DOGGER BANK D
WIND FARM
Preliminary Environmental Information Report

Volume 1
Chapter 25 Noise and Vibration

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Glossary

Term	Definition
A-weighting	This is a filter weighting which approximates to the frequency sensitivity of the human ear. Our sensitivity is at a maximum at around 2 kHz and steadily decreases above and below. Humans are unable to hear below 20Hz and above about 20 kHz.
Additional Mitigation	Measures identified through the EIA process that are required as further action to avoid, prevent, reduce or, if possible, offset likely significant adverse effects to acceptable levels (also known as secondary (foreseeable) mitigation). All additional mitigation measures adopted by the Project are provided in the Commitments Register.
Birkhill Wood Substation	The onshore grid connection point for DBD identified through the Holistic Network Design process. Birkhill Wood Substation is being developed by National Grid Electricity Transmission and does not form part of the Project.
Commitment	Refers to any Embedded Mitigation and Additional Mitigation, enhancement or monitoring measures identified through the EIA process and those identified outside the EIA process such as through stakeholder engagement and design evolution. All commitments adopted by the Project are provided in the Commitments Register.
Decibels (dB)	A logarithmic ratio of two values of a variable. The decibel is not a true measurement unit nor is it exclusive to noise assessments. Decibels are used because they can represent very wide ranges of ratios (from trillionths and billionths to billions and trillions) with a small range of decibel values. Decibels can be used to represent measured values by using a known reference value in the ratio. When using decibels to measure something it is therefore important to specify what variable is being measured and what reference level has been used. This is done by adding a reference value statement in the form dB re x units, where the units indicate the variable being measured and x is the reference value. Decibels are used in noise assessments because the human ear responds to sound pressure in a logarithmic way and the quantities measured in acoustics vary over wide ranges. As the decibel is used in acoustics to represent a range of sound level parameters, there is a standardised notation system. This takes the form of an italic capital letter '*L*' (referring to 'level') and subscript characters which give specific details of what is being represented. Because decibels are logarithmic, they must be added, subtracted, multiplied, divided and averaged using different techniques from normal, linear, quantities.

Term	Definition
Design	All of the decisions that shape a development throughout its design and pre-construction, construction / commissioning, operation and, where relevant, decommissioning phases.
Development Consent Order (DCO)	A consent required under Section 37 of the Planning Act 2008 to authorise the development of a Nationally Significant Infrastructure Project, which is granted by the relevant Secretary of State following an application to the Planning Inspectorate.
Directivity	The amount by which a source radiates more sound in one direction than another.
Effect	An effect is the consequence of an impact when considered in combination with the receptor's sensitivity / value / importance, defined in terms of significance.
Embedded Mitigation	Embedded mitigation includes: • Measures that form an inherent part of the project design evolution such as modifications to the location or design of the development made during the pre-application phase (also known as primary (inherent) mitigation); and • Measures that will occur regardless of the EIA process as they are imposed by other existing legislative requirements or are considered as standard or best practice to manage commonly occurring environmental impacts (also known as tertiary (inexorable) mitigation). All embedded mitigation measures adopted by the Project are provided in the Commitments Register.
Energy Storage and Balancing Infrastructure (ESBI)	A range of technologies such as battery banks to be co-located with the Onshore Converter Station, which provide valuable services to the electrical grid such as storing energy to meet periods of peak demand and improving overall reliability.
Enhancement	Measures committed to by the Project to create or enhance positive benefits to the environment or communities, as a result of the Project. All enhancement measures adopted by the Project are provided in the Commitments Register.
Environmental Impact Assessment (EIA)	A process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information and includes the publication of an Environmental Statement.
Evidence Plan Process (EPP)	A voluntary consultation process with technical stakeholders which includes a Steering Group and Expert Topic Group (ETG) meetings to encourage upfront agreement on the nature, volume and range of supporting evidence required to inform the EIA and HRA process.

Term	Definition
Environmental Statement (ES)	A document reporting the findings of the EIA which describes the measures proposed to mitigate any likely significant effects.
Expert Topic Group (ETG)	A forum for targeted technical engagement with relevant stakeholders through the EPP.
Grid Connection	The offshore and onshore electricity transmission network connection to Birkhill Wood Substation.
Haul Roads	Temporary tracks set aside to facilitate transport access during construction works.
Impact	A change resulting from an activity associated with the Project, defined in terms of magnitude.
Index	A value based on the mathematical processing of raw data.
Indicator	A value used to indicate the likelihood of a particular response of effect.
Jointing Bays	Underground structures constructed at regular intervals along the onshore export cable corridor to facilitate the joining of discrete lengths of the installation of cables.
Landfall	The area on the coastline, south-east of Skipsea, at which the offshore export cables are brought ashore, connecting to the onshore export cables at the transition joint bay above Mean High Water Springs.
Level	Values measured in decibels.
Link Boxes	Structures housing electrical equipment located alongside the jointing bays in the onshore export cable corridor and the transition joint bay at the landfall, which could be located above or below ground.
Mitigation	Any action or process designed to avoid, prevent, reduce or, if possible, offset potentially significant adverse effects of a development. All mitigation measures adopted by the Project are provided in the Commitments Register.
Mitigation Hierarchy	A systematic approach to guide decision-making and prioritise mitigation design. The hierarchy comprises four stages in order of preference and effectiveness: avoid, prevent, reduce and offset.

Term	Definition
Monitoring	Measures to ensure the systematic and ongoing collection, analysis and evaluation of data related to the implementation and performance of a development. Monitoring can be undertaken to monitor conditions in the future to verify any environmental effects identified by the EIA, the effectiveness of mitigation or enhancement measures or ensure remedial action are taken should adverse effects above a set threshold occur. All monitoring measures adopted by the Project are provided in the Commitments Register.
Noise	No strict definition and is often used interchangeably with sound. However, it is usually taken to mean unwanted sound.
Offshore Construction Base Port(s)	The offshore construction base port(s) will be the home for the Project's service vessels, crew transfers and the control centre for managing marine logistics and traffic for offshore construction activities. At this stage, no decision has been made regarding which port(s) would be used for the Project's offshore construction. A decision upon the offshore construction base port(s) would not be made until post DCO determination.
Onshore Converter Station (OCS)	A compound containing electrical equipment required to stabilise and convert electricity generated by the Wind Turbines and transmitted by the export cables into a more suitable voltage for grid connection into Birkhill Wood Substation.
Onshore Converter Station (OCS) Zone	The area within which the Onshore Converter Station and Energy Storage and Balancing Infrastructure will be located in vicinity of Birkhill Wood Substation.
Onshore Development Area	The area in which all onshore infrastructure associated with the Project will be located, including any temporary works area required during construction and permanent land required for mitigation and enhancement areas, which extends landward of Mean Low Water Springs. There is an overlap with the Offshore Development Area in the intertidal zone.
Onshore Export Cable Corridor (ECC)	The area within which the onshore export cables will be located, extending from the landfall to the Onshore Converter Station zone and onwards to Birkhill Wood Substation.
Onshore Export Cables	Cables which bring electricity from the transition joint bay at landfall to the Onshore Converter Station zone (HVDC cables) and from the Onshore Converter Station zone onwards to Birkhill Wood Substation (HVAC cables).

Term	Definition
Operation and Maintenance Base Port	The operation and maintenance (O&M) base port will be the home for the Project's service vessels, crew transfers and the control centre for managing marine logistics and traffic for offshore O&M activities. At this stage, no decision has been made regarding which port(s) would be used for the Project's offshore O&M activities. A decision upon an O&M base port would not be made until post DCO determination.
Project Design Envelope	A range of design parameters defined where appropriate to enable the identification and assessment of likely significant effects arising from a project's worst-case scenario. The Project Design Envelope incorporates flexibility and addresses uncertainty in the DCO application and will be further refined during the EIA process.
Scoping Opinion	A written opinion issued by the Planning Inspectorate on behalf of the Secretary of State regarding the scope and level of detail of the information to be provided in the Applicant's Environmental Statement. The Scoping Opinion for the Project was adopted by the Secretary of State on 02 August 2024.
Scoping Report	A request by the Applicant made to the Planning Inspectorate for a Scoping Opinion on behalf of the Secretary of State. The Scoping Report for the Project was submitted to the Secretary of State on 24 June 2024.
Sound	The physical phenomenon of the transmission of energy through gaseous, liquid or solid media via rapid periodic fluctuations in pressure.
Sound Pressure Level L_p obsolete – SPL	The basic measure of how much sound there is at a given location. It is a measure of the size of the pressure fluctuations in the air that we perceive as sound. Sound Pressure Level is expressed in decibels with a reference level of $20x10^{-6}$ Pa (L_p in dB re 20 µPa).
Sound Power Level L_W obsolete – SWL	The total amount of sound produced by a source. It cannot be measured directly but can be calculated from Sound Pressure Level measurements in known conditions. It can be used to predict the Sound Pressure Level at any point. Sound Power Level is expressed in decibels with a reference level of $1x10^{-12}$ W (L_W in dB re 1 pW).
Study Areas	A geographical area and / or temporal limit defined for each EIA topic to identify sensitive receptors and assess the relevant likely significant effects.
Temporary Construction Compounds	Areas set aside to facilitate the construction works for the onshore infrastructure, which include the landfall construction compound, main and intermediate construction compounds for onshore export cable works and OCS and ESBI construction compounds.

Term	Definition
The Applicant	SSE Renewables and Equinor acting through 'Doggerbank Offshore Wind Farm Project 4 Projco Limited'.
The Project	Dogger Bank D Offshore Wind Farm Project, also referred to as DBD in this PEIR.
Transition Joint Bay (TJB)	An underground structure at the landfall that house the joints between the offshore and onshore export cables.
Trenching	Open cut method for cable or duct installation.
Trenchless Techniques	Trenchless cable or duct installation methods used to bring offshore export cables ashore at landfall, facilitate crossing major onshore obstacles such as roads, railways and watercourses and where trenching may not be suitable. Trenchless techniques included in the Project Design Envelope include Horizontal Directional Drilling (HDD), auger boring, micro-tunnelling, pipe jacking / ramming and Direct Pipe.
Weighted	Spectral values that have been modified to reflect a frequency sensitivity.

25 Noise and Vibration

25.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the Environmental Impact Assessment (EIA) of the noise and vibration impacts of Dogger Bank D Offshore Wind Farm Project (hereafter 'the Project' or 'DBD').

2. **Chapter 4 Project Description** provides a description of the key infrastructure components which form part of the Project and the associated construction, operation and maintenance (O&M) and decommissioning activities.

3. The primary purpose of the PEIR is to support the statutory consultation activities required for a Development Consent Order (DCO) application under the Planning Act 2008. The information presented in this PEIR chapter is based on the baseline characterisation and assessment work undertaken to date. The feedback from the statutory consultation will be used to inform the final design where appropriate and presented in an Environmental Statement (ES), which will be submitted with the DCO application.

4. This PEIR chapter:

   - Describes the baseline environment relating to noise and vibration;
   - Presents an assessment of the likely significant noise and vibration effects during the construction, O&M and decommissioning phases of the Project on human noise and vibration sensitive receptors (NVSR), which includes structures (e.g. buildings);
   - Identifies any assumptions and limitations encountered in compiling the environmental information; and
   - Sets out proposed mitigation measures to avoid, prevent reduce or, if possible, offset potential significant adverse environmental effects identified during the EIA process and, where relevant, monitoring measures or enhancement measures to create or enhance positive effects.

5. This chapter should be read in conjunction with the following related chapters. Inter-relationships are discussed further in **Section 25.9.1**:

   - **Chapter 23 Onshore Ecology and Ornithology**;
   - **Chapter 26 Traffic and Transport**;
   - **Chapter 29 Human Health**; and
   - **Chapter 30 Socio-Economics, Tourism and Recreation**.

6. Additional information to support the noise and vibration assessment includes:

   - **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration;**
   - **Volume 2, Appendix 25.2 Noise and Vibration Baseline Report;**
   - **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment;** and
   - **Volume 2, Appendix 25.4 Construction Traffic Noise Assessment**.

25.2 Policy and Legislation

25.2.1 National Policy Statements

7. Planning policy on energy National Significant Infrastructure Projects (NSIP) is set out in the National Policy Statements (NPS). The following NPS are relevant to the noise and vibration assessment:

   - Overarching NPS for Energy (EN-1) (Department of Energy Security and Net Zero (DESNZ), 2023a); and
   - NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2023b).

8. NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2023c) contains policy in relation to the assessment of generation and transmission infrastructure for renewable energy installations, however it does not contain any policy requirement relevant to the noise and vibration assessment.

9. The noise and vibration chapter has been prepared with reference to specific requirements in the above NPS. The relevant parts of the NPS are summarised in **Table 25-1**, along with how and where they have been considered in this PEIR chapter.

Table 25-1 Summary of Relevant National Policy Statement Requirements for Noise and Vibration

NPS Reference and Requirement	How and Where Considered in the PEIR
NPS for Energy (EN-1)	
Paragraph 5.12.6: "Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment: • a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive, low frequency or temporal characteristics of the noise; • identification of noise sensitive receptors and noise sensitive areas that may be affected; • the characteristics of the existing noise environment; • a prediction of how the noise environment will change with the proposed development: o in the shorter term, such as during the construction period; o in the longer term, during the operating life of the infrastructure; and o at particular times of the day, evening and night (and weekends) as appropriate and at different times of year. • 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; • if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and • measures to be employed in mitigating the effects of noise - applicants should consider using best available techniques to reduce noise impacts."	Refer to **Section 50** for the methodology for assessing potential noise and vibration impacts, **Section 25.6** for details on the existing noise environment including the identification of Noise and Vibration Sensitive Receptor (NVSR) and **Section 25.1** where any changes in noise levels as a result of the Project are assessed and any potential effects are identified. Embedded mitigation measures are identified in **Section 0** and additional mitigation measures are identified in **Section 25.7.4**.
Paragraph 5.12.7: "The nature and extent of the noise assessment should be proportionate to the likely noise impact."	The noise and vibration assessment includes all likely significant effects through a robust scoping process which has been agreed through engagement with key stakeholders (see **Sections 25.3** and **25.4.2**).
Paragraph 5.12.8: "Applicants should consider the noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation."	Refer to **Section 25.7.1** where any changes in noise levels as a result of the Project from ancillary works, such as from project-generated vehicle movements, are assessed, and any potential effects and appropriate mitigation measures are identified.
Paragraph 5.12.9: "Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology specific NPS. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies."	Any changes in noise levels as a result of the Project are assessed in **Section 25.1**, and any potential effects and appropriate mitigation measures are identified. The current relevant British Standards (BS) have been used within this assessment, as detailed in **Section 50.**

NPS Reference and Requirement	How and Where Considered in the PEIR
Paragraph 5.12.10: "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). The applicant should consult EA and / or the SNCB, as necessary, and in particular regarding assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be considered."	It is not anticipated that noise impacts on protected species and other wildlife will need to be controlled via environmental permit. Noise impacts on terrestrial protected species are considered within **Chapter 23 Onshore Ecology and Ornithology**.
Paragraph 5.12.11: "In the marine environment, applicants should consider noise impacts on protected species, both at the individual project level and in-combination with other marine activities."	Offshore airborne noise impacts on marine protected species are considered within **Chapter 13 Offshore and Intertidal Ornithology**. Underwater noise impacts on marine protected species are considered within **Chapter 10 Benthic and Intertidal Ecology**, **Chapter 11 Fish and Shellfish Ecology** and **Chapter 12 Marine Mammals**.
Paragraph 5.12.12: "Applicants should submit a detailed impact assessment and mitigation plan as part of any development plan, including the use of noise mitigation and noise abatement technologies during construction and operation."	**Section 25.1** presents a detailed assessment of the Project's predicted noise effects. Embedded mitigation measures are identified in **Section 0,** and additional mitigation measures are identified in **Section 25.7.4**.
Paragraph 5.12.13: "The Secretary of State should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the Secretary of State may wish to impose mitigation measures. Any such mitigation measures should take account of the NPPF or any successor to it and planning practice guidance on noise."	The assessment of effects presented in **Section 25.1** takes account of the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) on noise, which are summarised in **Section 50**. Mitigation measures are proposed in **Sections 0** and **Section 25.7.4,** and the residual effects are considered to be not significant.
Paragraph 5.12.14: "Mitigation measures may include one or more of the following: • Engineering: reducing the noise generated at source and / or containing the noise generated. • Lay-out: where possible, optimising the distance between the source and noise-sensitive receptors and / or incorporating good design to minimise noise transmission through the use of screening by natural or purpose-built barriers, or other buildings. • Administrative: using planning conditions / obligations to restrict activities allowed on the site at certain times and / or specifying permissible noise limits / noise levels, differentiating as appropriate between different times of day, such as evenings and late at night, and taking into account seasonality of wildlife in nearby designated sites. • Insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building."	The noise and vibration assessment has incorporated all practical mitigation measures where relevant and required, including all the mitigation options identified in the NPS. Embedded mitigation measures are identified in **Section 0**, and additional mitigation measures are identified in **Section 25.7.4**.
Paragraph 5.12.15: "The project should demonstrate good design through selection of the quietest or most acceptable cost-effective plant available; containment of noise within buildings wherever possible, taking into account any other adverse impacts that such containment might cause (e.g. on landscape and visual impacts; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission)."	The embedded mitigation measures described in **Section 0** and additional mitigation measures described in **Section 25.7.4** demonstrate good design has been adopted.

NPS Reference and Requirement	How and Where Considered in the PEIR
Paragraph 5.12.16: "A development must be undertaken in accordance with statutory requirements for noise. Due regard must be given to the relevant sections of the Noise Policy Statement for England (NPSE), the NPPF, and the government's associated planning guidance on noise. In Wales the relevant policy will be PPW and the TANs, as well as the Welsh Government's Noise and Soundscape Action Plan."	Due regard is given to statutory requirements and the quoted policy, as described in **Section 25.2**.
Paragraph 5.12.17: "The Secretary of State should not grant development consent unless they are satisfied that the proposals will meet the following aims, through the effective management and control of noise: • avoid significant adverse impacts on health and quality of life from noise; • mitigate and minimise other adverse impacts on health and quality of life from noise; and • where possible, contribute to improvements to health and quality of life through the effective management and control of noise."	These aims are met by adoption of the embedded and additional mitigation measures as discussed above and presented in the context of the assessment of effects in **Section 25.1**.
Paragraph 5.12.18: "When preparing the DCO, the Secretary of State should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent. These requirements or mitigation measures may apply to the construction, operation, and decommissioning of the energy infrastructure development."	Where relevant, requirements and mitigation measures to ensure that limits are not exceeded are proposed in **Section 25.1**.
NPS for Electricity Networks Infrastructure (EN-5)	
Paragraph 2.9.40 to 2.9.43: "For the assessment of noise from overhead lines, the applicant must use an appropriate method to determine the sound level produced by the line in both dry and wet weather conditions, in addition to assessing the impact on noise-sensitive receptors. For instance, the applicant may use an appropriate noise modelling tool or tools for the prediction of overhead line noise and its propagation over distance, such as an ISO 9613-2 or Technical Report TR(T)94. When assessing the impact of noise generated by overhead lines in wet weather relative to existing background sound levels, the applicant should consider the effect of varying background sound levels due to rainfall. The Secretary of State is likely to regard it as acceptable for the applicant to use a methodology that demonstrably addresses these criteria."	The Project does not include any requirement for overhead lines. As such, further operational assessment of rain-induced noise is not considered relevant to the Project and therefore scoped out of the assessment.

25.2.2 Other Policy and Legislation

10. Other policy and legislation relevant to the noise and vibration assessment is summarised in the following sections.

25.2.2.1 National

25.2.2.1.1 Environmental Protection Act 1990

11. The Environmental Protection Act 1990 prescribes 'noise (and vibration) emitted from premises (including land) so as to be prejudicial to health or a nuisance' as a statutory nuisance.

12. Local authorities are required to investigate any public complaints of noise and if they are satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve a noise abatement notice. A notice is served on the person responsible for the nuisance. It requires either the abatement of the nuisance, works to abate the nuisance to be carried out or it prohibits or restricts the activity. Contravention of a notice without reasonable excuse is an offence. A right of appeal to the Magistrates Court exists within 21 days of the service of a noise abatement notice.

13. No statutory noise limits exist for determining a nuisance. Therefore, the local authority can take account of various guidance documents and existing case law when investigating complaints. Lower noise level limits are generally applied when considering the acceptability of a planning permission than those which would be used when considering whether an existing noise source amounts to a statutory nuisance. Demonstrating the use of Best Practicable Means (BPM) to minimise noise levels is an accepted defence against a noise abatement notice.

14. When considering a planning application, local authorities' Environmental Health Officers are obliged to consider whether the development under consideration has the potential to cause a statutory nuisance and to use the planning process to avoid this outcome if possible.

25.2.2.1.2 Control of Pollution Act 1974

15. The Control of Pollution Act 1974 (CoPA) requires that BPM (as defined in Section 72 of CoPA) are adopted to control construction noise on any given site as far as reasonably practicable. Sections 60 and 61 of the CoPA provide the main legislation regarding enabling works and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the local authority with instructions to cease work until specific conditions to reduce noise have been adopted.

16. Section 61 of the CoPA provides a means to apply for prior consent to carry out noise generating activities during construction. Once prior consent has been agreed under Section 61, a Section 60 notice cannot be served provided the agreed conditions are maintained on-site.

17. Whilst construction noise and vibration are factors which can be considered during the planning process, local authorities have alternative powers under Sections 60 and 61 of CoPA to regulate these issues if complaints arise.

25.2.2.1.3 National Planning Policy Framework

18. The NPPF (as revised in December 2024) forms the basis of the Government's planning policies for England and how these should be applied. Section 15, Paragraph 187 of the NPPF states:

"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....."

19. Furthermore, Section 15, Paragraph 198 states:

"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...".

25.2.2.1.4 Noise Policy Statement for England

20. The Noise Policy Statement for England (NPSE) document was published by Department for the Environment and Rural Affairs (Defra) in 2010, and Paragraph 1.7 states the following three policy aims:

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

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

21. The Explanatory Note contained within the NPSE introduces the following concepts to aid in the establishment of significant effects:

- No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

22. The aims of the NPSE can therefore be interpreted as follows (within the context of Government policy on sustainable development):

- The first aim is to avoid noise levels above the SOAEL; and
- To consider situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

23. In addition, Paragraph 2.22 of the NPSE states that:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations"…"Further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise".

25.2.2.2 Local

24. EN-1 states that the Planning Inspectorate will also consider Development Plan Documents or other documents in the Local Plan Framework to be relevant to its decision making. The local plans relevant to noise and vibration are summarised in the following sections.

25. The Project falls within the jurisdiction of East Riding of Yorkshire Council (ERYC). Relevant ERYC policies to the noise and vibration assessment are described below. The Study Area(s) for the noise and vibration assessment (see **Section 25.4.1**) also overlap with the jurisdiction of Hull City Council, therefore, their local policies are also described.

25.2.2.2.1 East Riding Local Plan Update 2025 – 2039 (Adopted 2025)

26. Policy EC5 of the plan states:

"Proposals for the development of the energy sector, excluding mineral extraction, but including all other types of development listed in Table 13, will be supported where any significant adverse impacts are addressed satisfactorily, and the residual harm is outweighed by the wider benefits of the proposal. Developments and their associated infrastructure should be acceptable in terms of….

3(i) [The effects of development on] local amenity, including noise, air and water quality, traffic, vibration, dust, light (including reflection, glint, glare and shadow flicker), and visual impact."

27. Section 6 (A Prosperous Economy), Paragraph 6.75 of the document also states the following with regard to noise assessment:

"Proposals should also ensure they are located at an appropriate distance from noise sensitive uses, such as housing and quiet leisure-based uses, to ensure that increases in ambient noise levels are acceptable. The prevailing noise standards (e.g. BS4142 or ETSU-R-97), and any current best practice/guidance (e.g. from the Institute of Acoustics), should be used, giving consideration to the level of existing background noise in the area. Light impacts can be a particular consideration with wind energy developments, including reflection and shadow flicker. Where impacts cannot be mitigated, on-site proposals should consider design alterations and soundproofing of the affected properties.

25.2.2.2.2 Hull Local Plan 2016 to 2032 (Adopted 2017)

28. Policy 18 (Renewable and low carbon energy) states:

"Development that generates, transmits and/or stores renewable and/or low carbon energy will be supported where the impact is or can be made acceptable. Potential impacts that are particularly relevant to this type of development are: a. local amenity, including noise, air quality, water quality, traffic, vibration, dust, visual impact, shadow flicker and odour".

29. Policy 49 (Noise Pollution) states:

"1. Development which would site noise sensitive receptors in proximity to noisy uses or areas should demonstrate that there would be an acceptable level of amenity for end users. Where this has not been demonstrated, development will not be allowed.

2. Development of noisy uses should demonstrate that adverse impacts of noise can be mitigated and that there would be an acceptable impact on the amenity of surrounding land uses, including the Humber Estuary International Site."

25.3 Consultation

30. Topic-specific consultation in relation to noise and vibration has been undertaken in line with the process set out in **Chapter 7 Consultation**. A Scoping Opinion from the Planning Inspectorate was received on 2nd August 2024, which has informed the scope of the assessment presented within this chapter (as outlined in **Section 25.4.2**).

31. Feedback received through the ongoing Evidence Plan Process (EPP) in relation to Expert Topic Group (ETG) meetings and wider technical consultation meetings with relevant stakeholders has also been considered in the preparation of this chapter. Details of technical consultation undertaken to date on noise and vibration are provided in **Table 25-2**.

32. **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration** summarises how consultation responses received to date are addressed in this chapter.

33. This chapter will be updated based on refinements made to the Project Design Envelope and to consider where appropriate stakeholder feedback on the PEIR. The updated chapter will form part of the ES to be submitted with the DCO application.

Table 25-2 Technical Consultation Undertaken to Date on Noise and Vibration

Meeting	Stakeholder(s)	Date(s) of Meeting / Frequency	Purpose of Meeting
ETG Meetings			
ETG11 (Air Quality, Noise and Vibration, Socio-Economics, Tourism and Recreation) Meeting 02	ERYC *(Hull City Council invited but not able to attend)*	27th August 2024	• Overview / agreement on impacts scoped in / out; • Overview / agreement on baseline survey method statement; and • Overview / agreement on modelling and assessment methodology.

25.4 Basis of the Assessment

34. The following sections establish the basis of the assessment of likely significant effects, which is defined by the Study Area(s), assessment scope, realistic worst-case scenarios and development scenarios.

35. This section should be read in conjunction with **Volume 2, Appendix 1.2 Guide to PEIR, Volume 2, Appendix 6.2 Impacts Register** and **Volume 2, Appendix 6.3 Commitments Register**.

25.4.1 Study Area

36. This section sets out how the Noise and Vibration Study Area(s) (hereafter referred to as 'the Study Area(s)') have been defined for the consideration of potential noise and vibration effects.

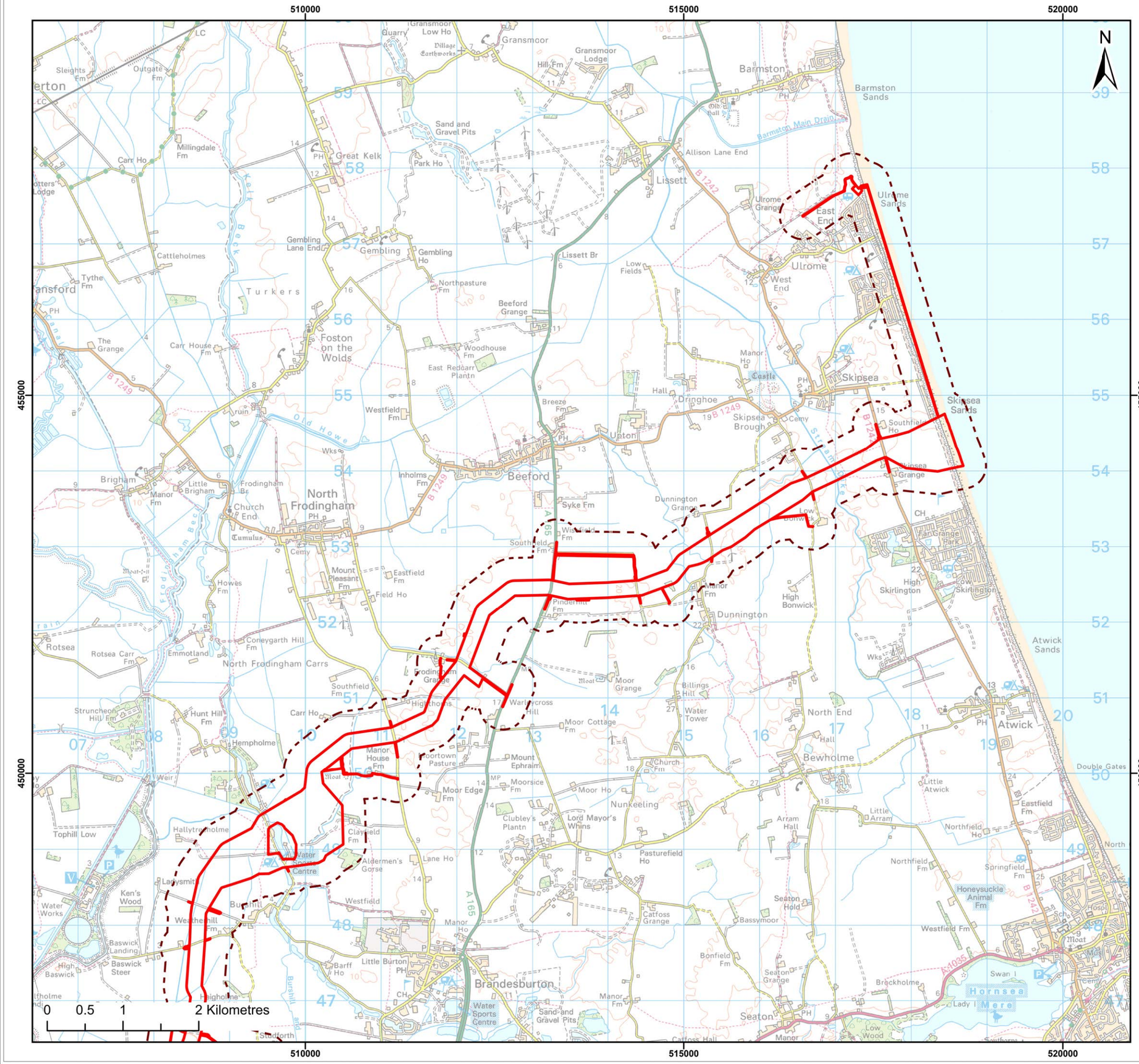
37. A list of potential NSVR types considered in the noise and vibration assessment is provided in **Table 25-9** within **Section 25.5.3**. The receptors are classified according to their sensitivity, using professional judgement based on the potential for noise and vibration level changes to cause significant disruption.

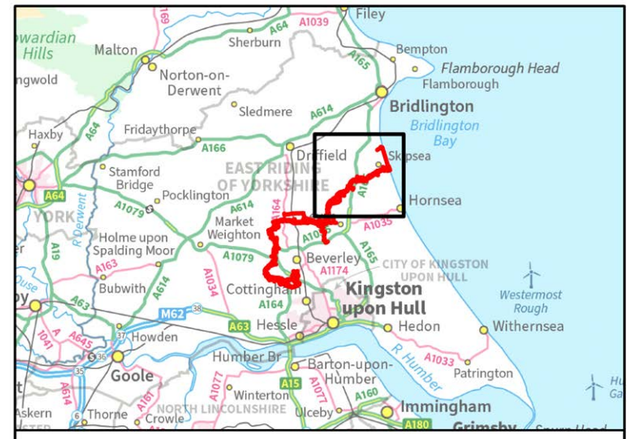
38. The Study Area(s) extend from the Onshore Development Area to the closest NVSR within the following distances:

- **Construction Noise Study Area** – in accordance with the guidance in the Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration Revision 2 (2020), construction noise impacts would only be assessed at NVSR which are no further than 300m from the Onshore Development Area. **Figure 25-1** illustrates this Study Area;

- **Construction Vibration Study Area** – in accordance with the DMRB LA111, construction vibration impacts would only be assessed at NVSR which are no further than 100m from the Onshore Development Area;
- **Operational Noise Study Area** – to ensure potential operational noise impacts are assessed, the proposed Onshore Converter Station (OCS) and Energy Storage and Balancing Infrastructure (ESBI) have been assumed to have the potential to emit audible levels of operational noise. There is no applicable guidance on an appropriate Study Area for the assessment of operational noise impacts. This depends on sound emission levels from operational plant, which are not known at this stage. A sufficient Operational Noise Study Area to capture all NVSR with the potential to experience significant effects will be determined at ES stage, and consultation will be undertaken with relevant stakeholders once plant sound emissions data are available; and
- **Traffic Noise Study Area** – defined in relation to the assessment of impacts due to changes in road traffic noise levels. In accordance with the DMRB LA111, it incorporates the closest NVSR (which are no more than 50m away) to the roads on which the Project's traffic is anticipated to result in noise level changes of at least 1 A-weighted decibel (dB(A)). The road links for which traffic data are supplied are shown on **Figure 26-1** of **Chapter 26 Traffic and Transport**.

39. The methodology for defining the above Study Area(s) has been discussed and agreed with ERYC at the second meeting of ETG11 held on the 27th August 2024. Agreement from Hull City Council has been obtained through their Scoping Opinion's responses (see **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration**).





Legend:

- Onshore Development Area
- Construction Noise and Vibration Study Area (Onshore Development Area 300m Buffer)

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Noise and Vibration Study Area - Sheet 1 of 3

Figure: 25-1

Drawing No: PC6250-RHD-XX-ON-M2-GS-0537

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
03	20/05/2025	JH	SP	A3	1:50,000
02	27/03/2025	JH	SP	A3	1:50,000

Co-ordinate system: British National Grid

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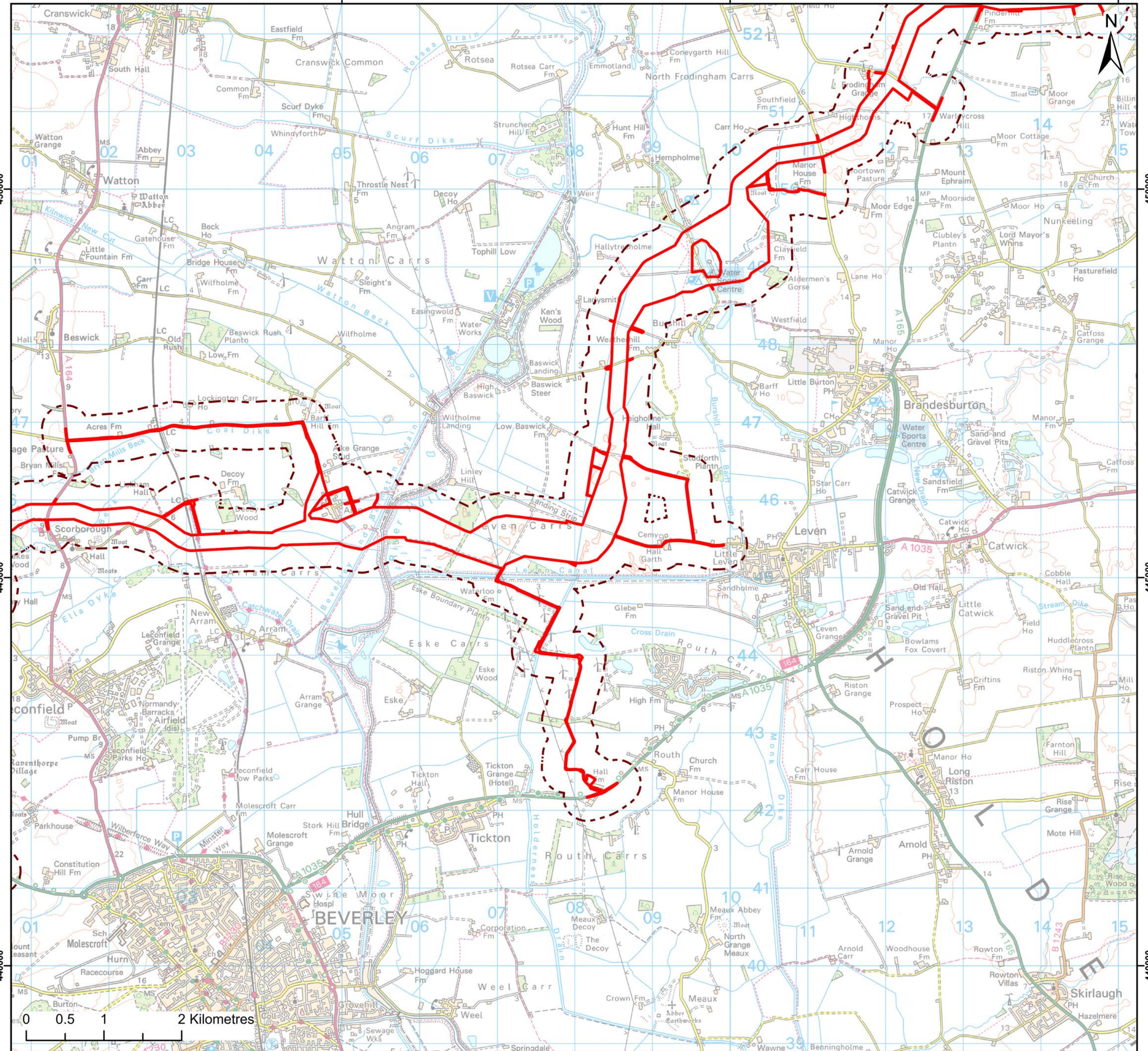

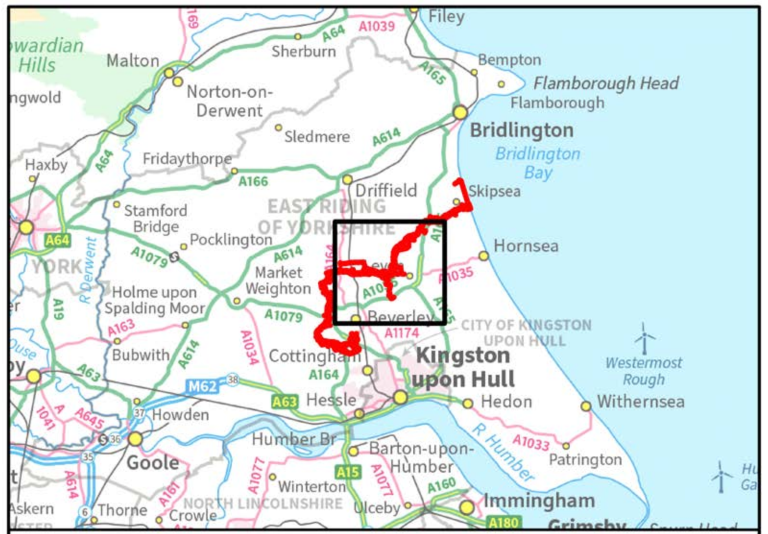

Legend:

Onshore Development Area

Construction Noise and Vibration Study Area (Onshore Development Area 300m Buffer)

Source: © Haskoning DHV UK Ltd, 2025.

Project:
Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:
Noise and Vibration Study Area - Sheet 2 of 3

Figure: 25-1	Drawing No: PC6250-RHD-XX-ON-M2-GS-0537				
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
03	20/05/2025	JH	SP	A3	1:50,000
02	27/03/2025	JH	SP	A3	1:50,000

Co-ordinate system: British National Grid

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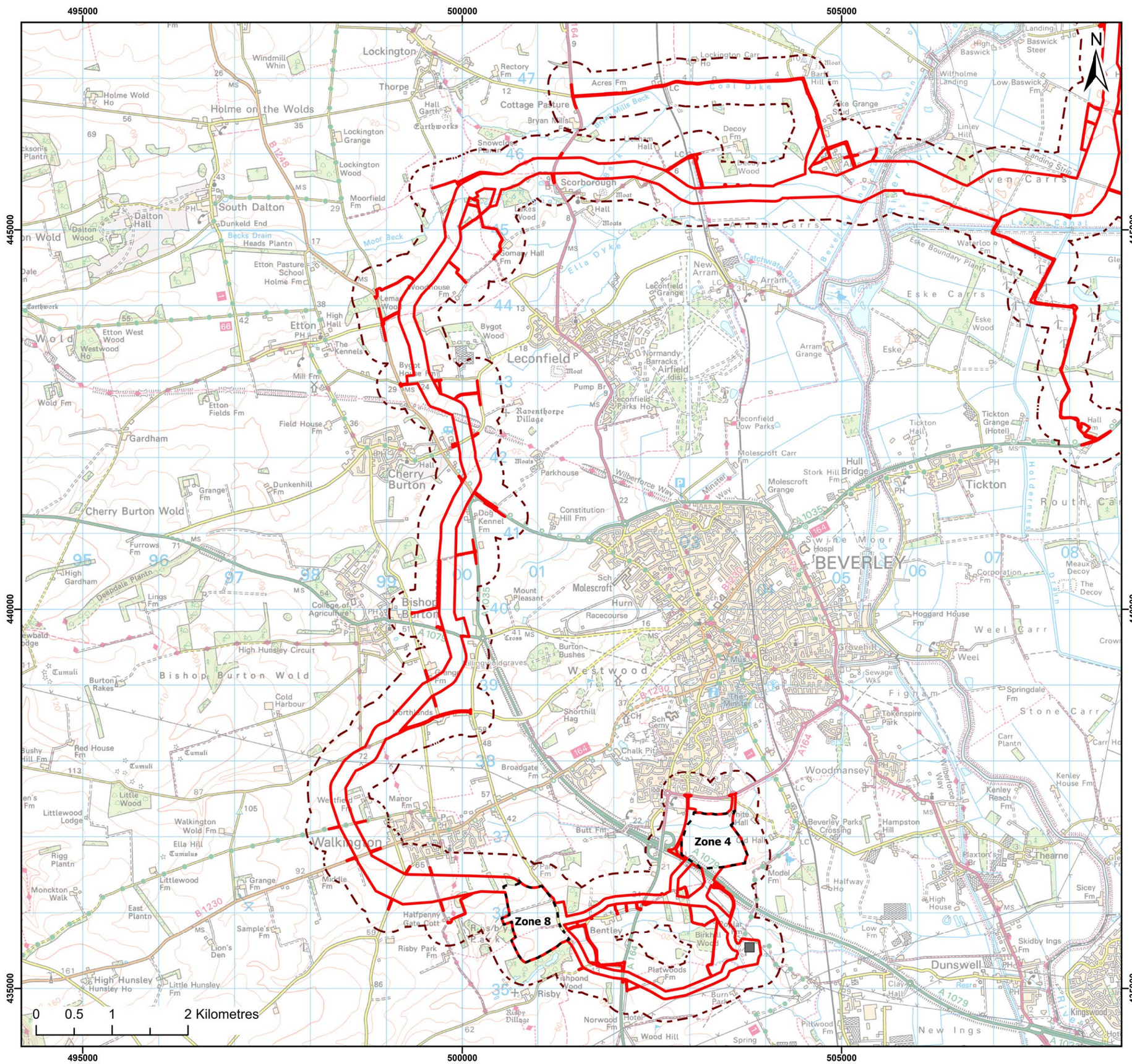

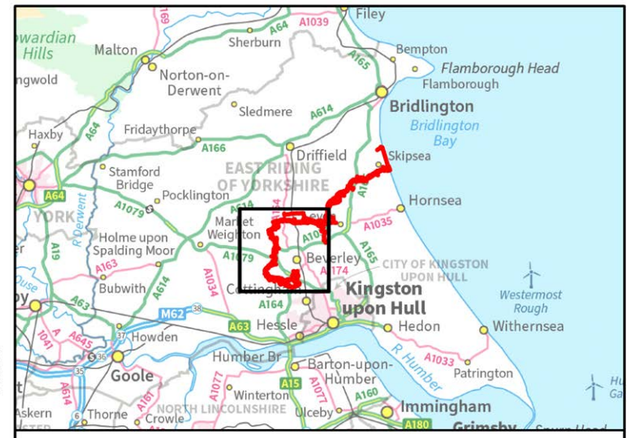

Legend:

- Onshore Development Area
- Onshore Converter Station Zone Options
- Indicative Birkhill Wood Substation Location
- Construction Noise and Vibration Study Area (Onshore Development Area 300m Buffer)

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Noise and Vibration Study Area - Sheet 3 of 3

Figure: 25-1

Drawing No: PC6250-RHD-XX-ON-M2-GS-0537

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
03	20/05/2025	JH	SP	A3	1:50,000
02	27/03/2025	JH	SP	A3	1:50,000

Co-ordinate system: British National Grid

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25.4.2 Scope of the Assessment

40. The following impacts have been scoped out of the noise and vibration assessment, as agreed with the Planning Inspectorate through the Scoping Opinion (see **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration** for further details):

- Noise and vibration from offshore construction activities ("offshore airborne noise"); and
- Noise associated with operation of the buried infrastructure at the landfall and along the onshore export cable corridor (ECC).

41. The impacts scoped into the assessment are outlined in **Table 25-3** and discussed further in **Section 25.1**. Some impacts (i.e. NV-C-04, NV-O-02, NV-O-03 and NV-04) have been scoped into the PEIR to provide evidence demonstrating the absence of likely significant effects as requested by the Planning Inspectorate in the Scoping Opinion.

42. The second meeting of ETG11 held on 27th August 2024 discussed the scope of the noise and vibration assessment. This was agreed with ERYC who were in attendance, while agreement from Hull City Council has been obtained through their Scoping Opinion response (see **Section 25.3**). As requested by the Planning Inspectorate in the Scoping Opinion, evidence was presented to the relevant consultation bodies to support the assertion that impacts NV-C-04, NV-O-02, NV-O-03 and NV-O-04 would not have likely significant effects and therefore do not require further assessment.

43. A full list of impacts scoped in / out of the noise and vibration assessment is summarised in **Volume 2, Appendix 6.2 Impacts Register**. A description of how the Impacts Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**.

Table 25-3 Noise and Vibration – Impacts Scoped into the Assessment

Impact ID	Impact and Project Activity	Rationale
Construction		
NV-C-01	Construction noise – onshore construction activities such as open cut trenching and OCS and ESBI construction	Construction activities will generate noise with the potential to disturb nearby NVSR.
NV-C-02	Construction vibration – onshore construction activities such as trenchless cable installation and use of vibratory rollers and compactors	Construction activities will emit vibration with the potential to disturb nearby NVSR.
NV-C-03	Construction road traffic noise – construction vehicles on the public highway	Increases in road traffic flows have the potential to increase noise levels and disturb nearby NVSR.
NV-C-04	Construction road traffic vibration – construction vehicles on the public highway	Evidence showing the absence of a likely significant effect has been provided in **Section 25.1**.
Operation and Maintenance		
NV-O-01	Operational noise – operational plant at the OCS and ESBI	Operational plant noise emissions have the potential to disturb nearby NVSR.
NV-O-02	Operational vibration – operational plant at the OCS and ESBI	Evidence showing the absence of a likely significant effect has been provided in **Section 25.1**.
NV-O-03	Operational road traffic noise – O&M vehicles on the public highway	Evidence showing the absence of a likely significant effect has been provided in **Section 25.1**.
NV-O-04	Operational road traffic vibration – O&M vehicles on the public highway	Evidence showing the absence of a likely significant effect has been provided in **Section 25.1**.
Decommissioning		
NV-D-01	Decommissioning noise – decommissioning activities not yet defined	Decommissioning impacts are scoped in; however, details of onshore decommissioning activities are not known at this stage. As discussed in **Section 25.7.3**, decommissioning impacts will be assessed in detail through the Onshore Decommissioning Plan (see **Table 25-4**, Commitment ID CO56) where relevant, which will be developed prior to the commencement of onshore decommissioning works. In this assessment, it is assumed that most decommissioning activities would be the reverse of their construction counterparts, and that their impacts would be of similar nature to, and no worse than, those identified during the construction phase.
NV-D-02	Decommissioning vibration – decommissioning activities not yet defined	
NV-D-03	Decommissioning road traffic noise – decommissioning activities not yet defined	
NV-D-04	Decommissioning road traffic vibration – decommissioning activities not yet defined	

25.4.3 Embedded Mitigation Measures

44. The Project has made several commitments to avoid, prevent, reduce or, if possible, offset potential adverse environmental effects through mitigation measures embedded into the evolution of the Project Design Envelope. These embedded mitigation measures include actions that will be undertaken to meet other existing legislative requirements and those considered to be standard or best practice to manage commonly occurring environmental effects.

45. The assessment of likely significant effects has therefore been undertaken on the assumption that these measures are adopted during the construction, O&M and decommissioning phases. **Table 25-4** identifies proposed embedded mitigation measures that are relevant to the noise and vibration assessment.

46. Full details of all commitments made by the Project are provided within the Commitments Register in **Volume 2, Appendix 6.3 Commitments Register**. A description of how the Commitments Register should be used alongside the PEIR chapter is provided in **Volume 2, Appendix 1.2 Guide to PEIR** and **Chapter 6 Environmental Impact Assessment Methodology**. In addition, a list of draft outline management plans which are submitted with the PEIR for consultation is provided in **Section 1.10** of **Chapter 1 Introduction.** These documents will be further refined and submitted along with the DCO application. See **Volume 2, Appendix 1.2 Guide to PEIR** for a list of all PEIR documents.

47. The Commitments Register is provided at PEIR stage to provide stakeholders with an early opportunity to review and comment on the proposed commitments. Proposed commitments may evolve during the pre-application phase as the EIA progresses and in response to refinements to the Project Design Envelope and stakeholder feedback. The final commitments will be confirmed in the Commitments Register submitted along with the DCO application.

Table 25-4 Embedded Mitigation Measures Relevant to Noise and Vibration

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Noise and Vibration Assessment	Relevance to Impact ID
CO39	A Code of Construction Practice (CoCP) will be provided in accordance with the Outline CoCP. The CoCP will enable effective planning, monitoring and management of onshore construction works to mitigate potential impacts on the environment and communities and ensure compliance with the latest relevant regulatory requirements and best practice.	DCO Requirement - Code of Construction Practice	Includes a requirement for the Principal Contractor(s) to produce a Construction Noise and Vibration Management Plan (CNVMP) to accompany the CoCP developed post-consent. The Outline CoCP will include embedded best practicable means to mitigate construction noise and vibration, which will form part of the site-specific CNVMP.	NV-C-01 NV-C-02
CO56	An Onshore Decommissioning Plan will be developed prior to commencement of onshore decommissioning works based on the relevant available guidance and legislative requirements. The scope and methodology of onshore decommissioning works and appropriate mitigation measures will be detailed in the plan.	DCO Requirement - Onshore Decommissioning Plan	Ensures that decommissioning noise and vibration emissions will be minimised in accordance with relevant available guidance and legislative requirements at the time.	NV-D-01 NV-D-02 NV-D-03 NV-D-04
CO69	Core working hours for onshore construction activities will be 07:00 to 19:00 Monday to Saturday. Outside of these hours, including Sunday and bank holidays, no construction activities will be undertaken apart from in the following circumstances: • Where extended and continuous periods (up to 24 hours a day, seven days a week) of working are required such as trenchless installation works, concrete pouring and cable pull-in and jointing operations; • Deliveries of abnormal indivisible loads that may otherwise cause congestions on the public highway network; • Testing and commissioning of installed onshore electrical infrastructure; • Daily start-ups and shut-downs, limited to site inspections, housekeeping, briefings, toolbox talks and safety checks; • Emergency works; and • Works as otherwise agreed in writing with the relevant local authority. Vehicle movements on the public highway network and employees' arrival and departure to/from site may occur outside of the core working hours.	DCO Requirement - Onshore Construction Hours	Minimises disturbance due to out of hours working when receptors may be more sensitive to noise.	NV-C-01 NV-C-02 NV-C-03 NV-C-04
CO71	The noise emissions from operation of the Onshore Converter Station (OCS) and Energy Storage and Balancing Infrastructure (ESBI) will not exceed limits at identified noise sensitive receptors, as specified in the DCO requirement. An operational noise investigation protocol will ensure that noise emissions from operation of the OCS and ESBI will not exceed limits at identified noise sensitive receptors.	DCO Requirement - Control of Operational Noise during Operational Stage	Ensures that OCS and ESBI noise emissions will be below the identified thresholds for significant effects. An operational noise assessment will be undertaken in the ES, and relevant noise sensitive receptors will be identified (see **Section 25.7.2.1**).	NV-O-01

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Noise and Vibration Assessment	Relevance to Impact ID
CO73	A Construction Traffic Management Plan (CTMP) will be developed in accordance with the Outline CTMP. The CTMP will include: • Measures to control, monitor and enforce the numbers and routeing of Heavy Goods Vehicle (HGV) movement during construction and include localised road improvements that are necessary to ensure the safe passage of HGV traffic via the public highway network; • Details on the location and design of construction and operational accesses, such as the frontage, general layout and visibility; • Detail on how construction employee traffic will be managed and measures to encourage sustainable alternative modes of travel including but not limited to single occupancy car trips during construction; • Measures to manage peak construction traffic flows and reduce the associated construction traffic noise and vehicle emissions; • Measures to ensure early and ongoing information provision to road users and emergency and healthcare services with regard to any temporary road or lane closures and diversions; and • Details on any site-specific additional mitigation measures required to avoid significant effects identified due to construction traffic.	DCO Requirement - Construction Traffic Management Plan	Minimises noise and vibration impacts due to increases in traffic on the public highway.	NV-C-03 NV-C-04
CO74	Highway condition surveys will be undertaken to determine reinstatement requirements for roads affected by the Project's construction. The timings, specification and scale of the survey for each road link will be agreed with the relevant highway authorities prior to implementation and will be proportional to the Project's impacts using recognised UK Pavement Management Systems. Any damage to roads on the public highway network as a result of Heavy Goods Vehicles (HGV) movements directly attributable to the Project's construction activities will be repaired to pre-construction conditions in agreement with the relevant highway authorities and in accordance with the Construction Traffic Management Plan (CTMP).	DCO Requirement - Construction Traffic Management Plan	Minimises noise and vibration impacts due to increases in traffic on the public highway.	NV-C-03 NV-C-04
CO75	Routeing of construction Heavy Goods Vehicles (HGV) and employee traffic will be directed to and managed at temporary construction compounds where possible to reduce vehicle movements on the public highway network. Onwards travel to the works site will be via the installed temporary haul roads to reduce the number of access points required and construction vehicle movements along the public highway network.	DCO Requirement - Construction Traffic Management Plan	Minimises noise and vibration impacts due to increases in traffic on the public highway.	NV-C-03 NV-C-04
CO76	Temporary construction compounds will utilise the most suitable roads as access points and be located close to main A roads and away from population centres where practicable to minimise impacts on local communities.	DCO Requirement - Construction Traffic Management Plan DCO Requirement - Code of Construction Practice	Minimises noise and vibration impacts on nearby NVSR due to construction and ongoing activities at the temporary construction compounds and from construction traffic access / egress from the compounds.	NV-C-01 NV-C-02 NV-C-03 NV-C-04

Commitment ID	Proposed Embedded Mitigation	How the Embedded Mitigation Will be Secured	Relevance to Noise and Vibration Assessment	Relevance to Impact ID
CO80	A Communications Plan will be provided as part of the Code of Construction Practice (CoCP). The Communications Plan will be developed in accordance with the Outline CoCP and will outline how the relevant stakeholders, such as local authorities, residents, businesses and emergency services, will be notified in advance of construction works and kept informed during construction. The Communications Plan will also include measures to ensure effective and open communication and set out appropriate grievance mechanisms.	DCO Requirement - Code of Construction Practice	Ensures that nearby residents will be kept informed of the works, what is being done to minimise disturbance and how they can raise complaints. This will increase the likelihood that they will be able to tolerate periods of high construction noise and / or vibration.	NV-C-01 NV-C-02 NV-C-03 NV-C-04
CO102	A Port Access Management Plan(s) (PAMP) will be developed once the preferred offshore construction base port(s) and O&M base port for the Project have been confirmed and agreed with the relevant authorities prior to commencement of construction and operation respectively. The PAMP will be developed if the traffic generated for the construction and operation of the selected base port is outwith the existing baseline of traffic movements at the existing port facility or existing permitted developments should a new facility or extension be required. The PAMP will provide an assessment of the traffic movements due to the port(s) operations for offshore construction and O&M activities and the associated noise and air quality effects, and if required, detail mitigation measures to avoid significant effects.	DCO Requirement - Port Access Management Plan	If required, the PAMP would assess the potential noise effects as a result of additional traffic movements associated with operations at the offshore construction base port(s) and O&M base port.	NV-C-03 NV-C-04 NV-O-03 NV-O-04

48. A draft version of the **Outline Code of Construction Practice** (document reference 8.9) has been prepared for the PEIR for consultation and will be further refined and submitted with the DCO application. The Outline CoCP includes embedded best practicable means to mitigate construction noise and vibration, which will inform the site-specific CNVMP to be developed post-consent by the Principal Contractor(s) as part of the CoCP. Indicative embedded mitigation measures relevant to noise and vibration which are included in the Outline CoCP are set out in **Table 25-5**.

Table 25-5 Indicative Embedded Mitigation Measures Included in the Outline Code of Construction Practice

Outline CoCP: Embedded Mitigation Measures for Construction Noise and Vibration

Construction Nosie and Vibration Management Plan (CNVMP) (to be developed post-consent)
 	
A CNVMP for the specific stage of construction works will be included in the CoCP. The CNVMP will contain embedded best practicable means for controlling construction noise and vibration levels during the onshore construction works, including site-specific mitigation and monitoring measures where required. Where monitoring is required in the CNVMP, this will include details of the monitoring locations in relation to sensitive receptors, duration of monitoring and the frequency of reporting.
 	
The CNVMP will include a noise and / or vibration assessment based on the construction programme and list of plant and equipment for the specific works confirmed by the Principal Contractor(s). Where any exceedance of noise and / or vibration threshold(s) of significance is identified post-consent, appropriate mitigation measures will be implemented to ensure residual effects are no worse than those assessed in the EIA.
 	
Onshore construction works will be undertaken in accordance with best practicable means (as defined in Section 72 of the Control of Pollution Act 1974), regulatory requirements with respect to the control of construction noise and vibration and best practice recommendations in *BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise and Part 2: Vibration* or the latest available guidance.
 	
Best practicable means to be adopted by the Principal Contractor(s) include but are not limited to the following:
 	
• All onshore construction works will adhere to the core working hours or alternative agreed working hours for other activities such as continuous and emergency activities;
• Where practicable, locating temporary plant and equipment so that it is screened from receptors by on-site structures such as site cabins;
• Locating construction accesses as far away from sensitive receptors as practicable to manage noise from construction traffic movements;
• Locating or operating high vibration-generating / noisy plant and equipment as far away from sensitive receptors as practicable;
• Specifying modern, quiet plant and equipment for the works during procurement stage;
• Ensuring that plant and equipment are properly maintained and operated by trained staff;
• Ensuring that there are no loose body fittings or exhausts on mobile plant and equipment to avoid rattling and vibration;
• Applying temporary screening and / or enclosures to particularly noisy plant and equipment where practicable;
• Avoiding unnecessary revving of engines;
• Designing construction site layout to avoid or minimise reversing of vehicles where practicable;
• Vehicles should be fitted low noise reversing warnings where practicable;
• Reporting any defective plant and equipment as soon as practicable so that they can be taken out of use pending corrective maintenance or replacement;
• Ensuring plant and equipment are turned off when not in use;
• Establishing a community engagement process through the Communications Plan, including informing local residents, businesses and emergency services about the construction works, detailing the timing and duration of any particularly noisy activities, and providing a contact telephone number for complaints and enquiries;
• Planning the construction programme to minimise adverse effects where practicable by:
  o Interspersing noisy works between quieter works to provide periods of respite;
  o Sequencing works so that vibration-causing activities do not occur simultaneously;
  o Sequencing works to ensure that the noisiest / most vibration-generating operations are performed during the least sensitive times;
  o Minimising the duration of works wherever practicable. However, if higher noise levels may result in a significant reduction in the overall duration of the works, this should be considered;
• Choosing alternative construction methods wherever practicable with lower noise / vibration impacts; and
• Isolating vibration-generating plant and equipment on resilient mounts.
 	
Where core working hours would need to be extended for continuous activities, alternative working hours will be agreed with ERYC prior to commencement of the relevant works. A Section 61 consent (under the Control of Pollution Act 1974) would be obtained from ERYC as required.

25.4.4 Realistic Worst-Case Scenarios

49. To provide a precautionary, but robust, assessment at this stage of the Project's development process, a realistic worst-case scenario has been defined in **Table 25-6** for each impact scoped into the noise and vibration assessment (as outlined in **Section 25.4.2**). The realistic worst-case scenarios are derived from the range of parameters included in the Project Design Envelope. They ensure that the assessment of likely significant effects is based on the maximum potential impact on the environment. Should an alternative development scenario be taken forward in the final design of the Project, the resulting effects would not be greater in effect significance. Further details on the Project Design Envelope approach are provided in **Chapter 6 Environmental Impact Assessment Methodology**.

Table 25-6 Realistic Worst-Case Scenarios for Noise and Vibration Impacts

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Construction			
NV-C-01	Construction noise – onshore construction activities such as open cut trenching and OCS and ESBI construction	Core working hours for onshore construction activities will be 07:00 to 19:00 Monday to Saturday. Outside of these hours, including Sunday and bank holidays, no construction activities will be undertaken apart from in the circumstances outlined in Commitment ID CO69 (see **Table 25-5**). Vehicle movements on the public highway network and employees' arrival and departure to/from site may occur outside of the core working hours. **Landfall** • Maximum horizontal length of trenchless installation: 2,000m • Maximum number of landfall cable ducts: 3 (including 1 spare) • Maximum number of landfall construction compound: 1 • Indicative temporary landfall construction compound area: 12,500m^2 (including footprint of TJB and underground link box) • Maximum number of transition joint bay (TJB) at landfall: 1 • Maximum number of underground link box at landfall: 1 • Indicative haul road width at landfall: 7m • Anticipated duration of landfall construction works: approximately 3 years (including 1 year of trenchless installation works) **Onshore ECC** • Indicative temporary construction corridor width for High Voltage Direct Current (HVDC) export cables: 32m (50m at trenchless crossing locations) • Indicative temporary construction corridor width for High Voltage Alternating Current (HVAC) export cables: 55m (60m at trenchless crossing locations) • Indicative haul road width within temporary construction corridor: 6m (8.5 where passing places are required) • Maximum length of HVDC export cable corridor: 50km (from landfall to OCS zone) • Maximum length of HVAC export cable corridor: 5km (from OCS zone to Birkhill Wood Substation) • Maximum number of trenches of HVDC onshore export cables: 2 • Maximum number of trenches of HVAC onshore export cables: 4 • Target minimum cable burial depth using open cut trenching: 1.2m • Target minimum cable burial depth using trenchless installation techniques: 3.5m • Target maximum cable burial depth using trenchless installation techniques: 20m • Maximum land area temporarily disturbed during construction: 1,700,000m^2 • Indicative number of jointing bay locations along onshore ECC: 62 • Indicative number of link box locations along onshore ECC: 56	The significance of a construction noise or vibration effect depends on the noise level and duration of exposure. Consideration is given to both the spatial impacts (proximity to receptors) and temporal (duration) aspect of each of the activities. Noise emissions from the works are primarily a function of the type and number of plant required, as detailed in **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment**. The construction noise and vibration predictions have been based on an indicative construction programme produced by the Applicant based on available design information, which uses a number of these physical parameters to derive the works durations. This construction programme has been used to identify the potential for construction activities to result in simultaneous or consecutive noise impacts at NVSR. It has also been used to identify activities with a duration at any one location shorter than ten days in 15 or 40-days in six-months, which have been excluded from the assessment as they cannot result in a significant effect, as explained in **Section 25.5.3.3**.
NV-C-02	Construction vibration – onshore construction activities such as trenchless cable installation and use of vibratory rollers and compactors		

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
		• Maximum jointing bay and link box temporary construction area for HVDC export cables: 660m^2 (per location) • Maximum jointing bay and link box temporary construction area for HVDC export cables: 1,040m^2 (per location) • Indicative number of main construction compounds for onshore export cable works: 4 • Indicative number of intermediate construction compounds for onshore export cable works: 8 • Indicative number of trenchless crossing locations: 70 • Indicative main construction compound area: 20,000m^2 (per compound) • Indicative intermediate construction compound area: 5,625m^2 (per compound) • Indicative trenchless installation compound area for HVDC export cables: 300m^2 (5,625m^2 for non-HDD techniques) (per compound) • Indicative trenchless installation compound area for HVAC export cables: 800m^2 (5,625m^2 for non-HDD techniques) (per compound) • Trenchless installation techniques considered in the Project Design Envelope include: HDD, auger boring, micro-tunnelling, pipe jacking / ramming and Direct Pipe. • Anticipated duration of onshore export cable construction works: approximately 4 years **OCS and ESBI (OCS Zone)** • Indicative access road width (including site access road from the public highway and internal tracks within the site): 7.3m • Maximum developable area for OCS and ESBI: 25ha (including but not limited to platform footprint, landscaping, access, drainage and attenuation but exclude areas for ecological mitigation / enhancement) • Total permanent area: 20.5ha (including but not limited to platform footprint, landscaping, access, drainage and attenuation but exclude areas for ecological mitigation / enhancement) • Total temporary area: 4.5ha (including 2 temporary construction compounds for the OCS and ESBI) • Anticipated duration of OCS and ESBI construction works: approximately 5 years	
NV-C-03	Construction road traffic noise – construction vehicles on the public highway	Earliest onshore construction commencement year is 2029. The realistic worst-case scenario upon which these flows have been derived is set out in **Chapter 26 Traffic and Transport** and presented in **Volume 2, Appendix 25.4 Construction Traffic Noise Assessment**.	The impact of construction road traffic is dependent on the change in traffic flows due to the Project's construction. The baseline data are provided based on the first year of construction (assumed to be at the earliest 2029). It is anticipated that later years would have higher baseline traffic flows so the calculated change in flows due to the Project is maximised by assuming the earliest possible construction year.
NV-C-04	Construction road traffic vibration – construction vehicles on the public highway	As discussed in **Section 25.7.1.4**, this impact is not assessed in detail, but evidence to demonstrate the absence of likely significant effect has been provided.	

Impact ID	Impact and Project Activity	Realistic Worst-Case Scenario	Rationale
Operation and Maintenance			
NV-O-01	Operational noise – operational plant at the OCS and ESBI	OCS and ESBI plant assumed to be located at either OCS Zone 4 or Zone 8. Operational noise emissions depend on the number and type of plant proposed at the OCS and ESBI. Assessment of operational noise within the OCS zone will be undertaken in the ES when sufficient design information is known (as discussed in **Section 25.7.2.1**). Assessment of this impact will be determined by plant noise emission magnitude of impact criteria based on measured baseline *background sound levels* and BS4142:2014+A1:2019 guidance.	
NV-O-02	Operational vibration – operational plant at the OCS and ESBI	As discussed in **Sections 25.7.2.2** and **25.7.2.3**, these impacts are not assessed in detail, but evidence to demonstrate the absence of likely significant effect has been provided.	
NV-O-03	Operational road traffic noise – O&M vehicles on the public highway		
NV-O-04	Operational road traffic vibration – O&M vehicles on the public highway		
Decommissioning			
NV-D-01	Decommissioning noise – decommissioning activities not yet defined	The final decommissioning strategy of the Project's onshore infrastructure has not yet been decided. For a description of potential onshore decommissioning works, refer to **Chapter 4 Project Description**. It is recognised that regulatory requirements and industry best practice change over time. Therefore, the details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning. Specific arrangements will be detailed in an Onshore Decommissioning Plan (see **Table 25-4**, Commitment ID CO56), which will be submitted and agreed with the relevant authorities prior to the commencement of onshore decommissioning works. For this assessment, it is assumed that decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within the temporary construction working areas and require no greater amount or duration of activity than assessed for construction). The decommissioning sequence will generally be the reverse of the construction sequence. It is therefore assumed that decommissioning impacts would likely be of similar nature to, and no worse than, those identified during the construction phase.	
NV-D-02	Decommissioning vibration – decommissioning activities not yet defined		
NV-D-03	Decommissioning road traffic noise – decommissioning activities not yet defined		
NV-D-04	Decommissioning road traffic vibration – decommissioning activities not yet defined		

50. Following the PEIR publication, further design refinements will be made based on ongoing engineering studies and considerations of the EIA and stakeholder feedback. Therefore, realistic worst-case scenarios presented in the PEIR may be updated in the ES. The Project Design Envelope will be refined where possible to retain design flexibility only where it is needed.

25.4.5 Development Scenarios

51. Consideration is also given to the different development scenarios with respect to the OCS zones. At this stage, two OCS zone options remain in the Project Design Envelope (see **Chapter 4 Project Description** for further details) noting that only one option will be developed. The two development scenarios are:

- Infrastructure located in OCS Zone 4; or
- Infrastructure located in OCS Zone 8.

52. With respect to the noise and vibration assessment, there is potential for the assessment of likely significant effects for the OCS zone infrastructure to differ between the two development scenarios. Where relevant, the assessment outcomes presented in **Section 25.6** are reported separately. Where realistic worst-case scenarios are likely to differ, these have also been set out separately in **Table 25-6**.

53. In general, OCS Zone 4 and the northern corridor section of the onshore ECC are located closer to and in the vicinity of, more NVSR, and are therefore considered an overall realistic worst-case scenario. However, the worst-case impact at each NVSR is associated with their location within the Onshore Development Area and to the closest construction works (e.g. NVSR SS6 is closest to OCS Zone 4, and therefore, worst-case impacts to the receptor are only considered from Zone 4). Hence, separate impacts on each NVSR are not reported for each OCS zone instead, the predicted noise level at each NVSR is from the construction works associated with the worst-case between the two potential OCS zones, including the associated optionality in the onshore ECC routeing.

25.5 Assessment Methodology

25.5.1 Guidance Documents

54. The following guidance documents have been used to inform the baseline characterisation, assessment methodology and mitigation design for noise and vibration.

25.5.1.1 National Planning Practice Guidance (2019)

55. The National PPG (July 2019) states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or making decisions about new development, there may also be opportunities to consider improvements to the acoustic environment. No material changes were made to the 2024 NPPF for noise and no update to the PPG is expected.

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

56. This standard describes a method for rating and assessing sound of an industrial and / or commercial nature. This method uses a *rating level* to assess the likely effects from sound of an industrial or commercial nature on people who might be inside or outside a dwelling or premises used for residential purposes upon which the sound is incident.

25.5.1.3 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise

57. Part 1 of BS 5228 provides recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities / operations generate significant noise and / or vibration levels. It also provides guidance on methods of predicting and measuring noise and assessing its impact on those exposed to it.

25.5.1.4 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration

58. Part 2 of BS 5228 gives recommendations for basic methods of vibration control on construction and open sites where work activities generate significant vibration levels. It also provides guidance on predicting and assessing vibration levels from construction and a database of measured vibration levels during piling activities.

25.5.1.5 BS 7385-2: 1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Groundborne Vibration

59. This standard provides guidance regarding the potential for vibration to result in building damage, including basic principles for carrying out vibration measurements and processing the data. It includes guide values for transient and continuous vibration, above which there is a likelihood of cosmetic damage.

25.5.1.6 BS 7445:2003 Part 1 and BS 7445:1991 Part 2 – Description and Measurement of Environmental Noise

60. These standards provide details of the instrumentation and measurement techniques to be used when assessing environmental noise and defines the basic noise quantity as the continuous A-weighted sound pressure level (L_{Aeq}). Part 2 of BS 7445 replicates International Standards Organisation (ISO) 1996-2.

25.5.1.7 BS 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings

61. This standard provides a methodology to calculate the noise levels entering a building through facades and facade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations and are based on World Health Organisation (WHO) recommendations.

25.5.1.8 Department of Transport's Calculation of Road Traffic Noise (1988)

62. This standard provides a method for calculating noise levels from the Annual Average Weekday Traffic (AAWT) flows and from measured noise levels. Since publication in 1988 this document has been the accepted standard for predicting noise levels from road traffic in the UK. The calculation methods take account of variables including percentage of heavy goods vehicles (HGV), road surfacing, gradient, screening by barriers and relative height of source and receiver.

25.5.1.9 Design Manual for Roads and Bridges LA 111 Noise and Vibration, Revision 2 (2020)

63. LA111 Noise and Vibration provides detailed methodologies for the assessment of construction and operational noise and vibration impacts from major road schemes. It provides guideline significance criteria in terms of both absolute noise and vibration levels (LOAEL and SOAEL for use in relation to the NPSE) and the change in noise levels due to a scheme.

25.5.1.10 World Health Organisation's Guidelines for Community Noise (1999)

64. These guidelines present health-based noise limits intended to protect the population from exposure to excess noise. They present guideline limit values at which the likelihood of particular effects, such as sleep disturbance or annoyance, may increase. The guideline external noise level values are 50 or 55dB L_{Aeq} during the day, related to annoyance, and 45dB L_{Aeq} or 60dB L_{Amax} at night, related to sleep disturbance.

65. In Section 4 'Guideline Values', these guidelines state:

"The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending on the nature of the source."

25.5.1.11 World Health Organisation's Night Noise Guidelines for Europe (2009)

66. These guidelines provide an extension to the WHO Guidelines for Community Noise (1999). Based on evidential review, in Section 5.6 'Recommendations for Health Protection', they conclude that:

"*Below the level of 30dB $L_{night,outside}$, no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise. There is no sufficient evidence that the biological effects observed at the level below 40dB $L_{night,outside}$ are harmful to health. However, adverse health effects are observed at the level above 40dB $L_{night,outside}$.*

Therefore, 40dB $L_{night,outside}$ is equivalent to the LOAEL for night noise."

67. Additionally, the Abstract to the guidelines states:

"Considering the scientific evidence on the thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002148/EC), an $L_{night,outside}$ of 40dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly. $L_{night,outside}$ value of 55dB is recommended as an interim target for those countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach."

25.5.1.12 World Health Organisation's Environmental Noise Guidelines for the European Region (2018)

68. The Abstract to this guidance state:

"The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway and aircraft) noise, wind turbine noise and leisure noise. They provide robust public health advice underpinned by evidence, which is essential to drive policy action that will protect communities from the adverse effects of noise."

69. These guidelines have not been adopted in any UK policy to date. Paragraph 2.4.3 states

"*The GDG [Guideline Development Group] agreed to set guideline exposure levels based on the definition: 'noise exposure levels above which the GDG is confident that there is an increased risk of adverse health effects. … The guideline exposure levels presented are therefore not meant to identify effect thresholds (the lowest observed adverse effect levels for different health outcomes). This is a difference in approach from prior WHO guidelines, like the NNG for Europe (WHO Regional Office for Europe, 2009), which explicitly aimed to define levels indicating no adverse health effects.*"

70. It follows that the guideline exposure levels do not constitute LOAEL or SOAEL as defined in the NPSE.

25.5.1.13 Institute of Environmental Management & Assessment's Guidelines for Environmental Noise Impact Assessment (2014)

71. The Institute of Environmental Management & Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment' (IEMA, 2014) provide guidance on how to undertake a noise impact assessment, with particular focus on the context of an EIA. They describe the process of scoping, defining a baseline, prediction of noise level changes and determination of the significance of the effect. They aim to apply to all types of proposed development.

25.5.2 Data and Information Sources

25.5.2.1 Desk Study

72. A desk study has been undertaken to compile baseline information in the previously defined Study Areas (see **Section 25.4.1)** using the sources of information set out in **Table 25-7**.

Table 25-7 Desk-Based Sources for Noise and Vibration Data

Data Source	Spatial Coverage	Year(s)	Summary of Data Contents
Google Maps aerial photography	Noise and Vibration Study Areas	2024	Location of noise sources and NVSR within the Noise and Vibration Study Areas
Environment Agency Lidar topographical data	Noise and Vibration Study Areas	2022	Topographical data
Local Authority Local Plans	Noise and Vibration Study Areas	2016	Local policy relevant to noise and vibration and any areas designated for development which could introduce new NVSR
Ordnance Survey mapping	Noise and Vibration Study Areas	2022	Ordnance Survey data, including locations of NVSR

25.5.2.2 Site-Specific Surveys

73. In addition to desk-based sources, and to provide site-specific and up to date information on which to base the impact assessment, a baseline sound survey was conducted during 2024. Survey locations were chosen in order to establish baseline sound levels at NVSR near the landfall, main temporary construction compounds along the onshore ECC and the OCS zones. **Table 25-8** summarises surveys that have been completed, and survey data that has been obtained to inform the noise and vibration baseline characterisation in the PEIR.

Table 25-8 Site-Specific Survey Data for Noise and Vibration

Survey	Spatial Coverage	Year(s)	Summary of Survey Data
Baseline sound survey	NVSR in the Construction Noise Study Area which are closest to the landfall, main temporary construction compounds along the onshore ECC and the OCS zones. NVSR in the Operational Noise Study Area which are closest to the OCS zones.	2024	Site-specific baseline noise level data at receptors relevant to the Project's noise and vibration assessment.

Survey	Spatial Coverage	Year(s)	Summary of Survey Data
Dogger Bank South Offshore Wind Farms' baseline sound surveys	Noise and Vibration Study Areas	2022 and 2023	Site-specific baseline noise level data at receptors relevant to the Project's noise and vibration assessment. Data was obtained from publicly available PEIR / ES documents and unpublished data provided by Dogger Bank South through engagement and coordination with the Applicant.

74. The baseline sound survey methodology has been consulted on and agreed with ERYC at the second meeting of ETG11 held on the 27th August 2024 (see **Section 25.3**).

75. The surveys and their results are reported in full in **Volume 2, Appendix 25.2 Noise and Vibration Baseline Report**.

25.5.3 Impact Assessment Methodology

76. **Chapter 6 Environmental Impact Assessment Methodology** sets out the overarching approach to the impact assessment methodology. The topic-specific methodology for the noise and vibration assessment is described further in this section.

25.5.3.1 Impact Assessment Criteria

77. For each potential impact, the assessment identifies receptors within the Study Area(s) which are sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts (i.e. magnitude) on given receptors.

78. In general, the potential impacts of noise and vibration in the scope of this assessment can be classified as disturbance to humans and, in the case of vibration, damage to structures.

25.5.3.2 Receptor Sensitivity

79. In accordance with the IEMA's Guidelines for Environmental Noise Impact Assessment (2014), the sensitivity of receptors to disturbance as a result of noise and vibration effects has been classified. This classification is based on the receptor function, using experience on other projects and professional judgement, as defined in **Table 25-9**.

Table 25-9 Definition of Different Noise and Vibration Sensitive Receptor Types and Sensitivity Levels

Sensitivity	Definition	Definitions and Classification Type
High	Receptors where noise or vibration level changes may significantly affect their usage.	Certain hospital wards (e.g. operating theatres or high dependency units), auditoria, laboratories with highly vibration sensitive equipment or buildings which are structurally unsound or identified as requiring special protection by cultural specialists (e.g. some historical / listed buildings or scheduled monuments).
Medium	Receptors where noise and / or vibration level changes may cause disturbance, protection is required but some tolerance is expected.	Residential accommodation, private gardens, hospital wards, care homes, schools, universities, research facilities and national parks (during the day).
Low	Receptors where noise and / or vibration level changes may cause some distraction or disturbance.	Offices, shops (including cafes), outdoor amenity areas during the day (including recreation, public amenity space / play areas), temporary holiday accommodation, long distance footpaths (including Public Rights of Way (PRoW), dog walking routes, bird watching areas, footpaths and other walking routes, visitor attractions, cycling routes including rural roads), doctor's surgeries, sports facilities and places of worship.
Negligible	Receptors where noise and / or vibration level changes are not expected to be detrimental.	Warehouses, light industry, car parks, and agricultural land.

80. In the case of sensitivity to vibration damage, classification by sensitivity is not considered appropriate or necessary. BS 7385-2, Section 5 'Factors to be considered in building response' states that this depends on "*the type of foundation, underlying ground conditions, the building construction and the state of repair of the building*". In Section 7.5.2 'Important buildings', the standard states that "*Important buildings which are difficult to repair may require special consideration on a case-by-case basis. A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.*" The adopted magnitude of impact criteria is discussed in **Section 25.5.3.3.2** to account for building type.

25.5.3.3 Impact Magnitude

81. The Planning Inspectorate requested in their Scoping Opinion (see **Section 25.3**) that, for a number of impacts, evidence is presented demonstrating the absence of a likely significant effect, and agreement is sought through technical consultation with the relevant authorities. Hence, the magnitude criteria for these impacts are not presented. The evidence demonstrating the absence of a likely significant effect is presented in **Section 25.7.1.4** (construction road traffic vibration (NV-C-04)), **Section 25.7.2.2** (operational vibration (NV-O-02)) and **Section 25.7.2.3** (operational road traffic noise and vibration (NV-O-03 and NV-O-04)).

25.5.3.3.1 Construction Noise

82. Annex E of BS 5228-1 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. Impacts on residential receptors have been determined with reference to the 'ABC' method. This approach is based on setting the threshold for the onset of potentially significant adverse effects depending on the existing ambient noise level. Receptors with low existing ambient noise levels (Category A) have a lower threshold than those with high existing ambient noise levels (Category C). Higher thresholds are set for normal daytime construction working hours, compared to the more sensitive evening / weekend and night-time periods. This is shown in **Table 25-10** which duplicates Table E.1 in BS 5228-1.

Table 25-10 Construction Noise Threshold Values Based on the ABC Method

Assessment Category and Threshold Value Period ($L_{Aeq,T}$)	Threshold Value $L_{Aeq,T}$ (dB) (Façade)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23.00 – 07.00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 – 13.00)	65	70	75

NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3dB due to site noise.

NOTE 3 Applied to residential receptors only.

[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

[B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

[C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

[D] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

83. The magnitude of the construction noise impact is based on the difference between the predicted construction noise level and the LOAEL and SOAEL values, adapted from the criteria in Table 3.16 of the DMRB LA111 (2020), as shown in **Table 25-11**.

Table 25-11 Magnitude Criteria for Construction Noise Impacts

Magnitude of Impact	Construction Noise Level (dB, $L_{Aeq,T}$)			NPSE/PPG Category
	Daytime	Evenings and Weekends	Night-Time	
Negligible	≤65	≤55	≤45	-
Low	>65 to ≤68	>55 to ≤58	>45 to ≤48	Lower end of range is equivalent to LOAEL
Medium	>68 to ≤70	>58 to ≤60	>48 to ≤50	Lower end of range is equivalent to SOAEL
High	>70	>60	>50	-

84. Given the length of the onshore ECC, it is not practical or proportionate to measure baseline sound levels at receptors along the entire corridor potentially affected by construction noise. In the absence of these baseline noise data, the existing noise levels at residential receptors have been assumed to be low, so the Category A threshold values presented in **Table 25-10** are deemed applicable. This is the industry-standard approach for the assessment of construction noise impacts from linear schemes, which considers the worst-case possible impacts and has been agreed with stakeholders through the second meeting of ETG11 held on the 27th August 2024 (see **Section 25.3**). The criteria presented in **Table 25-11** are therefore relative to the Category A threshold values, i.e. an exceedance of the threshold value by up to 3dB is a low impact etc.

85. Section E.3.2 of BS 5228-1 states that: "*If the site noise level exceeds the appropriate category value [Threshold Value], then a potential significant effect is indicated. The assessor then needs to consider other Project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect*." The following demonstrates how these other factors have been considered to determine the effect significance:

- The predicted construction noise level and change in noise level during the works at the receptor. Where baseline data are available which indicate the receptor is in Category B or C during a specific time period, the difference between the predicted noise level and threshold value has been used in accordance with the criteria in **Table 25-11**;
- The duration of the impact. Construction noise impacts which last less than ten days in 15 consecutive days or 40-days in six months would not normally be considered significant, to accord with the criteria for determining eligibility for insulation upgrades and temporary rehousing in BS 5228-1;
- The timing of the impact. Night time impacts being more likely to be considered significant than daytime impacts;
- The location of the impact at the NVSR. For example, a receptor may contain areas which are more or less sensitive than others, such as in a school, office spaces or kitchens would be considered less sensitive than classrooms; and
- The nature, times of use and design of the receptor. For example, a NVSR which is not used at night would not be considered sensitive to night-time construction works.

86. Noise levels for the construction phase have been calculated using the methods and guidance in BS 5228-1. The standard provides methods for predicting receptor noise levels from construction works based on the number and type of construction plant and activities operating on site, with corrections to account for:

- The 'on-time' of the plant, as a percentage of the assessment period;
- Distance from source to receptor;
- Acoustic screening by barriers, buildings or topography; and
- Ground type.

87. The predictions undertaken are indicative only, as they are based on a preliminary understanding of the likely construction programme, activities and plant to be used. This information may change post-consent once a Principal Contractor(s) is appointed.

88. The DMRB LA111 (2020) states that "*A study area of 300m from the closest construction activity is normally sufficient to encompass noise sensitive receptors"*. On this basis, and as agreed with stakeholders through the second ETG11 meeting (**Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration**), the assessment of construction noise impacts extends to NVSR which are no further than 300m from the Onshore Development Area.

25.5.3.3.2 Construction Vibration

89. Ground-borne vibration can result from construction works and may lead to perceptible levels of vibration at nearby receptors which, at higher levels, can cause annoyance to residents. In extreme cases, cosmetic or structural building damage can occur, but only at extremely high vibration levels and such cases are rare.

90. Typically, perceptible ground-borne vibration is only emitted by 'heavy' construction works such as piling, deep excavation, or dynamic ground compaction.

91. The response of a building to ground-borne vibration is affected by the type of foundation, ground conditions, the building construction and the condition of the building. BS 7385-2 provides guide values for transient vibration in terms of peak particle velocity (PPV) which are "*judged to give a minimal risk… of vibration-induced damage*" and is referenced in BS 5228-2, as shown in **Table 25-12**. BS 5228-2 states that for continuous vibration (such as that induced by vibratory compaction), the thresholds might need to be reduced by up to 50%.

Table 25-12 Transient Vibration Guide Values at the Building Foundation for Cosmetic Damage

Type of Building	**Peak Component Particle Velocity in Frequency Range of Predominant Pulse**	
	4Hz to 15Hz	**15Hz and Above**
Reinforced or framed structures Industrial and heavy commercial buildings	$50mms^{-1}$	$50mms^{-1}$
Un-reinforced or light framed structures Residential or light commercial type buildings	$15mm.s^{-1}$ at 4Hz increasing to $20mm.s^{-1}$ at 15Hz	20mm.s-1 at 15Hz increasing to $50mm.s^{-1}$ at 40Hz and above

Note 1: Values referred to are at the base of the building.

Note 2: For unreinforced or light framed structures and residential or light commercial buildings, a maximum displacement of 0.6mm (zero to peak) is not to be exceeded.

92. BS 7385-2 states that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration twice that of minor damage. The values in **Table 25-12** refer to the likelihood of cosmetic damage. ISO 4866:2010 Mechanical Vibration and Shock – Vibration of Fixed Structures – Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Structures (ISO, 2010) defines three different categories of building damage:

- Cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick / concrete block constructions;
- Minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick / block; and
- Major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.

93. These standards can be used to define the potential impact as identified in **Table 25-13** for continuous vibration for unreinforced or light framed structures and residential or light commercial buildings. Using the below criteria, reinforced or framed structures, industrial and heavy commercial buildings would be classified as of 'low' sensitivity to vibration damage. Unreinforced or light framed structures and residential or light commercial buildings are classified as of medium sensitivity to structural vibration damage.

Table 25-13 Construction Vibration Criteria for Assessing Building Damage

Damage Risk	Impact Magnitude	Continuous Vibration Level (PPV,mm.s^{-1}) at the Building Foundation		
		Frequency of 4Hz	Frequency of 15Hz	Frequency of 40Hz and Greater
Negligible	**Negligible**	<6	<10	<25
Cosmetic	**Low**	6 to <15	10 to <20	25 to <50
Minor	**Medium**	15 to <30	20 to <40	50 to <100
Major	**High**	≥30	≥40	≥100

94. The vibration level and effects presented in **Table 25-14** are taken from Table B-1 of BS 5228-2. These levels and effects are based on human perception of vibration in residential environments.

Table 25-14 Construction Vibration Criteria for Assessing Human Perception in Buildings

Vibration Limit PPV (mm.s^{-1})	Interpreted Significance to Humans	Magnitude of Impact	NPSE/PPG Category
<0.14	Vibration unlikely to be perceptible	**Negligible**	NOEL
0.14 to 0.3	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction		LOAEL
0.3 to 1.0	Vibration might just be perceptible in residential environments	**Low**	
1.0 to <10.0	It is likely that vibration at this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents	**Medium**	SOAEL
>10.0	Vibration is likely to be intolerable for any more than a brief exposure to this level	**High**	

95. Where predicted construction vibration levels at receptors exceed a value of 1mm.s^{-1} there is the potential for a significant effect. However, the same additional project-specific factors which can influence the construction noise effect significance (as discussed in **Section 25.5.3.3**) are considered relevant to vibration impacts. Hence, the same process for considering these other factors should be used to determine the vibration effect significance.

96. Annex E of BS 5228-2 contains empirical formulae derived by Hiller and Crabb (2000) from field measurements relating to resultant PPV, with several other parameters for vibratory compaction, dynamic compaction, percussive and vibratory piling, the vibration of stone columns and tunnel boring operations. Use of these empirical formulae enables resultant PPV to be predicted, and for some activities (vibratory compaction, vibratory piling and vibrated stone columns), they provide an indicator of the probability of these levels of PPV being exceeded.

97. Consequently, calculations following these methodologies were carried out for the anticipated construction activities with the potential to result in perceptible vibration at receptors. Reasonable worst-case assumptions were applied regarding ground conditions and energy levels to determine set-back distances at which critical vibration levels may occur, as detailed in **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment**.

98. The DMRB LA111 (2020) states that "*A study area of 100m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors"*. On this basis, and as agreed in consultation with stakeholders through the second ETG11 meeting (see **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration**), the assessment of vibration impacts only extends to NVSR which are no further than 100m from the Onshore Development Area. The closest identified NVSR to the landfall and OCS zones are further than 100m away. Hence, assessment of vibration impacts due to construction of the landfall, OCS and ESBI has been excluded from the assessment scope.

25.5.3.3.3 Construction Road Traffic Noise

99. Construction traffic noise impacts along existing roads have been estimated based on the Calculation of Road Traffic Noise (CRTN) methodology for the calculation of the Basic Noise Level (BNL) at a reference distance of 10m from the nearside carriageway. Calculations have been undertaken for both the 'with' and 'without' construction traffic scenarios for the peak construction year, for each road link in the construction traffic model.

100. To undertake the BNL calculations, details of the Traffic and Transport Study Area for the construction traffic assessment were provided by traffic EIA specialists, along with AAWT 18-hour flows, % HGV and speed data for each road link, as detailed in **Chapter 26 Traffic and Transport** and **Volume 2, Appendix 25.4 Construction Traffic Noise Assessment**. Where traffic flows are within the validated range of CRTN (i.e. at least 1,000 vehicles per 18 hours), these data have been used to undertake the BNL calculations.

101. In order to determine impacts, the assessment of construction traffic noise compares the calculated BNL with and without the construction traffic. Any changes in day or night-time noise levels due to a corresponding change in volume and composition have been assessed using the impact magnitude criteria detailed in **Table 25-15**, which is reproduced from Table 3.17 of the DMRB LA111 (2020).

Table 25-15 Magnitude Criteria for Relative Change due to Construction Road Traffic

Magnitude of Impact	Increase in BNL of Closest Public Road Used for Construction Traffic (dB)
Negligible	<1.0
Low	≥1.0 to <3.0
Medium	≥3.0 to <5.0
High	≥5.0

102. For any road links where the traffic flows are less than the validated CRTN range, the haul route calculation method provided in BS5228-1 has been used to determine the noise from construction vehicles. The magnitude of these noise impacts is determined using the construction noise assessment criteria in **Table 25-11**.

103. The LOAEL and SOAEL for construction traffic noise during the daytime period are defined in the DMRB LA111 (2020) as 55dB $L_{A10,18hr}$ and 68dB $L_{A10,18hr}$ respectively. The calculated BNL used to determine the *change* in road traffic noise levels are the noise level at 10m from the carriageway edge, depending on traffic flow parameters only (i.e. total flow, vehicle speed and % HGV). They do not account for actual distance to the receptor, the presence of screening, angle of view or road gradient. Therefore, these BNL cannot be compared directly with any LOAEL and SOAEL based upon absolute levels.

104. For temporary impacts due to construction traffic noise, predicted 'with the Project' scenario road traffic noise levels which are less than the LOAEL are considered to represent an impact of no worse than minor magnitude (i.e. not significant), irrespective of the change in BNL. For effects between the LOAEL and SOAEL, the duration of the impact must be considered, in addition to the magnitude of the change, when determining whether an effect is significant.

25.5.3.3.4 Operational Noise

105. Operational noise from the proposed OCS and ESBI will be assessed in accordance with BS 4142 which is the accepted UK standard for rating and assessing the impact of sound of an industrial and / or commercial nature and is referred to in NPS EN-1.

106. BS 4142 describes methods for rating and assessing sound of an industrial and / or commercial nature using outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a residential dwelling upon which sound is incident.

107. The basis of BS 4142 is a comparison between the *background sound level* in the vicinity of residential locations and the *rating level* of the noise source under consideration. The relevant parameters in this instance are as follows:

- *Background sound level – $L_{A90,T}$ – defined in the standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F (Fast) and quoted to the nearest whole number of decibels;*
- *Specific sound level – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a reference time interval, Tr (1 hour during the daytime hours (07:00 to 23:00 hours) and 15 minutes during night-time hours (23:00 to 07:00 hours));*

- *Residual Sound Level - $L_{Aeq,T}$ – the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and*
- *Rating level – $L_{Ar,Tr}$ – the specific sound level plus a "character correction" if required for the acoustic features of the noise such as tonality, impulsivity and intermittency.*

108. When comparing the *background sound* and the *rating* levels, BS 4142 states that:

"a) Typically, the greater the difference, the greater the magnitude of impact;

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;

c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and

d) The lower the rating level 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".

109. When assessing the noise from a source, it is necessary to have regard to the acoustic features that may be present in the source noise at the receptors. Section 9.1 of BS 4142 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".

110. For clarity, an explanation of each character correction type (taken from BS 4142:2014+A1:2019, Pages 13 and 14) is provided here:

- Tonality - for sound ranging from not tonal to prominently tonal a correction of between 0dB and +6dB for tonality can be applied. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible;
- Impulsivity - a correction of up to +9dB can be applied for sound that is impulsive. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- Intermittency - 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 intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and
- Other sound characteristics - where the specific sound feature characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

111. To predict operational noise, it is necessary to understand the plant that will be incorporated into the OCS and ESBI and its sound emissions. At this stage in the project design development, this information is not available. However, this design information is anticipated to become available to inform the operational noise assessment in the ES.

112. Once the required information is available, the OCS and ESBI sound levels will be predicted at the identified receptors using 3-D noise modelling software which will be set to implement the ISO9613-2 prediction methodology. The model will incorporate proposed buildings and noise sources located in the OCS zone. The model will also include nearby residential dwellings and other buildings in the Operational Noise Study Area, intervening ground cover and topographical information.

113. The magnitude of impact of the predicted OCS and ESBI sound levels will be based on a quantitative assessment of noise impact using BS 4142, as shown in **Table 25-16**. Separate assessments will be undertaken of day and night-time impacts, and the overall magnitude of impact will be based on the worst-case time period.

Table 25-16 Operational Noise Impact Magnitude Criteria

Rating Level dB $L_{Ar,Tr}$	**Impact Magnitude**
≤ Measured L_{A90}	**Negligible**
L_{A90}+ up to 5dB	**Low**
Measured L_{A90}+ >5dB to <10dB	**Medium**
Measured L_{A90}+ ≥10dB	**High**

114. Operational noise effects may therefore be considered significant depending on the margin by which the *rating level* of the specific sound source exceeds the *background sound level* and also the context in which the sound occurs.

115. The BS 4142 methodology is interpreted to mean that a difference between the *background sound level* and *rating level* of 5dB equates to the LOAEL and a difference of 10dB equates to the SOAEL. Effects are only considered significant if the SOAEL is exceeded.

116. BS 4142 also requires that the context is considered. Of particular relevance to this assessment is the absolute sound level. On this point Section 11 'Assessment of the impacts' of the standard states that "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night*." The standard offers no guidance about what *background* and *rating* levels are considered low. However, the 1997 version of the standard stated that *background sound levels* below around 30dB L_{A90}, and *rating levels* below around 35dB L_{ArTr}, were considered very low and therefore outside the scope of the assessment method.

117. The Association of Noise Consultants produced guidance on the application of BS 4142 (BS 4142:2014+A1:2019 Technical Note, Association of Noise Consultants, March 2020) which states that "*similar values* [i.e. *background sound levels* below around 30dB L_{A90}, and *rating levels* below around 35dB L_{ArTr}] *would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate*."

118. The WHO NNG for Europe (NNG) (2009) have been used to establish alternative LOAEL and SOAEL values for night-time operational noise which could be applied when *background sound levels* are low. In summary, the NNG found that below the level of 30dB(A) $L_{night,outside}$ (equivalent to a free-field L_{Aeq},23:00 to 07:00), there are no observed effects on sleep. Furthermore, there is no evidence that biological effects observed at levels below 40dB(A) $L_{night,outside}$ are harmful to health. However, the NNG found that *"closer examination of the precise impact will be necessary in the range between 30dB and 55dB as much will depend on the detailed circumstances of each case"* (Section 5.6 'Recommendations for health protection') and Table 5.2 of the document states that the threshold for the wellbeing effect of "complaints" is 35dB $L_{night,outside}$. At levels above 55dB(A) $L_{night,outside}$, the NNG detailed that adverse health effects occur frequently and there is limited evidence that the cardio-vascular system is coming under stress.

119. Therefore, based on the NNG, the following effect levels for assessing against the NPSE categories are applicable:

- 30dB(A) $L_{night,outside}$ - NOEL;
- 35dB(A) $L_{night,outside}$ - LOAEL; and
- 55dB(A) $L_{night,outside}$ - SOAEL.

120. OCS / ESBI noise levels below the NOEL and LOAEL would represent impacts of negligible and low magnitude respectively, irrespective of the difference between the *rating level* and *background sound level*. The above criteria have been agreed with stakeholders through the second ETG11 meeting (see **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration**).

121. Of additional relevance to the contextual analysis is the change in ambient sound levels. Table 7-14 of the IEMA 'Guidelines for Environmental Noise Impact Assessment' (2014) refers to impacts from change in sound levels. The impact of operational noise from the Project will be present immediately when operation starts. Hence, the criteria applied to impacts which occur in the short-term are relevant. **Table 25-17** outlines these sound level change criteria.

Table 25-17 IEMA Sound Level Change Criteria

Short Term Impact Classification	Sound Level Change dB $L_{Aeq,T}$ (Positive or Negative) T = 16hr day/8hr night
Negligible	≥0 and <1
Low	≥1 and <3
Medium	≥3 and <5
High	≥5

25.5.3.4 Effect Significance

122. The assessment of significance of an effect is informed by the sensitivity of the receptor and the magnitude of the impact. The determination of effect significance is guided by the use of a matrix-based approach, as presented in **Table 25-18**. Definitions of each level of effect significance due to noise exposure are provided in **Table 25-19**, which are based on the NPPG (2019) and IEMA 'Guidelines for Environmental Noise Impact Assessment' (2014)**.** These definitions are only available in guidance relating to noise exposure. However, many of the identified behavioural changes associated with the effects would also correspond to vibration exposure.

123. For the purposes of this assessment, any effect that is of major or moderate significance is considered to be significant in EIA terms, whether this be adverse or beneficial. Any effect that has a significance of minor or negligible is not significant.

Table 25-18 Significance of Effect Matrix

		Adverse Effect				Beneficial Effect			
		Impact Magnitude							
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Receptor Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 25-19 Definition of Effect Significance for Noise

Significance	Definition
Major	Extensive and regular changes in behaviour, attitude or other physiological response and / or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation / awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.
Moderate	The noise causes a material change in behaviour, attitude or other physiological response, 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
Minor	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.
Negligible	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.

25.5.4 Cumulative Effects Assessment Methodology

124. The cumulative effects assessment (CEA) considers other plans and projects that may act collectively with the Project to give rise to cumulative effects on noise and vibration receptors. The general approach to the CEA for noise and vibration involves screening for potential cumulative effects, identifying a short list of plans and projects for consideration and evaluating the significance of cumulative effects. **Chapter 6 Environmental Impact Methodology** and **Volume 2, Appendix 6.5 Cumulative Effects Screening Report - Onshore** provides further details on the general framework and approach to the CEA.

125. For noise and vibration, these activities include on-site construction noise, construction road traffic noise and operational noise associated with the OCS and ESBI.

126. Due to the information available and the uncertainty regarding programming of activities associated with other plans and projects, the cumulative construction phase assessment for noise and vibration has been undertaken qualitatively, with discussion of likely construction effects. Reference is made to the construction noise and construction vibration methodologies as appropriate (as set out in **Section 25.5.3.3** and **Section 25.5.3.3.2**).

25.5.5 Assumptions and Limitations

127. This chapter provides a preliminary assessment of the likely significant effects of the Project in relation to NVSR using information available at the time of drafting as described in **Chapter 6 Environmental Impact Assessment Methodology**. This assessment will be refined where relevant and presented in the ES to be submitted with the DCO application.

128. Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort is made to ensure that measurements are undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions and school holiday periods (which are often considered to result in atypical sound levels). However, a small degree of uncertainty will always remain in the values taken from such a measurement survey.

129. For the assessment of construction noise associated with the landfall works, noise predictions were undertaken assuming all construction plant is concurrently operating in an area approximately 25% of the landfall construction compound, at the closest part of the landfall extent to the NVSR. The same assumption was made for the OCS and ESBI construction works. These assumptions ensure that a precautionary worst-case assessment is presented, as in reality most of the works will be undertaken further away from the NVSR. Further details are provided in **Volume 2, Appendix 25.2 Construction Noise and Vibration Assessment**.

130. The construction road traffic noise assessment is reliant on the traffic data provided by the traffic EIA specialists. Hence, any assumptions made in the generation of these traffic data (as discussed in **Chapter 26 Traffic and Transport**) are also inherently assumed within this assessment. This includes that traffic associated with activities at the offshore construction base port(s) and O&M base port cannot be determined pre-consent. Road traffic noise effects associated with these ports will be assessed in the PAMP (if required) (see Commitment ID CO102, **Table 25-4**), and mitigation will be identified if required to avoid significant effects.

131. Calculations of likely construction vibration levels have been undertaken. In some instances, it has been necessary to calculate vibration levels at distances beyond their validated range. Hence, the result should only be treated as an approximation. This is noted where relevant in **Section 25.7.1.2.**

132. The design of the OCS and ESBI are not finalised and will be further refined for the DCO application and during detailed design stage post-consent. Hence, it has not been possible to predict operational noise emissions in the PEIR. The assessment of operational noise impact has therefore been limited to the identification of impact criteria for the combined operational sound levels at identified NVSR based on appropriate guidance and the baseline sound levels.

133. At this stage in the project design, the locations of some onshore infrastructure elements (e.g. jointing bays and associated link boxes, entry pits for trenchless crossings along the onshore ECC) are not finalised and will be further refined for the DCO application and during detailed design stage post-consent. Hence, the assessment of construction noise and vibration for these elements has been based on the precautionary assumption that the onshore infrastructure (and therefore associated construction works) will be at the closest potential location to each NVSR. Specifically:

- The onshore export cables along the corridor will be located up to the boundary of the Onshore Development Area;
- Jointing bays and associated link boxes are assumed to be at the worst-case possible location along the onshore ECC;
- Trenchless crossing entry pits are assumed to be located at the worst-case possible location along the onshore ECC; and
- Indicative locations have been identified within which the main and intermediate construction compounds for onshore export cable works could be located, but the final locations and positioning of the compound at each location are not finalised and will be further refined for the DCO application. It is assumed that, for each construction compound area, the compound will be as close as possible to each nearby NVSR.

134. The Project's onshore construction works will include a number of activities for which the information required to predict the noise impact (i.e. likely noise level and duration at specific NVSR) is not available at this stage. Hence, the assessment of impacts associated with these activities is limited to identifying the distance from the works to NVSR which would result in a significant effect, with and without additional mitigation. This incorporates a worst-case assumption that these activities will result in impacts at NVSR which last for at least ten days in 15 or 40-days in six months. This assessment approach applies to the following construction activities:

- Junction improvements and other traffic modification works;
- Trenchless crossings along the onshore ECC (positions of entry and exit pits are not known); and
- Construction of jointing bays and link boxes along the onshore ECC.

25.6 Baseline Environment

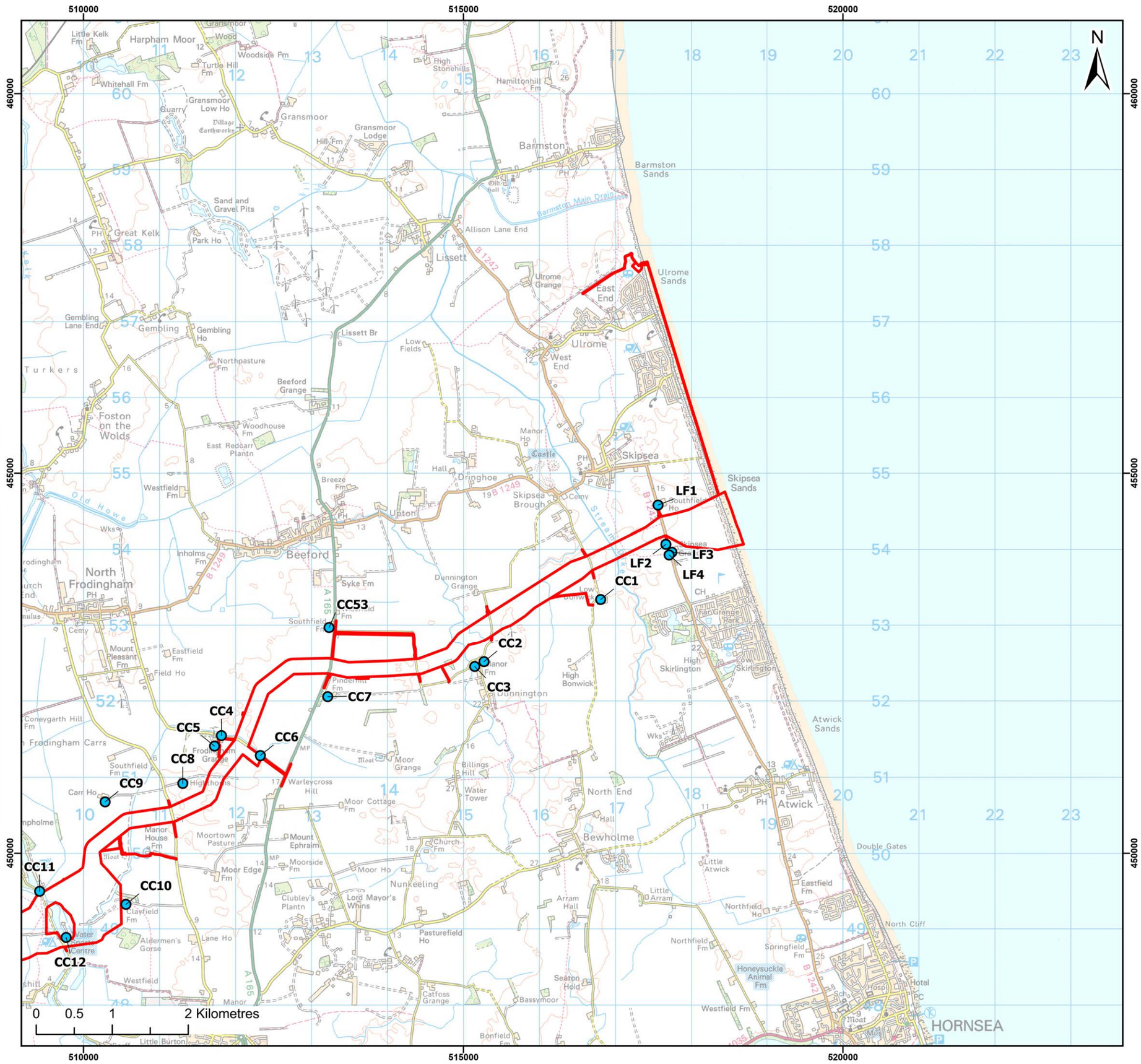
25.6.1 Existing Baseline

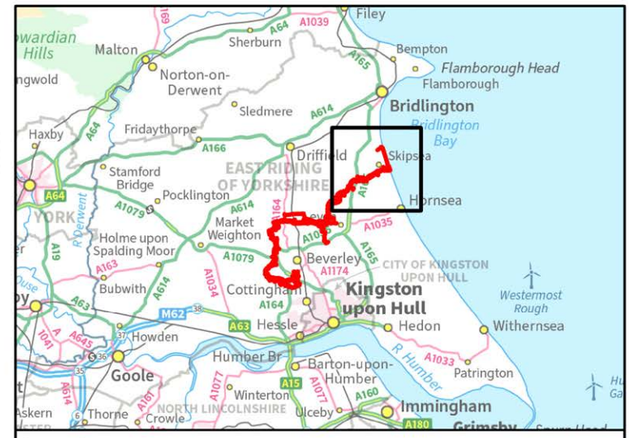
25.6.1.1 Baseline Noise Environment

135. An understanding of the baseline noise environment is required to determine the significance of potential noise effects during both construction and O&M phases.

136. Four NVSR locations at the landfall, labelled with the prefix LF, have been identified, along with 56 locations along the onshore ECC representing receptors with the potential to be impacted by noise radiated from onshore export cable works and associated temporary construction compounds, labelled with the prefix CC, and 23 locations around the OCS zones for receptors with the potential to be impacted by OCS / ESBI construction and operational noise, labelled with the prefix SS.

137. These receptor locations are illustrated in **Figure 25-2** and presented in **Table 25-20**.





Legend:

- Onshore Development Area
- Receptor Location

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Noise and Vibration Sensitive Receptors - Sheet 1 of 3

Figure: 25-2

Drawing No: PC6250-RHD-XX-ON-DR-GS-0348

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	27/03/2025	JH	SP	A3	1:50,000
01	02/01/2025	AB	GC	A3	1:50,000

Co-ordinate system: British National Grid

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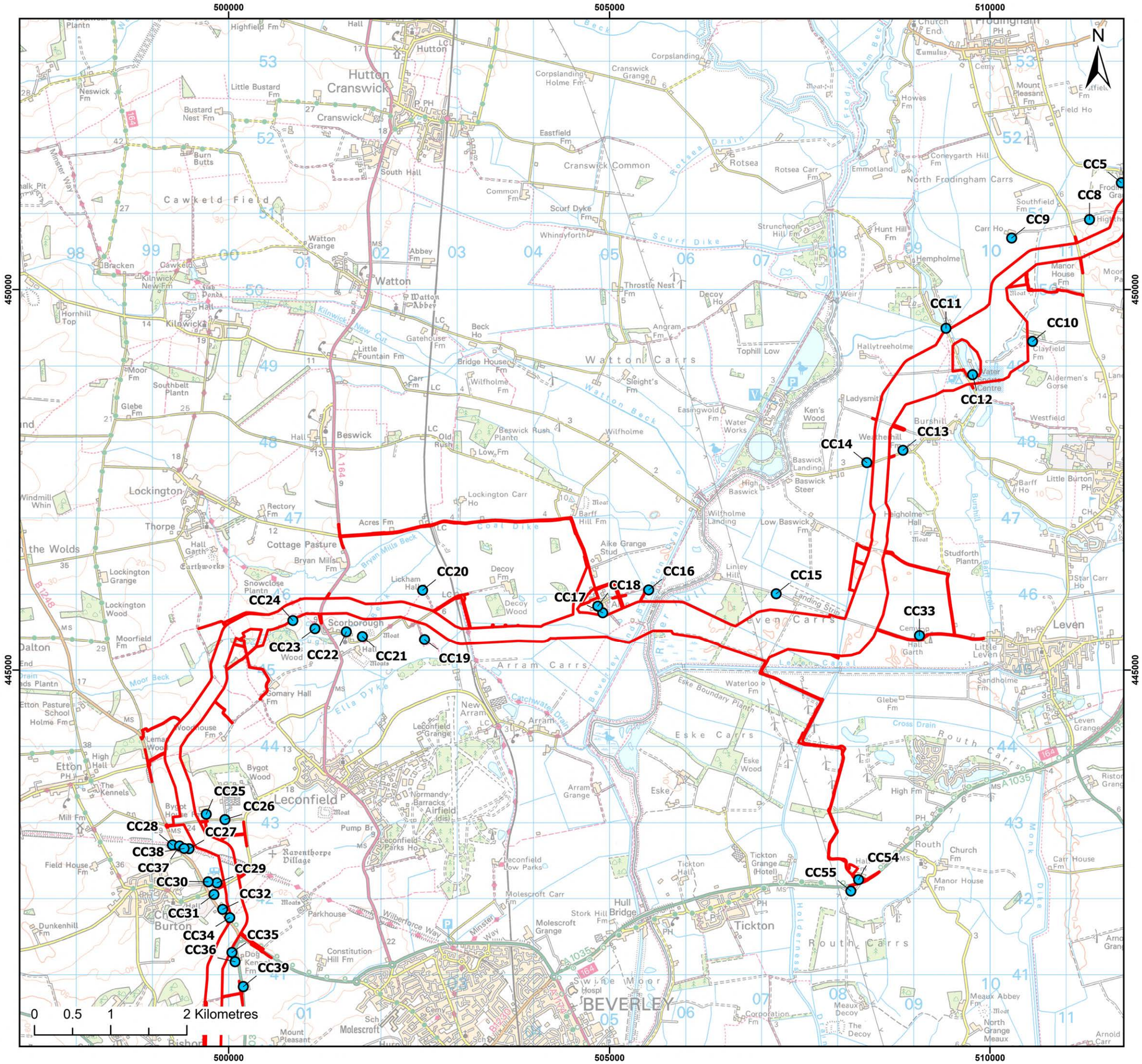

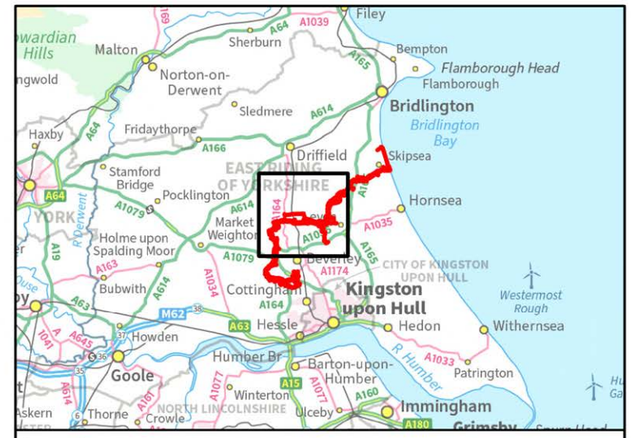

Legend:

- Onshore Development Area
- Receptor Location

Project: Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title: Noise and Vibration Sensitive Receptors - Sheet 2 of 3

Figure: 25-2

Drawing No: PC6250-RHD-XX-ON-DR-GS-0348

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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01	02/01/2025	AB	GC	A3	1:50,000

Co-ordinate system: British National Grid

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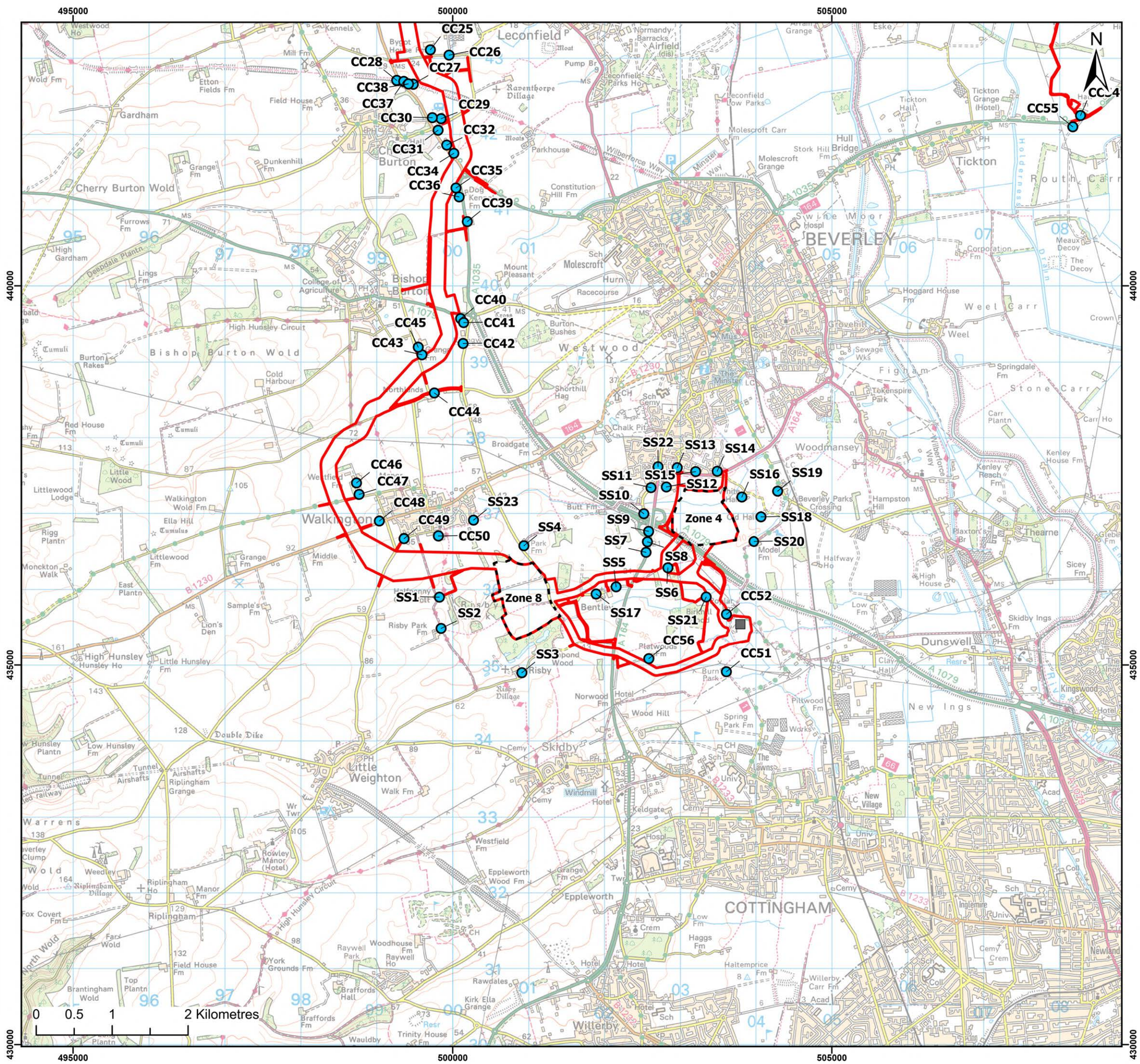

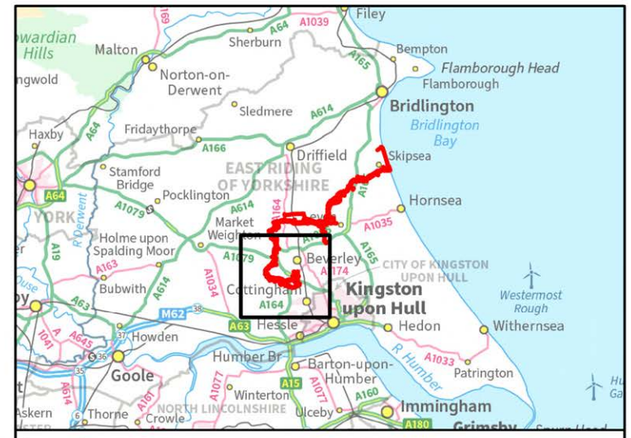

Legend:

▭ Onshore Development Area

⬚ Onshore Converter Station Zone Options

■ Indicative Birkhill Wood Substation Location

● Receptor Location

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Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK
WIND FARM

Title:

Noise and Vibration Sensitive Receptors
- Sheet 3 of 3

Figure: 25-2

Drawing No: PC6250-RHD-XX-ON-DR-GS-0348

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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01	02/01/2025	AB	GC	A3	1:50,000

Co-ordinate system: British National Grid

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Table 25-20 Onshore Noise and Vibration Sensitive Receptors Included in the Assessment

NSVR Identifier	Coordinates		Classification	Sensitivity
	X	Y		
Landfall				
LF1	517561	454580	Residential	Medium
LF2	517664	454066	Residential	Medium
LF3	517742	453962	Residential	Medium
LF4	517707	453925	Residential	Medium
Onshore ECC				
CC1	516806	453339	Residential	Medium
CC2	515271	452516	Residential	Medium
CC3	515148	452453	Residential	Medium
CC4	511815	451544	Residential	Medium
CC5	511724	451406	Residential	Medium
CC6	512327	451281	Residential	Medium
CC7	513214	452056	Residential	Medium
CC8	511306	450918	Residential	Medium
CC9	510285	450676	Residential	Medium
CC10	510558	449323	Residential	Medium
CC11	509423	449495	Residential	Medium
CC12	509772	448886	Residential	Medium
CC13	508858	447889	Residential	Medium
CC14	508383	447727	Residential	Medium
CC15	507194	446007	Residential	Medium
CC16	505514	446057	Residential	Medium
CC17	504910	445757	Residential	Medium
CC18	504845	445843	Residential	Medium
CC19	502571	445403	Residential	Medium
CC20	502546	446053	Residential	Medium
CC21	501755	445443	Residential	Medium
CC22	501544	445506	Residential	Medium
CC23	501133	445547	Residential	Medium
CC24	500843	445655	Residential	Medium
CC25	499706	443112	Residential	Medium
CC26	499952	443042	Residential	Medium
CC27	499480	442660	Residential	Medium
CC28	499262	442709	Residential	Medium
CC29	499847	442207	Residential	Medium
CC30	499732	442220	Residential	Medium
CC31	499807	442054	Residential	Medium
CC32	499921	441859	Residential	Medium
CC33	509075	445457	Residential	Medium
CC34	500015	441750	Residential	Medium
CC35	500043	441292	Residential	Medium
CC36	500085	441170	Residential	Medium
CC37	499355	442696	Residential	Medium
CC38	499417	442663	Residential	Medium
CC39	500192	440845	Residential	Medium

NSVR Identifier	Coordinates		Classification	Sensitivity
	X	Y		
CC40	500104	439572	Residential	Medium
CC41	500144	439519	Residential	Medium
CC42	500137	439244	Residential	Medium
CC43	499595	439095	Residential	Medium
CC44	499758	438593	Residential	Medium
CC45	499546	439195	Residential	Medium
CC46	498733	437402	Residential	Medium
CC47	498767	437251	Residential	Medium
CC48	499034	436900	Residential	Medium
CC49	499359	436671	Residential	Medium
CC50	499811	436705	Residential	Medium
CC51	503604	434911	Residential	Medium
CC52	503605	435673	Residential	Medium
CC53	513231	452970	Residential	Medium
CC54	508276	442249	Residential	Medium
CC55	508174	442099	Residential	Medium
CC56	502583	435083	Residential	Medium
OCS Zone 8				
SS1	499825	435899	Residential	Medium
SS2	499847	435486	Residential	Medium
SS3	500911	434899	Residential	Medium
SS4	500938	436577	Residential	Medium
SS5	502152	436035	Residential	Medium

NSVR Identifier	Coordinates		Classification	Sensitivity
	X	Y		
SS17	501889	435940	Residential	Medium
SS23	500274	436911	Residential	Medium
OCS Zone 4				
SS6	502834	436286	Residential	Medium
SS7	502546	436490	Residential	Medium
SS8	502565	436629	Residential	Medium
SS9	502580	436763	Residential	Medium
SS10	502517	436996	Residential	Medium
SS11	502612	437340	Residential	Medium
SS12	502814	437349	Residential	Medium
SS13	502957	437603	Residential	Medium
SS14	503484	437556	Residential	Medium
SS15	503200	437552	Residential	Medium
SS16	503809	437217	Residential	Medium
SS18	504067	436955	Residential	Medium
SS19	504286	437293	Residential	Medium
SS20	503969	436633	Residential	Medium
SS21	503338	435901	Residential	Medium
SS22	502704	437616	Residential	Medium

25.6.1.1.1 Survey Procedures

138. For those NVSR with the potential to experience construction and operational noise effects (i.e. those around the proposed OCS zones), baseline noise surveys comprised unattended continuous measurements over a period of six to 14 days. For those NVSR with the potential to experience construction effects only (i.e. along the onshore ECC and at the landfall), the baseline noise survey consisted of unattended continuous measurements for a total of approximately 24-hours, where it was possible to identify a secure survey location. Where secure locations were unavailable, shortened attended measurements were undertaken. Measurements were conducted in accordance with current guidance including BS 4142 and BS 7445.

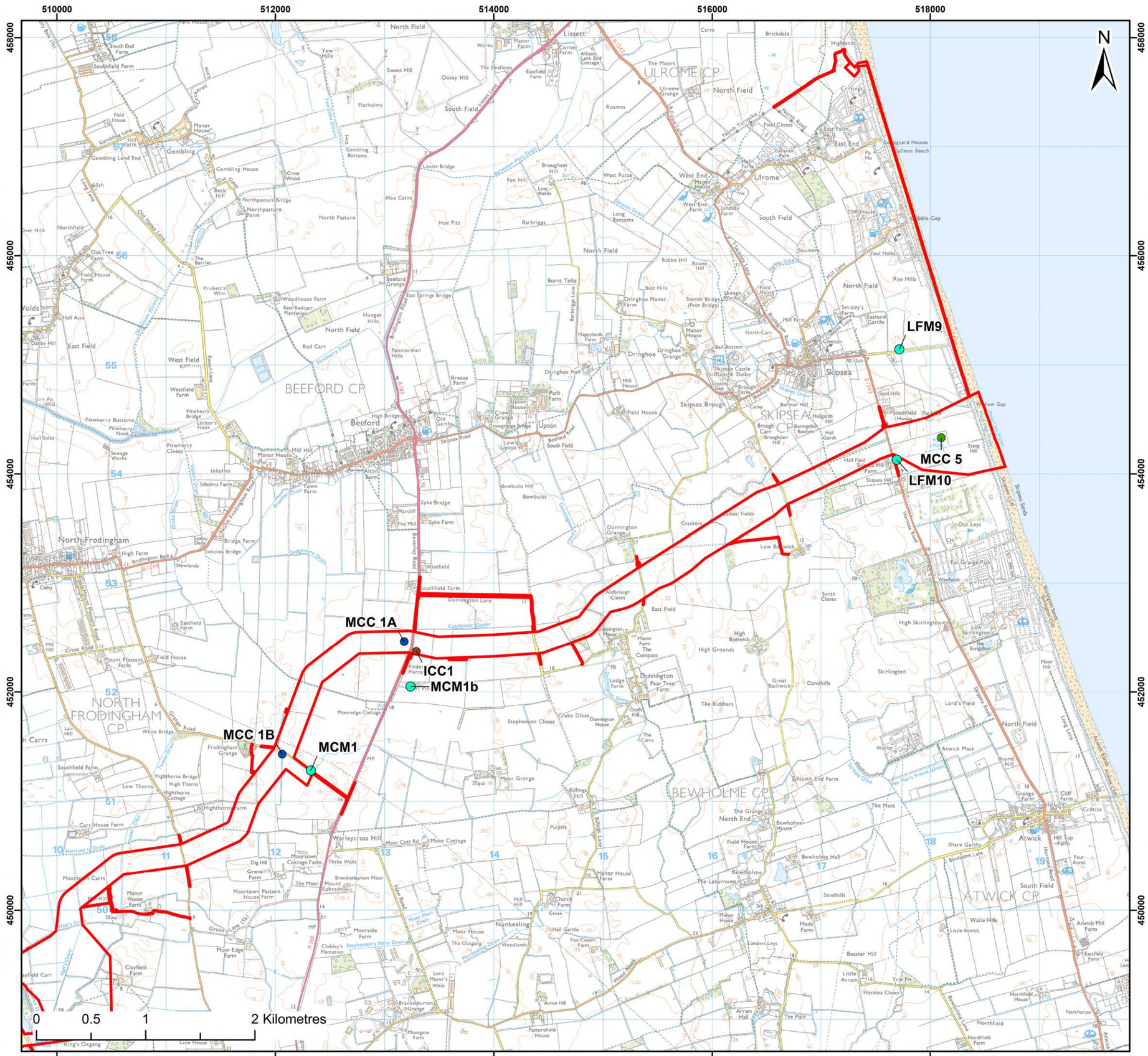
139. Measurement locations (representative of individual or groups of NVSR) are as identified and agreed through the second meeting of ETG11 held on 27th August 2024 (see **Volume 2, Appendix 25.1 Consultation Responses for Noise and Vibration**) and are provided in **Table 25-21** and illustrated on **Figure 25-3**. **Table 25-21** also includes the NVSR represented by each measurement location.

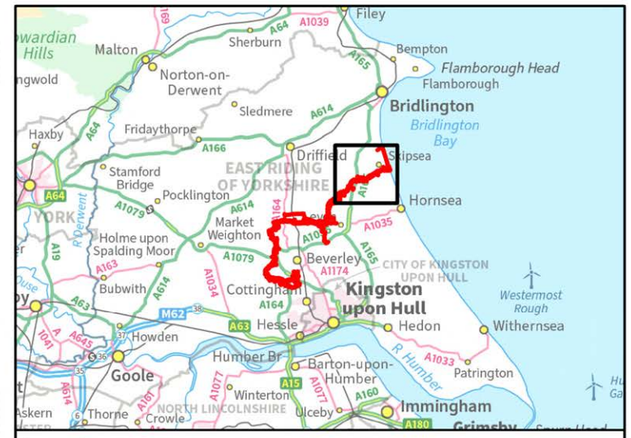
140. Of these, five locations have made use of publicly available noise survey data from the Dogger Bank South project (OSM11, OSM12, OSM13, OSM14 and OSM17). Baseline monitoring data for locations LFM9, LFM10, OSM15 and OSM16 have also been obtained from the Dogger Bank South project. As these data are not publicly available, they were obtained through engagement and coordination between Dogger Bank South and the Applicant.

141. Further details on the baseline sound surveys are presented in **Volume 2, Appendix 25.2 Noise and Vibration Baseline Report**.

Table 25-21 Baseline Noise Survey Measurement Locations

Monitoring Location	Coordinates		Representative Receptors
	X	Y	
Landfall			
LFM9	517652	455128	LF1
LFM10	517694	454130	LF2, LF3, LF4
Main Construction Compound Locations along Onshore ECC			
MCM1	512361	451264	CC4, CC5, CC6
MCM1B	513238	452050	CC7, CC53
MCM2	508284	442245	CC55, CC56
MCM3	501480	445501	CC21, CC22, CC23, CC24
OCS Zone 8			
OSM4	500922	436623	SS4
OSM5	500241	436907	SS23 and CC50
OSM6	499819	435892	SS1 and SS2
OSM7	501897	435956	SS5 and SS17
OSM12	500932	434908	SS3
OCS Zone 4			
OSM8	503280	437554	SS13, SS14, SS15 and SS22
OSM11	502534	436614	SS7, SS8, SS9 and SS10
OSM13	503289	435949	SS21
OSM14	502874	436318	SS6
OSM15	503988	436590	SS20
OSM16	503893	437134	SS16, SS18 and SS19
OSM17	502833	437308	SS11 and SS12





Legend:

- Onshore Development Area
- Surveyed Noise Measurement Locations

Indicative Temporary Construction Compound Locations

- Intermediate Construction Compound for Onshore Export Cable Works
- Main Construction Compound for Onshore Export Cable Works
- Landfall Construction Compound

Note: Two additional construction compounds for the Onshore Converter Station and Energy Storage Balancing Infrastructure will be required. These will be sited within the Onshore Converter Station zone.

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Onshore Noise Measurement Locations - Sheet 1 of 3

Figure:	Drawing No:
25-3	PC6250-RHD-XX-ON-DR-GS-0014

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	04/12/2024	AB	GC	A3	1:35,000
01	25/07/2024	JH	AB	A3	1:35,000

Co-ordinate system: British National Grid

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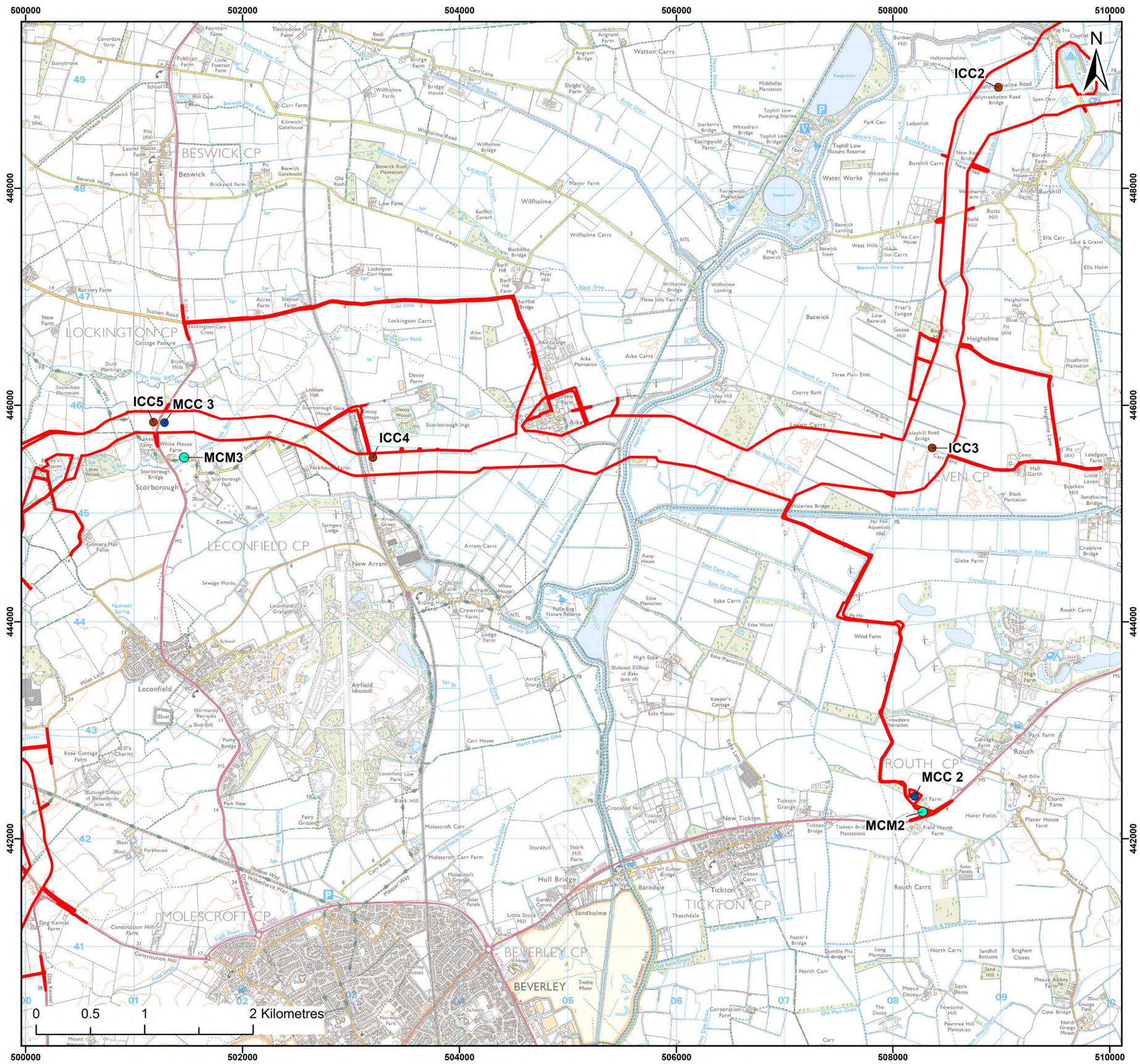

Legend:

- Onshore Development Area
- Surveyed Noise Measurement Locations

Indicative Temporary Construction Compound Locations

- Intermediate Construction Compound for Onshore Export Cable Works
- Main Construction Compound for Onshore Export Cable Works

Note: Two additional construction compounds for the Onshore Converter Station and Energy Storage Balancing Infrastructure will be required. These will be sited within the Onshore Converter Station zone.

Project:

Dogger Bank D
Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Onshore Noise Measurement Locations
- Sheet 2 of 3

Figure: 25-3

Drawing No: PC6250-RHD-XX-ON-DR-GS-0014

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	04/12/2024	AB	GC	A3	1:35,000
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Co-ordinate system: British National Grid

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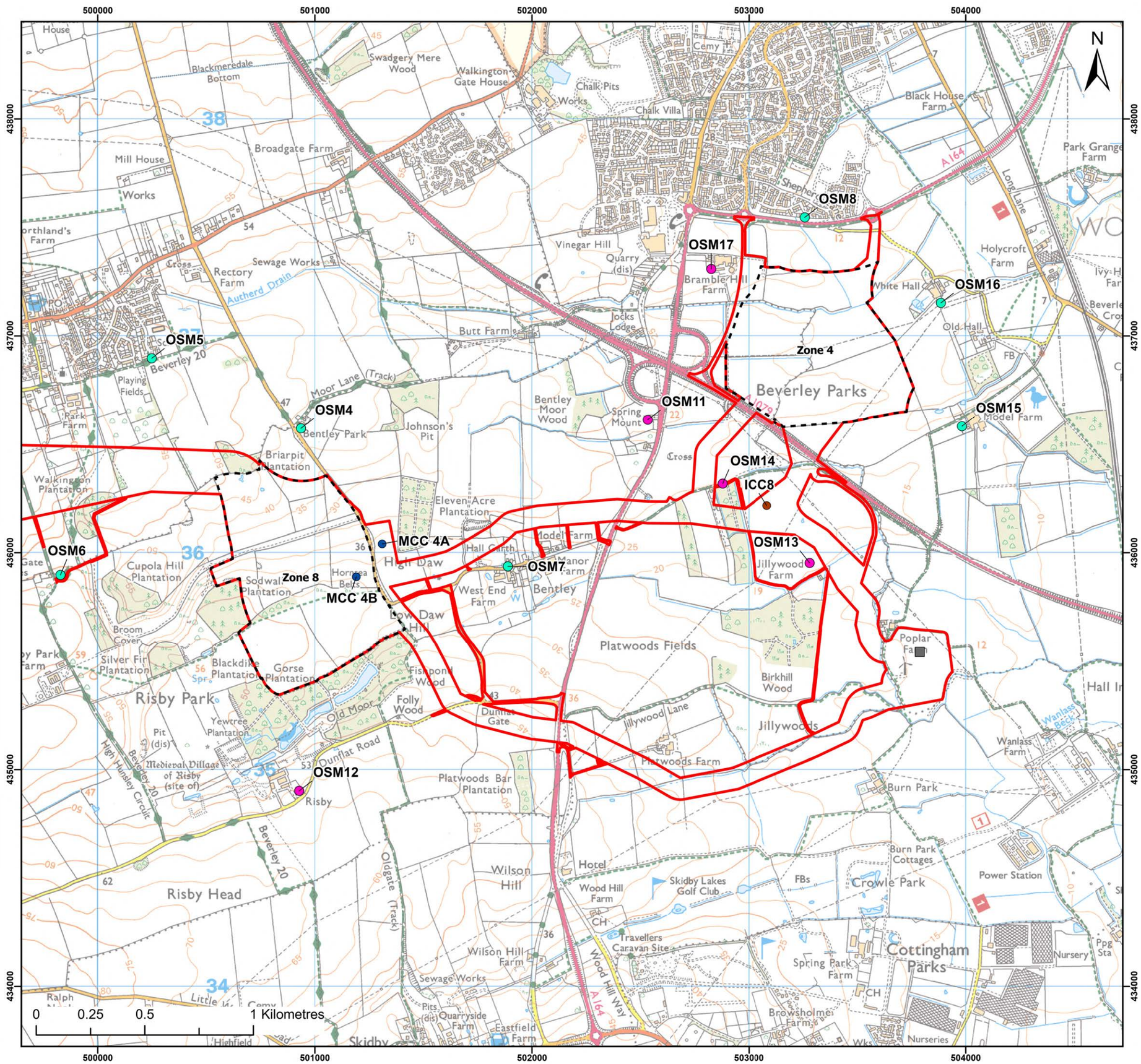

Legend:

- Onshore Development Area
- Onshore Converter Station Zone Options
- Indicative Birkhill Wood Substation Location
- Surveyed Noise Measurement Locations
- Dogger Bank South Noise Measurement Locations

Indicative Temporary Construction Compound Locations

- Intermediate Construction Compound for Onshore Export Cable Works
- Main Construction Compound for Onshore Export Cable Works

Note: Two additional construction compounds for the Onshore Converter Station and Energy Storage Balancing Infrastructure will be required. These will be sited within the Onshore Converter Station zone.

Project:

Dogger Bank D Offshore Wind Farm

DOGGER BANK WIND FARM

Title:

Onshore Noise Measurement Locations - Sheet 3 of 3

Figure: 25-3

Drawing No: PC6250-RHD-XX-ON-DR-GS-0014

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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01	25/07/2024	JH	AB	A3	1:17,500

Co-ordinate system: British National Grid

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25.6.1.1.2 Survey Results

142. The purpose of the baseline noise measurement survey at the landfall and along the onshore ECC was to enable the assessment of potential construction noise impacts. To inform the assessment, the measured L_{Aeq} levels have been separated into the daytime, evening and weekends and night-time periods specified in BS 5228-1, as shown in **Table 25-22** and **Table 25-23** for landfall and along the onshore ECC respectively.

Table 25-22 Baseline Sound Levels for Construction Assessment – Landfall

Measurement Location	Start Date and Time (dd/mm/yy, hh:mm)	Measurement Duration	L_{Aeq} (dB)		
			Daytime	Evenings and Weekends	Night-Time
LFM9	Daytime – 18/01/2023, 15:25 Evening – 18/01/2023, 22:08 Night-time – 18/01/2023, 23:43	30 minutes per period	45	41	40
LFM10	Daytime – 18/01/2023, 14:45 Evening – 18/01/2023, 21:31 Night-time – 18/01/2023, 23:05	30 minutes per period	60	52	50

Table 25-23 Baseline Sound Levels for Construction Assessment – Onshore Export Cable Corridor

Measurement Location	Start Date and Time (dd/mm/yy, hh:mm)	End Date and Time (dd/mm/yy, hh:mm)	L_{Aeq} (dB)		
			Daytime	Evenings and Weekends	Night-Time
MCM1	20/11/2024, 12:15	21/11/2024, 12:30	58	55	52
MCM1b	20/11/2024, 12:00	21/11/2024, 12:30	57	53	49
MCM2	21/11/2024, 13:00	22/11/2024, 10:15	60	59	56
MCM3	20/11/2024, 13:45	21/11/2024, 13:15	46	43	40

143. Data from the baseline noise measurement survey at the OCS zone permits the assessment of potential OCS and ESBI construction and operational noise impacts. To inform the construction assessment, the measured L_{Aeq} levels have been separated into the daytime, evening and weekends and night-time periods specified in BS 5228-1, as shown in **Table 25-24**. To inform the operational noise assessment, the measured L_{Aeq} and L_{A90} levels have been separated into the daytime and night-time periods specified in BS 4142, as shown in **Table 25-25**.

Table 25-24 Measured Baseline Sound Levels for Construction Assessment – Onshore Converter Station Zone

Measurement Location	Start Date (dd/mm/yy)	End Date (dd/mm/yy)	L_{Aeq} (dB)		
			Daytime	Evenings and Weekends	Night-Time
OCS Zone 8					
OSM4	06/11/2024	19/11/2024	55	52	45
OSM5	06/11/2024	20/11/2024	47	44	37
OSM6	06/11/2024	19/11/2024	45	40	35
OSM7	17/10/2024	24/10/2024	46	46	42
OSM12	13/10/2022	27/10/2022	50	46	44
OCS Zone 4					
OSM8	17/10/2024	24/10/2024	55	53	48
OSM11	13/10/2022	27/10/2022	59	57	52
OSM13	19/01/2023	26/01/2023	52	45	43
OSM14	13/10/2022	27/10/2022	53	49	43
OSM15	19/01/2023	26/01/2023	56	48	46
OSM16	19/01/2023	26/01/2023	52	45	41
OSM17	13/10/2022	26/10/2022	55	53	47

Table 25-25 Measured Baseline Sound Levels for Operational Assessment – Onshore Converter Station Zone

Measurement Location	L_{A90} (dB)		L_{Aeq} (dB)	
	Daytime	Night-time	Daytime	Night-Time
OCS Zone 8				
OSM4	35	27	54	45
OSM5	31	21	46	37
OSM6	30	21	43	35
OSM7	34	24	46	42
OSM12	35	27	49	44
OCS Zone 4				
OSM8	40	29	54	48
OSM11	50	29	58	52
OSM13	40	28	51	43
OSM14	43	29	52	43
OSM15	44	31	54	46
OSM16	41	28	50	41
OSM17	47	30	54	47

25.6.1.2 Baseline Vibration Environment

144. No significant sources of vibration have been identified in the vicinity of the Onshore Development Area. Hence, baseline vibration levels are assumed to be negligible. The adopted construction vibration assessment criteria, described in **Section 25.5.3.3.2**, are independent of the baseline vibration levels. Therefore, an understanding of the baseline vibration environment is not required.

25.6.2 Predicted Future Baseline

145. In the event that the Project is not developed, an assessment of the future baseline noise conditions has been carried out and is described within this section.

146. The assessment of construction traffic noise impacts uses forecast traffic flows for the worst-case one-month construction period on each link. The predicted change in traffic noise levels is based on the change in traffic flows due to the construction of the Project from the 2029 baseline.

147. The assessments of other noise and vibration impacts have assumed that the future baseline noise conditions are similar to those which exist currently. This is considered justified because, as discussed in **Section 25.2**, UK planning policy such as the NPPF (Paragraph 185) requires that new development incorporates mitigation measures to reduce potential adverse noise impacts to a minimum. Hence, in general, developments which significantly increase noise in the Study Area would not be expected to be granted consent. In addition to planning controls, there is a clear trend for noise from vehicle, commercial and industrial sources to be driven down in compliance with stricter legislation and guidance as well as consumer expectations.

148. The baseline noise monitoring survey identifies the existing acoustic environment within the Construction and Operational Noise Study Areas and the sources which are contributing to it. In the absence of evidence to the contrary, it is reasonable to assume that the contributing noise sources will not change over time. Hence, changes in future baseline noise levels will depend on the change in noise emissions from the identified sources.

149. In general, the dominant sources contributing to the baseline sound climate were aircraft, road traffic and sounds typical of a rural environment, such as bird call and farm machinery. Road traffic and aircraft noise levels depend on the frequency of events and individual vehicle/aircraft noise emissions. Traffic flows and aircraft movements are generally expected to increase in line with expectations for macro-economic expansion. However, as discussed above, vehicle and aircraft noise levels are expected to reduce over time. Farm machinery noise levels would also be expected to reduce as old equipment is replaced with newer, quieter versions.

150. It is reasonable to anticipate that the trend for increased economic activity to increase baseline noise levels would be balanced out by the effect of planning controls and reductions in source noise emissions. This would result in no change in overall baseline noise conditions in the Construction and Operational Noise Study Areas.

25.7 Assessment of Effects

151. The likely potential significant effects to noise and vibration receptors that may occur during construction, operation and decommissioning of the Project are assessed in the following sections. The assessment follows the methodology set out in **Section 25.5.3** and is based on the realistic worst-case scenarios defined in **Section 25.4.4**, including the embedded mitigation measures identified in **Section 0**.

152. As noted in **Section 25.4.5**, there is potential for the assessment of likely significant effects for the OCS zone infrastructure to differ between the two development scenarios. Where the assessment outcomes are likely to differ, these have been reported separately below.

25.7.1 Potential Effects during Construction

25.7.1.1 Construction Noise (NV-C-01)

25.7.1.1.1 Receptor Sensitivity

153. As shown in **Table 25-20**, all identified NVSR in the Construction Noise Study Area are residential, and no higher sensitivity NVSR have been identified. In accordance with the criteria presented in **Table 25-9**, the sensitivity of the receptor is therefore considered to be **medium**.

25.7.1.1.2 Impact Magnitude

154. This assessment incorporates the implementation of embedded best practicable means to mitigate construction noise impacts, along with the other embedded mitigation measures in **Table 25-4** (Commitment IDs CO39, CO69, CO76 and CO80). However, in order to comply with the Project Design Envelope approach, worst-case assumptions have been made in the noise level predictions (for example in terms of plant noise levels and on-time factors). It is likely that implementation of best practicable means would result in lower noise levels at NVSR than predicted. Implementation of best practicable means would also be expected to increase the potential tolerance of residents to periods of high noise levels, for example through providing clear lines of communication. It is not possible to robustly quantify these reductions in impact. Therefore, a worst-case assessment has been undertaken which does not specifically account for many of the potential benefits of best practicable means.

155. Impacts at NVSR near to the OCS zones have the potential to differ between the two development scenarios (see **Section 25.4.5**). These impacts depend on which OCS (Zone 4 or Zone 8) is taken forward to development, as well as the chosen onshore ECC routeing into the OCS zone and onwards to Birkhill Wood Substation. The assessment will be refined at ES stage based on the options that remain under consideration at the time.

156. In general, OCS Zone 4 and the northern corridor section come closer to more NVSR, making it the overall worst-case for construction noise impacts. However, the worst-case impact at each NVSR is associated with their location within the Onshore Development Area and to the closest construction works (e.g. NVSR SS6 is closest to OCS Zone 4, and therefore, worst-case impacts to the receptor are only considered from Zone 4). Hence, separate impacts on each NVSR are not reported for each OCS zone instead, the predicted noise level at each NVSR is from the construction works associated with the worst-case between the two potential OCS zones, including the associated optionality in the onshore ECC routeing. This assessment approach reflects the optionality in the development scenarios discussed in **Section 25.4.5**, noting that only one OCS zone option and one corridor section to / from the OCS zone and onwards to Birkhill Wood Substation will be developed.

157. For the onshore export cable construction works, worst-case impacts at CC56 and CC51 are associated with the southern corridor section. At all other NVSR, impacts associated with the southern corridor section are either the same or lower than predicted than those from the northern corridor section.

158. For the OCS and ESBI construction works, worst-case impacts at the following NVSR are associated with OCS Zone 8: SS1, SS2, SS4, SS5, SS17 and SS23. At all other NVSR, the worst-case impacts are associated with OCS Zone 4.

159. Core working hours for onshore construction activities will be 07:00 to 19:00 Monday to Saturday. Outside of these hours, including Sunday and bank holidays, no construction activities will be undertaken apart from in the following circumstances: (see **Table 25-5**, Commitment ID CO69):

- Where extended and continuous periods (up to 24 hours a day, seven days a week) of working are required such as trenchless installation works, concrete pouring and cable pull-in and jointing operations;
- Deliveries of abnormal indivisible loads that may otherwise cause congestions on the public highway network;
- Testing and commissioning of installed onshore electrical infrastructure;
- Daily start-ups and shut-downs, limited to site inspections, housekeeping, briefings, toolbox talks and safety checks;
- Emergency works; and
- Works as otherwise agreed in writing with the relevant local authority.

160. Most of the above works are either not expected to generate high levels of noise, or will last for less than ten days in any 15 consecutive days. Hence, the associated noise impacts are negligible. The only exception is trenchless crossing works, which, depending on factors such as length, ground conditions and asset owner / operator requirements (e.g. Network Rail require that works under railway lines are undertaken on a 24-7 basis), could need to be undertaken during the night. For most trenchless crossing works, drilling may briefly and occasionally continue into the night-time period to complete a drill or reach a safe stopping point for the day. These occasional over-runs could result in exceedances of the night-time construction noise threshold values, but would not occur regularly enough to exceed ten days in any 15 consecutive days (i.e. night-time effects would not be significant). To allow flexibility in the delivery of trenchless crossing works during construction, all trenchless crossings have been assumed to exceed this duration on a precautionary basis to assess potential worst-case impacts.

161. The noise level criteria applicable to working on Saturday afternoons (see **Table 25-11**) are lower than those which apply during the remainder of the core working hours. However, exceedances of only the Saturday afternoon criteria could not result in impacts which last for more than ten days in any 15 or 40-days in six months. Hence, the assessment of impacts on a Saturday afternoon uses the month-long criterion identified in BS5228-1 Section E.3.3 (i.e. impacts would need to occur over at least four consecutive Saturdays to have the potential to cause significant effects).

162. In order to determine the impact magnitude, the construction noise levels at NVSR have been predicted using 3-D noise modelling software. The modelling procedures, assumptions and exclusions are described in **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment**. Noise modelling scenarios were derived from the indicative construction programme (see **Chapter 4 Project Description** for a high-level programme) and are as follows:

- Landfall construction:
  - Site preparation activities, including vegetation and site clearance, topsoil stripping, junction and other traffic modification works, temporary fencing works, construction of the landfall construction compound and haul road; and
  - Landfall trenchless installation works.
- Onshore ECC construction:
  - Works at the temporary construction compounds, including site preparation activities, such as vegetation and site clearance, temporary fencing works and construction of the temporary construction compounds; and
  - Trench excavation, cable duct installation and trench backfilling.
- OCS and ESBI construction:
  - Site preparation and enabling works;
  - OCS construction; and
  - ESBI construction.

163. Site preparation and topsoil stripping works along the onshore ECC are expected to move at a rate of at least 600m per week. Hence, the works will only be within 300m of a NVSR (within the Construction Noise Study Area) for one week (i.e. shorter than the minimum duration of impact to cause a significant effect). These works have therefore been excluded from the modelling as the associated noise effects will not be significant.

164. For the following activities, it was not possible to predict the noise levels at specific NVSR due to a lack of design and location information at this stage. Hence, to assess potential worst-case impacts, the closest distance to a NVSR at which these works can be undertaken before experiencing a significant adverse effect has been calculated:

- Junction improvement and other traffic modification works along the onshore ECC and for the OCS zones (locations and details on the nature of works are anticipated to be available at ES following further development of the Project's access strategy);
- Trenchless crossings along the onshore ECC (positions of entry and exit pits are not known, and micro-siting flexibility will be retained for detailed design post-consent. However, broad zones in which trenchless crossing works will be undertaken are anticipated to be defined in the ES); and
- Jointing bay and associated link box construction along the onshore ECC (positions of jointing bay and link box locations are not known, and micro-siting flexibility will be retained for detailed design post-consent).

165. The results of the noise level calculations are provided in **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment**. **Table 25-26** and **Table 25-27** respectively list the number of NVSR at which impacts due to daytime (weekday daytime and Saturday morning) and Saturday afternoon working are predicted.

Table 25-26 Number of NVSR at Which Impacts Are Predicted, Daytime Working

Location	Activity	Magnitude of Impact			
		Negligible	Low	Medium	High
Landfall	Site preparation activities (vegetation and site clearance, topsoil stripping, junction and other traffic modification works, temporary fencing works, construction of the landfall construction compound and haul road)	4	0	0	0
	Landfall trenchless installation works	4	0	0	0
Onshore ECC	Construction of temporary construction compounds	19	1	0	1
	Temporary fencing works at temporary construction compounds	20	0	0	1
	Vegetation and site clearance at temporary construction compounds	20	0	0	1
	Trench excavation, cable duct installation and trench backfilling along the onshore ECC	64	1	1	2
OCS Zone 4 (works in proximity of SS20)	Site preparation and enabling works, OCS and ESBI construction	17	0	0	0
OCS Zone 4 (works in proximity of SS14)		17	0	0	0
OCS Zone 8 (works in proximity of SS3)	Site preparation and enabling works, OCS and ESBI construction	8	0	0	0
OCS Zone 8 (works in proximity of SS4)		8	0	0	0

Table 25-27 Number of NVSR at Which Impacts Are Predicted, Saturday Afternoon Working

Location	Activity	Magnitude of Impact			
		Negligible	Low	Medium	High
Landfall	Landfall trenchless installation works	4	0	0	0
Onshore ECC	Construction of temporary construction compounds	16	2	0	3
	Trench excavation, cable duct installation and trench backfilling along the onshore ECC	8	3	1	2
OCS Zone 4 (works in proximity of SS20)	Site preparation and enabling works, OCS and ESBI construction	13	1	1	2
OCS Zone 4 (works in proximity of SS14)		13	1	0	3
OCS Zone 8 (works in proximity of SS3)	Site preparation and enabling works, OCS and ESBI construction	7	0	1	0
OCS Zone 8 (works in proximity of SS4)		7	0	0	1

166. The number of NVSR at which impacts due to night-time working are predicted are identified in **Table 25-28**.

Table 25-28 Number of NVSR at Which Impacts are Predicted, Night-Time Working

Location	Activity	Magnitude of Impact			
		Negligible	Low	Medium	High
Landfall	Trenchless installation works (evenings and weekends)	4	0	0	0
	Trenchless installation works (night-time)	1	3	0	0

167. The NVSR anticipated to experience the worst-case impact (i.e. medium and high) have been identified, and the noise level which will be exceeded for the worst-case ten days (daytime working) or month (Saturday afternoon working) is provided in **Table 25-29**.

Table 25-29 Worst-Case Predicted Noise Impacts

Activity	NVSR	Maximum Predicted Construction Noise Level (dB $L_{Aeq,T}$)	Magnitude of Impact (Daytime)	Magnitude of Impact (Saturday Afternoons)
Construction of temporary construction compounds	CC6	80	High	High
	CC40	64	Negligible	
	CC54	68	Low	
Temporary fencing works at temporary construction compounds	CC6	74	High	Negligible*
Vegetation and site clearance at temporary construction compounds	CC6	77		Negligible*
Trench excavation, cable duct installation and trench backfilling along the onshore ECC	LF2	61	Negligible	High
	LF3	59	Negligible	Medium
	CC12	69	Medium	Negligible*
	CC24	61	Negligible	High
	CC35	72	High	Negligible*
	CC43	71	High	Negligible*
OCS Zone 4 (works in proximity of SS20) site preparation, enabling works and OCS and ESBI construction	SS20	65	Negligible	High
OCS Zone 4 (works in proximity of SS14) site preparation, enabling works and OCS and ESBI construction	SS14	65	Negligible	High
OCS Zone 8 (works in proximity of SS3) site preparation, enabling works and OCS and ESBI construction	SS3	60	Negligible	Medium
OCS Zone 8 (works in proximity of SS4) site preparation, enabling works and OCS and ESBI construction	SS4	65	Negligible	High

* Works in the vicinity of this receptor are expected to be shorter than one month; hence, impacts from Saturday afternoon working are negligible.

168. Without additional mitigation measures, the potential worst-case magnitude of impact is therefore considered to be **high** at NVSR LF2, CC6, CC24, CC35, CC40, CC43, CC54, SS20, SS14 and SS4, and **medium** at LF3, CC12 and SS3. At all other NVSR, the magnitude of impact is no worse than **low**.

169. The locations of the construction activities identified in **Table 25-30** are not known at this stage so it is not possible to predict noise levels at specific NVSR. **Table 25-30** identifies the distance from NVSR at which noise from these works could cause a **medium** or **high** impact magnitude.

Table 25-30 Impact Distance Limit Calculation with Embedded Mitigation Only

Activity	Daytime Distance Limit		Evenings and Weekends Distance Limit		Night-Time Distance Limit	
	Medium	High	Medium	High	Medium	High
Trenchless crossings along the onshore ECC	32m	26m	105m	80m	325m	260m
Jointing bay and associated link box construction along the onshore ECC	25m	20m	N/A*	N/A*	N/A	N/A
Junction improvement and other traffic modification works	60m	50m	N/A*	N/A*	N/A	N/A

* Activities are not expected to last for more than one month at one location; hence, impacts on a Saturday afternoon are not assessed.

170. As the locations of the above construction activities are not known at this stage, and there are NVSR inside and adjoining the Onshore Development Area, it is possible that impacts of **high** magnitude could occur as a precautionary assumption.

25.7.1.1.3 Effect Significance

171. For those NVSR at which **medium** (LF3, CC12 and SS3) or **high** (LF2, CC6, CC24, CC35, CC40, CC43, CC54, SS20, SS14 and SS4) impacts are predicted, the baseline sound survey data has been examined to determine the applicable category for the receptor in accordance with BS 5228-1. Where the receptor is not in Category A, the predicted exceedance of the actual threshold value has been used to determine whether the magnitude of impact should be changed.

172. LF2 and LF3 are represented by survey location LFM10. At this location, the results of the surveys indicates that the location is in Category A during the daytime and at evenings and weekends, and Category C at night. The predicted impacts occur on Saturday afternoon and are based on a worst-case assumption that the NVSR is in Category A; hence, the impact magnitude does not change.

173. CC6 is represented by MCM1. The survey indicates that the location is in Category A during the daytime, Category B during the evenings and weekends, and Category C at night. The predicted impacts occur during the daytime and on Saturday afternoon; hence, the measured baseline sound levels do not change the assessment of effect significance for daytime working. The predicted construction noise level at this receptor is more than 5dB above the Category B threshold value for Saturday afternoon working (60dB $L_{Aeq,T}$, as shown in **Table 25-10**); hence, as discussed in **Section 25.5.3.3.1**, the impact magnitude is **high**.

174. CC24 is represented by MCM3, this survey indicates that the location is in Category A during all time periods; hence, the measured baseline sound levels do not change the impact magnitude.

175. CC54 is represented by MCM2, the predicted impacts occur on Saturday afternoon and the survey indicates that the location is in Category B during the evenings and weekends. The predicted construction noise level at this receptor is more than 5dB above the Category B threshold value for Saturday afternoon working; hence, the impact magnitude is **high**.

176. SS3 and SS4 are represented by OSM12 and OSM4 respectively, the predicted impacts occur on Saturday afternoon and the surveys indicate that both locations are in Category A during the evenings and weekends. Hence, the measured baseline sound levels do not change the impact magnitude.

177. SS14 is represented by OSM8, the predicted impacts occur on Saturday afternoon and the survey indicates that the location is in Category B during the evenings and weekends. The predicted construction noise level at this receptor is 5dB above the relevant threshold value; hence, the impact magnitude is **medium**.

178. SS20 is represented by OSM15, the predicted impacts occur on Saturday afternoon and the survey indicates that the location is in Category A during the evenings and weekends; hence, the measured baseline sound levels do not change the impact magnitude.

179. There are no survey locations representative of CC12, CC35, CC40 and CC43. However, at every survey location, the daytime threshold value is Category A. Hence, this is highly likely to be the case at these NVSR and the impact magnitude does not change.

180. It is predicted that the sensitivity of all receptors is **medium**.

181. For NVSR at which the magnitude of impact is predicted as **medium** as a worst-case, the effect significance is **moderate adverse** which is **significant** in EIA terms.

182. For NVSR at which the magnitude of impact is predicted as **high** as a worst-case and for construction activities without defined locations within the Onshore Development Area at this stage (as shown in **Table 25-30**) at which impacts of **high** magnitude have been assumed on a precautionary basis, the effect significance is **major adverse**, which is **significant** in EIA terms.

183. For NVSR at which the magnitude of impact is predicted as no worse than **low** as a worst-case, the effect significance is **minor adverse**, which is **not significant** in EIA terms.

25.7.1.1.4 Additional Mitigation and Residual Effect

184. The identified significant effects using predicted construction noise levels at NVSR are associated with works to construct temporary construction compounds for onshore export cable works (CC6, CC40 and CC54), trench excavation, cable duct installation and trench backfilling along the onshore ECC (LF2, LF3, CC12, CC24, CC35 and CC43), and works to construct the OCS and ESBI (SS3, SS4, SS14 and SS20). The noise level predictions included precautionary worst-case assumptions regarding the location of these construction works. Similarly, the predicted significant effects from trenchless crossings and jointing bay and link box construction along the onshore ECC and junction improvement and other traffic modification works are primarily because the locations of these works are not known. Hence, a worst-case location in the Onshore Development Area has been assumed.

185. As a result of design refinement prior to preparation of the ES, it is envisaged that greater certainty will be available regarding the proximate locations of onshore construction activities (as noted in **Section 25.7.1.1.2**). The design refinement process will account for the predicted significant effects and seek to apply more appropriate and realistic distances between the identified works and NVSR where practicable.

186. The Outline CoCP (see **Table 25-5**, Commitment ID CO39) submitted with the DCO application will include a range of additional mitigation options for the significant effects identified, as detailed in **Table 25-34**. Where, in spite of embedded best practicable means, including the design refinement process, significant effects are anticipated to remain, the appointed Principal Contractor(s) at the detailed design stage post-consent will select the appropriate additional mitigation measures from the presented options and other relevant measures to achieve the required overall noise level attenuation. These additional mitigation measures will be identified in the site-specific CNVMP developed as part of the CoCP post-consent and prior to the commencement of the relevant stage of construction works (see **Table 25-34**, Commitment ID CO70) along with the embedded best practicable means, where applicable and practicable.

187. BS 5228-1 indicates that screening provides 5 to 10dB of attenuation, but the effectiveness is dependent on the position of the barrier between the source and receiver and its height. The standard states: "*assume an approximate attenuation of 5dB when the top of the plant is just visible to the receiver over the noise barrier, and of 10dB when the noise screen completely hides the sources from the receiver*".

188. For the works without a defined location at this stage, **Table 25-31** identifies the distance from NVSR at which the noise from these works could cause a **medium** or **high** magnitude impact, with 10dB of screening.

Table 25-31 Impact Distance Limit Calculation with Additional Mitigation

Activity	Daytime Distance Limit		Evenings and Weekends Distance Limit		Night-Time Distance Limit	
	Medium	High	Medium	High	Medium	High
Trenchless crossings along the onshore ECC	18m	15m	58m	45m	180m	150m
Jointing bay and associated link box construction along the onshore ECC	15m	12m	N/A*	N/A*	N/A	N/A
Junction improvement and other traffic modification works	20m	16m	N/A*	N/A*	N/A	N/A

* Activities are not expected to last for more than one month at one location; hence, impacts on a Saturday afternoon are not assessed.

189. It is envisaged that the design refinement process will eliminate the majority of significant effects associated with the works identified in **Table 25-31**. However, it is possible that some trenchless crossing entry pits (the primary source of the works noise) along the onshore ECC may need to be located within 180m of an NVSR. As discussed in **Section 25.7.1.1.2**, most trenchless crossings are not expected to require night-time works lasting for at least ten days in 15 or 40 days in six months. Hence, the effect of night-time working will not be significant in EIA terms. It is also likely that most jointing bay and link box construction works along the onshore ECC and junction improvement and other traffic modification works will not last this long at any one location. Effect durations will be considered in further detail at ES stage, should more information on trenchless crossing methodology, broad entry pit locations and other parameters such as crossing owner/operator restrictions and crossing length become available.

190. The number of NVSR within 150m and 180m of the onshore ECC that have the potential to experience residual impacts of **medium** and **high** magnitude (as shown in **Table 25-31**) respectively due to noise from night-time trenchless crossing works have been identified as follows and are shown on **Figure 25-2**:

- Impact of medium magnitude: LF1, LF3, CC4, CC5, CC13, CC16, CC19, CC31 and CC49; and
- Impact of high magnitude: LF2, CC10, CC11, CC12, CC14, CC17, CC18, CC24, CC25, CC27, CC29, CC32, CC34, CC35, CC36, CC38, CC40, CC41, CC42, CC43, CC45, CC52, CC56, SS5, SS6, SS17 and SS21.

191. With the adoption of additional mitigation measures (see **Table 25-34**, Commitment ID CO70), the magnitude of impact associated with most construction works would be no worse than **low**. The residual effect is therefore of **minor adverse** significance, which is **not significant** in EIA terms. The only exception to this is residual effects associated with night-time trenchless crossing works which, in the absence of additional information, have the potential to result in impacts of **high** magnitude, resulting in residual effects of **major adverse** significance, which is **significant** in EIA terms.

25.7.1.2 Construction Vibration (NV-C-02)

25.7.1.2.1 Receptor Sensitivity

192. The most sensitive identified NVSR are residential and therefore of **medium** sensitivity.

25.7.1.2.2 Impact Magnitude

193. This assessment incorporates the implementation of embedded best practicable means to mitigate construction vibration impacts, along with other embedded mitigation measures in **Table 25-4** (Commitment IDs CO39, CO69, CO76 and CO80). However, as with the construction noise impact assessment, worst-case assumptions have been made in the vibration level predictions, and it is likely that implementation of best practicable means would result in lower vibration levels at NVSR than predicted. Implementation of best practicable means would also be expected to increase the potential tolerance of residents to periods of high vibration levels, for example through providing clear lines of communication. It is not possible to robustly quantify these reductions in impact. Therefore, a worst-case assessment has been undertaken which does not specifically account for many of the potential benefits of best practicable means.

194. The assessment of construction vibration impacts is confined to the onshore ECC. As discussed in **Section 25.5.3.3.2**, the closest identified NVSR to the landfall and OCS zones are farther than 100m away. Hence, no vibration impacts are anticipated due to construction of the landfall or OCS and ESBI.

195. Construction activities with the potential to emit significant vibration have been identified. **Table 25-32** lists the minimum set-back distances at which the vibration level criteria relevant to the potential for human annoyance may occur for these activities. Set back distances were derived using the calculation methods provided in BS 5228-2.

Table 25-32 Predicted Distances at Which Vibration Levels May Occur for the Assessment of Human Disturbance

Activity	Set- Back Distance at Which Vibration Level (PPV indoors, ground-floor) Occurs		
	0.3mm.s^{-1}	1.0mm.s^{-1}	10mm.s^{-1}
Trenchless crossing operations along the onshore ECC (Assumed to be similar to rotary piling) based on Ref.103 Table D.6 (BS 5228-2)	39m	15.2m	N/A**
Vibratory compaction (start-up)	123m*	48m	7.2m
Vibratory compaction (steady state)	87m	38m	7.3m

* Calculation method only validated to distances of 100m; hence, this value must be treated with caution

** N/A as level does not reach 10mm.s^{-1} at any distance

196. The trenchless crossing works are likely to generate similar levels of vibration to rotary bored piling due to the similar mechanisms involved. Table D.6 of BS 5228-2 shows that the outdoor free-field vibration level from rotary bored piling activities is unlikely to exceed 1.0mm.s^{-1} at a distance of approximately 7m.

197. The calculations for impacts upon humans (i.e. PPV levels 0.3 to 10mm.s-1) assume a frequency independent vibration transfer function (level multiplied by 1.8) between outdoors and indoors, based upon measurements described in the Transport and Road Research Laboratory (TRRL) report ‘Ground vibrations from impact pile driving during road construction’ (Martin, D. J., 1980). There is a 5% probability that the predicted vibration levels are exceeded. Further detail on the assumptions made to undertake these calculations are provided in **Volume 2, Appendix 25.3 Construction Noise and Vibration Assessment**.

198. **Table 25-32** shows that vibration from activities which are no closer to a NVSR than the following set-back distances would result in impacts of low magnitude: >15.2m (trenchless crossings), >48m (start-up of vibratory compactors / rollers) and >38m (steady state operation of vibratory compactors / rollers).

199. The location of compaction works is not currently known at this stage and is therefore assumed to occur anywhere in the Onshore Development Area on a precautionary basis to allow the assessment of potential worst-case impacts. NVSR SS6 is inside the Onshore Development Area. Hence, a worst-case is that compaction works could be undertaken closer than 7m to this NVSR, and the impact magnitude is therefore **high**.

200. The locations of the trenchless crossing entry and exit pits within the onshore ECC is not known at this stage (see **Section 25.7.1.1.2**). Hence, the distance to the nearest NVSR is not known. However, to allow the assessment of potential worst-case impacts at this stage, the following preliminary assumptions have been reviewed. The drill depth at trenchless crossing locations is expected to be at a target minimum depth of 3.5m, and the indicative width of operational easement is 20m for HVDC export cables and 25m for HVAC export cables (which may be wider at trenchless crossing locations). A typical trenchless crossing cross-section has been provided which shows an indicative width of 12m. It is assumed that the onshore export cables will be in the centre of the easement, and the easement will not contain a residential dwelling. Hence, the minimum distance between the drill and any NVSR is expected to be 4m, resulting in a worst-case impact of **medium**.

201. Considering the potential for structural damage, the impact magnitude depends on the frequency of the vibration, as shown in **Table 25-13**. TRL Report 429 '*Groundborne vibration caused by mechanised construction works'* (D.M. Hiller, and G.I. Crabb (2000)) shows that the frequency of vibration generated by compaction using rollers exceeds 15Hz. According to the criteria in **Table 25-13**, at a frequency of 15Hz and above, the building damage impact will be no worse than low or negligible if the vibration level at the building foundation does not exceed 20mm.s^{-1} or 10mm.s^{-1} respectively. The vibration from trenchless crossing works is not expected to reach the minimum threshold for damage impacts (6mm.s^{-1}) irrespective of frequency or distance.

202. Outdoor free-field vibration levels emitted by ground compaction have been calculated and indicate (with a 95% confidence) that the level is unlikely to exceed 20mm.s^{-1} at a distance of at least 2.5m from the works (for a low impact) and 10mm.s^{-1} at least 4.6m from the works (for a negligible impact). Based on professional judgement from previous experience of similar projects, ground compaction works are not expected to be undertaken within 2.5m of a NVSR for a length of time that could result in significant building damage. Hence, structural damage impacts are considered no worse than **low**.

25.7.1.2.3 Effect Significance

203. In relation to the potential for human disturbance effects, professional judgement based on experience of similar projects has been used. Whilst brief periods of high (compaction) and medium (trenchless crossings) vibration impacts could occur, the durations of such impacts will be relatively short. The durations of any works within the distance thresholds from NVSR for the onset of medium impacts are not expected to reach 10 days in 15 or 40 days in six months. Structural damage impacts are considered no worse than **low**.

204. The CNVMP will provide refined post-consent calculations of construction vibration to determine whether the impacts remain non-significant, while specifying any requirement for additional mitigation, as per Commitment ID CO70 in **Table 25-34**.

205. Overall, it is predicted that sensitivity of the receptor is **medium,** and the magnitude of impact is no worse than **low**. The effect is therefore of **minor adverse** significance, which is **not significant** in EIA terms.

25.7.1.3 Construction Road Traffic Noise (NV-C-03)

206. This impact only considers construction road traffic noise impacts associated with the Project's onshore construction activities.

207. At this stage, no decision has been made regarding which port(s) would be used for the Project's offshore construction. A decision on the offshore construction base port(s) would not be made until post DCO determination. A PAMP will be developed, if required, once the preferred offshore construction base port(s) has been confirmed and agreed with the relevant authorities prior to the commencement of construction. The PAMP (see **Table 25-4**, Commitment ID CO102) will provide an assessment of the traffic movements due to port operations associated with the Project's offshore construction activities and detail mitigation measures as required to avoid significant effects. The associated construction road traffic noise effects will therefore also be covered in the PAMP.

25.7.1.3.1 Receptor Sensitivity

208. The assessment methodology makes an assumption that residential dwellings are located within 50m of a road link that will be used by construction traffic, and no high sensitivity NVSR have been identified within 50m of a link. The sensitivity of the receptor is therefore considered to be **medium**.

25.7.1.3.2 Impact Magnitude

209. This assessment incorporates the implementation of the embedded mitigation measures targeted at these impacts (see **Table 25-4**, Commitment IDs CO69, CO73, CO74, CO75, CO76 and CO80). These measures have reduced the noise impacts from construction vehicles by, for example, selecting traffic routes away from population centres and using roads with relatively high baseline flows where possible.

210. **Volume 2, Appendix 26.2 Transport Assessment** details those roads links subject to increased vehicle movements during the Project's construction.

211. Traffic data for these road links were provided for a baseline year (assumed first year of construction) ('without the Project' scenario) and baseline year plus development ('with the Project' scenario). The baseline data are provided based on the first year of construction (at the earliest assumed to be 2029). It is anticipated that later years would have higher baseline traffic flows so the calculated change in flows due to the Project is maximised by assuming the earliest possible construction year.

212. For each road link with flows above 1,000 AAWT, BNL were calculated for the 'without the Project' and 'with the Project' scenarios. The difference between the BNL for each link is the short-term change in noise level from construction traffic associated with the Project, assessed using the criteria in **Table 25-15**.

213. Road links with traffic below 1,000 AAWT have been treated similarly to construction haul roads. Noise levels from HGV associated with the Project have been calculated at the closest identified NVSR to the link, for comparison with the criteria in **Table 25-11**.

214. The road traffic noise level calculations for each link are provided in full in **Volume 2, Appendix 25.4 Construction Traffic Noise Assessment**.

215. The calculation methods do not account for any potential changes in vehicle noise over time. The magnitude of impact determined using BNL calculations is only dependent on the change in traffic flow, so assuming the earliest realistic construction year ensures a worst-case effect has been determined. The magnitude of impact determined using the haul route method uses the Project's peak construction traffic flows, irrespective of the baseline year.

216. A <1dB change in BNL (a negligible magnitude of impact according to **Table 25-15**) is predicted at 64 of the road links during peak construction traffic flows. Changes of 1 to 2.9dB (low impact) are predicted on 11 road links and ≥ 5dB (high impact) at one link (Link 48, Neptune Street in Hull).

217. Predicted construction traffic noise levels for the Project using the haul route method are less than or equal to 65 dB $L_{Aeq,12h}$ (a negligible magnitude of impact according to **Table 25-11**) on eight links and between 65 and 68 dB $L_{Aeq,12h}$ (low impact) on three links. Predicted construction traffic noise levels using the haul route method do not exceed 68 dB $L_{Aeq,12h}$. Hence, impacts are no worse than **low**.

218. As the calculated change in BNL results in a high impact on link 48, the closest NVSR to this link have been determined. Link 48 is in Kingston Industrial Estate next to Albert Docks in Hull. There are no identified medium or high sensitivity NVSR within 50m of this link. However, there is one low sensitivity NVSR (Neptune House offices) at the junction of Neptune Street and Jackson Street. Baseline noise levels at this NVSR are likely to be dominated by road traffic on Jackson Street and the nearby A63, along with industrial noise from other units in the estate. Hence, the calculated changes in noise emissions from Neptune Street are unlikely to result in perceptible changes in the ambient noise levels at this NVSR. To consider a potential worst-case, impacts on this NVSR are assumed to be **medium**.

25.7.1.3.3 Effect Significance

219. For the vast majority of the identified road links, the sensitivity of the receptor is **medium** and the magnitude of impact is no worse than **low**. At one road link (Link 48), the sensitivity of the receptor is **low**, and the magnitude of impact is **medium**. The effect is therefore of **minor adverse** significance, which is **not significant** in EIA terms.

25.7.1.4 Construction Road Traffic Vibration (NV-C-04)

220. As discussed in **Section 25.3**, the Scoping Report proposed that this impact was scoped out. The Scoping Opinion stated that a full assessment need not be included in the ES, provided this had the agreement of the relevant local authorities (ERYC and Hull City Council) (see **Section 25.3**) and arguments were presented demonstrating the absence of a likely significant effect.

221. The primary mechanism for heavy vehicles to give rise to vibration is the movement of the vehicles over irregularities in the road surface. The DMRB LA111 (2020) states that: "*a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects*". For those roads which are currently in good condition, there would be no pathway for the increase in traffic flows on public roads associated with the construction of the Project to increase vibration levels at sensitive receptors.

222. If the construction traffic associated with the Project uses roads with existing surface irregularities, HGV passing over these irregularities could emit vibration which is perceptible in nearby buildings. However, the additional HGV introduced by the Project's construction activities will generate vibration which is at a similar level to that caused by HGV currently using the road. Whilst the additional HGV would increase the frequency of passbys, and therefore the frequency of potential exposure to perceptible vibration, vibration levels are not calculated cumulatively. The impact assessment criteria for both annoyance (**Table 25-13**) and building damage (**Table 25-14**) are based on exceedance of a fixed limit (i.e. specified in PPV by one event - in this case, one HGV passby). The number of HGV passing a property would therefore not affect the PPV experienced at a receptor in the way that it does for noise and hence, annoyance impacts due to vibration associated with construction traffic will be no worse than those due to noise. Research undertaken by the Transport and Road Research Laboratory (TRRL Report 246) confirms this assertion, concluding that: "*Overall, fewer people are bothered by vibration from traffic than by traffic noise. However, the proportion of residents seriously bothered by vibration (8%) is similar to the percentage seriously bothered by noise (9%).*" In accordance with best practice in the UK acoustics industry, the assessment therefore focusses on the potential for annoyance due to change in noise levels caused by construction traffic.

223. The local highways authority has a duty to undertake regular inspection and maintenance of the local highway network, and therefore, maintenance of the local highway network is outside of the control of the Applicant. The Outline CTMP (see **Table 25-4**, Commitment ID CO73) submitted with the DCO application will provide details on construction traffic management measures, including a proposition for highway condition surveys to be undertaken to identify whether the Project's construction activities have negatively impacted highway conditions on affected roads. Any damage to roads on the local highway network as a result of construction HGV movements directly attributable to the Project will be repaired to pre-construction conditions in agreement with the relevant local highway authorities and in accordance with the CTMP developed post-consent (see **Table 25-4**, Commitment ID CO74). In addition, the following embedded mitigation measures as outlined in **Table 25-4**, specifically, Commitment IDs CO69, CO75, CO76, CO80 and CO102 would also be relevant for minimising vibration impacts.

224. On that basis, and with the proposed embedded mitigation measures in place, it is concluded that evidence of an absence of a likely significant effect has been presented and therefore vibration impacts due to construction traffic using public roads is not assessed further. This approach was agreed in consultation with ERYC through the second meeting of ETG11 held on 27th August 2024 and through Hull City Council's Scoping Opinion responses (see **Volume 2, Appendix 25.3 Consultation Responses for Noise and Vibration**).

25.7.2 Potential Effects during Operation

25.7.2.1 Operational Noise (NV-O-01)

225. As discussed in **Section 25.5.3**, in order to predict the noise from the operation of the OCS and ESBI, it is necessary to understand the plant that will be incorporated and its sound emissions. At this stage in the project design, sufficient information is not available. Modelling and assessment of predicted OCS and ESBI sound levels will be undertaken and reported in the ES for the Project.

226. In the absence of predictions, operational noise level limits have been recommended, based on measured *background sound levels* and in accordance with relevant policy.

25.7.2.1.1 Receptor Sensitivity

227. The sensitivity of residential NVSR is considered to be **medium**, as determined in **Section 25.5.3.2**.

25.7.2.1.2 Impact Magnitude

228. The impact magnitude criteria presented in **Table 25-16**, along with the measured *background sound levels*, have been used to determine the *rating levels* of the OCS and ESBI noise at which low, medium and high impacts would be anticipated, according to the initial numerical assessment in BS 4142, as shown in **Table 25-33**.

Table 25-33 Operational Noise Rating Level Thresholds for the Onset of Impacts

NVSR	Measurement Location	Time Period	Measured *Background Sound Level* (dB L_{A90})	*Rating Level* of Operational Noise Resulting in the Identified Impact (dB $L_{Ar,Tr}$)		
				Low	Medium	High
SS4	OSM4	Day	35	36 to 40	41 to 44	≥ 45
		Night	27	28 to 32	33 to 36	≥ 37
SS23 and CC50	OSM5	Day	31	32 to 36	37 to 40	≥ 41
		Night	21	22 to 26	27 to 30	≥ 31
SS1 and SS2	OSM6	Day	30	31 to 35	36 to 39	≥ 40
		Night	21	22 to 26	27 to 30	≥ 31

NVSR	Measurement Location	Time Period	Measured *Background Sound Level* (dB L_{A90})	*Rating Level* of Operational Noise Resulting in the Identified Impact (dB $L_{Ar,Tr}$)		
				Low	Medium	High
SS5 and SS17	OSM7	Day	34	35 to 39	40 to 43	≥ 44
		Night	24	25 to 29	30 to 33	≥ 34
SS13, SS14, SS15 and SS22	OSM8	Day	40	41 to 45	46 to 49	≥ 50
		Night	29	30 to 34	35 to 38	≥ 39
SS8, SS9, SS10 and SS7	OSM11	Day	50	51 to 55	56 to 59	≥ 60
		Night	29	30 to 34	35 to 38	≥ 39
SS3	OSM12	Day	35	36 to 40	41 to 44	≥ 45
		Night	27	28 to 32	33 to 36	≥ 37
SS21	OSM13	Day	40	41 to 45	46 to 49	≥ 50
		Night	28	29 to 33	34 to 37	≥ 38
SS6	OSM14	Day	43	44 to 48	49 to 52	≥ 53
		Night	29	30 to 34	35 to 38	≥ 39
SS20	OSM15	Day	44	45 to 49	50 to 53	≥ 54
		Night	31	32 to 36	37 to 40	≥ 41
SS16, SS18 and SS19	OSM16	Day	41	42 to 46	47 to 50	≥ 51
		Night	28	29 to 33	34 to 37	≥ 38
SS11 and SS12	OSM17	Day	47	48 to 52	53 to 56	≥ 57
		Night	30	31 to 35	36 to 39	≥ 40

229. The *rating levels* in **Table 25-33** include any character corrections (for tonality, intermittency, impulsivity or other sound characteristics) which may be applicable to the OCS / ESBI *specific sound levels*, as discussed in **Section 25.5.3.3.4**.

230. The sound emitted by some of the OCS / ESBI plant is likely to include low-frequency tonal components. Manufacturer's plant sound emissions data would be required to determine the degree of tonality likely to be present, which will not be available after planning permission is granted. At this stage, it is assumed that the maximum (i.e. + 6dB) correction for tonality is applicable.

231. The sound emissions from the OCS / ESBI plant and equipment will be present 24 hours a day, seven days a week and are relatively continuous. Hence, no penalty corrections for intermittency or impulsivity are required. If a penalty is applicable for tonality, it would not be appropriate to apply the *"other sound characteristics"* penalty, as this is only applicable where no other penalty has been applied.

25.7.2.1.3 Effect Significance

232. To determine the significance of the effect of the operational noise, it is necessary to consider the context. Of particular relevance to this assessment are very low (i.e. below 30dB L_{A90}) *background sound levels* during the night. **Section 25.5.3.3.4** identifies a LOAEL for operational noise of 35dB(A) $L_{night,outside}$, the $L_{night,outside}$ is equivalent to the *specific sound level* without a rating correction. OCS and ESBI sound levels equal to or below this level would not be anticipated to result in significant effects, irrespective of the difference to the *background sound level*.

233. An OCS and ESBI *sound rating level* limit is proposed for inclusion in a DCO requirement (see **Table 25-4**, Commitment ID CO71). The limit will be determined in the ES based on the results of operational noise modelling and an assessment of potential impacts in accordance with BS 4142 including additional mitigation measures if required. Compliance with this limit, which will be secured by a DCO requirement, will ensure that the operational noise effects are of no worse than **minor adverse** significance, which is **not significant** in EIA terms.

25.7.2.2 Operational Vibration (NV-O-02)

234. As discussed in **Section 25.3**, the Scoping Report proposed that the impact of operational vibration should be scoped out. The Scoping Opinion stated that a full assessment need not be included in the ES, provided this had the agreement of the relevant local authorities (ERYC and Hull City Council) (see **Section 25.3**) and arguments were presented demonstrating the absence of a likely significant effect.

235. Whilst the selection of the final OCS and ESBI electrical plant has not yet been made, some of it is likely to be vibration sensitive. Hence, to prevent damage, both installations will be designed to achieve very low levels of ground-borne vibration within those installations. This will be achieved using industry standard mitigation measures applied to items of plant with the potential to generate significant levels of vibration, such as vibration isolation pads / mounts for proposed transformers.

236. Additionally, the OCS and ESBI will not contain any large items of rotating plant that may give rise to significant vibration.

237. In terms of the potential for impacts at receptors, the very low levels of vibration within the installations will be greatly attenuated due to propagation with distance. The closest NVSR to either OCS zone (Zone 4 and Zone 8) is approximately 240m away. This further attenuation will ensure that operational plant will not result in perceptible levels of vibration at receptors.

238. Evidence of an absence of likely significant effect has been presented and therefore operational vibration impacts have not been assessed further. This approach was agreed in consultation with ERYC through the second meeting of ETG11 held on 27th August 2024 and through Hull City Council's Scoping Opinion responses (see **Volume 2, Appendix 25.3 Consultation Responses for Noise and Vibration**).

25.7.2.3 Operational Road Traffic Noise and Vibration (NV-O-03 and NV-O-04)

239. The Scoping Opinion stated that a full assessment need not be included in the ES, provided this had the agreement of the relevant local authorities (ERYC and Hull City Council) (see **Section 25.3**) and that arguments were presented demonstrating the absence of a likely significant effect.

240. The OCS and ESBI will be unmanned with no permanent on-site personnel presence. Hence, operational traffic associated with the Project's onshore infrastructure would be limited to routine and unplanned maintenance activities. Inspection and maintenance works would typically involve a very small number of vehicles, typically light duty vehicles (LDV) (e.g. vans). Infrequently, equipment may be required to be replaced (e.g. battery replacements for the ESBI), therefore the use of an occasional HGV may be required, depending on the nature of the replacement. Further details on the O&M activities associated with the Project's onshore infrastructure are described in **Chapter 4 Project Description**. **Chapter 26 Traffic and Transport** identities the likely number of vehicle movements required during the O&M phase and concludes that there is no potential for significant effects with respect to traffic impacts.

241. At this stage, no decision has been made regarding which port would be used for the Project's offshore O&M activities. A decision on the O&M base port would not be made until post DCO determination. A PAMP will be developed, if required, once the preferred O&M base port has been confirmed and agreed with the relevant authorities prior to the commencement of operation. The PAMP (see **Table 25-4**, Commitment ID CO102) will provide an assessment of the traffic movements due to port operations associated with the Project's offshore O&M activities and detail mitigation measures as required to avoid significant effects. The associated operational road traffic noise and vibration effects will therefore also be covered in the PAMP where relevant.

242. Evidence of an absence of likely significant effects has been presented and therefore operational road traffic noise and vibration impacts have not been assessed further. This approach was agreed in consultation with ERYC through the second meeting of ETG11 held on 27th August 2024 and through Hull City Council's Scoping Opinion responses (see **Volume 2, Appendix 25.3 Consultation Responses for Noise and Vibration**).

25.7.3 Potential Effects during Decommissioning

25.7.3.1 Decommissioning Noise, Vibration and Road Traffic Noise and Vibration (NV-D-01,NV-D-02,NV-D-03 and NV-D-04)

243. No decision has been made regarding the final decommissioning strategy for the onshore infrastructure, as it is recognised that regulatory requirements and industry best practice change over time.

244. Commitment ID CO56 (see **Table 25-4**) requires an Onshore Decommissioning Plan to be prepared and agreed with the relevant authorities prior to the commencement of onshore decommissioning works. This will ensure that decommissioning noise and vibration impacts will be assessed in accordance with the applicable regulations and guidance at that time of decommissioning where relevant, with appropriate mitigation implemented as necessary to avoid significant effects.

245. The detailed activities and methodology for decommissioning will be determined later within the Project's lifetime, but would be expected to include:

- Deinstallation and removal of electrical equipment, buildings and other infrastructure for the OCS and ESBI;
- Removal of above-ground link boxes along the onshore ECC;
- Inspection of underground infrastructure to be left in-situ along the onshore ECC and at the landfall (i.e. TJB, jointing bays, underground link boxes, onshore export cables and ducting) to ensure they are safe to remain in place. If considered unsuitable to be left in-situ at the time of decommissioning, these components will be removed; and

- Site reinstatement and landscaping.

246. Whilst a detailed assessment of decommissioning impacts cannot be undertaken at this stage, for this assessment, it is assumed that decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within the temporary construction working areas and require no greater amount or duration of activity than assessed for construction). The decommissioning sequence will generally be the reverse of the construction sequence. It is therefore assumed that decommissioning impacts would likely be of similar nature to, and no worse than, those identified during the construction phase.

25.7.4 Additional Mitigation Measures

247. **Table 25-34** outlines the proposed additional mitigation measure relevant to noise and vibration that has been identified by the EIA process to reduce likely significant adverse effects to acceptable levels. Full details of all commitments made by the Project are provided in **Volume 2, Appendix 6.3 Commitments Register**.

Table 25-34 Additional Mitigation Measure Relevant to Noise and Vibration

Commitment ID	Proposed Additional Mitigation	How the Additional Mitigation Will be Secured	Relevance to Noise and Vibration Assessment	Relevance to Impact ID
CO70	A Construction Noise and Vibration Management Plan (CNVMP) will be provided as part of the Code of Construction Practice (CoCP). The CNVMP will be developed in accordance with the Outline CoCP and will set out the relevant noise and vibration management measures, including embedded best practicable means and site-specific mitigation and monitoring measures, to be adopted during construction.	DCO Requirement – Code of Construction Practice	Requires the Principal Contractor(s) to undertake construction noise and vibration calculations and monitoring post-consent. The results will be used to identify the required site-specific additional mitigation measures to avoid significant effects, which will form part of the site-specific CNVMP.	NV-C-01 NV-C-02
	Where any exceedance of noise and vibration thresholds of significance is identified during post-consent modelling or monitoring, appropriate additional mitigation measures will be identified and implemented to avoid significant construction noise and vibration effects.			

248. A draft version of the **Outline Code of Construction Practice** (document reference: 8.9) has been prepared for the PEIR for consultation and will be further refined and submitted along with the DCO application. Further to embedded best practicable means identified in **Table 25-5**, the Outline CoCP also includes additional mitigation measures to avoid significant construction noise and vibration effects that may be required, should any exceedances of noise and vibration thresholds be identified during post-consent modelling / monitoring. The site-specific additional mitigation measures will be detailed in the CNVMP developed post-consent by the Principal Contractor(s) as part of the CoCP. Indicative additional mitigation measures which are included in the Outline CoCP are identified in **Table 25-35**.

Table 25-35 Indicative Additional Mitigation Measures Included in the Outline Code of Construction Practice

Outline CoCP: Additional Mitigation Measures for Construction Noise and Vibration
Construction Nosie and Vibration Management Plan (CNVMP) (to be developed post-consent) Following the application of embedded best practicable means, should residual effects identified in the CNVMP exceed the relevant noise and / or vibration threshold(s) of significance, additional mitigation measures will be proposed to reduce the effects to non-significant levels. Potential additional mitigation options may include the following but will vary depending on the site and nature of works: • Increasing separation distance between works and sensitive receptors, including micro-siting onshore export cables and trenchless crossings to locate entry pits as far away as practicable from sensitive receptors; • Selection of alternative plant, equipment and construction methods with lower noise / vibration impacts; • Use of additional exhaust noise attenuators on noisy plant and equipment;

Outline CoCP: Additional Mitigation Measures for Construction Noise and Vibration

- Reduced numbers / on-time operations of plant and equipment during sensitive periods of the working day such as in the early mornings;
- Reviewing the construction programme to:
- Schedule noisiest activities to the least sensitive times (and vice versa);
- Minimise the duration of works at the closest approach to sensitive receptors where practicable;
- Schedule works to avoid high noise levels at sensitive receptors for more than ten days in any 15 consecutive days, or 40 days in any six consecutive months; and
- Installation of additional temporary screening and / or enclosures around plant and equipment or at works boundary.

25.8 Cumulative Effects

249. Cumulative effects are the result of the impacts of the Project acting in combination with the impacts of other proposed and reasonably foreseeable developments on receptors. This includes plans and projects that are not inherently considered as part of the current baseline.

250. The overarching framework used to identify and assess cumulative effects is set out in **Chapter 6 Environmental Impact Assessment Methodology**. The four-stage approach is based upon the Planning Inspectorate's Nationally Significant Infrastructure Projects (NSIP): Advice on Cumulative Effects Assessment (The Planning Inspectorate, 2024). The fourth stage of the process is the assessment stage, which is detailed within the sections below for potential cumulative effects on noise and vibration receptors.

25.8.1 Screening for Potential Cumulative Effects

251. The first step of the CEA identifies which impacts associated with the Project alone, as assessed under **Section 25.1**, have the potential to interact with other plans and projects to give rise to cumulative effects.

252. All potential cumulative effects to be taken forward in the CEA are detailed in **Table 25-36** with a rationale for screening in or out. Only impacts determined to have a residual effect of negligible or greater are included in the CEA. Where an assessment of effects has been scoped out, these impacts are excluded, as there is no potential for them to contribute to a cumulative effect.

Table 25-36 Noise and Vibration – Potential Cumulative Effects

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
Construction			
NV-C-01	Construction noise – onshore construction activities such as open cut trenching and OCS and ESBI construction	Yes	Construction works associated with other projects in similar locations to the Project's construction activities have the potential to result in cumulative effects, where there is a temporal overlap.
NV-C-02	Construction vibration – onshore construction activities such as trenchless cable installation and use of vibratory rollers and compactors	Yes	
NV-C-03	Construction road traffic noise – construction vehicles on the public highway	Yes	There is the potential for road traffic introduced by the construction of the Project and traffic introduced by other nearby projects to result in cumulative road traffic noise impacts, where there is a temporal overlap.
NV-C-04	Construction road traffic vibration – construction vehicles on the public highway	No	Evidence of an absence of a likely significant effect has been presented and vibration impacts due to construction traffic using public roads are not assessed further. Therefore, there is no potential for significant cumulative effects.
Operation and Maintenance			
NV-O-01	Operational noise – operational plant at the OCS and ESBI	Yes	There is the potential for cumulative operational noise impacts with projects that are introducing industrial / commercial noise sources nearby to the OCS and ESBI.

Impact ID	Impact and Project Activity	Potential for Cumulative Effects	Rationale
NV-O-02	Operational vibration – operational plant at the OCS and ESBI	No	Evidence of an absence of a likely significant effect has been presented and operational vibration and operational road traffic noise and vibration impacts are not assessed further. Therefore, there is no potential for significant cumulative effects.
NV-O-03	Operational road traffic noise – O&M vehicles on the public highway	No	
NV-O-04	Operational road traffic vibration – O&M vehicles on the public highway	No	
Decommissioning			
There is insufficient information available on other plans and projects which could have a spatial and temporal overlap with the Project's onshore decommissioning works. The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see **Table 25-4**, Commitment ID CO56). This will include a detailed assessment of decommissioning impacts and appropriate mitigation measures to avoid significant effects, including cumulative effects. For this assessment, it is assumed that cumulative decommissioning effects would be of similar nature to, and no worse than, those identified during the construction phase.			

253. As discussed in **Chapter 26 Traffic and Transport**, only a preliminary assessment of cumulative traffic and transport effects has been undertaken for the PEIR, and a full CEA will be undertaken at ES stage. The CEA section of **Chapter 26 Traffic and Transport** is limited to identifying other plans and projects which will be included in the CEA to be presented in the ES. The traffic data for these cumulative plans and projects, which is required to undertake assessments of cumulative traffic noise effects, will therefore not be available until preparation of the ES. Hence, the cumulative traffic noise effects will be assessed in the ES.

254. As discussed in **Section 25.7.1.4**, construction road traffic vibration impacts are not considered to have the potential to cause likely significant effects. Similarly, **Section 25.7.2.2** and **Section 25.7.2.3** explain that operational vibration impacts and operational road traffic noise and vibration impacts do not have the potential to cause likely significant effects. Hence, these impacts are excluded from the scope of the CEA.

25.8.2 Screening for Other Plans / Projects

255. The second step of the CEA identifies a short-list of other plans and projects that have the potential to interact with the Project to give rise to significant cumulative effects during the construction and O&M phases. The short-list provided in **Table 25-37** has been produced specifically to assess cumulative effects on noise and vibration receptors. The exhaustive list of all onshore plans and projects considered in the development of the Project's CEA framework is provided in **Volume 2, Appendix 6.5 Cumulative Effects Screening Report - Onshore**.

256. Developments that were fully operational during baseline characterisation, including at the time of site-specific surveys, are considered as part of baseline conditions for the surrounding environment. It is assumed that any residual effects associated with these developments are captured within the baseline information. As such, these developments are not subject to further assessment within the CEA and excluded from the screening exercise presented in **Table 25-37**.

257. For developments that were not fully operational, including those in planning / pre-construction stages or under construction, during baseline characterisation and operational developments with potential for ongoing impacts, these are included in the screening exercise presented in **Table 25-37**.

258. The screening exercise has been undertaken based on available information on each plan or project up to and including 31st December 2024. Information has been obtained from the Planning Inspectorate's NSIP portal, ERYC and Hull City Council planning portals. It is noted that further information regarding the identified plans and projects may become available between PEIR publication and DCO application submission or may not be available in detail prior to construction. The assessment presented here is therefore considered to be conservative at the time of PEIR publication. The list of plans and projects will be updated at ES stage to incorporate more recent information at the time of writing.

259. Plans and projects identified in **Table 25-37** have been assigned a tier based on their development status, the level of information available to inform the CEA and the degree of confidence. A three-tier system based on the Planning Inspectorate Advice Note Seventeen has been adopted (The Planning Inspectorate, 2024).

260. The zone of influence (ZoI) used to identify relevant plans and projects for the noise and vibration CEA depends on the element of the Project with the potential to cause cumulative effects. The onshore ECC only has the potential to cause construction effects at receptors within the Construction Noise Study Area (300m from the Onshore Development Area) and the receptors experience cumulative construction impacts from another project 300m away from it. Hence, the ZoI for the onshore ECC is 600m. The OCS and ESBI have the potential to cause operational effects; in accordance with standard EIA practice, the ZoI for the OCS zones is 1km.

261. Each plan or project presented in **Table 25-37** has been considered on a case-by-case basis. Only plans and projects with potential for significant cumulative effects with the Project are taken forward to a detailed assessment, which are screened based on the following criteria:

- There is potential that a pathway exists whereby an impact could have a cumulative effect on a receptor;
- The impact on a receptor from the Project and the plan or project in consideration has a spatial overlap (i.e. occurring over the same area);
- The impact on a receptor from the Project and the plan or project in consideration has a temporal overlap (e.g. occurring at the same time);
- There is sufficient information available on the plan or project in consideration and moderate to high data confidence to undertake a meaningful assessment; and
- There is some likelihood that the residual effect (i.e. after accounting for mitigation measures) of the Project could result in significant cumulative effects with the plan or project in consideration.

262. The CEA for noise and vibration has identified a total of three plans and projects where significant cumulative construction effects could arise in combination with the Project. A detailed assessment of these cumulative effects is provided in the section below. No plans or projects have been identified where significant cumulative operational effects could arise in combination with the Project.

Table 25-37 Short List of Plans / Projects for the Noise and Vibration Cumulative Effect Assessment

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to Onshore ECC (km)	Closest Distance to OCS Zone 4 (km)	Closest Distance to OCS Zone 8 (km)	Potential for Significant Cumulative Effects	Rationale
A164 And Jock's Lodge Junction Improvement Scheme Adjacent to and South of Beverley Road (20/01073/STPLF)	Road Improvement Scheme	Under Construction	1	Construction: 2024 to 2026 Operation: 2027+	0.77	0.40	1.94	No	The road improvement works will be complete before the Project's construction works commence. Hence, there is no potential for temporal overlap of construction activities. The road improvement works could change road traffic noise levels in the Operational Noise Study Area around OCS Zone 4. This could change the baseline noise levels at these NVSR but would not cause a cumulative operational noise effect.
Dogger Bank A Offshore Wind Farm (EN010021)	Offshore Wind Farm	Operational	1	Operation: 2025+	0	0.50	2.66	No	These wind farms will be / are operational prior to commencement of the Project's construction phase. Operational noise from the Dogger Bank A and B converter station may be present in the baseline sound climate at receptors impacted by operational noise from the Project's OCS / ESBI infrastructure. However, this would only increase baseline noise levels from those which were measured to inform this assessment (i.e. reduce the Project's operational noise effects). Hence, operational cumulative effects are screened out.
Dogger Bank B Offshore Wind Farm (EN010021)	Offshore Wind Farm	Under Construction	1	Construction: 2020 to 2025 Operation: 2026+	0	0.50	2.66		
Dogger Bank South Offshore Wind Farms (EN010125)	Offshore Wind Farm	Examination	1	Construction: 2026 to 2033 Operation: 2034+	0	0.10	0.30	Yes	There is the potential for a temporal overlap of construction activities which could cause cumulative effects within the Construction Noise Study Area. Hence, cumulative construction effects are screened in. Operational noise from the Dogger Bank South's onshore substations may be present in the baseline sound climate at receptors impacted by operational noise from the Project's OCS and ESBI infrastructure. However, this would only increase baseline noise levels from those which were measured to inform this assessment (i.e. reduce the Project operational noise effects). Hence, cumulative operational effects are screened out.
Hornsea Project Four Offshore Wind Farm (EN010098)	Offshore Wind Farm	Under Construction	1	Construction: 2024 to 2028 Operation: 2029+	0	0.11	0.01	No	The wind farm would be operational prior to commencement of the Project's construction phase. The only aspect of the wind farm with the potential to cause cumulative operational effects is the Hornsea Four onshore substation. However, this is further than 1km from either proposed OCS zones.
Skipsea Sands Holiday Park (22/01741/PLF)	Leisure Facility	Approved	1	Construction: Unknown	0.20	23.6	26.0	No	There is a potential for a temporal overlap with construction of the Project which could cause cumulative effects at receptors within the Construction Noise Study Area. However, noise and vibration effects arising from construction of projects of this scale are likely to be relatively minor, and therefore it is considered that there is not the potential for significant cumulative effects. These schemes are sufficiently far from the OCS zones that significant cumulative operational noise effects are not anticipated.
Erection of a Leisure Hub (19/04358/STPLF/ 23/03025/STREM)	Leisure Facility	Approved	1	Construction: Unknown	0.54	21.33	23.77	No	

Project / Plan	Development Type	Status	Tier	Construction / Operation Period	Closest Distance to Onshore ECC (km)	Closest Distance to OCS Zone 4 (km)	Closest Distance to OCS Zone 8 (km)	Potential for Significant Cumulative Effects	Rationale
Erection of 39 Dwellings at Land East of 30 Canada Drive (24/00410/PLF)	Residential Development	Pending Consideration	1	Construction: Unknown	0.56	6.38	6.14	No	
Field House Solar Farm (22/00824/STPLF)	Solar Farm	Approved	1	Construction: Unknown Operation: Unknown	0.39	7.44	9.99	No	
High Farm Holiday Park (22/03269/STPLF)	Leisure Facility	Approved	1	Construction: Unknown	0.39	7.44	9.99	No	
Creyke Beck Solar Farm (21/02335/STPLF)	Solar Farm	Approved	1	Construction: Unknown Operation: Unknown	0.33	1.05	1.56	No	
Peartree Hill Solar Farm (EN010157)	Solar Farm	Planning	2	Construction: 2026 to 2027 Operation: 2028+	0.42	1.05	2.66	No	The solar farm will be operational prior to commencement of the Project's construction phase and would not have the potential to cause a cumulative operational effect.
Birkhill Wood National Grid Substation	Electricity Transmission Infrastructure	Planning	3	Construction: 2026 to 2030 Operation: 2031+	0	1.11	2.31	Yes	No planning application for the new substation has been submitted at this stage, but there is potential for spatial and temporal overlap of construction activities in the Construction Noise Study Area. Hence, cumulative construction effects are screened in. The proposed substation project is further than 1km from either proposed OCS zones. Hence, cumulative operational effects are screened out.
North Humber to High Marnham Grid Upgrade (EN020034)	Electric Transmission Infrastructure	Planning	3	Construction: 2028 to 2030 Operation: 2031+	0	0.89	0.41	Yes	Potential for spatial and temporal overlap of construction activities in the Construction Noise Study Area. Hence, cumulative construction effects are screened in. The aspects of the grid upgrade project with the potential to cause operational effects are further than 1km from either proposed OCS zone. Hence, cumulative operational effects are screened out.

25.8.3 Assessment of Cumulative Effects

263. As described in **Table 25-37** there is the potential for cumulative construction noise and vibration effects as a result of the following cumulative projects and the Project:

- Dogger Bank South Offshore Wind Farms;
- North Humber to High Marnham Grid Upgrade; and
- Birkhill Wood National Grid Substation.

264. Similar to the approach noted in **Section 50**, there is potential for the CEA for the OCS zone infrastructure to differ based on the development scenario taken forward at ES stage. Where the assessment outcomes are likely to differ, these have been reported separately below. Only one OCS zone option will be taken forward to development.. Therefore, there is no cumulative development scenario in which both OCS zones would be considered in the CEA.

25.8.3.1 Cumulative Impact 1: Construction Noise (NV-C-01)

25.8.3.1.1 Receptor Sensitivity (OCS Zones 4 and 8)

265. As shown in **Table 25-20**, all identified NVSR in the Construction Noise Study Area are residential in nature. In accordance with the criteria presented in **Table 25-9**, the sensitivity of the receptor is therefore **medium**.

25.8.3.1.2 Cumulative Impact Magnitude

266. Due to the proximity of the identified projects to the Project and potential temporal overlap in construction phases, there is the potential for cumulative construction noise effects. However, such impacts would only occur if works were undertaken within 300m of the same shared NVSR and within six months of each other. The six-month criteria is based on BS 5228-1, which is taken to imply that a gap of this duration between periods of working eliminates the potential for significant disturbance effects. Given that the onshore construction works for the Project's onshore ECC and the vast majority of the Dogger Bank South Offshore Wind Farms and North Humber to High Marnham Grid Upgrade projects are of a linear nature, with a relatively short duration of works in any one location, cumulative impacts are considered unlikely to occur.

267. Cumulative construction noise impacts could occur if sources of potential longer-term impacts at a fixed location (e.g. a substation / converter station or a temporary construction compound) associated with a cumulative project and the Project are within 300m of the same NVSR, and the works will be undertaken within six months of each other. There is insufficient detail available on the North Humber to High Marnham Grid Upgrade project to determine whether this will occur. However, this project will be required to minimise its construction noise impacts using best practicable means in accordance with the CoPA. Therefore, cumulative impacts would be expected to be no worse than **low**.

268. The Birkhill Wood National Grid Substation is further than 1km from any source of potential longer-term impacts at a fixed location associated with the Project. Hence, cumulative impacts are anticipated to be **negligible**.

269. There are potential sources of longer-term construction noise impacts associated with the Dogger Bank South Offshore Wind Farms project and the Project that are within 600m of each other. The following sections assess the potential cumulative impacts separately by OCS zone.

25.8.3.1.2.1 OCS Zone 4

270. The Dogger Bank South Offshore Wind Farms project includes a proposed satellite temporary construction compound within 600m of potential sources of longer-term impacts associated with the Project (OCS Zone 4 and two temporary construction compound locations for onshore ECC construction works). The Noise and Vibration chapter of the ES for Dogger Bank South (June 2024) has been reviewed and the shared NVSR with the potential to experience cumulative effects identified. These are identified in **Table 25-38**, along with the predicted construction noise levels from Dogger Bank South's ES.

Table 25-38 NVSR with the Potential to Experience Cumulative Effects with Dogger Bank South Offshore Wind Farms

NVSR	Dogger Bank South's Reference	Dogger Bank South's Predicted Noise Level from Temporary Construction Compound Works (dB, L_{Aeq})
SSR6	R46	52
SSR7	R43	58
SSR8	R66	56
SSR9	R67	51
SSR17	R57	Not calculated as outside of Construction Noise Study Area

271. If construction works in the identified locations occur within six-months of each other, there is the potential for cumulative effects, either due to an extended duration of impact or, if the works occur simultaneously, an increase in noise levels at the identified NVSR. However, the predicted Dogger Bank South construction noise levels are all at least 10dB below the threshold for the onset of potentially significant construction noise effects identified in **Section 25.5.3.3**. Hence, cumulative impacts cannot be any worse than **low**.

25.8.3.1.2.2 OCS Zone 8

272. The Dogger Bank South Works Plans (Onshore), Drawing Number ED13554-GE-1060 (June 2024) show the location of the proposed HVDC converter station footprint, which is approximately 330m from OCS Zone 8 at their closest approach. The shared NVSR with the greatest potential to experience cumulative impacts is SSR17 (Dogger Bank South Offshore Wind Farms Noise and Vibration ES Chapter reference R57). However, this is further than 300m from the Dogger Bank South's DCO limits. Hence, construction noise impacts have not been calculated at the receptor and are assumed to be no worse than negligible. SSR17 is also further than 300m from OCS Zone 8, and the Project's construction noise impacts are therefore also **negligible**.

25.8.3.1.3 Cumulative Effect Significance

273. For all cumulative projects, the sensitivity of the receptor is **medium**. For the Birkhill Wood National Grid Substation, the magnitude of impact is **negligible**. Hence, the effect is of **minor adverse** significance, which **is not** significant in EIA terms. For the Dogger Bank South Offshore Wind Farms project, the magnitude of impact is no worse than **low**. Hence, the effect is of **minor adverse** significance, which is **not significant** in EIA terms.

274. There is insufficient detail available on the North Humber to High Marnham project to determine the cumulative impact magnitude. Cumulative impacts are assumed to be **low**. Hence, the effect is of **minor adverse** significance, which is **not significant** in EIA terms. This will be re-examined in the CEA prepared at ES stage based on publicly available information at the time.

25.8.3.2 Cumulative Impact 2: Construction Vibration (NV-C-02)

25.8.3.2.1 Receptor Sensitivity (OCS Zones 4 and 8)

275. All identified NVSR in the Construction Vibration Study Area are residential in nature. Hence, the sensitivity of the receptor is **medium**.

25.8.3.2.2 Cumulative Impact Magnitude

276. Due to the proximity of the identified projects to the Project and potential temporal overlap, there is the potential for cumulative construction vibration effects, if works are undertaken within 100m of the same shared NVSR and within six months of each other. Due to the linear nature of the Dogger Bank South Offshore Wind Farms and North Humber to High Marnham Grid Upgrade projects, with a relatively short duration of works in any one location, cumulative impacts are considered unlikely to occur. In addition, the only construction works associated with the Project with the potential to cause likely significant effects are ground compaction and trenchless crossings, which are of short duration in any one location. It is also the case that the identified cumulative projects are also unlikely to comprise works emitting high levels of vibration in one location for a long period. The only exception to this would be if they required extended periods of piling. However, none of the cumulative projects are proposing a substation or similar permanent infrastructure within 100m of a shared NVSR which could be exposed to high levels of vibration from the Project. Cumulative vibration impacts are therefore considered to be **negligible**.

25.8.3.2.3 Cumulative Effect Significance

277. The sensitivity of the receptor is **medium** and the magnitude of impact is **negligible**. Hence, the effect is of **minor adverse** significance, which is **not significant** in EIA terms.

25.8.3.3 Cumulative Impact 3: Construction Road Traffic Noise (NV-C-03)

278. As discussed in **Section 25.8.1**, the traffic data for cumulative schemes, which is required to undertake assessments of cumulative traffic noise effects, will not be available until preparation of the ES. Hence, the cumulative traffic noise effects will be assessed in the ES.

25.8.3.4 Cumulative Impact 4: Operational Noise (NV-O-01)

279. As noted in **Section 25.8.2**, no plans or projects have been identified where significant cumulative operational effects could arise in combination with the Project.

25.9 Inter-Relationships and Effects Interactions

25.9.1 Inter-Relationships

280. Inter-relationships are defined as effects arising from residual effects associated with different environmental topics acting together upon a single receptor or receptor group. Potential inter-relationships between noise and vibration and other environmental topics have been considered, where relevant, within the PEIR. **Table 25-39** provides a summary of key inter-relationships and signposts to where they have been addressed in the relevant chapters.

281. Inter-relationships between other environmental topics and impacts NV-C-04 (construction road traffic vibration), NV-O-02 (operational vibration), NV-O-03 (operational road traffic noise) and NV-O-04 (operational road traffic vibration) are not expected. This is because these impacts do not have the potential to cause likely significant effects, either on their own or acting together with other potential environmental effects of the Project.

Table 25-39 Noise and Vibration – Inter-Relationships with Other Topics

Impact ID	Impact and Project Activity	Related EIA Topic	Where Assessed in the PEIR Chapter	Rationale
Construction				
NV-C-01 NV-C-02 NV-C-03	Construction noise – onshore construction activities such as open cut trenching and OCS and ESBI construction Construction vibration – onshore construction activities such as trenchless cable installation and use of vibratory rollers and compactors	**Chapter 23 Onshore Ecology and Ornithology**	**Section 25.7.1.1, Section 25.7.1.2** and **Section 25.7.1.3**	Construction noise and vibration emissions have the potential to affect onshore ecological and ornithological receptors.
		Chapter 24 Onshore Archaeology and Cultural Heritage		Construction noise and vibration emissions have the potential to disturb the setting of onshore cultural heritage receptors.
		Chapter 29 Human Health		Construction noise and vibration emissions have the potential to affect population and human health.
	Construction road traffic noise – construction vehicles on the public highway	**Chapter 30 Socio-Economics, Tourism and Recreation**		Construction noise and vibration emissions have the potential to affect amenity, business, tourism and employment.
Operation and Maintenance				
NV-O-01	Operational noise – operational plant at the OCS and ESBI	**Chapter 23 Onshore Ecology and Ornithology**	**Section 25.7.2.1**	Operational noise emissions have the potential to affect onshore ecological and ornithological receptors.
		Chapter 24 Onshore Archaeology and Cultural Heritage		Operational noise emissions have the potential to disturb the setting of onshore cultural heritage receptors.
		Chapter 29 Human Health		Operational noise emissions have the potential to affect population and human health.
		Chapter 30 Socio-Economics, Tourism and Recreation		Operational noise emissions have the potential to affect amenity, business, tourism and employment.
Decommissioning				
The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see **Table 25-3,** Commitment ID CO56). For this assessment, it is assumed that inter-relationships during the decommissioning phase would be of similar nature to those identified during the construction phase.				

25.9.2 Interactions

282. The impacts identified and assessed in this chapter have the potential to interact with each other. Potential interactions between impacts are identified in **Table 25-40**. Where there is potential for interaction between impacts, these are assessed in **Table 25-41** for each receptor or receptor group.

283. Interactions are assessed by development phase ("phase assessment") to see if multiple impacts could increase the overall effect significance experienced by a single receptor or receptor group during each phase. Following from this, a lifetime assessment is undertaken which considers the potential for multiple impacts to accumulate across the construction, O&M and decommissioning phases and result in a greater effect on a single receptor or receptor group. When considering synergistic effects from interactions, it is assumed that the receptor sensitivity remains consistent, while the magnitude of different impacts is additive.

Table 25-40 Noise and Vibration – Potential Interactions between Impacts throughout the Project's Lifetime

Construction, Operation and Maintenance

	NV-C-01	NV-C-02	NV-C-03	NV-C-04	NV-O-01	NV-O-02	NV-O-03	NV-O-04
Construction noise (NV-C-01)		Yes	Yes	No	Yes	No	No	No
Construction vibration (NV-C-02)	Yes		Yes	No	Yes	No	No	No
Construction road traffic noise (NV-C-03)	Yes	Yes		No	Yes	No	No	No
Construction road traffic vibration (NV-C-04)	No	No	No		No	No	No	No
Operational noise (NV-O-01)	Yes	Yes	Yes	No		No	No	No
Operational vibration (NV-O-02)	No	No	No	No	No		No	No
Operational road traffic noise (NV-O-03)	No	No	No	No	No	No		No
Operational road traffic vibration (NV-O-04)	No	No	No	No	No	No	No	

Decommissioning

The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see **Table 25-3**, Commitment ID CO56).

For this assessment, it is assumed that interactions during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.

Table 25-41 Interaction Assessment – Phase and Lifetime Effects

Receptor	Impact ID	Highest Significance Level			Phase Assessment	Lifetime Assessment
		Construction	Operation and Maintenance	Decommissioning		
Human receptors (e.g. residential dwellings and other noise and vibration sensitive locations)	NV-C-01 NV-C-02 NV-C-03 NV-O-01	Major adverse (night-time trenchless crossing works along the onshore ECC)	Minor adverse	TBC – assumed no greater than construction	**Construction**: No greater than individually assessed impact. Given the predicted effect significance and that each impact will be managed with mitigation measures, it is considered that there would either be no interactions or that these would not result in greater impact than assessed individually. **Operation and Maintenance**: No greater than individually assessed impact. Only one impact (NV-O-01) is identified. Hence, there is no potential for interactions between impacts during the O&M phase. **Decommissioning**: No greater than individually assessed impact. For assessment purposes, it is assumed that decommissioning impacts will be of similar nature to, and no worse than, construction impacts.	No greater than individually assessed impact. Noise and vibration impacts from the landfall and onshore ECC will only occur during the construction and decommissioning phases of the Project. These impacts will be temporally separated by the O&M phase (approximately 35 years). Therefore, these impacts will not combine to increase their significance level. The construction and operation of the OCS and ESBI has the potential to result in noise effect interactions, as the most exposed NVSR will be the same for both phases, essentially extending the duration of their exposure to noise associated with the Project. However, the adopted operational noise level criteria (Commitment ID CO71) are sufficiently stringent to avoid significant effects over the O&M phase of the Project, irrespective of their duration. Therefore, it is considered that these impacts would not combine to increase the significance level. It is therefore considered that over the Project's lifetime, these impacts would not interact to change the overall effect significance.

25.10 Monitoring Measures

284. The Outline CoCP requires that the site-specific CNVMP, which will be developed post-consent by the Principal Contractor(s) as part of the CoCP (see **Table 25-34**, Commitment ID CO70), includes procedures for monitoring construction noise and vibration. In addition, Commitment ID CO71 (see **Table 25-34**) requires the submission of an operational noise investigation protocol to the relevant authorities for approval, detailing the operational noise monitoring that will be undertaken in the event of a complaint. These construction and O&M phase monitoring measures will provide evidence that the actual noise and vibration levels are below the thresholds for the onset of significant effects or identify a requirement for additional mitigation measures. No additional monitoring measures are therefore proposed.

25.11 Summary

285. **Table 25-42** presents a summary of the preliminary results of the assessment of likely significant effects on noise and vibration during the construction, operation and decommissioning of the Project.

286. This chapter has been developed with regard to the legislative and policy framework outlined in **Section 25.2** and further informed by consultation with ERYC and Hull City Council (see **Section 25.3**).

287. The existing noise and vibration environment at NVSR has been characterised using a site-specific baseline noise survey (details are presented in **Volume 2, Appendix 25.2 Noise and Vibration Baseline Report**) and following current best practice and guidance.

288. Construction noise and vibration assessments were undertaken based on a preliminary understanding of the mobile / fixed construction plant and machinery required to build the Project at the landfall, onshore ECC and OCS zones. With the application of embedded best practicable means and additional mitigation measures to be specified in the site-specific CNVMP developed post-consent as part of the CoCP, the residual effect upon all receptors was assessed to be not significant in EIA terms, except for night-time trenchless crossing works which are predicted to have the potential to result in significant noise effects.

289. Construction road traffic noise impacts were assessed based on a preliminary understanding of the traffic flows likely to be generated by the construction of the Project. Calculations of road traffic noise levels with and without the construction of the Project concluded that residual effects will be no greater than minor adverse, which are not significant in EIA terms.

290. The assessment of operational noise has identified ranges of potential OCS / ESBI noise levels at NVSR associated with potential impact magnitudes. Compliance with these limits will ensure that operational noise effects are not significant in EIA terms.

25.12 Next Steps

291. The Noise and Vibration ES chapter will incorporate any additional data which becomes available following the submission of the PEIR and will consider any relevant stakeholder comments received as part of the statutory consultation.

292. With regard to operational noise impacts (NV-O-01), computational noise modelling will be undertaken at ES stage in order to predict impacts with and without mitigation, in addition to identifying appropriate OCS and ESBI noise level limits at nearby NVSR.

293. Regarding construction noise and vibration, updated assessments will be undertaken at ES stage based on additional available information and design refinement. Additional site-specific mitigation measures will be identified to reduce any identified significant adverse effects where required.

Table 25-42 Summary of Potential Effects Assessed for Noise and Vibration

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Receptor Sensitivity	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Construction									
NV-C-01	Construction noise – onshore construction activities such as open cut trenching and OCS and ESBI construction	CO39 CO69 CO76 CO80	Residential dwellings and other noise sensitive locations	**Medium**	**High** at: • NVSR LF2, CC6, CC24, CC35, CC40, CC43, CC54, SS4, SS14 and SS20; and • NVSR within 20m of jointing bay and link box construction works, 50m of junction improvement and other traffic modification works and 260m of trenchless crossing entry pits along the onshore ECC (due to night-time working). Medium at: • NVSR LF3, CC12 and SS3; and • NVSR that are 20 to 25m from jointing bay and link box construction works, 50 to 60m from junction improvement and other traffic modification works and 260 to 325m of trenchless crossing entry pits along the onshore ECC (due to night-time working). **Low or negligible** at all other NVSR.	**Major Adverse (Significant)** at NVSR experiencing high magnitude impacts **Moderate Adverse (Significant)** at NVSR experiencing medium magnitude impacts **Minor Adverse (Not Significant)** at NVSR experiencing low or negligible magnitude impacts.	CO70 Additional site-specific mitigation measures will be identified as required at ES stage to reduce the identified major and moderate adverse effects.	**Major Adverse (Significant)** at NVSR within 150m (LF2, CC10, CC11, CC12, CC14, CC17, CC18, CC24, CC25, CC27, CC29, CC32, CC34, CC35, CC36, CC38, CC40, CC41, CC42, CC43, CC45, CC52, CC56, SS5, SS6, SS17 and SS21) of potential trenchless crossing entry pits locations along the onshore ECC where night-time working may last for at least ten consecutive days. **Moderate Adverse (Significant)** at NVSR between 150 and 180m (LF1, LF3, CC4, CC5, CC13, CC16, CC19, CC31 and CC49) from potential trenchless crossing entry pits locations along the onshore ECC where night-time working may last for at least ten consecutive days. **Minor Adverse (Not Significant)** at all other NVSR and other construction activities besides night-time trenchless crossing works.	Construction noise monitoring procedures to be identified in CNVMP (CO70)
NV-C-02	Construction vibration – onshore construction activities such as trenchless cable installation and use of vibratory rollers and compactors	CO39 CO69 CO76 CO80	Residential dwellings and other vibration sensitive locations and structures	**Medium**	**Low or negligible**	**Minor Adverse** **(Not Significant)**	CO70 (to determine whether the impacts remain non-significant)	**Minor Adverse** **(Not Significant)**	Construction vibration monitoring procedures to be identified in CNVMP (CO70)

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Receptor Sensitivity	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
NV-C-03	Construction road traffic noise – construction vehicles on the public highway	CO69 CO73 CO74 CO75 CO76 CO80 CO102	Residential dwellings and other noise sensitive locations	**Medium**	**Low or negligible**	**Minor Adverse** **(Not Significant)**	N/A	**Minor Adverse** **(Not Significant)**	N/A
			Office	**Low**	**Medium**				
NV-C-04	Construction road traffic vibration – construction vehicles on the public highway	CO69 CO73 CO74 CO75 CO76 CO80 CO102	Not applicable as impacts not assessed. Evidence provided demonstrating absence of likely significant effect.						N/A
Operation and Maintenance									
NV-O-01	Operational noise – operational plant at the OCS and ESBI	CO71	Residential dwellings and other noise sensitive locations	**Medium**	**Low or negligible**	**Minor Adverse** **(Not Significant))**	N/A	**Minor Adverse** **(Not Significant)**	Operational noise investigation protocol (CO71)
NV-O-02	Operational vibration – operational plant at the OCS and ESBI	N/A	Residential dwellings and other vibration sensitive locations and structures	Not applicable as impacts not assessed. Evidence provided demonstrating absence of likely significant effect.					N/A
NV-O-03	Operational road traffic noise – O&M vehicles on the public highway	CO102	Residential dwellings and other noise sensitive locations						N/A
NV-O-04	Operational road traffic vibration – O&M vehicles on the public highway	CO102	Residential dwellings and other vibration sensitive locations and structures						N/A

Impact ID	Impact and Project Activity	Embedded Mitigation Measures	Receptor	Receptor Sensitivity	Impact Magnitude	Effect Significance	Additional Mitigation Measures	Residual Effect	Monitoring Measures
Decommissioning									
NV-D-01	Decommissioning noise – decommissioning activities not yet defined	CO56	The details and scope of onshore decommissioning works will be determined by the relevant regulations and guidance at the time of decommissioning and provided in the Onshore Decommissioning Plan (see **Table 25-4**, Commitment ID CO56). This will include a detailed assessment of decommissioning impacts and appropriate mitigation measures to avoid significant effects. For this assessment, it is assumed that impacts during the decommissioning phase would be of similar nature to, and no worse than, those identified during the construction phase.						
NV-D-02	Decommissioning vibration – decommissioning activities not yet defined								
NV-D-03	Decommissioning road traffic noise – decommissioning activities not yet defined								
NV-D-04	Decommissioning road traffic vibration – decommissioning activities not yet defined								

References

British Standards Institution (1993). British Standard 7385-2:2003 Evaluation and measurement for vibration in buildings - Part 2: Guide to damage levels from groundborne vibration. London: BSI.

British Standards Institution (2003). British Standard 7445-1:2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures. London: BSI.

British Standards Institution (1991). British Standard 7445-2:1991 Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use. London: BSI.

British Standards Institution (2014). British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 Noise. London: BSI.

British Standards Institution (2014). British Standard 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 Vibration. London: BSI.

British Standards Institution. (2014). British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings. London: BSI.

British Standards Institution. (2019). British Standard 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound. London: BSI.

Crabb, G. I., & Hiller, D. M. (2000). Report 429 Groundborne vibration caused by mechanised construction works. Transport Research Laboratory.

D.J. Rockhill, M. B. (2014). Ground-borne vibrations due to press-in piling operations. Cambridge Universities engineering Department. Available at: https://www.icevirtuallibrary.com/doi/epdf/10.1680/fiodap.32446.0070

DEFRA. (2010). Noise Policy Statement for England. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

Department for Environment, Food & Rural Affairs. (2010, March 15). Noise policy statement for England. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf [Accessed: June 14, 2023]

Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government. (2019, July 22). Planning Practice Guidance on Noise. Available at: https://www.gov.uk/guidance/noise--2 [Accessed: June 14, 2023]

Department of Energy and Climate Change. (2023a). Overarching NPS for Energy (EN-1) (Department of Energy Security and Net Zero). Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1

Department of Energy and Climate Change. (2023b). NPS for Renewable Energy Infrastructure (EN-3). Available at: https://assets.publishing.service.gov.uk/media/655dc352d03a8d001207fe37/nps-renewable-energy-infrastructure-en3.pdf

Department of Energy and Climate Change. (2023c). NPS for Electricity Networks Infrastructure (EN-5). Available at: https://assets.publishing.service.gov.uk/media/655dc25e046ed400148b9dca/nps-electricity-networks-infrastructure-en5.pdf

Department of Transport Welsh Office. (1988). Calculation of Road Traffic Noise. London: The Stationary Office.

East Riding of Yorkshire Council (2025). East Riding Local Plan Update 2025-2039: Strategy Document Update. Available at: https://downloads.eastriding.org.uk/corporate/pages/east-riding-local-plan-update/adoption-docs/LPU%20-%20Strategy%20Document%20Update%20Adopted%202025.pdf [Accessed 08 April 2025]

Highways England. (2020, May). LA 111 Noise and Vibration Revision 2. Available at: https://www.standardsforhighways.co.uk/tses/attachments/cc8cfcf7-c235-4052-8d32-d5398796b364?inline=true[Accessed [Accessed: June 15, 2023]

Hull City Council. (2017). Hull Local Plan: 2016 - 2032. Available at: https://www.hull.gov.uk/downloads/file/101/hull-local-plan-2016-to-2032

International Organization for Standardization. (2024). BS ISO 9613-2:2024 Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation. London: ISO.

International Standards Organization. (2010). ISO 4866: 2010 Mechanical vibration and shock - Vibration of fixed structures - Guidelines for the measurement of vibrations and evaluation of their effects on structures. London: ISO.

Martin, D. J. (1980). Ground vibrations from impact pile driving during road construction. Crowthorne: Transport and Road Research Laboratory.

Ministry of Housing, Communities and Local Government. (2021, July). National Planning Policy Framework. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [Accessed: June 14, 2023]

RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited (2024). Environmental Statement– Chapter 25 – Noise. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010125/EN010125-000452-7.25%20ES%20Chapter%2025%20-%20Noise.pdf [Accessed: January 2025]

RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited (2024). Volume 2 Works Plan (Onshore). Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010125/ EN010125-000374-2.6%20Works%20Plan%20-%20Onshore.pdf [Accessed: January 2025]

World Health Organisation. (1999). Guidelines for Community Noise. London: WHO.

World Health Organisation. (2009). Night Noise Guidelines for Europe. Copenhagen: WHO.

World Health Organisation. (2018). Environmental Noise Guidelines for the European Region. Available at: https://iris.who.int/bitstream/handle/10665/279952/9789289053563-eng.pdf?sequence=1 [Accessed: April 2024]

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List of Acronyms

Acronym	Definition
AAWT	Annual Average Weekday Traffic
BNL	Basic Noise Level
BPM	Best Practicable Means
BS	British Standard
BSI	British Standards Institution
CEA	Cumulative Effects Assessment
CoCP	Code of Construction Practice
CoPA	Control of Pollution Act 1974
CNVMP	Construction Noise and Vibration Management Plan
CRTN	Calculation of Road Traffic Noise
CTMP	Construction Traffic Management Plan
dB	Decibel
DBD	Dogger Bank D Offshore Wind Farm
DCO	Development Consent Order
DEFRA	Department for the Environment and Rural Affairs
DENSZ	Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ERYC	East Riding of Yorkshire Council
ES	Environmental Statement
ESBI	Energy Storage and Balancing Infrastructure
ETG	Expert Topic Group
GDG	Guideline Development Group
HDD	Horizontal Directional Drill
HGV	Heavy Goods Vehicle
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management and Assessment
IPC	Infrastructure Planning Commission
ISO	International Standards Organisation
km	Kilometre
LDV	Light Duty Vehicle
LOAEL	Lowest Observed Adverse Effect Level
MCZ	Marine Conservation Zone
MHWS	Mean High Water Springs
NNG	Night Noise Guideline
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPS	National Policy Statements
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Project
NVSR	Noise and Vibration Sensitive Receptor
O&M	Operation and Maintenance
OCS	Onshore Converter Station

Acronym	Definition
PAMP	Port Access Management Plan
PEIR	Preliminary Environmental Information Report
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PRoW	Public Rights of Way
SOAEL	Significant Observed Adverse Effect Level
TJB	Transition Joint Bay
TRRL	Transport and Road Research Laboratory
UK	United Kingdom
WHO	World Health Organisation
ZoI	Zone of Influence