It can, where justified, although it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern.'

11.2.20. As such, Paragraph: 003 of the NPPG states that:

'Plan-making and decision making need to take account of the acoustic environment and in doing so consider:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*

- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure … is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'

11.2.21. Consequently, PPG Noise summarises the noise exposure hierarchy, based on the likely average response. The following three observed effect levels are identified below, as identified in Paragraph 004:

- Significant Observed Adverse Effect Level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest Observed Adverse Effect Level: This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No Observed Adverse Effect Level: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

11.2.22. Importantly, Paragraph: 004 of the PPG Noise states that:

'Although the word 'level' is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs.'

11.2.23. Paragraph: 005 of the PPG Noise expands the significant criteria related to each of these levels, which are reproduced in Table 11.1 below.

Table 11.1 Significance Criteria from NPPG in England: Noise

Perception	Examples of Outcome	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the	No Observed Adverse Effect	No specific measures required

Perception	Examples of Outcome	Increasing Effect Level	Action
	acoustic character of the area but not such that there is a perceived change in the quality of life.		
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant,	Unacceptable Adverse Effect	Prevent

Perception	Examples of Outcome	Increasing Effect Level	Action
	medically definable harm, e.g. auditory and non-auditory		

Local Planning Policy

11.2.24. In April 2023, North Yorkshire Council ('NYC') became the administrative authority in which the Site is located, following its creation as a unitary authority by combining several district councils, including Selby District Council ('SDC'), the administrative area within which the Site had previously been located. However, the planning policy of SDC is still relevant to the Proposed Development.

Selby District Local Plan (2005) Saved Policies[8]

11.2.25. Policy EC5 states that the proposals for the development of the energy sector will be supported where any significant adverse impacts are addressed satisfactorily and the residual harm is outweighed by the wider benefits of the proposal in relation to local amenity, including noise.

Selby District Core Strategy Local Plan (2013)[9]

11.2.26. The Selby District Core Strategy Local Plan (2013) states the following under *'Objectives'*:

> *'Protecting against pollution, improving the quality of air, land and water resources, and avoiding over-exploitation of water resources, and preventing noise/light/soil pollution and protecting development from noise/light/soil pollution.'*

11.2.27. Under *'Strategic Development Management Issues'* the Selby District Core Strategy Local Plan (2013) states:

> *'Future Local Plan documents, SPDs and guidance will consider setting local targets and requirements and tackle detailed issues such as siting and design, landscape and cumulative visual impact, noise/odour, habitat or*

[8] Accessed at: https://www.northyorks.gov.uk/planning-and-conservation/planning-policy/planning-policy-your-local-area/selby-planning-policy/selby-development-plan/selby-core-strategy-2013 Accessed August 2023

[9] Accessed at: https://www.northyorks.gov.uk/sites/default/files/fileroot/planning_migrated/planning_policy/CS_Adoption_Ver_OCT_2013_REDUCED.pdf Accessed May 2023

species disturbance. The Site Allocations Local Plan will consider whether it is appropriate, based on further evidence, to identify suitable areas for renewable and low carbon sources. Proposals for conversion of historic buildings and developments in conservation areas will require special consideration to assess the practicality of incorporating on-site renewables against the objectives of the designation to ensure they will not be compromised.'

11.2.28. Policy SP19 – Design Quality outlines expectations of new developments both residential and non-residential, including:

'Preventing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water, light or noise pollution or land instability.'

Selby District Local Plan Publication Version (2022)[10]

11.2.29. Policy NE8 (Pollution and Contaminated Land) states that development which could present noise pollution will not be permitted unless satisfactory remedial or preventative measures are incorporated.

Relevant Guidance

Construction Noise

11.2.30. Noise levels generated by construction and decommissioning plant and activities have the potential to impact upon nearby Noise Sensitive Receptors ('NSRs').

11.2.31. British Standard 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise' ('BS5228-1')[11] sets out an approach for predicting, assessing and controlling noise levels arising from a wide variety of demolition and construction plant and related activities. As such, it can be used to predict noise levels arising from the operations at proposed construction sites. BS5228-1 also sets out tables of sound power levels generated by a wide variety of construction plant to facilitate such predictions.

11.2.32. The magnitude of the potential impact on sensitive receptors would depend upon a

[10] Accessed at https://selby-consult.objective.co.uk/kse/event/37045 Accessed August 2023

[11] Accessed at https://www.warrington.gov.uk/sites/default/files/2020-08/cf53_bs_5228_pt1-2009a1-2014.pdf Accessed May 2023

number of variables, the following of which are of particular relevance to this assessment:

- The amount of noise generated by plant and equipment being used at the Site, generally expressed as a sound power level;
- The periods of operation of the plant at the Site, known as the 'on-time';
- The distance between the noise source and the receptor, known as the 'stand-off';
- The attenuation due to ground absorption or barrier screening effects; and
- The reflection of noise due to the presence of hard vertical faces such as walls.

11.2.33. In order to determine the likely effect of noise during construction and decommissioning of the Proposed Development, noise predictions have been carried out in accordance with the procedures presented in BS5228-1, taking full account of BPM. The prediction method described in BS5228-1 comprises taking the source noise level of each item of plant and correcting it for the following variables:

- distance effects between source and receiver;
- percentage operating time of the plant;
- barrier attenuation effects;
- ground absorption; and
- facade corrections.

11.2.34. BS5228-1 gives several examples of acceptable limits for construction and decommissioning noise. The most simplistic is based upon the exceedance of fixed noise limits and Annex E.2 states that:

> *'Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.'*

11.2.35. Annex E.2 goes on to state:

> *'Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the Site boundary should not exceed: 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise or 75 decibels (dBA) in urban areas near main roads in heavy*

industrial areas. These limits are for daytime working outside living rooms and offices.'

11.2.36. In respect of potentially more sensitive residential receptors, this assessment has considered the criteria set out in Annex E.3 of BS5228-1, which considers impact significance based upon the change in ambient noise associated with construction activities. BS5228-1 states that this can be considered as *'an alternative and/or additional method to determine the significance of construction noise levels'*.

11.2.37. Paragraph E.3.2 describes Example Method 1 ('The ABC Method'), which considers the existing ambient noise environment (the L_{Aeq} noise level environment) at the neighboring sensitive receptors and identifies levels that if exceeded would be considered to result in a significant adverse effect and is noted to apply to residential receptors only.

11.2.38. Table E.1 of BS5228-1 sets out significance effect threshold values at receptors. The process for determining this requires the determination of the ambient noise level at the relevant receptor (rounded to the nearest 5 decibels ('dB')), which is then compared to the total noise level, including the predicted construction noise level. If the combined noise level exceeds the appropriate category value, then the impact is deemed to be significant. The relevant statistics from Table E.1 are set out in the Table 11.2 below. Compliance with these guidance levels would ensure that no significant adverse effects are experienced at sensitive receptor locations.

Table 11.2 Construction Noise Impact Significance Criteria

Assessment category and threshold value period, L_{Aeq}	**Threshold value, in decibels – dB(A)**		
	Category A	**Category B**	**Category C**
Daytime	65	70	75
NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.			
NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.			
NOTE 3 Applied to residential receptors only. *A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.*			

Assessment category and threshold value period, L_{Aeq}	**Threshold value, in decibels – dB(A)**		
	Category A	**Category B**	**Category C**
B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. *C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.*			

11.2.39. In addition to the above method of assessing impacts, BS 5228 also suggests the 5dB(A) change method. This states that noise levels generated by construction and decommissioning activities are deemed to be significant if the total noise (pre-construction ambient noise plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB L_{Aeq}, from construction and decommissioning noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact.

Construction/Decommissioning Vibration

11.2.40. Vibration may be impulsive such as that due to hammer-driven piling; transient such as that due to vehicle movements along a railway; or continuous such as that due to vibratory driven piling.

11.2.41. The primary cause of community concern in relation to vibration generally relates to building damage from both construction and operational sources of vibration, although, the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.

11.2.42. Damage to buildings associated solely with ground-borne vibration is not common and although vibration may be noticeable, there is little evidence to suggest that they produce cosmetic damage such as a crack in plaster unless the magnitude of the vibration is excessively high. The most likely impact, where elevated levels of vibration do occur during a proposed development's construction and decommissioning phases, is associated with perceptibility.

11.2.43. There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS5228-1: Part 2, which relates to percussive or vibratory piling only. Therefore, it is not possible to accurately predict levels of vibration during the Site preparation and construction phases of a proposed development, as well as its decommissioning

phase. As such, to control the impact of vibration during site preparation and construction of a development, limits relating to the perceptibility of vibration are typically set.

11.2.44. BS5228-1 indicates that the threshold of human perception to vibration is around 0.15 mms-1, although it is generally accepted that for the majority of people vibration levels in excess of between 0.15 and 0.3 mms^{-1} peak particle velocity ('PPV') are just perceptible, which forms the basis of the recommend maximum permitted vibration levels of 1 mms-1 PPV within occupied residential dwellings.

11.2.45. BS5228-1 also sets out the distances (based on historical field measurements) at which certain activities could give rise to a just perceptible level of vibration. These distances are presented in Table 11.3 below.

Table 11.3 Distances at which vibrations are just perceptible

Construction/Decommissioning Activities	Distance from activity when vibration may just be perceptible (metres)
Excavation	10 - 15
Heavy Vehicles (e.g. dump trucks)	4 - 10
Hydraulic Breaker	15 - 20
Rotary Bored Piling	20 - 30

11.2.46. The approach described above, has therefore been adopted within this assessment.

11.2.47. In accordance with the guidance given in BS5228-1, 1 mms^{-1} PPV has been selected as the target criteria to control the impact of construction and decommissioning vibration, with the criteria for assessing the magnitude of vibration impacts according to the margin by which this target criterion is achieved or exceeded presented in Table 11.4. This target criterion is based on the guidance contained within BS5228-1, experience from previous sites and accepted vibration policy criteria across a range of enforcing authorities elsewhere in the UK. The limits are presented in terms of PPV as it is the simplest indicator for both perceptibility and building damage.

Table 11.4 Construction and Decommissioning Vibration Significance Criteria

Vibration Level, mm.s-1 PPV	Significance of Effect
>1.0	Major Adverse
0.30 - 1.0	Moderate Adverse
0.15 - 0.30	Minor Adverse
<0.15	Negligible

Vibration Level, mm.s-1 PPV	Significance of Effect
Notes: *The above vibration limits relate to maximum PPV ground borne vibration occurring in any one of three mutually perpendicular axes (one of which may be vertical). Vibration is to be measured on the foundation or on an external façade no more than 1m from the ground, or failing this, solid ground as near to the building façade as possible.*	

11.2.48. It is again worth noting that the purpose of the target construction and decommissioning vibration criteria is to control the impact of construction and decommissioning vibration insofar as is reasonably practicable and is entirely based on the likelihood of the vibration being perceptible, rather than causing damage to property. Hence, although vibration levels in excess of 1 mms^{-1} PPV would be considered major adverse in respect of the likelihood of perceptibility, they would not be considered significant in terms of the potential for building damage, which would require levels of at least 15 mms^{-1} PPV to result in minor cosmetic damage in light / unreinforced buildings.

Commercial Uses

11.2.49. British Standard 4142:2014+A1:2019 'Method for Rating and Assessing Industrial and Commercial Sound' ('BS4142') sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

11.2.50. The procedure contained in BS4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

11.2.51. Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

11.2.52. BS4142 states:

> *'The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound*

occurs.'

11.2.53. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

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

11.2.54. During the daytime, the assessment is carried out over a reference time period of 1-hour. The periods associated with day or night, for the purposes of BS4142, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.

Road Traffic Noise

11.2.55. The impact of any changes in $L_{A10,18hour}$ road traffic noise levels during the construction and decommissioning phase were assessed in accordance with the principles and guidance presented within the Design Manual for Roads and Bridges ('DMRB') document LA 111 'Noise and Vibration' (Rev 2).[12]

11.2.56. The DMRB states that:

> *'The impact of a project at any location can be reported in terms of changes in absolute noise level. In the UK the standard index used for traffic noise is the $L_{A10,18hour}$ level, which is quoted in decibels.'*

11.2.57. In order to determine whether changes in traffic noise levels are likely to occur as a

[12] Accessed at: **https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/design-manual-for-roads-and-bridges-dmrb/** Accessed May 2023

result of the Proposed Development during its construction and decommissioning phases, noise levels were predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise ('CRTN'[13]).

11.2.58. The calculation method uses a number of input variables to predict the $L_{A10,18hour}$ noise level for any receptor point at a given distance from the road. However, in this assessment, the key factors are changes in traffic flows and the composition of the traffic (i.e. the percentage of traffic comprising heavy goods vehicles). Therefore, the likely increase in road traffic noise levels as a direct result of the Proposed Development during construction and decommissioning has been calculated in accordance with the Basic Noise Level ('BNL') prediction method detailed in CRTN. This method considers the relative change in noise level for a notional road-side receptor at a distance of 10m from the kerb and at a height of 1.5m (free-field).

11.2.59. The traffic data used in the assessment (provided by the Applicant's Transport Consultant) is provided in Appendix 11.3. The data includes details of Annual Average Weekday Traffic flows ('AAWT') for the following assessment scenarios:

- Future Baseline (2026); and
- Future Baseline (2026) + Construction Traffic.

11.2.60. The DMRB presents a significance matrix for assessing the magnitude of changes in noise level as a result of traffic, which is reproduced in Table 11.5. This has been used in this assessment to consider the effect of any changes in road traffic noise levels. An increase in noise level represents an adverse effect whilst a reduction in noise represents a beneficial effect.

Table 11.5 Road Traffic Noise Significance Criteria

Change in Noise Level, dB(A)	Significance of Effect
0.0	No Change - No Effect
0.1 - 0.9	Negligible
1.0 - 2.9	Minor
3.0 - 4.9	Moderate
>5.0	Major

[13] Accessed at: https://www.bradford.gov.uk/Documents/Hard%20Ings%20Road%20improvement%20scheme/2b%20Compulsory%20Purchase%20Order%20and%20Side%20Road%20Order/5%20Supporting%20documents/Calculation%20of%20Road%20Traffic%20Noise%201988.pdf Accessed May 2023

11.2.61. The approach described above has therefore been adopted within this assessment.

11.3. Assessment Methodology

Study Area

11.3.1. The study area (shown on Figure 11.1) comprises the NSRs located adjacent to the Site and those sections of the surrounding road network anticipated to experience a significant change in traffic flow as a result of the construction and decommissioning of the Proposed Development. The assessment considers receptors within Temple Hirst, Hirst Courtney, Camblesforth, Drax and surrounding areas. The study area for the construction, operational and decommissioning phase assessments incorporates the area within, and up to, approximately 400m from the Site boundary, where residential properties have been identified to be potentially sensitive receptors.

Baseline Methodology

11.3.2. A baseline sound measurement exercise was undertaken at key receptor locations in and around the Site, between 3rd and 8th March 2022. The approach to baseline monitoring has been agreed with a representative of SDC's Environmental Health Department, the email correspondence can be found within Appendix 11.2. Details of the baseline noise survey can be found in the following section.

11.3.3. Measurements were taken at nine discrete locations (see Figure 11.1), representative of the closest potentially affected sensitive receptor locations to the Proposed Development. These are residential receptors and are shown on Figure 11.2, relative to the Site boundary.

11.3.4. All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of British Standard 7445: 2003: 'Description and Measurement of Environmental Noise'[14].

11.3.5. All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672: 2013: 'Electroacoustics. Sound Level

[14] Accessed at https://knowledge.bsigroup.com/?creative=304960833589&keyword=buy%20british%20standards&matchtype=b&network=g&device=c&gad=1&gclid=Cj0KCQjwrMKmBhCJARIsAHuEAPQ-JIbSBb_1NnCk-B96FPZAkkboYmhkBTKLniSnsq6ZyyZdLg6Sl14aAh1jEALw_wcB&gclsrc=aw.ds Accessed August 2023

Meters. Part 1 Specifications'[15]. A full inventory of this equipment is shown in Table 11.6.

Table 11.6 Inventory of Sound Measurement Equipment

Position	Make, Model & Description	Serial Number
MP1	Bruel & Kjaer 2238 Sound Level Meter	2812838
	Bruel & Kjaer ZC 0030 Preamplifier	-
	Bruel & Kjaer 4188 Microphone	2793282
MP2	Bruel & Kjaer 2238 Sound Level Meter	2328256
	Bruel & Kjaer ZC 0030 Preamplifier	-
	Bruel & Kjaer 4188 Microphone	171603
MP3	Rion NL-52 Sound Level Meter	00943282
	Rion NH-25 Preamplifier	43298
	Rion UC-59 Microphone	7045
MP4	NTI XL2 Sound Level Meter	A2A-14637-E0
	MA220 Preamplifier	7615
	MC230A Microphone	A15851
MP5	Rion NL-52 Sound Level Meter	00764926
	Rion NH-25 Preamplifier	76427
	Rion UC-59 Microphone	12922
MP6	Bruel & Kjaer 2238 Sound Level Meter	2756961
	Bruel & Kjaer ZC 0030 Preamplifier	-
	Bruel & Kjaer 4188 Microphone	2407240
MP7	Rion NL-52 Sound Level Meter	00965159
	Rion NH-25 Preamplifier	65386
	Rion UC-59 Microphone	18640
MP8	Svantek 957 Sound Level Meter	21890
	Svantek SV 12L Preamplifier	24215
	ACO 7052E Microphone	58524
MP9	Bruel & Kjaer 2238 Sound Level Meter	2812839
	Bruel & Kjaer ZC 0030 Preamplifier	-
	Bruel & Kjaer 4188 Microphone	2793282
All	Larson Davis CAL200 Acoustic Calibrator	15314

11.3.6. Measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A calibration laboratory had calibrated the field calibrator used within the 12 months preceding the measurements.

[15] Accessed at https://knowledge.bsigroup.com/?creative=304960833589&keyword=buy%20british%20standards&matchtype=b&network=g&device=c&gad=1&gclid=Cj0KCQjwrMKmBhCJARIsAHuEAPQ-JIbSBb_1NnCk-B96FPZAkkboYmhkBTKLniSnsq6ZyyZdLg6Sl14aAh1jEALw_wcB&gclsrc=aw.ds Accessed August 2023

11.3.7. The weather conditions during the survey were monitored via the deployment of a rain tipping gauge and anemometer, thus ensuring the exclusion of any weather affected periods from the dataset.

11.3.8. The microphones were fitted with protective windshields for the measurements which are described below and identified on Figure 11.1.

11.3.9. All of the measurements described below were predominantly unattended. The microphones were all located at a height of 1.5 metres above local ground level and under free-field conditions.

- MP1 was situated in the northernmost part of the Site outside the Site boundary, to the east of the settlement of Burn, toward the mid-western point of the field. The land to the north comprises arable land, while the land to the west comprises a small area pf woodland and a duckpond, with the Selby Branch of the East Coast Mainline railway situated just beyond. The dominant noise source at MP1 was noted to be fast moving and continuous road traffic noise emanating from the M62 motorway and occasional passing rail traffic.
- MP2 was situated to the west of Camblesforth, Field 12 as shown in Figure 3.1 Field Boundaries Plan, toward the south-eastern point of the field in which it was situated. The land to the north comprises arable land. A small area of woodland and the A1041 are situated to the east of the microphone position, with woodland also lying to the south-east, south and south-west. A further area of arable land lies to the west. The dominant noise source at this position was road traffic travelling along the A1041, which was located 100m to the north-east of the microphone position.
- MP3 was situated toward the north of the central region of the Site, Field 23, to the north of the field(s) that are included as part of the Site. Immediately to the north is woodland, with the nearest NSRs beyond (at a distance of 30m), situated upon the A1041. The land to the east a small parcel of agricultural land, with the A1041 curving around to the north, with a large residential estate just beyond. The space to the south comprises woodland within which the microphone was situated, with fields that form part of the Site and some barns that are associated with the involved farm. The dominant noise source at this position was noted to be road traffic travelling along the A1041, which was located approximately 80m to the north.

- MP4 was situated toward the south of the central region of the Site, south of Field 25, to the west of Station Road. Immediately towards the north is arable land that forms part of the Site, within which agricultural vehicles were seen operating. The dominant noise source at this microphone position was noted to be road traffic travelling along Station Road, at a distance of approximately 280m to the east (with line-of-sight).
- MP5 was situated at the southern-most area of the Site, with the microphone itself situated to the south of Field 42. The dominant noise source at this position was noted to be road traffic contributions from the A1041 (1.9km to the north/north-east), which was observed to be fairly continuous at this position, although not intrusively loud.
- MP6 was situated towards the south-west of the Site, with the microphone itself placed in the south-eastern most point of the field within which the microphone was placed. The area towards the north was occupied by land that forms a part of the Site, Field 40, adjacent to the hedgerow (to the east) which divides the Site from the neighbouring property. The dominant noise source at MP6 was noted to be road traffic contributions arising from vehicles using Hirst Road, situated around 170m to the southwest of the microphone position.
- MP7 was positioned within Field 44, in the centre of the Site. Arable land lies to the north, beyond the hedgerow that was immediately adjacent to the microphone position. The dominant noise source at MP7 was noted to be road traffic travelling along the A1041, which is located approximately 1.1km to the north-east of the microphone position.
- MP8 was positioned within the vicinity of Hirst Courtney, situated toward the western boundary of Field 38 that forms part of the Site. The land towards the north, east and south of the microphone position was flat, arable farm land that contained only short grass at the time of the survey. The dominant noise source at this position comprised road traffic noise from vehicles travelling along the A1041, which was situated approximately 3km to the north-east.
- MP9 was located in the north-easternmost part of the Site, Field 47, separated from the main area of the Site. The dominant noise source at this position was noted to be road traffic noise from several roads in the area, including New Road (400m to the west), the A63 (4km to the north-east) and the M62 (6km to the south-east).

Figure 11.1 Study Area

Project Title
Helios Renewable Energy Project

Drawing Title
Study Area

DRWG No	Rev	Sht no
Figure 11.1	-	-

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Figure 11.2 Noise Measurement Locations

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Project Title
Helios Renewable Energy Project

Drawing Title
Acoustic Measurement Positions

DRWG No	Rev	Sht no
Figure 11.2	-	-

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Consultation

11.3.10. Table 11.7 below summarises the consultation undertaken regarding the assessment of the Proposed Development's likely significant effects on noise and vibration to inform this chapter.

Table 11.7: Consultation Summary

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
Planning Inspectorate ('PINS')	EIA Scoping Opinion (14th July 2022)	Agreement to scope out operational traffic noise effects due to low anticipated volumes of traffic.	As advised in Chapter 10 Transport and Access of the PEIR, there are expected to be a predicted 10 (two way) vehicles per month during operation.
Planning Inspectorate ('PINS')	EIA Scoping Opinion (14th July 2022)	In the absence of presenting the proposed piling technique and likely impacts, the Inspectorate is not satisfied that impacts from piling can be scoped out.	Piling impacts have been factored into the construction noise assessment (refer to Section 11.5 Construction Phase – Construction Noise)
Planning Inspectorate ('PINS')	EIA Scoping Opinion (14th July 2022)	Tracking motors have been proposed but not addressed.	Noise from tracking motors for individual panels has not been included in the noise assessment as it is considered negligible. Potential disturbance effects to ecological receptors have been addressed in Chapter 8 Biodiversity of the PEIR.
Long Drax Parish Council	EIA Scoping response (undated)	Disruption during construction will always be a concern with control of dust, traffic, noise and site lights being the main concerns.	Impact of construction noise has been addressed from paragraph 11.5.10 onwards.
National Highways	EIA Scoping response (30th June 2022)	CTMP will need to include a noise management plan	Impact of construction traffic noise has been addressed within paragraph 11.5.19.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
North Yorkshire County Council ('NYCC') and SDC (now NYC)	EIA Scoping response (5th July 2022)	Construction noise related comments and no exceedance of background noise during operation.	All points addressed within the construction noise assessment and operational assessment.
UK Health Security Agency	EIA Scoping response (4th July 2022)	Vulnerable/disadvantaged populations and PRoW.	PRoW are for access, therefore the amenity of these areas is not considered. Inacoustic have not been advised of any atypical demographics in the area.
SDC Senior Environmental Health Officer	Email/Phone 7th March 2022	Agreement of baseline noise survey methodology including measurement positions. Agreement to aim for no exceedance of background noise levels. Agreement to an assessment of construction impacts in accordance with BS5228-1.	Baseline measurements undertaken at agreed locations (refer to section 11.4 'Baseline Conditions'). The BS4142-1 low impact thresholds have been adopted as the target in this assessment. The ABC Method of BS5228 has been adopted in this assessment.

Limitations and Assumptions

11.3.11. In terms of limitations, as the specific infrastructure components/models for the noise generating elements of the Proposed Development have not yet been specified, the assessment has considered a maximum acoustic performance specification to ensure that a realistic 'worst case' scenario has been assessed.

11.4. Baseline Conditions

11.4.1. The background sound environment across the Site and surrounding area was varied, with those positions closest to roads measuring higher levels of road traffic noise. The nine positions selected to measure the background sound levels within

the area are shown in Figure 11.2 and represent all identified noise sensitive receptors with the potential to be acoustically affected by the Proposed Development.

11.4.2. Table 11.8 below sets out a summary of the results for the noise measurement locations.

Table 11.8 Summary of Noise Measurement Results

Position	Associated Receptors	Period	Noise Level, dB		
			$L_{Aeq,T}$	Typical $L_{A90,T}$	L_{AFMax}
MP1	NSR1 NSR19-28	Day (07:00-23:00)	48	37	73
		Night (23:00-07:00)	48	32	69
MP2	NSR2-10	Day (07:00-23:00)	60	50	73
		Night (23:00-07:00)	54	33	72
MP3	NSR11-15	Day (07:00-23:00)	52	46	68
		Night (23:00-07:00)	46	37	65
MP4	NSR16 NSR17	Day (07:00-23:00)	56	40	83
		Night (23:00-07:00)	56	35	81
MP5	NSR31 NSR32 NSR34-40	Day (07:00-23:00)	44	34	66
		Night (23:00-07:00)	40	31	58
MP6	NSR33 NSR41-45	Day (07:00-23:00)	43	27	69
		Night (23:00-07:00)	43	25	64
MP7	NSR18 NSR29 NSR30	Day (07:00-23:00)	45	35	63
		Night (23:00-07:00)	42	31	53
MP8	NSR46	Day (07:00-23:00)	50	32	73
		Night (23:00-07:00)	40	28	58
MP9	Receptors at this position have been	Day (07:00-23:00)	49	40	71

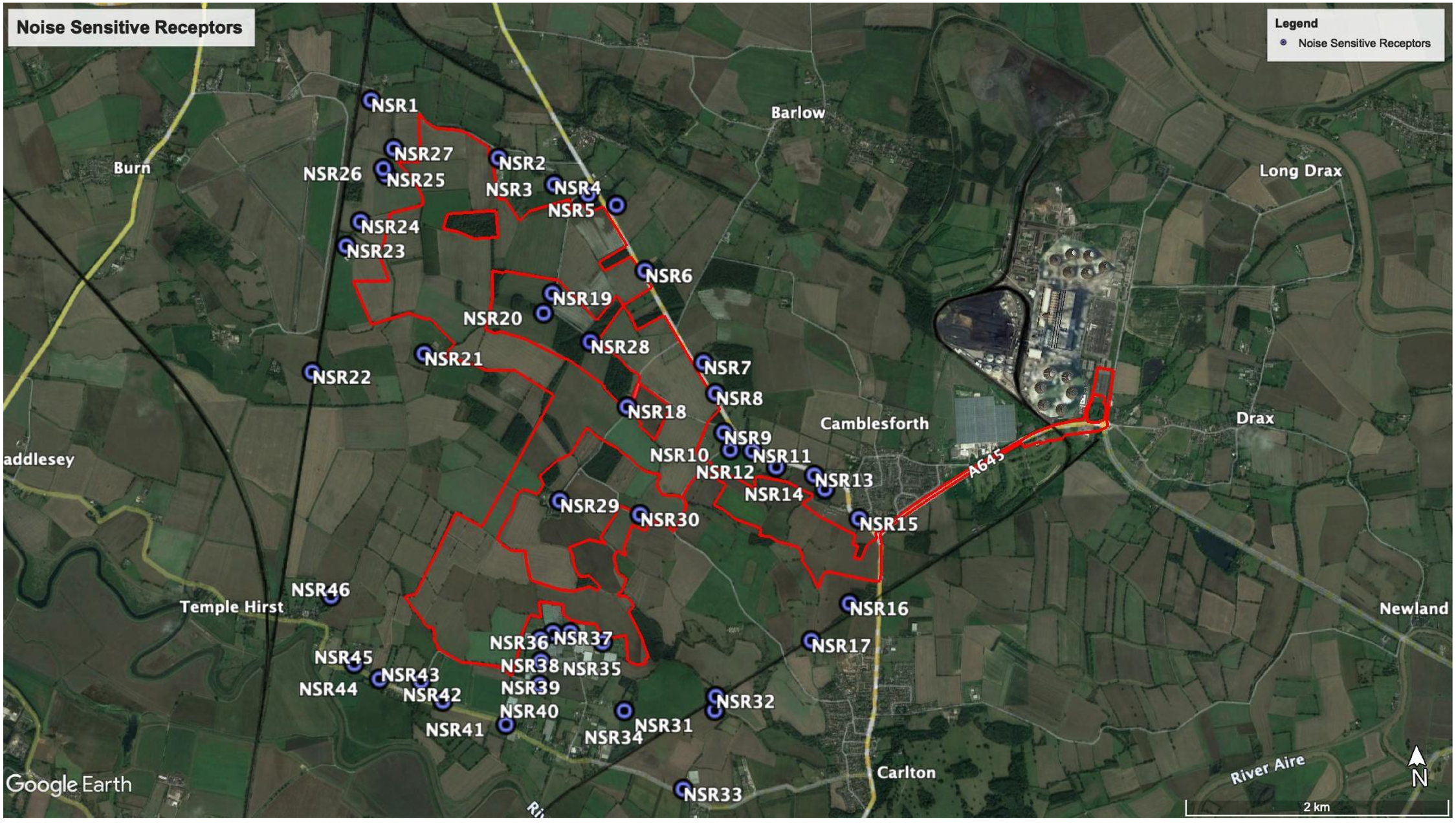
Position	Associated Receptors	Period	Noise Level, dB		
			$L_{Aeq,T}$	Typical $L_{A90,T}$	L_{AFMax}
	deemed far enough from noise generating equipment associated with the site.	Night (23:00-07:00)	48	42	63

11.4.3. All considered receptors are human/residential in nature, and represent the closest and most sensitive receptors to the Proposed Development. These locations are identified in Figure 11.3.

Future Baseline Conditions

11.4.4. It is considered that there would be no significant or measurable change to the baseline conditions at the Site as presented above for the future baseline year of 2027. Cumulative schemes in the vicinity have been considered in Section 11.8 ‘Cumulative Effects’ of this chapter.

Figure 11.3 Noise Sensitive Receptors



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Noise Sensitive Receptors

DRWG No	Rev	Sht no
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11.5. Likely Significant Effects

Embedded Mitigation

11.5.1. The Proposed Development has been designed, such that all noise generating plant is optimally located and distributed throughout the Site, such that acoustic effects at sensitive receptors are minimised. This approach, coupled to the adoption of appropriate candidate plant specifications, to be adopted as design targets effectively designs out the operational noise effects of the Proposed Development.

Measures to be adopted by the Project

11.5.2. Contractors would be required to ensure that works are carried out in accordance with BPM as stipulated in the 1974 Act. A full explanation of measures to control construction noise and vibration would be incorporated within a CEMP, secured as a DCO requirement, and detailed in all demolition and construction method statements.

11.5.3. Effective co-ordination and time management of construction operations would be important in avoiding noise and vibration nuisance to surrounding uses. Early and helpful communications with the surrounding and on-site receptors would assist reducing potential for and in managing any complaints arising during the demolition and construction works of the Proposed Development.

11.5.4. The proposals in regard to general noise mitigation would be in accordance with BPM as specified in BS5228 and would comprise the following, where possible:

- Using continuous flight auger piling, at locations where noise-sensitive receptors are within 20m;
- Using 'silenced' plant and equipment;
- Switching off engines where vehicles are standing for a significant period of time;
- Fitting of acoustic enclosures to suppress noisy equipment as appropriate;
- Operating plant at low speeds and incorporation of automatic low speed idling;
- Selecting electrically driven equipment in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- Properly maintaining all plant (greased, blown silencers replaced, saws kept

sharpened, teeth set and blades flat, worn bearings replaced, etc.);

- Considering the use of temporary screening or enclosures for static noisy plant to reduce visual impacts (refer to Chapter 7 Landscape and Views of the PEIR for further details);
- Certifying plant to meet any relevant EC Directive standards; and
- Undertaking awareness training of all contractors in regards to BS5228 (Parts 1 and 2) which would form a prerequisite of their appointment.

11.5.5. Typically, adopting BPM can reduce overall construction noise levels by approximately 5 dB.

11.5.6. Should any non-routine activities be identified that would make it impracticable to work to the target criterion, provisions would be set out in advance and with the agreement of the Local Authority, to reduce the effect. Noise and vibration monitoring would be carried out during particularly noisy phases of work and when work is undertaken in close proximity to the Site boundary so that such situations can be actively managed in accordance with the CEMP for the Site.

11.5.7. Furthermore, pre-commencement condition surveys of those properties that are located in close proximity to planned construction activities, would be undertaken.

11.5.8. For any proposed construction works to be undertaken outside of the permitted working day, particularly at night, prior consent would be sought from the Local Planning Authority. Dispensation procedures for works would be agreed in advance and included within Construction Method Statements and the CEMP or Section 61 Agreement where adopted. Section 61 of the 1974 Act, allows a contractor to apply to the local planning authority for prior consent for construction works.

- Deliveries and removal of material off-site, would be subject to the following controls:
- Planning all mass concreting operations for weekends whenever possible;
- Ensuring that construction traffic is parked off the public highway;
- Controlling the discharge of trucks from Site to avoid congestion; and
- Implementing traffic management systems at the entrance to the Site at all times to control the traffic into the Site.

11.5.9. With regard to the potential effects of vibration from piling activities impacting upon existing utilities in the area, particular attention would be given during the preparation of the CEMP to the safeguarding of the in-ground services near the Site. At this stage, the mitigative input is limited to that set out within BS5228, which is summarised below.

- Where reasonably practicable, low vibration working methods would be employed and consideration given to the most suitable plant;
- Vibration would be controlled at source via methods such as mechanical isolation and the spread of vibration would be limited by breaking potential transmission pathways i.e. common structures; and
- Where processes could give rise to potentially significant levels of vibration, on-Site vibration levels would be regularly monitored.

Construction Phase

Construction Noise

11.5.10. Construction noise levels have been predicted at the closest identified NSRs based on the construction activities and programme set out in Chapter 5 Construction and Decommissioning Methodology and Phasing of the PEIR, and in accordance with BS 5228.

11.5.11. Works will span 12 months and will be undertaken between 8am and 6pm from Monday to Friday, and between 8am and 1pm on Saturdays, with no work planned for Sundays or Bank Holidays.

11.5.12. In order to assess the realistic 'worst-case' scenario for the assessment of the Proposed Development's likely significant effects resulting from construction noise, worst-case construction noise levels during the civil engineering phase of the works (i.e. erection of the structure etc.) have been predicted at the closest NSRs. Detail of relevant activities to be undertaken during this phase can be found in Chapter 5 Construction and Decommissioning Methodology and Phasing of the PEIR.

Sound Source Data

11.5.13. The source data associated with the most significant items plant to be used near to the closest NSRs during the construction works, as set out in Chapter 5 of this

document, has been taken from BS5228-1, is set out below in Table 11.9.

Table 11.9 Construction Noise Source Data

Plant	BS5228 Reference	Quantity	% On Time	Sound Power Level (dB)
Telehandler	Table C.4 Ref 44	2	50	107
Piler	Pauselli 500	4	50	96
Diesel Bowser	Table C.6 Ref 36	1	5	117

11.5.14. Calculations were carried out in accordance with guidance given in BS5228-1:2009+A1:2014.

11.5.15. From these predictions, it has been possible to determine whether the adopted target noise criterion of 65 dB $L_{Aeq,T}$ from the ABC Method is likely to be met during the noisiest stages of the construction activities.

Construction Sound Level Summary

11.5.16. A summary of the predicted construction sound levels at a statistically representative selection of NSRs, which lie directly adjacent to the Site boundary shown in Figure 11.1 is provided in Table 11.10 below. These NSRs have been presented as they represent a realistic 'worst-case' scenario due to their proximity to the Site boundary.

Table 11.10 Predicted Construction Sound Level Summary

NSR	Construction Sound Level (dB)
NSR2	52
NSR6	47
NSR8	48
NSR13	52
NSR18	49
NSR30	54
NSR35	54

11.5.17. The predictions presented in Table 11.10 identify that noise levels are not predicted to exceed the adopted 65 dB(A) limit when works are undertaken at the closest point of the works to the closest off-Site NSR, equating to a short-term, temporary effect of negligible to minor adverse significance, which is **not significant**.

11.5.18. Consequently, further mitigation measures are not considered necessary to those

set out previously.

Construction Road Traffic

11.5.19. The likely change in road traffic noise levels as a direct result of the construction of the Proposed Development has been determined by comparing the predicted noise levels for the future baseline scenarios, with the future baseline plus construction traffic scenarios, on the basis of traffic flow information provided by the Applicant's Transport Consultant (refer to Chapter 10 Transport and Access of the PEIR for more location information). The calculations reflect the predicted change in traffic flows on the assessed routes and are referenced to the impact significance criteria set out within Table 11.11.

Table 11.11 Predicted Change in Road Traffic During Construction Phase

Road Link	Predicted Change in Road Traffic Noise – $L_{A10,18\text{-hour}}$ dB 2026	Significance of Effect
A614	0.4	Negligible
A645	0.3	Negligible
A1041	0.2	Negligible
Jowland Winn Lane	6.8	Major
Hardenshaw Lane	3.7	Moderate

11.5.20. Table 11.11 identifies that a wide area negligible impact effect is predicted to occur, with localised impacts on minor routes, that will be more proportionally affected increasing to moderate/major impacts. These localised impacts are attributed to the extremely low baseline traffic flows, with the Proposed Development's construction traffic flows being significant by comparison, but still remaining at extremely low levels. Consequently, these moderate/major effects would not be experienced by nearby receptors in reality, with these localised impacts being sufficiently diluted by the overall ambient sound level, contributed to by the major routes in the area, so as to not exceed negligible to minor adverse effect significance thresholds.

11.5.21. To explain the principle of acoustic dilution, it is potentially helpful for the non-specialist, to use light as a more readily tangible example; for example, if a dim lamp is turned on within a darkened room, its impact may be considered significant. However, if the door of that room is open to another room that is brightly lit, the impact of the lamp is greatly reduced. Therefore, although the impact of the lamp in isolation is significant, its impact in real terms is negligible as a result of the influence of the neighbouring sources of light that elevate the background light levels. This is

similar to the case for small amounts of road traffic on quiet roads; their effect in isolation may be deemed significant; however, when considered in the context of the actual baseline environment, which is influenced by the sounds of much busier neighbouring road links, the impact is greatly reduced in its significance.

Construction Vibration

11.5.22. The separation distances between the closest construction works and the closest residential receptors, coupled to the low-intensity nature of the construction works, would ensure that construction vibration effects on these receptors would be no greater than negligible (**not significant**).

Grid Connection

11.5.23. The grid connection works would be additional to those considered above. These works would be of a low impact significance; being both brief in duration and giving rise to no more of an impact than typical utilities maintenance works, that residents of the area would be accustomed to, as such noise impact from these works do not need to be considered further.

Operational Phase

Noise Source Data

11.5.24. The sound source levels used in the assessment are set out in Table 11.12. It is important to note that these are candidate plant selections, used for the purposes of this assessment and that individual plant specifications may differ. Noise from tracking motors is insignificant and is therefore not assessed. The noise level has been included in the table below to illustrate their acoustic insignificance.

Table 11.12 Sound Source Data

Plant	Quantity	Sound Power Level per unit, L_{wA} (dB)
Containerised Inverter Station	66	85 (Day – Full Duty[16]) 83 (Night – Reduced Duty)
Battery Cooling System	76	82 (Day – Full Duty) 76 (Night – Reduced Duty)

[16] Duty refers to operational loading level of machinery. This comprises aspects such as: speed, load capacity and energy consumption.

Plant	Quantity	Sound Power Level per unit, L_{wA} (dB)
132/33 kilovolt ('Kv') Substation Transformer	2	88
Filter	3	80
DNO Substation	1	N/A
Tracking Motors	~2000	<57

Calculation Process

11.5.25. Calculations were carried out using Cadna/A software, which undertakes its calculations in accordance with guidance given in ISO9613-1:1993[17] and ISO9613-2:1996[18].

Sound Data Assumptions

11.5.26. Given that the ground condition of the land between the Proposed Development and nearest NSRs is predominantly soft, the ground factor has been set to 0.8, within the calculation software.

11.5.27. The assessment considers open sound propagation from the Site, and assumes that there are no proposed perimeter acoustic barriers in place as part of the Proposed Development which could reduce noise levels at NSRs.

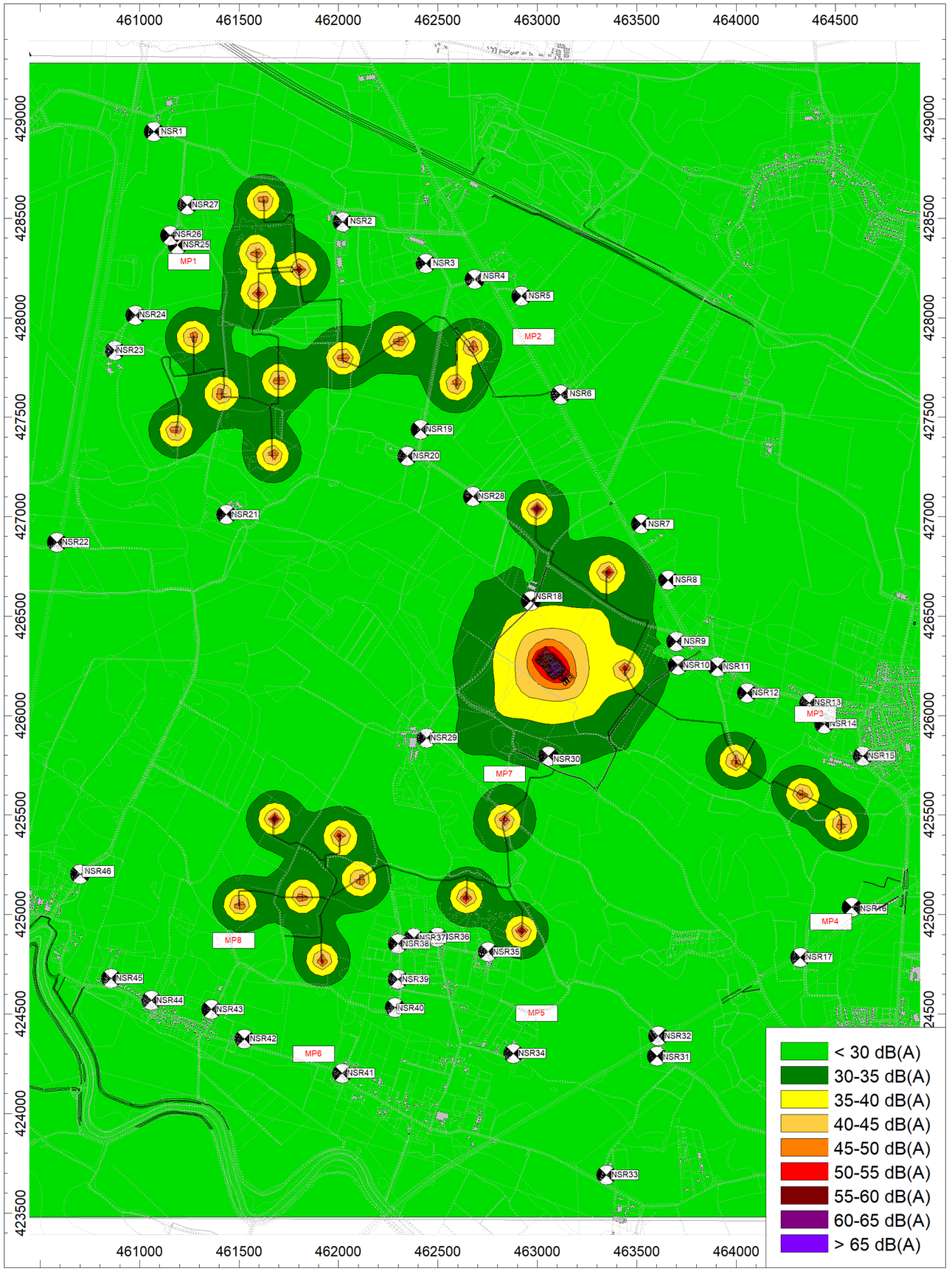
Specific Sound Level Map

11.5.28. The sound map showing the daytime specific sound level emissions from the Proposed Development is shown in Figure 11.4.

[17]ISO 9613-1:1993 Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere.

[18] ISO 9613-1:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation.

Figure 11.4 Noise Contour Map



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Specific Sound Level Summary

11.5.29. A summary of the predicted specific sound levels at the identified NSRs, based on the sound map shown in Figure 11.3 is shown in Table 11.13.

Table 11.13: Specific Sound Level Summary

Receptor	Predicted Specific Sound Level – dB(A)	
	Daytime	Night-time
NSR1	18	16
NSR2	25	23
NSR3	23	21
NSR4	24	22
NSR5	23	21
NSR6	23	20
NSR7	27	24
NSR8	29	25
NSR9	28	24
NSR10	29	26
NSR11	25	22
NSR12	25	22
NSR13	23	20
NSR14	24	21
NSR15	24	22
NSR16	21	18
NSR17	17	15
NSR18	34	30
NSR19	26	24
NSR20	24	22
NSR21	21	19
NSR22	15	13
NSR23	22	20
NSR24	23	21
NSR25	24	22
NSR26	23	21
NSR27	23	21
NSR28	26	23
NSR29	28	24
NSR30	31	28
NSR31	15	13
NSR32	17	14
NSR33	8	6
NSR34	14	12
NSR35	30	28

Receptor	Predicted Specific Sound Level – dB(A)	
	Daytime	Night-time
NSR36	28	26
NSR37	26	23
NSR38	23	21
NSR39	21	19
NSR40	23	21
NSR41	17	15
NSR42	18	16
NSR43	19	17
NSR44	17	15
NSR45	16	14
NSR46	15	13

Assessment of Likely Significant Effects from Operational Noise

Rating Penalty Principle

11.5.30. Section 9 of BS4142 describes how the rating sound level should be derived from the specific sound level, by determining a rating penalty. BS4142 states:

> *'Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:*
>
> - *subjective method;*
> - *objective method for tonality;*
> - *reference method.'*

11.5.31. Given that the Proposed Development is proposed and not currently operational, the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142, which states:

> *'Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.*
>
> *Correct the specific sound level if a tone, impulse or other characteristics*

occurs, or is expected to be present, for new or modified sound sources.'

11.5.32. BS4142 defines four characteristics that should be considered when deriving a rating penalty, namely: tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

Tonality

11.5.33. A rating penalty of +2 dB is applicable for a tone which is '*just perceptible*', +4 dB where a tone is '*clearly perceptible',* and +6 dB where a tone is '*highly perceptible*'.

Impulsivity

11.5.34. A rating penalty of +3 dB is applicable for impulsivity which is '*just perceptible*', +6 dB where it is '*clearly perceptible',* and +9 dB where it is '*highly perceptible*'.

Other Sound Characteristics

11.5.35. BS4142 states that where *'the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied'.*

Intermittency

11.5.36. BS4142 states that when the *'specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.'*

Rating Penalty Assessment

11.5.37. Considering the above, an assessment of the various sound sources associated with the Proposed Development, in terms of whether any rating penalties are applicable, has been carried out and has been detailed in Table 11.14 below.

Table 11.14: Rating Penalty Assessment

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
PV Inverters and Transformers	0 dB	0 dB	0 dB	0 dB	The inverters and transformers housed within the containerised inverter stations will operate as demand requires. However, once operating, these do not cycle on and off. Tonality is unlikely to be perceptible, as although there is a potential mid-low-frequency bias at source, the residual acoustic environment will substantially mask any significant tones.
Battery Energy Storage System ('BESS') Plant and 132/33kV Substation	0 dB	0 dB	0 dB	0 dB	The battery cooling systems typically operate continuously during the majority of the charging/ discharging periods. They might switch on/off, but not simultaneously, during cool down periods when they are less noisy, and therefore the intermittency is not expected to be readily noticeable at the NSR locations. Potential low-frequency bias might exist at source, but due to the distance to NSRs, the residual acoustic environment will mask any significant tones or low frequency characteristics.

11.5.38. In summary, no rating penalty has been included in this assessment.

Uncertainty in Calculations

11.5.39. BS4142 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. It recommends that steps should be taken to reduce the level of uncertainty.

Measurement Uncertainty

11.5.40. BS4142 states that measurement uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

'….

b) the complexity and level of variability of the residual acoustic environment;

….

d) the location(s) selected for taking the measurements;

….¶

g) the measurement time intervals;

h) the range of times when the measurements have been taken;

i) the range of suitable weather conditions during which measurements have been taken;

….

k) the level of rounding of each measurement recorded; and

l) the instrumentation used.'

11.5.41. Each of the relevant measurement uncertainty factors outlined above have been considered and discussed in Table 11.15.

Table 11.15 Measurement Uncertainty Factors

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b) the complexity and level of variability of the	0 dB	Residual acoustic environment is relatively constant, and therefore no

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
residual acoustic environment		correction for a complex residual acoustic environment is required.
d) the location(s) selected for taking the measurements	0 dB	Measuring at locations representative of the closest affected NSRs to the Site has enabled the determination of robust background sound levels.
g) the measurement time intervals	0 dB	Measurement time intervals were set in accordance with BS4142, and therefore no further correction is required.
h) the range of times when the measurements have been taken	0 dB	Measurements were undertaken over seven consecutive daytime and night-time periods.
i) the range of suitable weather conditions during which measurements have been taken	0 dB	Where periods of wind or precipitation were measured, these were removed from the dataset.

11.5.42. In summary, a correction of 0 dB has been included in the assessment, to account for measurement uncertainty.

Calculation Uncertainty

11.5.43. BS4142:2014+A1:2019 states that calculation uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

'…

b) uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;

c) uncertainty in the calculation method;

d) simplifying the real situation to "fit" the model (user influence on modelling); and

e) error in the calculation process.'

11.5.44. Each of the calculation uncertainty factors outlined above have been considered and discussed in Table 11.16.

Table 11.16: Calculation Uncertainty Factors

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b) uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels	0 dB	Sound source levels for all plant are worst-case candidate data to be achieved by the Proposed Development.
c) uncertainty in the calculation method	0 dB	Calculations were undertaken in accordance with ISO 9613-2, which is considered a “validated method” by BS4142.
d) simplifying the real situation to "fit" the model (user influence on modelling)	0 dB	The real situation has been simplified for the purposes of this assessment, with all on-Site screening effects removed, resulting in a worst-case propagation model.
e) error in the calculation process	+1 dB	ISO 9613-2 indicates that there is a ±3 dB accuracy to the prediction method, dependent upon input variables and propagation complexities.

11.5.45. In summary, an uncertainty budget of ±1 dB has been considered in this assessment, to account for calculation uncertainty.

11.5.46. The overall uncertainty is considered to be small enough that it would not affect the conclusions of this assessment.

BS4142 Assessment of Operational Effects

11.5.47. The rating sound level, as calculated from the predicted specific sound level, has been assessed in accordance with BS4142, at all residential NSRs.

11.5.48. The resultant assessment summary, during the daytime period, is shown in Table 11.17.

Table 11.17: Daytime BS4142 Assessment

NSR	Rating Sound Level (dB)	Background Sound Level LA90 dB	Excess of Rating Level Over Background Sound Level (dB)
NSR1	18	37	-19
NSR2	25	50	-25

NSR	Rating Sound Level (dB)	Background Sound Level LA90 dB	Excess of Rating Level Over Background Sound Level (dB)
NSR3	23	50	-27
NSR4	24	50	-26
NSR5	23	50	-27
NSR6	23	50	-27
NSR7	27	50	-23
NSR8	29	50	-22
NSR9	28	50	-23
NSR10	29	50	-21
NSR11	25	46	-21
NSR12	25	46	-21
NSR13	23	46	-23
NSR14	24	46	-23
NSR15	24	46	-22
NSR16	21	40	-19
NSR17	17	40	-23
NSR18	34	35	-1
NSR19	26	37	-11
NSR20	24	37	-13
NSR21	21	37	-16
NSR22	15	37	-22
NSR23	22	37	-15
NSR24	23	37	-14
NSR25	24	37	-14
NSR26	23	37	-14
NSR27	23	37	-14
NSR28	26	37	-11
NSR29	28	35	-7
NSR30	31	35	-4
NSR31	15	34	-19
NSR32	17	34	-17
NSR33	8	27	-20
NSR34	14	34	-20
NSR35	30	34	-4
NSR36	28	34	-6
NSR37	26	34	-9
NSR38	23	34	-11
NSR39	21	34	-13
NSR40	23	34	-11
NSR41	17	27	-10
NSR42	18	27	-9
NSR43	19	27	-8

NSR	Rating Sound Level (dB)	Background Sound Level LA90 dB	Excess of Rating Level Over Background Sound Level (dB)
NSR44	17	27	-10
NSR45	16	27	-11
NSR46	15	32	-17

11.5.49. As shown in Table 11.17 the Proposed Development is likely to have a 'low impact' at the NSRs during the daytime period, giving rise to a negligible effect (**not significant**).

11.5.50. The resultant assessment summary, during the night-time period, is shown in Table 11.18.

Table 11.18: Night-time BS4142 Assessment

NSR	Rating Sound Level (dB)	Background Sound Level LA90 dB	Excess of Rating Level Over Background Sound Level (dB)
NSR1	16	32	-16
NSR2	23	33	-10
NSR3	21	33	-12
NSR4	22	33	-12
NSR5	21	33	-12
NSR6	20	33	-13
NSR7	24	33	-9
NSR8	25	33	-8
NSR9	24	33	-9
NSR10	26	33	-7
NSR11	22	37	-15
NSR12	22	37	-15
NSR13	20	37	-17
NSR14	21	37	-16
NSR15	22	37	-16
NSR16	18	35	-17
NSR17	15	35	-20
NSR18	30	31	-1
NSR19	24	32	-8
NSR20	22	32	-10
NSR21	19	32	-13
NSR22	13	32	-19
NSR23	20	32	-12
NSR24	21	32	-11

NSR	Rating Sound Level (dB)	Background Sound Level LA90 dB	Excess of Rating Level Over Background Sound Level (dB)
NSR25	22	32	-11
NSR26	21	32	-11
NSR27	21	32	-11
NSR28	23	32	-9
NSR29	24	31	-7
NSR30	28	31	-3
NSR31	13	31	-19
NSR32	14	31	-17
NSR33	6	25	-19
NSR34	12	31	-19
NSR35	28	31	-3
NSR36	26	31	-5
NSR37	23	31	-8
NSR38	21	31	-10
NSR39	19	31	-12
NSR40	21	31	-10
NSR41	15	25	-10
NSR42	16	25	-9
NSR43	17	25	-8
NSR44	15	25	-10
NSR45	14	25	-11
NSR46	13	28	-15

11.5.51. As shown in Table 11.18, the Proposed Development is likely to have a 'low impact' and consequently, a negligible effect at the sensitive receptors during the night-time period.

11.5.52. The results set out above identify that the Proposed Development's operation would occur with no effect to minimal effect to the amenity of the closest residential NSRs to the Site, equating to a negligible effect (**not significant**).

Decommissioning Phase

11.5.53. Noise effects during the decommissioning phase of the Proposed Development, which would occur at the end of the Proposed Development's modelled operational lifespan of 40 years, are anticipated to be similar to those predicted for the Proposed Development's construction phase, which have been predicted to be of negligible to minor adverse significance (**not significant**). Many of the Proposed Development's construction phase activities will be replicated for the decommissioning phase, but

in reverse. There is the potential for benefits from technological advancements that are likely to have occurred in the intervening period between the Proposed Development's construction and decommissioning that would be anticipated to reduce noise generation, as well as the duration of the required activities. However, as a 'worst-case' scenario, if such technological advancements do not occur, the Proposed Development's noise effects during decommissioning would be no greater than for the construction phase and therefore of negligible to minor adverse significance (**not significant**).

11.6. Mitigation Measures

Construction Phase

11.6.1. No mitigation measures beyond those already stipulated are considered necessary to mitigate the effects of construction noise or vibration.

Operational Phase

11.6.2. The Proposed Development has incorporated noise mitigation within its design, which has been demonstrated by the assessment of peak ('worst-case') anticipated operational activity presented within section 11.5 'Likely Significant Effects' of this chapter.

11.6.3. On the basis of the findings of this assessment, no further specific mitigation measures are considered necessary.

Decommissioning Phase

11.6.4. As stated previously, many of the activities undertaken during the construction phase will be repeated for the decommissioning phase, but in reverse and, therefore, no additional mitigation measures beyond the incorporation of construction best practice controls are considered necessary to mitigate the effects of construction noise or vibration during the decommissioning phase.

11.7. Residual Effects

Construction Phase

11.7.1. As no additional mitigation measures have been proposed beyond those already

incorporated into the proposed construction methodology the residual construction noise and vibration effects remain unchanged from those set out in section 11.5 'Likely Significant Effects' of the chapter.

11.7.2. The residual construction noise and vibration effects are therefore predicted to not exceed short-term, temporary minor adverse (**not significant**).

Operational Phase

11.7.3. As no mitigation measures have been proposed beyond those already incorporated into the design of the Proposed Development, the residual operational noise effects remain unchanged from those set out in section 11.5 'Likely Significant Effects' of the chapter.

11.7.4. The residual operational noise effects are therefore predicted to not exceed minor adverse (**not significant**).

Decommissioning Phase

11.7.5. As no mitigation measures have been proposed beyond those already incorporated into the proposed construction methodology, the residual construction noise and vibration effects remain unchanged for the decommissioning phase from those set out in section 11.5 'Likely Significant Effects' of the chapter.

11.7.6. The residual decommissioning noise and vibration effects are therefore predicted to not exceed short-term, temporary minor adverse (**not significant**).

11.8. Cumulative Effects

Construction Phase

11.8.1. Any cumulative effects during construction are anticipated to be minimal. However, careful co-ordination with any adjacent developers will be necessary during the construction phases, should they overlap, so as to ensure that work phasing is appropriately scheduled so as to minimise concentrations of work in any given area and spikes in construction traffic.

Operational Phase

11.8.2. The noise effects of the operational phase of the Proposed Development in

cumulation with the cumulative schemes set out in Chapter 2 EIA Methodology of the PEIR are discussed below. Table 11.19 outlines the schemes which have been considered for likely significant cumulative effects with the Proposed Development, either due to their proximity or their similar noise impact profile to the Proposed Development. The other cumulative schemes set out in Chapter 2 EIA Methodology of the PEIR have been scoped out of the assessment of the Proposed Development's likely significant cumulative effects either due to their distance from the Proposed Development (at least 800m) or having incomparable noise impact profiles with the Proposed Development. Operating solar farms are not known to vibrate significantly. Therefore, vibration has been scoped out of this assessment.

Table 11.19: Cumulative Schemes with Potential for Cumulative Effects with the Proposed Development

Scheme	Description	Planning Status	Comments
Land South of A645, Wade House Lane, Drax (Ref. 2023/0128/EIA)	Development of a ground mounted solar farm including associated infrastructure.	Awaiting Decision	Application's site boundary overlaps with the Proposed Development's underground cable corridor to the grid connection. Although this scheme and the Proposed Development do not directly share an NSR, comparison can be made with NSR 15 and R10, and NSR 16 and R9[19].
East Yorkshire Solar Farm (Nationally Significant Infrastructure Project ('NSIP')) (PINS Ref: EN010143)	The installation of solar photovoltaic generating panels, associated electrical equipment, cabling and on-site energy storage facilities together with grid connection infrastructure. The point of connection	Pre-Application Stage	No shared receptors - NSRs associated with East Yorkshire Solar Farm fall outside the study area of this assessment (Figure 11.1). Additionally, the development area proposed to house noise generating elements is ~6.2km, therefore, operational cumulative

[19] Receptors identified within Carlton Solar Farm Acoustic Report Produced by Tetra Tech, Selby 2023/0128/EIA report accessed via council website May 2023

Scheme	Description	Planning Status	Comments
	will be at Drax Substation, situated approximately 6.2km to the south-west of the PV site. The generating capacity of the Scheme will exceed 50MW and its maximum capacity is anticipated to be 400MW		impact is not required.
Drax Bioenergy with Carbon Capture and Storage Project (NSIP) (PINS Ref: EN010120)	Carbon capture infrastructure at the Drax Power Station: • Compression and treatment of carbon dioxide at the Drax Power Station to allow connection to a National Grid carbon dioxide transport system; • Potential Upgraded Drax Jetty and Road Improvements to facilitate the transport of abnormal indivisible loads; and • Potential Environmental Mitigation Area to the north of the Drax Power Station.	Examination Stage	Adjacent to the eastern part of the Site boundary. Although this scheme does not directly share a NSR with the Proposed Development, comparison can be made with NSR 15 and R12[20]
Land Off New Road, Drax (Ref: 2020/1357/FULM)	Development of an energy storage facility including battery storage containers;	Consented in 2021 not yet under construction	Adjacent to north-eastern most part of the Site boundary. No shared NRSs with the Proposed Development.

[20] Information obtained from operational acoustic noise contours produced by WSP – Drax BECCS ES Vol Figure 7.3

Scheme	Description	Planning Status	Comments
	substations; power conversion systems; transformers and associated switchgear; HVAC equipment; communications and grid compliance equipment		
Land Off Hales Lane, Drax (Ref: 2021/1089/FULM)	Development of a battery storage facility, associated infrastructure, access and grid connection.	Consented in May 2022. Not yet under construction	Adjacent to the eastern part of the Site boundary. No shared NSRs with the Proposed Development.
Land North and South of Camela Lane, Camblesforth (Ref: 2021/0788/EIA)	Development of a ground mounted solar farm including associated infrastructure.	Consented in July 2022. Not yet under construction.	Adjacent to the eastern part of the Site boundary. Four NSRs identified as being shared by this scheme and the Proposed Development or close enough to make a comparison; NSR6-9 and R05-R08[21]
Land to the East of New Road, Drax (Ref: 2022/0711/EIA)	Hybrid Planning Application comprising two parts: (i) outline planning application (all matters reserved) for the construction of a converter station at Drax, Selby; and (ii) full planning application for the installation of high voltage direct current underground cables from the	Awaiting decision	Approximately 150m to the north of the Site boundary, at its closest point. No shared NSRs with the Proposed Development.

[21] Receptors identified in acoustic report ref:784-B024091- Land North and South of Camela Lane, Camblesforth, produced by Tetra Tech, accessed May 2023

Scheme	Description	Planning Status	Comments
	River Ouse to the converter station and high voltage alternating current underground cables from the converter station to the existing Drax Substation, as well as all associated temporary works including compounds, accesses and bellmouths as part of the construction of Scotland-England Green Link 2 (SEGL2), a two gigawatt reinforcement of the electricity transmission system between Peterhead, Scotland and Drax, England. [Installation of underground high voltage direct current cables from Mean Low Water Springs at Fraisthorpe, East Riding to the River Ouse and associated temporary works relating to land in an adjoining authority].		

11.8.3. Six NSR locations have been identified as having the potential to be affected by the Proposed Development, as well as one or more of the schemes set out in Table 11.19 above.

11.8.4. The assessment of cumulative effects only considers the calculated A-weighted

sound pressure levels at each NSR, in accordance with the requirements of BS4142.

Table 11.20: Calculated Cumulative Specific Sound Levels Daytime

NSRs	The Proposed Development	Land South of A645, Wade House Lane, Drax scheme	Drax Bioenergy with Carbon Capture and Storage Project NSIP	Land North and South of Camela Lane, Camblesforth scheme	Cumulative dB(A)
NSR6	23	-	-	21	25
NSR7	27	-	-	31	33
NSR8	29	-	-	27	31
NSR9	28	-	-	21	29
NSR15	24	22	30	-	32
NSR16	21	28	-	-	29

Table 11.21: Calculated Cumulative Specific Sound Levels Night-time

NSRs	The Proposed Development	Land South of A645, Wade House Lane, Drax scheme	Drax Bioenergy with Carbon Capture and Storage Project NSIP	Land North and South of Camela Lane, Camblesforth scheme	Cumulative dB(A)
NSR6	21	-	-	24	26
NSR7	26	-	-	34	35
NSR8	28	-	-	29	32
NSR9	28	-	-	24	30
NSR15	22	23	30	-	31
NSR16	20	24	-	-	26

Rating Penalty

11.8.5. The characteristic of the noise remains the same as previously stated, therefore the rating penalty assessment outcome is the same and no rating penalties need to be applied.

Assessment

11.8.6. The cumulative rating sound level assessment at the closest NSRs has been undertaken, on the basis of the above information, and is presented in Table 11.22 below.

Table 11.22: Cumulative Assessment

NSRs	Period	Cumulative Rating Sound Level, $L_{A,r}$ (dB)	Background Sound Level, L_{A90} (dB)	Excess over Rating Sound Level Limit (dB)
NSR6	Day	25	50	-25
	Night	26	33	-7
NSR7	Day	33	50	-17
	Night	35	33	2
NSR8	Day	31	50	-19
	Night	32	33	-1
NSR9	Day	29	50	-21
	Night	30	46	-16
NSR15	Day	32	46	-14
	Night	31	37	-6
NSR16	Day	29	40	-11
	Night	26	35	-9

11.8.7. During the daytime and night-time periods, the cumulative rating sound levels from all identified relevant schemes set out in Table 11.22 above is predicted to be lower than the background sound level at all NSRs, with the exception of NSR7. The increased cumulative noise level at this NSR is largely as a result of noise predicted from the Land North and South of Camela Lane, Camblesforth scheme (ref: 2021/0788/EIA). The night-time specific noise level from the Proposed Development in the absence of other noise is 9dB below the night-time background noise level at NSR7, demonstrating that there is no significant cumulative impact from the Proposed Development with any of the nearby energy developments with shared receptors (the Land South of A645, Wade House Lane, Drax scheme; the Drax

Bioenergy with Carbon Capture and Storage Project NSIP; or the Land North and South of Camela Lane, Camblesforth scheme).

Decommissioning Phase

11.8.8. It is assumed noise emission associated with the operation of the Site will cease during the decommissioning phase.

11.9. Summary

11.9.1. The assessment of the likely significant noise and vibration effects resulting from the construction and decommissioning phases of the Proposed Development, arising from construction and decommissioning activities, concluded that effects will be short-term and temporary, and no greater than negligible at the closest NSR to any construction and decommissioning activities.

11.9.2. No mitigation measures beyond the implementation of construction best practice measures will be required, to ensure that all construction noise and vibration effects are not significant.

11.9.3. For the Proposed Development's operation, the assessment has considered a set of worst-case, candidate input parameters and on this basis, it has been predicted to give rise to no worse than a negligible effect at the assessed NSRs.

11.9.4. Table 11.23 contains a summary of the likely significant effects of the Proposed Development.

Table 11.23: Table of Significance – Noise and Vibration

Potential Effect	Nature of Effect*	Significance **	Secondary Mitigation/ Enhancement Measures	Geographical Importance ***							Residual Effects ****
				I	UK	E	R	C	UA	L	
Construction Phase (accounting for Embedded Mitigation and Measures to be Adopted by the Project)											
Effects from Construction Noise	Temporary	Negligible to Minor Adverse	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Effects from Construction Road Traffic	Temporary	Negligible to Minor Adverse	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Effects from Construction Vibration	Temporary	Negligible	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Operational Phase (accounting for Embedded Mitigation and Measures to be Adopted by the Project)											
Effects from Operational Plant Noise	Permanent	Negligible	None required							X	Negligible (**Not Significant**)
Decommissioning Phase (accounting for Embedded Mitigation and Measures to be Adopted by the Project)											

Potential Effect	Nature of Effect*	Significance **	Secondary Mitigation/ Enhancement Measures	Geographical Importance ***							Residual Effects ****
				I	UK	E	R	C	UA	L	
Effects from Decommissioning	Temporary	Minor Adverse	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Effects from Decommissioning Vibration	Temporary	Negligible	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Cumulative Effects											
Construction Phase											
Cumulative Effects from Construction Noise	Temporary	Minor Adverse	None required further to implementation of embedded mitigation and measures to be adopted by the project.							X	Negligible (**Not Significant**)
Operational Phase											
Cumulative Effects from Operational Plant Noise	Permanent	Negligible	None Required							X	Negligible (**Not Significant**)
Nature of Effect * Significance** Geographical Importance *** Residual Effects ****	Permanent or Temporary Short-term, Medium-term, or Long-term Major/ Moderate/ Minor/ Negligible Beneficial/ Adverse I = International; UK = United Kingdom; E = England; R = Regional; C = County; UA = Unitary Authority; L = Local Major / Moderate / Minor / Negligible Beneficial / Adverse										