The Great Grid Upgrade

North Humber to High Marnham

NHHM-AEC-CNS-CPR-0016

North Humber to High Marnham

Volume 6: Environmental Statement

Document 6.16 Environmental Statement Chapter 16 - Noise and Vibration

Final Issue A

October 2026

Planning Inspectorate Reference: EN020034

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

nationalgrid

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16. Noise and Vibration

16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) presents the assessment of likely significant noise and vibration effects on noise and vibration sensitive receptors (NSRs) that could result from the North Humber to High Marnham Project (the Project) as described in **Application Document 6.4 Chapter 4 Description of the Project**.

16.1.2 This chapter describes relevant legislation and policy, the scope of the assessment, the methodology used, the datasets that have informed the assessment, the baseline conditions, mitigation measures, and the residual significant effects that could result from the Project.

16.1.3 The Order Limits, which illustrate the boundary of the Project, are shown on **Application Document 6.1.F1 Figure 1.1 Project Location and Route Sections**.

16.1.4 This chapter should be read in conjunction with the following ES chapters:

- **Application Document 6.3 Chapter 3 Main Alternatives Considered**;
- **Application Document 6.4 Chapter 4 Description of the Project**;
- **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology**;
- **Application Document 6.8 Chapter 8 Ecology**;
- **Application Document 6.9 Chapter 9 Ornithology**;
- **Application Document 6.10 Chapter 10 Cultural Heritage**;
- **Application Document 6.14 Chapter 14 Traffic and Transport**;
- **Application Document 6.17 Chapter 17 Socio-economics, Recreation and Tourism**;
- **Application Document 6.18 Chapter 18 Health and Wellbeing**;
- **Application Document 6.20 Chapter 20 Intra-project Cumulative Effects**; and
- **Application Document 6.21 Chapter 21 Inter-project Cumulative Effects**.

16.1.5 This chapter is supported by the following figures:

- **Application Document 6.4.F2 Figure 4.2 Construction Traffic Routes**
- **Application Document 6.16.F1 Figure 16.1 Noise and Vibration Baseline**;
- **Application Document 6.16.F2 Figure 16.2 Construction Noise Assessment Outputs**; and
- **Application Document 6.16.F3 Figure 16.3 Construction Vibration Assessment Outputs**.

16.1.6 This chapter is supported by the following appendices:

- **Application Document 6.16.A1 Appendix 16.1 Regional and Local Planning Policy**;
- **Application Document 6.16.A2 Appendix 16.2 Baseline Noise Survey Data**;
- **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data**;
- **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment**; and
- **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment**.

16.1.7 This chapter is supported by the following application documents:

- **Application Document 6.5.A1 Appendix 5.1 Environmental Impact Assessment (EIA) Scoping Report**;
- **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion**;
- **Application Document 6.5.A3 Appendix 5.3 Scoping Response Tables**;
- **Application Document 7.2 Outline Code of Construction Practice**;
- **Application Document 7.3 Register of Environmental Actions and Commitments**; and
- **Application Document 7.7 Outline Noise and Vibration Management Plan**.

16.2 Regulatory and Planning Context

16.2.1 This section sets out the legislation and planning policy that is relevant to the noise and vibration assessment. A full review of compliance with relevant national, regional and local planning policy is provided within **Application Document 5.5 Planning Statement** submitted as part of the application for development consent.

16.2.2 **Application Document 6.2 Chapter 2 Legislation and Policy Context** describes the overall regulatory and planning policy context for the Project. Key legislation, policy, and planning guidance relevant to the assessment of noise and vibration effects of the Project is presented below.

Legislation

Control of Pollution Act 1974

16.2.3 The Control of Pollution Act 1974 (HM Government, 1974) sets out the framework for the legislative control of construction noise and vibration from construction sites. Section 71 refers to approved codes of practice, which include British Standard (BS) 5228 Part 1 (BSI, 2014a) and Part 2 (BSI, 2014b), as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 (HM Government, 2015). The principles of best practicable means (BPM) are defined in Section 72 of the Control of Pollution Act 1974 (HM Government, 1974)) along with how BPM should be applied to construction activity noise.

16.2.4 Section 61 of the Control of Pollution Act 1974 (HM Government, 1974) states that consent may be sought from the relevant local authorities prior to the construction

works commencing. If prior consent is sought, the relevant local authorities will need to be provided with information about the proposed construction works and how construction noise will be managed, including the use of BPM.

Environmental Protection Act 1990

16.2.5 Under Part III of the Environmental Protection Act 1990 (HM Government, 1990), local authorities have a duty to investigate noise complaints relating to a variety of sources but excluding road traffic noise. If the local authority is satisfied that the noise amounts to a statutory nuisance it shall serve an Abatement Notice, which may require that the noise be stopped altogether or limited to certain times.

National Policy

National Policy Statements

16.2.6 National Policy Statements (NPSs) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Project will be considered.

16.2.7 Table 16.1 and Table 16.2 provide details of the elements of the Overarching NPS for Energy (EN-1) (Department for Energy Security & Net Zero, 2025), referred to hereafter as NPS EN-1, and NPS for Electricity Networks Infrastructure (EN-5) (Department for Energy Security & Net Zero, 2025), referred to hereafter as NPS EN-5, that are relevant to the assessment of noise and vibration effects from the Project and how and where related information is provided in the ES and Application.

Table 16.1 – NPS EN-1 sections relevant to noise and vibration

NPS EN-1 section	Where this is covered in the application
5.12.1 '*Excessive noise can have wide-ranging impacts on the quality of human life and health such as annoyance, sleep disturbance, cardiovascular disease and mental ill-health. It can also have an impact on the environment and the use and enjoyment of areas of value such as quiet places and areas with high landscape quality.*'	The potential residual significant effects of noise and vibration from the Project during both construction and operation are set out in section 16.9 of this chapter.
5.12.2 '*The Government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to "noise" below apply equally to assessment of impacts of vibration*.'	The potential residual significant effects of noise and vibration during both construction and operation are considered in section 16.9 of this chapter. The assessments consider the implications of the Noise Policy Statement for England (NPSE) (Department for Environment, Food & Rural Affairs, 2010). Potential impacts on health are considered in **Application Document 6.18 Chapter 18 Health and Wellbeing**.
5.12.4 '*Noise resulting from a proposed development can also have adverse impacts*	**Application Document 6.8 Chapter 8 Ecology** assesses the impact of noise on

NPS EN-1 section	Where this is covered in the application
on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the Secretary of State in accordance with the Biodiversity and Geological Conservation section of this NPS at Section 5.4. This should consider underwater noise and vibration especially for marine developments. Underwater noise can be a significant issue in the marine environment, particularly in regard to energy production.'	ecological receptors. This includes the potential for propagation of noise into the aquatic environment. **Application Document 6.9 Chapter 9 Ornithology** also assesses the potential impacts of noise on ornithological receptors.
5.12.5 [part] '*Factors that will determine the likely noise impact of a proposed development include:* • *The inherent operational noise from the proposed development, and its characteristics;* • *The proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);* • *The proximity of the proposed development to quiet places and other areas that are particularly valued for their soundscape or landscape quality;* • *The proximity of the proposed development to sites where noise may have an adverse impact on protected species or other wildlife, including migratory species.'*	The assessment of noise and vibration effects presented in section 16.9 of this chapter considers the points noted.
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 characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any 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;*	The various requirements of this section are provided as follows. A description of the noise generating elements of the Project is provided in section 16.9 of this chapter, and associated appendices: • **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data;** • **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment; and** • **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment.** Noise sensitive receptors and areas are described in section 16.6 of this chapter and are shown in:

NPS EN-1 section	Where this is covered in the application
• *A prediction of how the noise environment will change with the proposed development:* – *In the shorter term, such as during the construction period;* – *In the longer term, during the operating life of the infrastructure; and* – *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 quality of life/well-being where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas;* • *If likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and* • *All reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life.'*	• **Application Document 6.16.A2 Appendix 16.2 Baseline Noise Survey Data; and** • **Application Document 6.16.F1 Figure 16.1 Noise and Vibration Baseline.** Predictions of how the noise environment would change in the short-term (during construction phase) and during particular times of the day, evening, and night, are provided in section 16.9 of this chapter, and associated appendices and figures: • **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data;** • **Application Document 6.16.F2 Figure 16.2 Construction Noise Assessment Outputs;** • **Application Document 6.16.F3 Figure 16.3 Construction Vibration Assessment Outputs; and** • **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment.** Predictions of how the noise environment would change in the long-term (during operational phase) and during particular times of the day, evening, and night are provided in section 16.9 of this chapter, and associated appendix **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment**. The assessment of predicted changes in the noise environment on NSRs are provided in section 16.9 of this chapter, and associated appendices and figures: • **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data;** • **Application Document 6.16.F2 Figure 16.2 Construction Noise Assessment Outputs;** • **Application Document 6.16.F3 Figure 16.3 Construction Vibration Assessment Outputs;** • **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment; and**

NPS EN-1 section	Where this is covered in the application
	• **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment.** Outline mitigation measures for construction and operational effects are detailed in sections 16.8 and 16.9 of this chapter.
5.12.7 '*The nature and extent of the noise assessment should be proportionate to the likely noise impact*.'	The assessments presented in this chapter are proportionate to the likely impact.
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*.'	An assessment of potential noise and vibration impacts from construction traffic is presented in section 16.9 of this chapter and **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment**.
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 NPSs. 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*.'	Assessments of construction noise and vibration, and operational noise, on NSRs are provided in section 16.9 of this chapter, and associated appendices and figures: • **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data;** • **Application Document 6.16.F2 Figure 16.2 Construction Noise Assessment Outputs;** • **Application Document 6.16.F3 Figure 16.3 Construction Vibration Assessment Outputs;** • **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment; and** • **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment.** The assessments consider appropriate guidance and standards, as detailed in section 16.4 of this chapter.
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 the EA and/or the SNCB, and other relevant bodies, such* [as] *the MMO or NRW, as necessary, and in*	**Application Document 6.8 Chapter 8 Ecology** assesses the impact of noise on ecological receptors. **Application Document 6.9 Chapter 9 Ornithology** assesses the potential impacts of noise on ornithological receptors. Consultation with relevant bodies is described in section 3 of both chapters.

NPS EN-1 section	Where this is covered in the application
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.'	
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.*'	An assessment of potential noise and vibration impacts is presented in section 16.9 of this chapter. Mitigation is outlined in section 16.8 of this chapter and in the following application documents: • **Application Document 7.2 Outline Code of Construction Practice;** • **Application Document 7.3 Register of Environmental Actions and Commitments; and** • **Application Document 7.7 Outline Noise and Vibration Management Plan.**
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* [National Planning Policy Framework] *or any successor to it and the Planning Practice Guidance on Noise.*' 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*	Details of embedded mitigation measures, control and management measures, and additional mitigation measures for mitigating potential effects from noise and vibration are presented in section 16.8 of this chapter. Further information is provided in the following application documents: • **Application Document 7.2 Outline Code of Construction Practice;** • **Application Document 7.3 Register of Environmental Actions and Commitments; and** • **Application Document 7.7 Outline Noise and Vibration Management Plan.**

NPS EN-1 section	Where this is covered in the application
evenings and late at night, and taking into account seasonality of wildlife in nearby designated sites; and • *Insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building.'*	
5.12.16 [part] '*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, the NPPF, and the government's associated planning guidance on noise.*'	The assessments presented in this chapter consider the relevant sections of the NPSE (Department for Environment, Food & Rural Affairs, 2010), and the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government, 2026).

Table 16.2 – NPS EN-5 sections relevant to noise and vibration

NPS EN-5 section	Where this is covered in the application
2.9.41 '*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*.'	The assessment of operational noise from the proposed overhead line on NSRs is provided in section 16.9 of this chapter and associated appendix **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment**. The assessment uses an appropriate methodology (National Grid Technical Guidance Note TGN(E)322 (National Grid, 2021)) to determine the sound level produced by the line in both dry and wet weather conditions.
2.9.42 '*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*.'	The assessment uses an appropriate noise propagation modelling methodology National Grid Technical Guidance Note TGN(E)322 (National Grid, 2021), in line with current practice.
2.9.43 '*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*.' 2.9.44 '*The Secretary of State is likely to regard it as acceptable for the applicant to use a methodology that demonstrably addresses these criteria*.'	The assessment of overhead line noise has been conducted in accordance with current guidance, namely National Grid Technical Guidance Note TGN(E)322 (National Grid, 2021).
2.10.9 '*Applicants must consider the following measures:*	The route alignment has been designed, as far as practicable, to avoid NSRs. This would include

NPS EN-5 section	Where this is covered in the application
• *The positioning of lines to help mitigate noise;* • *Ensuring that the appropriately sized conductor arrangement is used to minimise potential noise;* • *Quality assurance through manufacturing and transportation to avoid damage to overhead line conductors which can increase potential noise effects;* • *Ensuring that conductors are kept clean and free of surface contaminants during stringing/installation; and* • *The selection of the quietest cost-effective plants.'*	avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby NSRs being isolated dwellings and small settlements. The Project would include 'triple Araucaria' conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons) for new transmission infrastructure along the majority of the route. The exceptions are potentially the River Ouse crossing, where flexibility in design is required, and the diversion of the existing ZDA route, where a like for like conductor replacement is proposed. These are set out in **Application Document 6.4 Chapter 4 Description of the Project**. Due to its geometrical configuration, the 'triple Araucaria' design is the least electrically stressed conductor system that National Grid uses. It is the best design for reducing the effects of line crackle (corona discharge) and would reduce the generation of noise from the proposed overhead line during operation. National Grid will follow established quality assurance procedures covering the manufacture, transportation and installation of overhead line conductors and fittings. Conductors will be handled and installed in accordance with approved procedures to avoid surface damage and contamination that could increase corona discharge activity and audible noise.
2.10.10 '*In addition, the ES should include information on planned maintenance arrangements. Where detail is not included, the Secretary of State should consider stipulating appropriate maintenance arrangements by way of requirements attached to any grant of development consent.*'	Noise and vibration impacts from maintenance have been scoped out, with agreement of the Planning Inspectorate as set out in Table 16.4, and no assessment has therefore been provided. Further details are provided in section 16.3 of this chapter.

National Planning Policy Framework

16.2.8 The National Planning Policy Framework (NPPF) as revised in August 2026 (Ministry of Housing, Communities & Local Government, 2026) sets out national planning policies that reflect priorities of the Government for the operation of the planning system and the economic, social, and environmental aspects of the development and use of land. The NPPF (Ministry of Housing, Communities & Local Government, 2026) has a strong emphasis on sustainable development, with a presumption in favour of such development. Although the NPSs set out the primary policy tests for

the Project, the NPPF (Ministry of Housing, Communities & Local Government, 2026) has the potential to be considered important and relevant to the consideration of the Project by the Secretary of State (SoS).

16.2.9 Table 16.3 provides details of the elements of the NPPF (Ministry of Housing, Communities & Local Government, 2026) that relate to the noise and vibration assessment, and how and where they are covered in the ES and application.

Table 16.3 – NPPF sections relevant to noise and vibration

NPPF section	Where this is covered in the application
Policy P3: Living conditions and pollution: *'1. Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of pre-existing conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where certain groups could be particularly vulnerable to its effects, such as children and older people).'*	An assessment of potential noise and vibration impacts is presented in section 16.9 of this chapter. The assessment considers the sensitivity of the NSRs and takes account of existing baseline noise and vibration environment.
Policy P3: Living conditions and pollution: *'2. Within this context development proposals should:* *a. Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions.* *b. Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting)'*	An assessment of impacts from noise and vibration is presented in section 16.9 of this chapter. The assessments show how unacceptable and significant adverse effects will be avoided, and adverse effects will be mitigated and minimised. Mitigation measures to reduce potential adverse impacts resulting from noise and vibration associated with the Project are detailed in section 16.8 of this chapter, together with **Application Document 7.2 Outline Code of Construction Practice**, **Application Document 7.3 Register of Environmental Actions and Commitments**, and **Application Document 7.7 Outline Noise and Vibration Management Plan**.

NPPF section	Where this is covered in the application
[…] *d. Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason)'*	

Noise Policy Statement for England

16.2.10 The NPSE (Department for Environment, Food & Rural Affairs, 2010) sets out the long-term vision of Government noise policy: to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

16.2.11 The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- 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.

16.2.12 The NPSE uses the key terms 'significant adverse' and 'adverse' in defining its aims. These terms directly link the NPSE to Policy P3 of the NPPF (Ministry of Housing, Communities & Local Government, 2026) which adopts the same terminology and refers to the NPSE's explanatory note. The note identifies two established concepts from toxicology that are currently being applied to noise impacts, which are:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

16.2.13 The NPSE (Department for Environment, Food & Rural Affairs, 2010) then extends this concept to include:

- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.

16.2.14 The NPSE (Department for Environment, Food & Rural Affairs, 2010) notes 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. Consequently, the SOAEL is likely to vary for different noise sources, receptors and times. Relevant SOAELs have been identified for the Project taking account of the sources of exposure and receptors.

National Planning Practice Guidance

16.2.15 The NPPF (Ministry of Housing, Communities & Local Government, 2026) is supported by Planning Practice Guidance (PPG) which was first published in March 2014. This guidance is updated on a regular basis and provides advice on a range of topics related to the implementation of NPPF (Ministry of Housing, Communities & Local Government, 2026) policies. The PPG that is relevant to the noise and vibration assessment is summarised below.

Planning Practice Guidance for Noise

16.2.16 The PPG for Noise (Ministry of Housing, Communities & Local Government, 2019) outlines how noise should be considered in the planning system to manage its impact on health and quality of life. It emphasises the importance of assessing noise when developments may introduce new sources of noise or be sensitive to existing acoustic environments. It provides a hierarchy of noise effects, examples the outcome in terms of NOELs, LOAELs, and SOAELs, and the associated action required.

Regional and Local Policy

16.2.17 **Application Document 6.2 Chapter 2 Legislation and Policy Context** lists relevant regional and local policy documents.

16.2.18 A range of regional and local planning policies are in place that seek to protect NSRs from the effects of noise and vibration; these have been given due regard in the noise and vibration assessment and have been considered as part of the design development process of the Project. Full details of local policies relevant to this assessment are presented in **Application Document 6.16.A1 Appendix 16.1 Regional and Local Planning Policy**.

16.3 Scoping Opinion and Consultation

Scoping Opinion

16.3.1 A Scoping Report for the Project was issued to the Planning Inspectorate on 21 August 2023 (**Application Document 6.5.A1 Appendix 5.1 Environmental Impact Assessment (EIA) Scoping Report**) and a Scoping Opinion was received from the Planning Inspectorate on behalf of the SoS for the Department for Energy Security and Net Zero on 29 September 2023 (**Application Document 6.5.A2 Appendix 5.2 Scoping Opinion**). Table 16.4 sets out the comments raised in **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion** that are relevant to noise and vibration and how these have been addressed in this assessment. **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion** takes account of responses from prescribed consultees as appropriate. **Application Document 6.5.A3 Appendix 5.3 Scoping Response Tables** provide responses to the comments made by the prescribed consultees at the scoping stage that relate to the scope of the assessment and how each comment has been considered.

Table 16.4 – Comments raised in the Scoping Opinion

ID	Inspectorate's comments	Response
3.10.1	**Vibration impact on structures due to construction activities – Construction** The Applicant proposes to scope out this matter for the phase identified on the basis that construction vibration would not be expected to cause damage to buildings or structures unless very high levels of vibration are generated within approximately 10 m, although this would be reviewed during the iterative design process and avoided where possible. The Inspectorate considers that there is insufficient information at present to scope this matter out from further assessment.	The assessment of potential construction vibration effects on buildings and structures is presented in section 16.9 of this chapter.
3.10.2	**Vibration impact at NSRs due to construction traffic – Construction** The Applicant proposes to scope out this matter for the phase identified on the basis that vibration from traffic on the public highway is caused by irregularities in the road surface. Where the road surface is free from irregularities, such as potholes, significant vibration effects would not be expected, even at relatively short distances. The Inspectorate considers that there is insufficient information at present to scope this matter out from further assessment.	The assessment of potential construction traffic vibration effects is presented in section 16.9 of this chapter and **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment**.
3.10.3	**Noise impact at NSRs from the overhead line – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that operational noise from the overhead line is not likely to be significant at nearby NSRs under any weather conditions owing to the proposed 'triple Araucaria' conductor bundle (Section 15.5 of the Scoping Report). The Applicant also proposes that, should the iterative design process result in alternative conductor types being used, consideration for this would be assessed within the	In **Application Document 6.5.A1 Appendix 5.1 Environmental Impact Assessment (EIA) Scoping Report** the Applicant detailed the overhead line system of 'triple Araucaria' conductor bundle would be utilised for the Project. Following further design work, it is now considered that conductor flexibility is required at the crossing of the River Ouse between proposed pylons 4AF76 and 4AF80. The reason this flexibility is required is set out in **Application Document 6.4 Chapter 4 Description of the Project**. Operational noise has

ID	Inspectorate's comments	Response
	noise and vibration assessment and technical information would be submitted as part of the application for development consent to support scoping out noise associated with overhead lines from the noise and vibration assessment. The Inspectorate is content with this approach, however, should alternative conductor types be proposed, the Applicant should submit further technical information as part of the development consent to support scoping out this matter from the noise and vibration assessment.	therefore been scoped into the assessment at this location on the basis of a twin conductor system potentially being used. Additionally, a realignment of the existing ZDA overhead line route is proposed to accommodate the Project, involving the introduction of a 'diamond duck under'[1]. This would result in a slight shift in the ZDA alignment at the crossover location, potentially bringing it closer to nearby NSRs. Although the conductors would be restrung on a like-for-like basis, meaning the noise emissions remain unchanged, the distance between the overhead line and NSRs may vary, which could influence perceived noise levels. Therefore, this crossover has been included in the operational noise assessment.
3.10.4	**CSEC Noise impact at NSRs – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that the source of operational noise is the same as that from an overhead line (i.e. which would be 'practically quiet' during operation) and therefore significant effects would not be likely. The Inspectorate is content with this approach.	It has been confirmed that Cable Sealing End Compounds (CSEC) are not proposed as part of the Project. No assessment of CSECs have therefore been provided.
3.10.5	**Noise impact at NSRs due to underground cables – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that underground cables are practically quiet and therefore not considered likely to cause significant effects. The Inspectorate is content with this approach.	As a result of further assessment, no sections of undergrounding are proposed on the proposed overhead line route. There is a requirement to divert existing utilities, including distribution network operator and telecommunication overhead lines, which would involve undergrounding of these assets. These sections of cabling continue to be scoped out of the assessment on the basis cables are practically quiet.

[1] A diamond duck-under is where one overhead line is routed beneath another using a diamond-shaped tower arrangement to maintain safe clearances

ID	Inspectorate's comments	Response
3.10.6	**Vibration impact at NSRs due to operational vibration – Operation** The Applicant proposes to scope out this matter for the phase identified on the basis that there are no sources of operational vibration proposed as part of the Proposed Development. The Inspectorate is content with this approach subject to no sources of operational vibration proposed for the phase identified.	There are no sources of operational vibration proposed as part of the Project. Therefore, operational vibration has been scoped out and its impacts are not considered further.
3.10.7	**Noise or vibration impact at NSRs due to maintenance for the overhead line, potential underground cables, cable sealing end compounds, and/or tunnel head houses – Operation (maintenance activity)** The Applicant proposes to scope out this matter for the phase identified on the basis that the maintenance of the overhead line, underground cables, and substations would be infrequent, localised and short term in duration. Maintenance activities would follow standard measures to reduce noise and vibration where required. The Inspectorate draws the Applicant's attention to ID 2.1.11. The Inspectorate is content to scope out the specific maintenance activities that are planned to occur during the operational phase in relation to the receptors identified on the basis of low-level activity associated with the phase identified and subject to the implementation of standard measures to reduce noise and vibration where required.	No sections of undergrounding are proposed on the proposed overhead line route. CSECs and tunnel head houses are not proposed as part of the Project. Noise and vibration impacts from maintenance of the proposed overhead line have been scoped out and no assessment has therefore been provided.
3.10.8	**Errata – References to Table 15.4** Table 15.4 refers only to Table 15.4. The Inspectorate assumes this is a typographical error and this should refer to Table 15.3. The Applicant should ensure that all cross-references within the ES are correct.	This is noted by the Applicant. All cross-references within the ES have been checked and reviewed.

ID	Inspectorate's comments	Response
3.10.9	**Scope of Assessment – Vibration monitoring** The Inspectorate advises that vibration from the installation of structures may adversely affect flood defences, therefore vibration monitoring should be scoped into further assessment to ensure that the associated vibrations will not adversely affect any flood defence structures. Depending on proximity, vibration from heavy goods vehicle (HGV) traffic/plant may also be necessary.	Construction vibration and construction traffic vibration impacts on structures and flood defences have been scoped into the assessment in 16.9. BPM to reduce vibration levels would be employed by the Main Works Contractor(s), as required. Monitoring would be conducted during the works if appropriate. No specific locations have been identified where there is the potential for structural damage. This will be reviewed by the Main Works Contractor(s) as part of their detailed assessments, as per commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments** and specific mitigation measures will be identified to reduce any potential effects. If construction vibration levels are predicted to approach or exceed the threshold for potential damage, even with mitigation (although this is considered unlikely), pre- and post-condition surveys would be undertaken of the building or structure, and any damage deemed to be caused by the works would be rectified, as per commitment NV04 of **Application Document 7.3 Register of Environmental Actions and Commitments**.

Statutory Consultation

16.3.2 Statutory consultation for the Project took place between 18 February and 15 April 2025. A summary of the relevant feedback received during statutory consultation relating to noise and vibration is provided below in Table 16.5. Further details on how consultation responses have informed the assessment are provided in **Application Document 5.1 Consultation Report**.

Table 16.5 – Assessment aspects raised at statutory consultation and how these have been addressed

Stakeholder	Assessment aspects raised	How this has been addressed
Nottinghamshire County Council	Consideration should be given to the impact of construction on	Different user groups are considered in paragraphs 16.9.26 to 16.9.29 of this

Stakeholder	Assessment aspects raised	How this has been addressed
	different user groups. Paying special attention to public rights of way (PRoW) used by horse riders and the potential of spooking horses.	chapter and include commitments to reduce effects.
Bassetlaw District Council	The proposed embedded measures, and control and management measures (including BPM) should be incorporated into the finalised Code of Construction Practice (CoCP) and Environmental Statement when submitted, with any updates and any additional mitigation measures if identified as the planning/design phase develops.	Outline mitigation measures are identified in section 16.8, and **Application Document 7.7 Outline Noise and Vibration Management Plan**. The Outline Noise and Vibration Management Plan will be updated by the Main Works Contractor(s) into a detailed Noise and Vibration Management Plan following their detailed assessment and specific mitigation measures will be incorporated as necessary. Commitments to reduce the effects of construction noise and vibration are provided in the **Application Document 7.3 Register of Environmental Actions and Commitments**.
Bassetlaw District Council	The preliminary assessment makes mention to a further detailed assessment of construction noise and vibration and operational noise effects; the Environmental Health Department will review this information when the Environmental Statement is submitted and may recommend certain working hours for certain construction activities accordingly.	The noise and vibration assessment is presented in section 16.9 of this chapter. Additional detailed assessments will be undertaken by the Main Works Contractor(s) based on their specific construction methodologies. This is secured through commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**.
Canal and Rivers Trust	Appropriate details should be provided to ensure that piling works will not result in vibrational impacts that could adversely impact the structural integrity of our network. This is pertinent on the Stainforth & Keadby Canal, where our records show that the canal is supported by an embankment in this location, which could be vulnerable to the impact of vibrations from nearby piling operations. The PEIR Documentation highlights that construction compounds and a 'stringing' position are proposed to	An assessment of potential damage from construction vibration on buildings and structures, including river banks and canals, has been undertaken as part of the ES, as described in section 16.9 of this chapter (specifically, paragraph 16.9.42). The assessment includes consideration of vibration generating activities, including percussive piling for pylon foundations, and compaction activities associated with construction access tracks and highway works.

Stakeholder	Assessment aspects raised	How this has been addressed
	be sited alongside the Stainforth & Keadby Canal, which has the potential to impact the embankment in this location. Crossing protection works, dependant on what these entail, could also pose a risk.	The assessment included consideration of the following canals which would be crossed by the Project: • Market Weighton Canal; • Sheffield & South Yorkshire Navigation (New Junction and Stainforth & Keadby Canals); and • Chesterfield Canal. The distance between proposed works and the canals is sufficiently large that vibration levels are not expected to reach a level where potential damage is likely. However, this would be reviewed by the Main Works Contractor(s) as part of their detailed assessments, as per commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**, and specific mitigation measures will be identified to reduce any potential effects, if required. If construction vibration levels are predicted to approach or exceed the threshold for potential damage, even with mitigation (although this is considered unlikely), pre- and post-condition surveys would be undertaken of the building or structure, and any damage deemed to be caused by the works would be rectified, as per commitment NV04 of **Application Document 7.3 Register of Environmental Actions and Commitments**.
Environment Agency	Impact assessment on fish from percussive piling near watercourses has not been assessed. Noise associated with percussive piling may affect natural migratory fish behaviour and in extremities, kill fish. The ES should include an assessment of noise impacts from piling on fish species, particularly in the River Ouse.	Due to the distance between proposed pylon locations and the banks of the River Ouse (approximately 90 m), vibration levels are not expected to generate noise levels which may disturb fish. However, this would be dependent on the construction method used and any potential movement of pylons within the Limits of Deviation (LoD), which is not known at this stage. However, given the inherent uncertainties in such an assessment, a precautionary approach has been taken. As such, commitment NV20 of **Application Document 7.3 Register**

Stakeholder	Assessment aspects raised	How this has been addressed
		of Environmental Actions and Commitments ensures that measures are put in place such that underwater noise due to construction vibration does not affect fish. The assessment of noise impacts on fish is presented in **Application Document 6.8 Chapter 8 Ecology**.

Stakeholder Engagement

16.3.3 National Grid Electricity Transmission plc (National Grid) has engaged with relevant stakeholders throughout the evolution of the Project including East Riding of Yorkshire Council, North Lincolnshire Council, and Bassetlaw District Council.

16.3.4 A summary of discussions and how these have influenced the scope and the approach to the noise and vibration assessment are provided in Table 16.6.

Table 16.6 – Further engagement

Organisation and date	Summary of issues raised	How this has been addressed
Environmental Health Departments of East Riding of Yorkshire Council, North Lincolnshire Council, and Bassetlaw District Council. April 2025	The proposed baseline noise survey methodology.	The surveys have been undertaken as per the proposed methodology described in the correspondence with local planning authorities.

Summary of Scope of Assessment

16.3.5 The following summarises which aspects have been scoped into and out of the assessment through **Application Document 6.5.A1 Appendix 5.1 Environmental Impact Assessment (EIA) Scoping Report** and **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion** as set out in Table 16.4, statutory consultation as set out in Table 16.5 and further engagement with stakeholders as set out in Table 16.6.

Aspects scoped into the assessment

16.3.6 The following aspects of noise and vibration have been scoped into the assessment:

- Construction noise;
- Construction vibration on people within buildings;
- Construction vibration on buildings and structures;
- Construction traffic noise;
- Construction traffic vibration;

- Operational noise from the proposed overhead line at the crossing of the River Ouse between proposed pylons 4AF76 and 4AF80, where conductors other than 'triple Araucaria' may be used; and
- Operational noise from the small realignment of the existing ZDA route between proposed pylons ZDA119A and ZDA120C to facilitate the Project which has the potential to bring the line slightly closer to receptors.

Aspects scoped out of the assessment

16.3.7 The following aspects of noise and vibration have been scoped out of the assessment:

- Operational noise (other than from the proposed overhead line at the River Ouse crossing, and the realignment of the existing ZDA route between pylons ZDA119A and ZDA120C); and
- Operational vibration;

16.3.8 Decommissioning has been scoped out of the assessment as explained in **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology**.

16.4 Assessment Approach and Methods

16.4.1 **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology** sets out the overarching approach which has been used in preparing the information in this ES. This section describes the technical methods used to determine the baseline conditions, sensitivity of receptors, and magnitude of impacts and sets out the criteria that have been used for the noise and vibration assessment. Where the assessment criteria terminology differs from the general assessment criteria terminology, as set out in **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology**, justification is provided.

Guidance Specific to the Noise and Vibration Assessment

16.4.2 Relevant guidance, specific to noise and vibration, that has informed the approach to the assessment in this chapter comprises:

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1) (BSI, 2014a);
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (BS 5228-2) (BSI, 2014b);
- Design Manual for Roads and Bridges, LA 111 Noise and Vibration (DMRB LA 111) (Highways England, 2020);
- Calculation of Road Traffic Noise (CRTN) (Department of Transport and Welsh Office, 1988); and
- National Grid Technical Guidance Note TGN(E)322 Operational audible noise assessment process for overhead lines (New build, reconductoring, diversion and uprating) (TGN(E)322) (National Grid, 2021);

- BS ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors, Part 2: Engineering method for the prediction of sound pressure levels outdoors (BS 9613-2) (BSI, 2024);
- BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142) (BSI, 2019); and
- BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures (BS 7445-1) (BSI, 2003).

16.4.3 With regards to the assessment of operational noise from proposed overhead lines, TGN(E)322 and BS 9613-2 have been included subsequent to the publication of **Application Document 6.5.A1 Appendix 5.1 Environmental Impact Assessment (EIA) Scoping Report** due to the inclusion of conductor flexibility at the River Ouse crossing between proposed pylons 4AF76 and 4AF80, and the realignment of the existing ZDA route between pylons ZDA119A and ZDA120C.

Study Area

16.4.4 The study areas for noise and vibration are presented in **Application Document 6.16.F1 Figure 16.1 Noise and Vibration Baseline** and summarised in the following sections.

Construction noise study area

16.4.5 The study area for construction noise effects includes NSRs within 300 m of the construction works associated with the Project, excluding traffic on the public highway which is considered separately below. This is based on guidance in BS 5228-1 (BSI, 2014a) and DMRB LA 111 (Highways England, 2020).

Construction vibration study area

16.4.6 The study area for construction vibration effects includes NSRs within 100 m of the construction works with the potential to generate vibration impacts associated with the Project. This is based on guidance from BS 5228-2 (BSI, 2014b) and DMRB LA 111 (Highways England, 2020).

Construction traffic noise study area

16.4.7 Noise generated by construction traffic on the existing road network has been assessed for each applicable road. The assessment considers the change in the basic noise level (BNL), calculated in line with the methodology described in CRTN (Department of Transport and Welsh Office, 1988), with a subsequent assessment of the impacts on NSRs within 50 m of routes where potential significant effects are identified.

Operational noise study area

16.4.8 The study area for operational noise effects from the proposed overhead line, based on guidance from BS 9613-2 (BSI, 2024), includes NSRs within 1 km of the proposed overhead line (and associated LoD; see flexibility assumptions in section 16.5 of this chapter), with a particular focus on the nearest NSRs as these typically represent the worst case for assessment purposes.

Baseline Data Gathering and Forecasting Methods

Data sources

16.4.9 The baseline information presented in this chapter has been informed by a desk study and on-site sound level surveys, drawing on the following information sources:

- Department for Environment, Food & Rural Affairs strategic noise mapping 2022 (Department for Environment, Food & Rural Affairs, 2024);
- Ordnance Survey mapping;
- Ordnance Survey AddressBase Plus data; and
- Baseline traffic data.

Site visits and surveys

16.4.10 The baseline within this chapter has been supported by baseline noise surveys. Details of the baseline noise surveys are provided in **Application Document 6.16.A2 Appendix 16.2 Baseline Noise Survey Data**.

Assessment Methods and Criteria

Sensitivity

16.4.11 The sensitivity of NSRs is determined partly on property type, for example residential properties are of a higher sensitivity than non-residential industrial facilities and offices. The sensitivity of NSRs varies depending on a number a factors including, but not limited to:

- The function of the space and its acoustic requirements – The primary activity within the space determines its sensitivity. For example, spaces used for sleeping (e.g. bedrooms, hospital wards), learning (e.g. classrooms), or worship (e.g. prayer halls) require low ambient noise levels to support concentration, rest, or spiritual reflection. Higher noise levels may be acceptable in spaces such as industrial units, shops, and restaurants, and these are therefore less sensitive.
- Occupant vulnerability – Receptors serving vulnerable populations, such as children, the elderly, patients, or individuals with hearing impairments, are more sensitive to noise. These groups may experience greater disruption or health impacts from noise exposure.
- Time of use – Sensitivity can vary depending on when the space is used. For example, residential areas are more sensitive at night due to sleep requirements, while schools are most sensitive during teaching hours.
- The existing noise climate – The existing noise climate can affect the sensitivity of receptors. For example, existing high noise residential areas (such as Noise Important Areas (NIAs)) are more sensitive to similar increases in road traffic noise than quiet areas due to a greater rate of impact on health outcomes with increasing long-term noise exposure.

16.4.12 The sensitivity of residential NSRs is factored into the various assessment methodologies and can be considered as the ‘standard’ receptor type. As such, residential NSRs are defined as having a medium sensitivity, with the impact

magnitudes being set to provide sensible outcomes in terms of significance of effect. The sensitivity of other, non-residential, NSRs are therefore determined relative to that of residential NSRs. The criteria used to determine the value and sensitivity of NSRs specific to noise and vibration are set out in Table 16.7. These values are based on standard practice.

Table 16.7 – Criteria for determining value/sensitivity

Sensitivity/value	Criteria
High	Schools and education premises, hospitals, clinics, care homes, places of worship, community centres, libraries, and dwellings within NIA (in relation to road traffic noise).
Medium	Residential dwellings, areas primarily used for leisure activities including PRoWs, sports facilities and sites of historic or cultural importance, camp sites, hotels, gardens, and parks.
Low	Offices, cafes/bars with external areas.
Negligible	Industrial or retail premises.

16.4.13 Although all residential NSRs are sensitive to noise and vibration, there are also cases where the sensitivity of an NSR may depend on the pre-existing noise climate. For example, NSRs within existing high noise areas, such as NIA in relation to road traffic noise, may be more sensitive to increases in noise than those outside NIA. Consideration has been given to such instances as part of the assessment of construction traffic noise impacts.

Magnitude

16.4.14 The assessment of noise and vibration effects makes reference to LOAELs and SOAELs, as defined by the NPSE (Department for Environment, Food & Rural Affairs, 2010) and PPG for Noise (Ministry of Housing, Communities & Local Government, 2019). 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. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times*'.

16.4.15 The LOAELs and SOAELs for the various source of noise and vibration are therefore defined with reference to applicable guidance documents.

Construction noise impact magnitudes

16.4.16 Construction noise impacts have been assessed in accordance with BS 5228-1 (BSI, 2014a) and with the guidance of DMRB LA 111 (Highways England, 2020). Note that although DMRB LA 111 was primarily developed for the assessment of highways schemes, it is generally recognised as suitable for the assessment of a wide range of infrastructure developments.

16.4.17 Construction noise levels have been calculated at NSRs for the various construction activities in accordance with the methodology described in Annex F of BS 5228-1 (BSI, 2014a) and compared against the assessment thresholds. The thresholds are

set relative to the lower noise thresholds (Category A) as detailed in Section E.3.2 of BS 5228-1 (the 'ABC' method). The Category A construction noise thresholds represent the lowest assessment criteria (typically used to assess impacts in rural areas) and are proposed to be used throughout the assessment as a worst-case.

16.4.18 The LOAEL and SOAEL are established in accordance with Table 16.8.

Table 16.8 – Construction noise LOAEL and SOAEL

Time period	LOAEL	SOAEL
Weekdays 07:00 to 19:00, and Saturdays 07:00 to 13:00	50 dB[2] $L_{Aeq,T}$[3]	65 dB $L_{Aeq,T}$
Weekdays 07:00 to 23:00, Saturdays 13:00pm to 23:00, and Sundays 07:00 to 23:00	50 dB $L_{Aeq,T}$	55 dB $L_{Aeq,T}$
Night-time 23:00 to 07:00	40 dB $L_{Aeq,T}$	45 dB $L_{Aeq,T}$
Note: The time periods shown relate to the applicable BS 5228-1 (BSI, 2014a) *'ABC' method assessment threshold periods and should not be interpreted as the proposed construction working hours*		

16.4.19 The magnitude of impact of construction noise would be determined against the criteria specified by DMRB LA 111 (Highways England, 2020), as detailed in Table 16.9.

Table 16.9 – Magnitude of impact from construction noise

Magnitude	Construction noise level
Large	Above or equal to SOAEL +5 dB
Medium	Above or equal to SOAEL and below SOAEL +5 dB
Small	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL
Note, LOAEL and SOAEL values to be taken from Table 16.8 for the period in question.	

16.4.20 The construction noise assessment highlights NSRs potentially experiencing significant adverse effects from construction noise, without mitigation. However, for the purposes of this assessment, specific mitigation measures, such as screening, are not included in the calculations (with the exception of certain fixed plant items, such as generators). This is so that construction noise 'hot-spots' can be highlighted, and specific noise mitigation measures can be identified to avoid significant adverse effects. In practice, BPM would be employed for all construction activities to reduce the effects of construction noise.

[2] Decibel

[3] A-weighted equivalent continuous noise level over the time period 'T'. An average noise level.

Construction vibration effect criteria on people in buildings

16.4.21 Construction vibration impacts have been assessed in accordance with BS 5228-2 (BSI, 2014b) and with the guidance of DMRB LA 111 (Highways England, 2020).

16.4.22 Construction vibration levels have been calculated at NSRs for the various construction activities in accordance with the methodology described in Annex E of BS 5228-2 and compared against the assessment thresholds.

16.4.23 Construction vibration effect threshold levels, including applicable LOAEL and SOAEL, are presented in Table 16.10.

Table 16.10 – Construction vibration effect levels on people within buildings

Vibration level, mm/s PPV*	Effect
0.14	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments (LOAEL).
1.0	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents (SOAEL).
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

* millimetres per second peak particle velocity

16.4.24 The magnitude of impact of construction vibration has been determined against the criteria specified by DMRB LA 111 (Highways England, 2020), as detailed in Table 16.11.

Table 16.11 – Magnitude of impact of construction vibration on people within buildings

Magnitude	Construction vibration level
Large	Above or equal to 10 mm/s PPV.
Medium	Above or equal to 1.0 mm/s PPV (SOAEL) and below 10 mm/s PPV.
Small	Above or equal to 0.3 mm/s PPV (LOAEL) and below 1.0 mm/s PPV (SOAEL).
Negligible	Below 0.3 mm/s PPV (LOAEL).
Note, LOAEL and SOAEL values to be taken from Table 16.10	

16.4.25 The construction vibration assessment highlights NSRs potentially experiencing significant adverse effects from construction vibration, without mitigation. However, for the purposes of this assessment, specific mitigation measures, such as the use of alternative methods, are not included in the calculations. This is so that construction vibration 'hot-spots' can be highlighted, and specific vibration mitigation measures can be identified to avoid significant adverse effects. In practice, BPM would be employed for all construction activities to reduce the effects of construction vibration.

Construction vibration effect criteria on structures and buildings

16.4.26 As above, construction vibration levels have been calculated and assessed in accordance with the methodologies described in BS 5228-2 (BSI, 2014b).

16.4.27 In the case of potential structural damage (including river banks and canals), an impact magnitude scale is not deemed appropriate. Rather, the assessment considers whether there is a likelihood of potential damage or not. As such, a fixed threshold has been used.

16.4.28 BS 5228-2 (BSI, 2014b) notes that the probability of damage tends towards zero at 12.5 mm/s PPV. Buildings and structures where the predicted vibration level, without mitigation, is above or approaching this value have been highlighted such that measures can be put in place by the Main Works Contractor(s) to reduce and manage vibration levels. The specific threshold may be reviewed for specific structures as deemed appropriate.

Construction traffic noise assessment criteria

16.4.29 Noise from construction traffic on the public highway has been calculated in accordance with CRTN (Department of Transport and Welsh Office, 1988) and assessed against the criteria detailed in DMRB LA 111 (Highways England, 2020). The BNL from roads within the construction traffic study area has been calculated in accordance with CRTN (Department of Transport and Welsh Office, 1988) for the 'do-nothing'[4] and 'do-something'[5] scenarios during the construction phase.

16.4.30 The calculated BNL values for the 'do-nothing' and 'do-something' scenarios have been compared to determine the magnitude of the impact in accordance with criteria specified by DMRB LA 111 as detailed in Table 16.12.

Table 16.12 – Magnitude of impact from construction traffic noise

Magnitude	Increase in BNL of closest public road used for construction traffic
Large	Greater than or equal to 5.0 dB.
Medium	Greater than or equal to 3.0 dB and less than 5.0 dB.
Small	Greater than or equal to 1.0 dB and less than 3.0 dB.
Negligible	Less than 1.0 dB.

Operational noise effects from the proposed overhead line assessment criteria

16.4.31 This section summarises the methodology for assessing operational noise from the proposed overhead line. Further detail is provided in **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment**.

16.4.32 Operational noise from the proposed overhead line has been assessed in accordance with the methodology described in National Grid technical guidance document TGN(E)322 (National Grid, 2021). The methodology follows a three-tier approach.

[4] i.e. existing traffic without traffic due to the Project

[5] i.e. existing traffic plus traffic due to the Project

16.4.33 Overhead transmission lines can produce audible noise in operation during both dry and wet weather conditions. Noise which occurs during dry weather conditions is referred to as 'dry noise' and can be described as a crackle, caused by corona discharge activity. Most transmission line conductors are designed to operate below the threshold for corona discharge activity, and so usually operate quietly in dry weather conditions. However, small areas of surface contamination on conductors can lead to a local enhancement of electrical stress and cause corona discharge, and hence noise, to occur. Noise which occurs during wet weather conditions is referred to as 'wet noise' and can be described as a crackle, which is sometimes accompanied by a hum. The highest noise levels generated by an overhead line generally occur during rainfall. Water droplets may accumulate on the surface of the conductor and initiate multiple corona discharges.

16.4.34 The three-tier approach comprises the following steps which are designed to screen out of further assessment, receptors where there would be no adverse impact:

- Tier 1: A primary screening step based on comparing 'worst-case' wet noise effects at an NSR and the predetermined assessment criteria in Table 16.13.
- Tier 2: An assessment step based on combined wet noise and dry noise effects.
- Tier 3: A further assessment step following the principles of BS 4142 (BSI, 2019) for both wet and dry noise.

16.4.35 If predicted noise levels fail the Tier 1 test, a Tier 2 assessment is undertaken. If predicted noise levels subsequently fail the Tier 2 test, a Tier 3 assessment is undertaken.

Table 16.13 – Overhead line operational noise Tier 1 noise criteria

Receptor sensitivity	Weather condition	No adverse impact (screened out of further assessment)[6]	Further assessment necessary (Tier 2 assessment required)[7]
High	Wet	< 29 dBA[8]	≥ 29 dBA
	Dry	< 32 dBA	≥ 32 dBA
Medium and residential	Wet	< 34 dBA	≥ 34 dBA
	Dry	< 37 dBA	≥ 37 dBA
Low	Wet	< 47 dBA	≥ 47 dBA
	Dry	< 44 dBA	≥ 44 dBA
Negligible	Wet	< 47 dBA	≥ 47 dBA
	Dry	< 44 dBA	≥ 44 dBA

[6] '<' denotes 'less than. Below these values no adverse effect is expected.

[7] '≥' denotes 'more than or equal to. At or above these values the next stage of assessment is required to determine potential effects.

[8] A-weighted decibel

16.4.36 Where a Tier 2 assessment is required, this considers the average noise level from both 'wet' and 'dry' noise based on the percentage of wet and dry weather expected to be experienced over the year. This average noise level is then compared against the combined wet and dry criteria based on the values from Table 16.13, similarly considering the percentage of wet and dry weather expected to be experienced over the year. If the 'No Adverse Impact' criteria is exceeded, a Tier 3 assessment will be necessary.

16.4.37 The Tier 3 assessment is based on the assessment methodology described in BS 4142 (BSI, 2019) which compares the noise rating level of a source at an NSR against the pre-existing background sound level. The rating level is the absolute level of the sound plus any penalties for acoustic character, such as 'hum'. Generally, the higher the rating level compared to the background sound level, the greater the impact, depending on context. The magnitude of impact of operational noise has been determined against the criteria detailed in Table 16.14.

Table 16.14 – Magnitude of impact of operational noise

Magnitude	Comparison of sound rating level and background sound level
Large	Rating level > 10 dB above the background sound level.
Medium	Rating level between 5 dB and 9 dB above background sound level.
Small	Rating level between 0 dB and 4 dB above background sound level.
Negligible	Rating level below background sound level.

16.4.38 Consideration has also been given to the context as defined in BS 4142 (BSI, 2019) for the final determination of significance.

Significance of effects

16.4.39 The significance of effect is based on the significance matrix provided in Table 16.15.

Table 16.15 – Significance matrix at NSRs

		NSR sensitivity			
		High	**Medium**	**Low**	**Negligible**
Impact Magnitude	**Large**	Major	Major	Moderate	Minor
	Medium	Moderate	Moderate	Minor	Negligible
	Small	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

16.4.40 Major and moderate effects are typically considered to be significant, whilst minor and negligible effects are considered to be not significant. However, professional judgement has also been applied in reaching conclusions as to the significance of effects at specific NSRs, including consideration of timing and durations of works.

16.4.41 With regards to construction noise and vibration, significant effects are deemed to occur where a medium or large magnitude impact occurs for a period of at least 10 days in any 15 consecutive days, or 40 days in any consecutive 6-month period, based on guidance from BS 5228-1 (BSI, 2014a) and DMRB LA 111 (Highways England, 2020).

Assumptions and Limitations

16.4.42 The assessment has been undertaken based on design information for the proposed overhead line as described in **Application Document 6.4 Chapter 4 Description of the Project**.

16.4.43 The assessment of construction noise and vibration uses noise and vibration information for the plant assumed to be used for the activities required based on similar National Grid projects, as presented in **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data**. Further detailed assessments will be undertaken by the Main Works Contractor(s) prior to construction based on their specific methodologies and proposed plant and these assessments will be presented in the detailed Noise and Vibration Management Plan (NVMP) for consultation with the local planning authorities. All assessments cover a reasonable worst-case and are based on information available at the time of the assessment.

16.4.44 Although in practice BPM will be employed to reduce construction noise and vibration levels, for the purposes of this assessment, specific mitigation measures are not included in the construction noise and vibration calculations. This is so that construction noise and vibration 'hot-spots' can be highlighted, and specific noise and vibration mitigation measures can be identified to avoid or reduce significant adverse effects. The assessment then considers the potential benefit of outline mitigation options at these 'hot-spots' to determine if there are any likely residual significant adverse effects.

16.4.45 In addition to the BPM, specific construction noise and vibration mitigation measures will be determined by the Main Works Contractor(s) following their own detailed assessment prior to the start of construction and incorporated into the detailed NVMP.

16.4.46 It is assumed that the majority of construction works would be expected to occur during normal core construction working hours, as described in **Application Document 6.4 Chapter 4 Description of the Project**. However, there may be some construction activities where works outside of these periods are required. Typical activities proposed that may take place outside of the proposed core construction working hours are set out in **Application Document 6.4 Chapter 4 Description of the Project**. These activities tend to be of a short duration, not exceeding the temporal criteria for potential significant adverse effects. Works outside of the core construction working hours are therefore not considered in this assessment. They would, however, be subject to detailed assessments by the Main Works Contractor(s) with appropriate mitigation incorporated into the detailed NVMP.

16.4.47 The operational noise assessment for the proposed overhead line noise assumes that the Project utilises a low noise 'triple Araucaria' conductor type apart from at the following locations:

- A worst-case potential conductor type ('twin Warwick') with regards to operational noise generation is used at the River Ouse crossing between proposed pylons 4AF76 and 4AF80; and
- a like-for-like 'twin Rubus' conductor is proposed for the temporary and permanent realignment of the existing ZDA overhead line where a 'diamond duck under' between pylons ZDA119A and ZDA120C.

16.5 Basis of Assessment

16.5.1 This section sets out the assumptions that have been applied in respect of design flexibility maintained within the Project.

16.5.2 Details of the available flexibility and assessment scenarios are presented in **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology**.

Flexibility Assumptions

16.5.3 The noise and vibration assessment has been undertaken based on the description of the Project provided in **Application Document 6.4 Chapter 4 Description of the Project**. To take account of the flexibility allowed in the Project, consideration has been given to the potential for effects to be of greater or different significance, should any of the permanent or temporary infrastructure elements be moved within the LoD (horizontal, vertical, or longitudinal) or Order Limits.

16.5.4 The assumptions made regarding the use of flexibility for the assessment are set out in Table 16.16.

Table 16.16 – Flexibility assumptions

Element of flexibility	How this has been considered within the assessment
Horizontal and longitudinal LoD	There is potential for horizontal and longitudinal movement of the proposed pylon locations within the LoD. This may mean that pylons, and their associated construction works could be located closer to or further away from NSRs than assessed. If works are located closer to NSRs, noise and vibration levels may increase. Conversely if works are located further from NSRs, levels may reduce. The self-limiting nature and likely use of the LOD is described in **Application Document 6.4 Environmental Statement Chapter 4 Description of the Project** and it is expected that the pylon would be constructed at the locations as shown on **Application Document 6.4.F1 Figure 4.1 Proposed Project Design** unless there were good engineering, safety or environmental reasons not to do so. The Assessment has included a review of the LoD to determine if there are any locations where movement of pylons within the LoD may lead to potential significant adverse effects. This includes construction noise and vibration, and operational noise from proposed overhead lines.
Vertical LoD	As vertical movement within the LoD does not have a material effect on the noise and vibration assessment, this has not been considered.

Element of flexibility	How this has been considered within the assessment
Pylon footprint	The assessment of construction noise and vibration considers the pylon construction working areas as a worst-case. In practice, most works would be located toward the centre of the working area, further from NSRs. A change to the footprint of individual pylons would have no material effect on the assessment. Additionally, where required and feasible, noisy plant would be located away from NRSs within the working area as part of BPM.
Foundation types	The assessment assumes that the worst-case pylon foundation construction method is required, which is percussive piling. Where practicable, an alternative, quieter/less vibratory method would be used. This would depend on ground conditions. Where percussive piling is required, BPM would be employed to reduce the effects of noise and vibration as far as practicable. These measures are not included in the assessment, so as to identify potential noise and vibration 'hot-spots'.
Order Limits – temporary construction works	The assessment assumes that main construction works are undertaken at their proposed respective locations within the Order Limits, as shown in **Application Document 6.4.F3 Figure 4.3 Temporary Construction Works**. Should elements move closer to NSRs than currently assumed, this may lead to higher noise levels at those NSRs. However, noise would be a constraint at these locations, and subject to further detailed assessment by the Main Works Contractor(s). Locations where works would lead to residual significant adverse effects with mitigation would be avoided.
Watercourse crossings	The assessment considers the worst-case construction works associated with watercourse crossings with regards to noise.
Modifications to third party assets – construction methodology	The construction noise and vibration assessment includes works to third party assets and directly considers the LoD. A reasonable worst-case has been assumed for third party works with regards to construction methods.

Optionality

16.5.5 As set out in **Application Document 6.4 Chapter 4 Description of the Project** and shown on **Application Document 6.4.F3 Figure 4.3 Temporary Construction Works** optionality has been included at the following five locations.

- Two alternative options for temporary construction access between Pennyhill Cottages Primary Access Route (PAR 34) and proposed pylon 4AF82 and satellite construction compound S-3:
  - Bellmouths BM-040/41, associated construction access track and watercourse crossings C-169 and BC-11; or
  - Bellmouths BM-040A/41A, associated construction access trach=k and watercourse crossings C-220A, C-169A and BC-11A.
- Two alternative options for temporary construction access tracks to proposed pylon 4AF88:

- Watercourse crossing BC-36 and BC-37; or
- Watercourse crossing B-06A.

- Two alternative options for the construction access track between proposed pylons 4AF130 and 4AF131:
  - Watercourse crossing BC-29; or
  - Watercourse crossings BC-29A and BC-29B.
- Two alternative options for taking access off High Melwood (PAR 63) and the associated construction access track:
  - Bellmouth BM-077; or
  - Bellmouth BM-110.
- Two alternative power supply connections to the proposed main construction compound (M1) as shown on **Application Document 6.4.F4 Third Party Works**:
  - NPG-09A from the west- there is currently uncertainty whether capacity of the network would be sufficient for this connection; or
  - NPG-09B from the east.

16.5.6 Where differences in effects between the two access options have been identified, these are set out within section 16.9, with clear reference to the nature, extent, and significance of any resulting noise and vibration effects.

Sensitivity Test

16.5.7 Under the terms of the DCO, construction could commence any year up to five years from the granting of the DCO which is assumed to be 2028. Consideration has therefore been given to whether the effects reported would be different if the works were to commence in any year up to year five, following the granting of the DCO. Where there is a difference, this is reported in section 16.9 of this chapter.

16.6 Baseline Conditions

16.6.1 This section describes the baseline noise and vibration environment within the study areas. Ecological and heritage receptors that may be affected by noise and vibration are considered within **Application Document 6.8 Chapter 8 Ecology**, **Application Document 6.9 Chapter 9 Ornithology** and **Application Document 6.10 Chapter 10 Cultural Heritage**, respectively.

Existing Baseline

16.6.2 The noise climate varies along the Order Limits depending on the nature of the area. For example, close to noise sources, such as roads and railways and in built up areas, ambient noise levels are expected to be higher. Further away from road and rail sources and in rural areas, ambient and background noise levels would be expected to be lower. Daytime noise level contours from existing road and railway sources are presented in **Application Document 6.16.F1 Figure 16.1 Noise and Vibration Baseline**, showing how existing noise levels vary within and surrounding the Order Limits. Areas outside of the shown noise contours are generally considered

to have low ambient and background noise levels. Areas where the road and rail noise contours overlap are considered to experience noise effects from both sources.

16.6.3 The Order Limits pass in proximity to a number of larger built-up areas, including (north to south):

- Route Section A – Skidby, Little Weighton, Riplingham, South Cave, Brantingham, Ellerker, Broomfleet;
- Route Section B – Ousefleet, Whitgift, Garthorpe, Fockerby, Luddington;
- Route Section C – Ealand;
- Route Section D – Bracon, Beltoft, Epworth, East Lound;
- Route Section E – Misterton, Saundby, South Wheatley, West Burton, Sturton le Steeple, Treswell, Woodbeck, East Drayton, Darlton; and
- Route Section F – High Marnham.

16.6.4 Baseline noise level surveys were undertaken within the study area to inform the assessments. Surveys were conducted at locations representative of the nearest NSRs to the Project. Details and results of the surveys are provided in **Application Document 6.16.A2 Appendix 16.2 Baseline Noise Survey Data**. The results of the surveys indicate that background and average sound levels are relatively low in the majority of the study area, typical of the rural setting in which the majority of the route sits. Higher ambient and background noise levels are experienced close to main transport routes, including roads and railways which are located along the Project route.

16.6.5 It is assumed that existing vibration levels are negligible within the Order Limits compared to construction vibration threshold values, which is likely to be the case even close to railways or busy main roads.

Future Baseline

16.6.6 As detailed in **Application Document 6.5 Chapter 5 Environmental Impact Assessment Approach and Methodology**, a review has been undertaken to determine whether the existing baseline conditions might change between the time of undertaking the assessment and the future years in which the Project is planned to be constructed and become operational.

16.6.7 Consideration has been given to the following types of change that could potentially alter the baseline environment associated with noise and vibration:

- Ambient noise level change with regard to construction noise impacts; and
- Background sound level change with regard to operational noise impacts.

16.6.8 With regards to construction noise impacts, the assessment assumes a low ambient noise level at all receptors. The lower noise BS 5228-1 (BSI, 2014a) ‘ABC’ threshold is therefore used as a worst-case. Changes to the future baseline would therefore not change the outcome of the worst-case assessment.

16.6.9 With regards to operational noise, similarly, the background sound levels are low, and the assessment considers absolute sound levels with reference to the LOAEL. A reduction in background sound levels would not alter the outcome with reference to the LOAEL, and an increase in background sound levels would lead to a reduction in

impact. Changes to the future baseline would therefore not change the outcome of the worst-case assessment.

16.7 Potential Effects

16.7.1 Based on the assessment scope (see section 16.3), the following sections describe how construction (C) and operation (O) activities are likely to affect noise and vibration receptors in the study area. This takes account of the embedded mitigation measures which are defined in **Application Document 7.3 Register of Environmental Actions and Commitments.** This section first lists the impacts that could result from each phase of the Project and Table 16.17 sets out the impact pathways that have the potential to result in an effect on the receptors identified in section 16.6.

Construction

16.7.2 The potential impacts that could result from the construction of the Project are:

- Construction noise;
- Construction vibration;
- Construction traffic noise; and
- Construction traffic vibration.

Operation

16.7.3 The potential impacts that could result from the operation of the Project are:

- Operational noise from the proposed overhead line at the River Ouse crossing between proposed pylons 4AF76 and 4AF80, where conductors other than 'triple Araucaria' may be used; and
- Operational noise from the realignment of the existing ZDA overhead line where a 'diamond duck under' is proposed between proposed pylons ZDA119A and ZDA120C to accommodate the Project.

Maintenance

16.7.4 Potential noise and vibration effects from the maintenance of the proposed overhead line have been scoped out, as agreed by the Planning Inspectorate in **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion**.

Potential Effects

16.7.5 Table 16.17 sets out the impact pathways that have the potential to result in an effect on the receptors identified in section 16.6 and during which phase of the Project.

Table 16.17 – Summary of potential noise and vibration effects at each phase of the Project

Receptor	Potential effect	Description	C	O
NSRs	Temporary disturbance from construction noise	There are potential effects from construction noise at NSRs close to construction works within the study area.	✓	
NSRs	Temporary disturbance from construction vibration	There are potential effects from construction vibration at NSRs close to construction works within the study area.	✓	
Building and structures	Potential damage	There are potential effects from construction vibration on buildings and structures located close to vibratory construction activities.	✓	
NSRs	Temporary disturbance from construction traffic noise	There are potential effects from construction traffic noise at NSRs close to construction traffic routes.	✓	
NSRs	Temporary disturbance from construction traffic vibration	There are potential effects from construction traffic vibration at NSRs close to construction traffic routes.	✓	
NSRs	Disturbance from operational proposed overhead line noise	There are potential effects from the operational proposed overhead line noise at NSRs close to the River Ouse crossing, and the realignment of the existing ZDA overhead line where a 'diamond duck under' is proposed between proposed pylons ZDA119A and ZDA120C to accommodate the Project.		✓

16.8 Mitigation

Embedded Measures

16.8.1 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable. National Grid has also embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation of the Project.

16.8.2 Embedded measures are those that are intrinsic to and built into the design of the Project; these are listed in **Application Document 7.3 Register of Environmental Actions and Commitments**. Embedded measures of relevance to the assessment of noise and vibration are:

- DE5: To reduce potential for audible noise and tones to occur from all types of fittings , the pylon fittings, such as insulators, dampers, spacers and clamps, will be designed and procured in accordance with a series of National Grid Technical Specifications and must be type registered (rigorously tested) to ensure the fittings conform to the specifications.
- DE12: The conductor bundle for the proposed overhead line will be Triple Araucaria (700 mm² All Aluminium Alloy Conductor (AAAC)) or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons. Flexibility on conductor type is required at the River Ouse crossing between proposed pylons 4AF76 and 4AF80 as further work would be required during detailed design to confirm the conductor type for this section. The conductor bundle for the proposed replacement and re-alignment of a section of the existing 400 kV ZDA overhead line route between Ealand and west of Keadby will be Twin Rubus (500 mm² AAAC), or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons.
- GG01: The final versions of the following environmental management plans will be submitted for approval in accordance with Requirement 4 (construction management plans) of **Application Document 3.1 Draft Development Consent Order** prior to commencement of development and will reflect the final construction methodologies produced by the Main Works Contractor(s). The following (relevant to noise and vibration) will be produced prior to construction:
  - Code of Construction Practice (CoCP);
  - Construction Traffic Management Plan (CTMP);
  - Public Rights of Way Management Plan; and
  - Noise and Vibration Management Plan (NVMP).

  All construction works will be undertaken in general accordance with these plans and all referenced subordinate plans
- The route alignment has been designed as far as practicable to avoid NSRs. This included, wherever practicable, avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby NSRs being isolated dwellings and small settlements.
- The Project will include ‘triple Araucaria’ conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons) for new transmission infrastructure along the majority of the route (with the exception potentially of the River Ouse crossing where flexibility in design is required, and like for like conductor replacement of the ZDA route). Due to its geometrical configuration, the ‘triple Araucaria’ design is the least electrically stressed conductor system that National Grid uses. It is the best design for reducing the corona discharge and would reduce the generation of noise from the proposed overhead lines during operation.

Control and Management Measures

16.8.3 Control and management measures comprise management activities and techniques that will be implemented during construction and reinstatement to limit effects, through adherence to good site practices and ensuring legal compliance.

16.8.4 Measures relevant to the control and management of impacts during construction have been included within **Application Document 7.2 Outline Code of Construction Practice**, which are secured by Requirement 4 of **Application Document 3.1 Draft Development Consent Order** and **Application Document 7.3 Register of Environmental Actions and Commitments** secured by Requirement 5 of **Application Document 3.1 Draft Development Consent Order**. These outline management plans and the following measures in Application Document 7.3 Register of Environmental Actions and Commitments have been taken into account i assessing the noise and vibration effects of the Project:

- GG02: The Mains Works Contractor(s) will undertake site inspections to check conformance to the measures set out within each of the management plans and their subordinate plans as set out within GG01.
- GG09: As per **Application Document 7.2 Outline Code of Construction Practice**, contact details for the Project will be displayed at a safe and accessible point in close proximity the entrance to all compounds
- GG10: As far as reasonably practicable and safe to do so, any activity carried out or equipment located within a construction compound that may produce dust, noise, vibration and lighting emissions, will be located away from sensitive receptors such as residential properties or designated ecological sites.
- GG11: Appropriate site layout and housekeeping measures will be implemented by the Main Works Contractor(s) at all construction sites. This will include but not be limited to(with regards to noise):
  - Managing staff/vehicles entering or leaving site, especially at the beginning and end of the working day; and
  - Managing potential off-site contractor and visitor parking.
- GG12: Vehicles and vessels will be correctly maintained and operated in accordance with manufacturer's recommendations and in a responsible manner. The operators of plant and vehicles will be required to switch off their engines when not in use and when it is safe to do so. Electric or other low carbon plant and equipment will be used where available and where practicable.
- GG13: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited, where practicable.
- GG27: Working areas will be appropriately demarcated. The type of demarcation to be installed will depend on the area to be managed and will take into consideration the level of security required in relation to the surrounding land and public access, rural or urban environment and arable or stock farming. For some locations the demarcation used may also serve to provide acoustic and visual screening of the work sites and reduce the potential for disturbance of users in the surrounding areas. Any demarcated area will be regularly inspected and maintained and removed as part of demobilisation unless otherwise specified.
- GG28: Members of the community and local businesses will be kept informed regularly of the works through active community liaison. This will include notification of noisy activities, heavy traffic periods and start and end dates of key phasing. A free telephone Project helpline and website will be provided which members of the public can use to raise any concerns or complaints about the

Project. All construction-related queries will be logged by National Grid in a complaint register, together with a record of the responses given and actions taken.

- NV01: **Application Document 7.7 Outline Noise and Vibration Management Plan** has been prepared to set out the framework for how noise and vibration will be controlled and managed. The Main Works Contractor(s) will conduct detailed construction noise and vibration assessments to determine whether any additional measures, including site-specific best practicable means (BPM) and monitoring, may be required. A Noise and Vibration Management Plan will be prepared by the Main Works Contractor(s) substantially in accordance with the **Application Document 7.7 Outline Noise and Vibration Management Plan** and submitted for approval by the relevant local planning authority prior to the commencement of construction and updated and managed during the construction phase as appropriate.
- NV02: The Contractor(s) will be required to follow good construction practices (referred to as best practicable means (BPM)) as outlined in BS 5228-1 (BSI, 2014a) and BS 5228-2 (BSI, 2014b) to control noise and vibration respectively. BS 5228-1 and BS 5228-2 have Approved Code of Practice status (in England) under the powers conferred by Sections 71(1)(b), (2) and (3) of the Control of Pollution Act 1974 (HM Government, 1974), as enacted under The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015 (HM Government, 2015). Compliance with the good practice noise and vibration requirements stated therein are a statutory obligation under the Control of Pollution Act 1974.
- NV03: In certain instances where construction noise and/or vibration may cause a significant adverse effect at nearby NSRs, applications for prior consent under Section 61 of the Control of Pollution Act 1974 (HM Government, 1974) may be submitted to the relevant local authority to ensure that BPM are applied to control noise and vibration.
- NV04: Where there is potential for works to generate vibration at, or approaching, levels exceeding 12.5 mm peak particle velocity (PPV) at buildings or structures (or lower levels if the building or structure is deemed particularly sensitive to vibration), pre- and post-work condition surveys will be conducted. Any damage (cosmetic or otherwise) deemed to be caused by the works will be rectified.
- NV05: Unnecessary revving of engines will be avoided and engines will be switched off when equipment when not required.
- NV06: Where practicable, internal construction access tracks will be kept well maintained and will avoid unnecessarily steep gradients.
- NV07: Where practicable, rubber linings will be used for example, for chutes and dumpers to reduce impact noise.
- NV08: Start-up plant and vehicles sequentially rather than all together where such items are located near NSRs.
- NV09: Continuous noisy plant should be housed in acoustic enclosures, where practicable and efficacious.
- NV10: Exhaust silencing and plant muffling equipment will be fitted on all construction vehicles and maintained in good working order.

- NV11: Static plant known to generate significant levels of vibration will be fitted with vibration dampening features.
- NV12: Each item of plant used will be selected to comply with the noise limits quoted in the European Commission Directive 2000/14/EC, as transposed into United Kingdom legislation by the Noise Emission in the Environment by Equipment for use Outdoors Regulations 2001 (HM Government, 2001).
- NV13: Equipment will be well maintained and where practicable will be used in the mode of operation that minimises noise.
- NV14: Plant and equipment will be shut-down when not in use.
- NV15: Semi-static equipment will be sited and orientated as far as reasonably practicable away from occupied buildings and, where feasible, will be fitted with suitable enclosures or screened using noise barriers.
- NV16: Materials will be handled in a manner that minimises noise.
- NV17: All appropriate personnel will be instructed on best practical means measures to reduce noise and vibration as part of their induction training and followed up by toolbox talks.
- NV18: For the construction of pylon foundations, non-percussive piling methods would be used where practicable.
- NV19: Where bird diverters are installed (see also commitment ON08), a specification will be selected that takes into consideration noise generated from atmospheric conditions.
- NV20: If percussive piling is required for pylon foundations near the River Ouse (see also commitment NV18), appropriate control measures to reduce potential effects on the aquatic environment will be identified by the Main Works Contractor(s) and implemented in accordance with Commitments NV01 and NV02.
- NV21: Construction works in the vicinity of routes or areas used with horses (ridden or driven), such as bridleways, byways, roads, permitted paths and open access areas which may be adjacent to or crossing the site, will follow British Horse Society guidance ‘Advice on construction sites and horses’ (The British Horse Society, 2024).
- NV22: Where noise from pylon fittings and insulators does occur which results in a complaint, appropriate action can be taken to seek to remedy the cause of the noise, usually through cleaning or replacing the relevant fitting.

16.8.5 Examples of construction noise mitigation measures are provided in Table 16.18, together with the attenuation values that these typically achieve. Specific mitigation measures would be determined by the Main Works Contractor(s) following their detailed construction noise assessment.

Table 16.18 – Examples of construction noise mitigation measures

Example mitigation	Likely attenuation
Screening	5 dB where activities are partially obscured and 10 dB where activities are totally obscured

Specified use of quieter plant	5 to 10 dB
Suitable material handling methods. Do not drop materials from excessive heights.	Up to 15 dB
Alternative methods for pylon construction, e.g. use of pad foundation	10 to 20 dB
Use an acoustic shed with adequate ventilation around trenchless crossing machinery	Up to 15 dB
Use of temporal restrictions	Avoiding temporal significance criteria being exceeded

16.8.6 Examples of construction vibration mitigation measures are provided in Table 16.19, together with the attenuation values that these typically achieve. Specific mitigation measures would be determined by the Main Works Contractor(s) following their detailed construction vibration assessment.

Table 16.19 – Examples of construction vibration mitigation measures

Example mitigation	Likely attenuation
Alternative methods for pylon construction, for example use of pad foundation or press-in piles	Would not generate material levels of vibration, therefore removing impact
Reducing energy per blow	Depends on the energy reduction but could be set relative to the impact thresholds. However, this may increase the duration of activities.
Pre-boring for piled foundations	Dependent on ground conditions

Additional Measures

16.8.7 Additional measures comprise mitigation measures over and above any embedded, and control and management measures, where assessment within this ES has identified a requirement to further reduce significant environmental effects.

16.8.8 No additional mitigation measures beyond the embedded, and control and management measures identified above, are required.

16.8.9 However, specific BPM to reduce construction noise and vibration would be determined by the Main Works Contractor(s) following their detailed assessment (as committed to by commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**). The assessments, together with any mitigation and control measures will be documented in the detailed NVMP for agreement with the relevant local planning authority prior to the start of works. Mitigation measures would typically include the use of alternative methods and

screening, together with the example measures identified in Table 16.18 and Table 16.19. This would be documented in the CoCP submitted by the Main Works Contractor(s) which would be substantially in accordance with **Application Document 7.2 Outline Code of Construction Practice**.

16.8.10 The construction noise and vibration assessments presented below do not include mitigation so that noise and vibration 'hot-spots' can be identified. The assessments then present outline mitigation options for the identified 'hot-spot' locations to determine whether residual significant adverse effects are expected at these locations. However, specific mitigation measures would be identified by the Main Works Contractor(s).

16.9 Residual Effects Assessment

Construction Noise

16.9.1 The construction noise assessment is based on the construction noise data presented in **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data** for the proposed construction activities, which include:

- Preparation and establishment of temporary access/egress to the works areas, and construction access tracks (including bridges and watercourse crossings where applicable), highway works, and bellmouths;
- Establishment and operation of construction compounds and laydown areas;
- Ancillary works, such as drainage and vegetation clearance;
- Construction of pylon foundations and erection of pylons;
- Removal of existing and temporary pylons;
- Stringing of the proposed overhead line;
- Third party works; and
- Removal of temporary construction works and site reinstatement.

16.9.2 Although BPM to reduce construction noise impacts would be employed by the Main Works Contractor(s) for all work areas, for the purposes of the assessment, it is assumed that no noise mitigation, such as screening or alternative methods, is included. This is so that potential noise 'hot-spots' can be identified which would require specific mitigation measures to avoid significant adverse effects. However, BPM to reduce construction noise impacts would be employed by the Main Works Contractor(s) for all work areas, as discussed in section 16.8.

16.9.3 The assessment considers the worst-case task for each applicable activity. For example, the assessment of pylon construction considers foundation construction, and in particular assumes the worst-case likely method such as percussive piling. Other tasks or alternative methods would produce lower noise levels. The assessment therefore presents a worst-case.

Weekday and Saturday 'daytime' working periods

16.9.4 This part of the assessment considers construction works during weekday and Saturday daytime periods, as defined by the BS 5228-1 (BSI, 2014a) 'ABC' method as:

- Weekdays 07:00 to 19:00; and
- Saturdays 07:00 to 13:00.

16.9.5 For simplicity, these periods are referred to as 'weekday daytime' periods.

16.9.6 Construction works that occur during the above time periods (noting that these periods reflect the threshold periods, not the proposed working periods for the Project) would be subject to the applicable threshold from the BS 5228-1 'ABC' method; namely the lower 65 dB $L_{Aeq,T}$, unless a higher threshold can be justified (65 dB is assumed for this assessment at all locations).

16.9.7 The construction noise assessment outputs are presented **Application Document 6.16.F2 Figure 16.2 Construction Noise Assessment Outputs** and are summarised in Table 16.20.

Table 16.20 – Summary of construction noise assessment during weekday daytime periods, without mitigation

NSR type/sensitivity	Total number of NSRs in study area	Number of NSRs experiencing magnitude of impact			
		Negligible	Small	Medium	Large
Residential	3,579	3,117 (2,696)	455 (842)	4 (25)	3 (16)
High sensitivity non-residential	42	42 (41)	0 (1)	0	0
Medium sensitivity non-residential	40	32 (26)	8 (13)	0 (1)	0
Low sensitivity non-residential	134	105 (95)	29 (39)	0	0

Note: Values in parentheses include construction of construction access tracks and highway works which are expected to be relatively short duration activities at any one location, not exceeding the temporal criteria for potential significant adverse effects.

16.9.8 The assessment indicates that there are potential significant adverse effects from construction activities, without mitigation, at seven residential NSRs. Effects at all other NSRs are not expected to be significant, even without mitigation. However, BPM would still be applied at these locations to reduce potential adverse effects.

16.9.9 Without mitigation, there are also potential significant adverse effects from the construction of construction access tracks, bellmouths, and highway works at a further 43 NSRs. However, the duration of such works at any one location is not

expected to exceed the temporal criteria for significant adverse effects. As above, BPM would still be applied at these locations to reduce potential adverse effects.

16.9.10 The potential significant adverse effects, without mitigation, ('hot-spots') are due to the following construction activities:

- Access construction affecting one NSR:
  - Bridge and access (cumulative) construction works at the Market Weighton Canal affecting one NSR (Route Section A):
    - R_1952 (Easting, Northing (E/N): 486921,427194).
- Pylon construction:
  - Pylon 4AF70 affecting one NSR (Route Section A):
    - R_2041 (E/N: 484429,425627).
  - Pylon 4AF148 affecting three NSRs (Route Section D):
    - R_4734 (E/N: 480091,402249);
    - R_4732 (E/N: 479991,402262); and
    - R_4733 (E/N: 479986,402265).
- Third party works:
  - National Grid Electricity Distribution works (NGED-17) near Fledborough affecting two NSRs (Route Section F):
    - R_6847 (E/N: 479723,371167); and
    - R_6846 (E/N: 479715,371168).

16.9.11 In all cases identified above, construction noise levels are expected to be readily mitigable to below the threshold for potential significant effects during weekday daytime periods with control and management measures, as part of the implementation of BPM. Specific mitigation measures will be identified by the Main Works Contractor(s) following their detailed assessments. However, Table 16.21 provides a reasonable worst-case assessment at the identified 'hot-spots' including outline mitigation for each of the above activities, based on the example mitigation options detailed in Table 16.18 above.

Table 16.21 – Reasonable worst-case construction noise assessment with mitigation at identified 'hot-spots'

Receptor ID (easting,northing)	Source (worst-case assumed activity)	Predicted noise level, without mitigation, dB $L_{Aeq,T}$ (impact magnitude)	Required mitigation to avoid significant adverse effect, potential mitigation options, and likely combined reduction, dB	Likely resultant noise level with mitigation, dB $L_{Aeq,T}$ (impact magnitude)	Significant effect?
R_1952 (E/N: 486921,427194)	Bridge and access (cumulative)	71 (large)	Minimum required mitigation 6 dB. Refinement of assumptions[9], screening, plant layout and orientation, plant selection. Likely reduction: ≥10 dB	≤61 (small)	No
R_2041 (E/N: 484429,425627)	Pylon 4AF70 (percussive piling)	72 (large)	Minimum required mitigation 7 dB. Refinement of assumptions, alternative methods, reduction of energy per blow (if percussive piling required), use of 'dolly'[10], screening, site layout and orientation. Likely reduction: ≥10 dB	≤62 (small)	No
R_4734 (E/N: 480091,402249)	Pylon 4AF148 (percussive piling)	70 (large)	Minimum required mitigation 6 dB. Refinement of assumptions, alternative methods, reduction of energy per blow (if	≤60 (small)	No
R_4732 (E/N: 479986,402265)		71 (large)		≤61 (small)	No

[9] Refinement of assumptions would include clarification of the location of the works within the LoD, and construction methodology.

[10] shock-absorbing cushion placed between the piling hammer and the top of the pile

Receptor ID (easting,northing)	Source (worst-case assumed activity)	Predicted noise level, without mitigation, dB $L_{Aeq,T}$ (impact magnitude)	Required mitigation to avoid significant adverse effect, potential mitigation options, and likely combined reduction, dB	Likely resultant noise level with mitigation, dB $L_{Aeq,T}$ (impact magnitude)	Significant effect?
R_4733 (E/N: 479986,402265)		71 (large)	percussive piling required), use of dolly, screening, site layout and orientation. Likely reduction: ≥10 dB	≤61 (small)	No
R_6847 (E/N: 479723,371167)	Third party works near Fledborough	67 (medium)	Minimum required mitigation 4 dB. Refinement of assumptions, screening, plant layout and orientation, plant selection. Likely reduction: ≥10 dB	≤57 (small)	No
R_6846 (E/N: 479715,371168)		69 (medium)		≤59 (small)	No

16.9.12 The assessment indicates that construction noise levels can readily be mitigated to non-significant levels with standard and readily feasible control and management measures.

16.9.13 As such, with control and management measures incorporated into the works, no residual significant adverse effects are expected from construction noise during weekday daytime periods.

Weekend, evening and bank holiday daytime working periods

16.9.14 This part of the assessment considers construction works during weekends and evenings, as defined by the BS 5228-1 (BSI, 2014a) 'ABC' method as:

- Weekdays 19:00 to 23:00;
- Saturdays 13:00 to 23:00; and
- Sundays 07:00 to 23:00.

16.9.15 The BS 5228-1 'ABC' method does not directly distinguish bank holidays from weekdays. However, BS 5228-1 example method E.4 does provide an indication that bank holiday periods should be treated as per weekend and evening periods. As such, bank holiday daytime periods are considered as per weekend and evening periods.

16.9.16 For simplicity, the periods described above are referred to as 'weekend and evening daytime' periods.

16.9.17 Construction works that occur during weekend daytime and evening periods (again, noting that these periods reflect the threshold periods, not necessarily the proposed working periods) would be subject to the applicable threshold from the BS 5228-1 'ABC' method; namely the lower 55 dB $L_{Aeq,T}$, unless a higher threshold can be justified (55 dB is assumed for this assessment at all locations).

16.9.18 Weekend daytime working is proposed during the construction phase. For the purposes of this assessment, it is assumed that construction activities during these periods would be similar to weekday daytime periods as a worst-case. However, the impact magnitudes are higher due to the increased sensitivity and associated lower noise level threshold for potential significant effects during these periods. It is, however, assumed that works during weekend daytime periods would consider temporal restrictions such that significant adverse effects from noise and vibration would not be expected purely due to weekend daytime working.

16.9.19 With the implementation of mitigation measures, construction noise levels are in principle expected to be at least 10 dB lower than those assumed in Table 16.21 above. As the difference between the weekday daytime and weekend daytime threshold is 10 dB, the assessment outcomes would be same as described in Table 16.21 for weekend daytime, assuming mitigation is included.

16.9.20 Based on this assumption, there are potential significant effects at the 'hot-spots' identified in paragraph 16.9.10 and Table 16.21 without some form of temporal restriction to avoid exceedance of the temporal criteria for significant effect (noting that both the noise level and temporal threshold is required to be exceeded for a significant effect).

16.9.21 Temporal restrictions would be considered as part of the BPM, as outlined in Table 16.18. Specific temporal restrictions would be identified by the Main Works

Contractor(s) as part of their detailed assessments in locations where the noise level threshold of the applicable working period may be exceeded for a particular activity. Such temporal restrictions, together with other specific mitigation measures, would be identified by the Main Works Contractor(s) as part of their detailed assessments secured by commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments** and will be documented in the final NVMP and agreed with the relevant local planning authority prior to the start of works.

16.9.22 Based on the implementation of BPM, including temporal restrictions where required, significant adverse effects from construction noise during weekend daytime periods (including bank holidays) would not be expected.

Drone and/or helicopter use during stringing operations

16.9.23 The Project is seeking flexibility to use drones and/or helicopters during the proposed overhead line stringing works. The worst-case with regards to noise would be helicopter operations. Such operations would be relatively short duration at any one location, in the order of a few days, and therefore would not lead to significant adverse effects. Noise from helicopter and/or drone usage would be subject to further assessment, as per commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**, and would also be subject to BPM, as per commitment NV02, to reduce the effects of noise.

Potential movement of pylons within LoD

16.9.24 The potential implications of moving pylons within the LoD have been reviewed. The assessment has identified 20 additional locations where moving pylons within the LoD may lead to significant adverse effects from construction noise, without mitigation. In all cases, either:

- The exceedance above the threshold is relatively small and can be readily mitigated; and/or
- A pylon could not or would not feasibly be constructed at the location in question, noting that the LoD also includes the overhead line, as well as pylons.

16.9.25 As such, moving pylons within the LoD would not introduce significant adverse effects from construction noise. Any movement of works within the LoD would be captured by Main Works Contractor(s) as part of their detailed assessments secured by commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**. The assessments, together with any required mitigation and control measures, will be documented in the final NVMP and agreed with the relevant local planning authority prior to the start of works.

Construction noise effects on PRoW users, canal and waterway users, and horses

16.9.26 There would be potential effects from construction noise on PRoW users, canal users, and horses.

16.9.27 With regards to users of PRoWs and canals, effects would be temporary and short lived as users traverse close to construction works. Effects would reduce as users leave the area close to the works. Effects of this type would not be significant; however, BPM (such as localised screening) would be incorporated into the works,

where feasible and appropriate, to reduce effects. This is committed to through commitments NV01, NV02, and NV05 to NV18 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

16.9.28 Construction noise is particularly pertinent for areas where there are horses, or where horses may be expected to be traversing, such as bridleways. Where construction works would be close to areas where horses are located, or where they may be expected to regularly traverse, the Main Works Contractor(s) will follow British Horse Society guidance 'Advice on construction sites and horses' (The British Horse Society, 2024), as per commitment NV21 in **Application Document 7.3 Register of Environmental Actions and Commitments**.

16.9.29 With the implementation of appropriate mitigation measures, construction noise effects on PRoW users, canal users and horses would not be expected to be significant.

Construction Vibration on People within Buildings

16.9.30 The construction vibration assessment is based on the construction vibration data presented in **Application Document 6.16.A3 Appendix 16.3 Construction Noise and Vibration Data** for the proposed construction activities. These include:

- Preparation and establishment of temporary access/egress to the works areas, and construction access tracks (including bridges, where applicable);
- Establishment and operation of construction compounds and laydown areas; and
- Construction of pylon foundations and erection of pylons.

16.9.31 Although BPM to reduce construction vibration impacts would be employed by the Main Works Contractor(s) for all work areas, for the purposes of the assessment, it is assumed that no vibration mitigation, such as alternative methods, is included. This is so that potential vibration 'hot-spots' can be identified which would require specific mitigation measures to avoid significant adverse effects. However, BPM to reduce construction vibration impacts would be employed by the Main Works Contractor(s) for all work areas, as discussed in section 16.8.

16.9.32 The assessment considers the worst-case task for each applicable activity. For example, the assessment of pylon construction considers foundation construction, and in particular assumes the worst-case likely method such as percussive piling. Other tasks or alternative methods would produce lower vibration levels.

16.9.33 The construction vibration assessment outputs are presented in **Application Document 6.16.F3 Figure 16.3 Construction Vibration Assessment Outputs** and are summarised in Table 16.22.

Table 16.22 – Summary of construction vibration assessment, without mitigation

NSR type/sensitivity	Total number of NSRs in study area	Number of NSRs experiencing magnitude of impact			
		Negligible	Small	Medium	Large
Residential	174	115	52	7	0

NSR type/sensitivity	Total number of NSRs in study area	Number of NSRs experiencing magnitude of impact			
		Negligible	Small	Medium	Large
High sensitivity non-residential	1	1	0	0	0
Medium sensitivity non-residential	3	0	3	0	0
Low sensitivity non-residential	4	3	1	0	0

16.9.34 The assessment indicates that there are potential significant adverse effects from construction activities, without mitigation, at seven residential NSRs. Effects at all other NSRs are not expected to be significant, even without mitigation. However, BPM would still be applied at these locations to reduce potential adverse effects.

16.9.35 The potential significant adverse effects, without mitigation, are due to the following construction activities:

- Pylon construction (assuming percussive piling):
  - Pylon 4AF70 affecting one NSR (Route Section A):
    - R_2041 (E/N: 484429,425627).
  - Pylon 4AF148 affecting three NSRs (Route Section D):
    - R_4734 (E/N: 480091,402249);
    - R_4732 (E/N: 479991,402262); and
    - R_4733 (E/N: 479986,402265).
- Construction access track/highway construction (including bellmouths) (assuming vibratory compaction):
  - Access (Bellmouth) off Outgate, to pylon ZDA116 affecting one NSR (Route Section C):
    - R_3247 (E/N: 478680,411987).
- Potential underground cabling (assuming vibratory compaction):
  - National Grid Electricity Distribution works (NGED-17) near Fledborough affecting two NSRs (Route Section F):
    - R_6847 (E/N: 479723,371167); and
    - R_6846 (E/N: 479715,371168).

16.9.36 In the case of vibratory compaction, the duration of the works would not be expected to be sufficient to cause significant adverse effects (typically less than a day). However, piling for pylon foundations may be of sufficient duration to lead to significant adverse effects if the vibration level threshold is exceeded.

16.9.37 In all cases identified above, construction vibration levels are expected to be readily mitigable to below the threshold for potential significant effects with control and management measures, as part of the implementation of BPM. Specific mitigation measures will be identified by the Main Works Contractor(s) following their detailed assessments. However, Table 16.23 provides a reasonable worst-case assessment including outline mitigation for each of the above activities, based on the outline mitigation options detailed in Table 16.19.

Table 16.23 – Reasonable worst-case construction vibration assessment with mitigation at identified 'hot-spots'

Receptor ID (easting,northing)	Source (worst-case assumed activity)	Predicted vibration level, without mitigation, mm/s PPV (impact magnitude)	Potential mitigation options, and likely combined reduction	Likely resultant vibration level with mitigation, mm/s PPV (impact magnitude)	Significant effect?
R_2041 (E/N: 484429,425627)	Pylon 4AF70 (percussive piling)	2.1 (medium)	Refinement of assumptions, alternative methods, reduction of energy per blow (if percussive piling required), use of 'dolly'. Likely reduction: to below 1.0 mm/s PPV.	≤1.0 (small)	No
R_4734 (E/N: 480091,402249)	Pylon 4AF148 (percussive piling)	1.5 (medium)	Refinement of assumptions, alternative methods, reduction of energy per blow (if percussive piling required), use of dolly[11]. Likely reduction: to below 1.0 mm/s PPV.	≤1.0 (small)	No
R_4732 (E/N: 479991,402262)		1.1 (medium)		≤1.0 (small)	No
R_4733 (E/N: 479986,402265)		1.1 (medium)		≤1.0 (small)	No
R_3247 (E/N: 478680,411987)	Access off Outgate, Ealing, to pylon ZDA116	1.0 (medium)	Refinement of assumptions, alternative method (e.g. 'dead rolling' without vibrator). Likely reduction: to below 1.0 mm/s PPV.	≤1.0 (small)	No
R_6847 (479723,371167)	Potential underground cabling	2.0 (medium)	Alternative method (e.g. 'dead rolling' without vibrator).	≤1.0 (small)	No

[11] Refinement of assumptions would include clarification of the location of the works within the LoD, and construction methodology.

Receptor ID (easting,northing)	Source (worst-case assumed activity)	Predicted vibration level, without mitigation, mm/s PPV (impact magnitude)	Potential mitigation options, and likely combined reduction	Likely resultant vibration level with mitigation, mm/s PPV (impact magnitude)	Significant effect?
R_6846 (479715,371168)	(vibratory compaction)	2.2 (medium)	Likely reduction: to below 1.0 mm/s PPV.	≤1.0 (small)	No

16.9.38 The assessment indicates that construction vibration levels can readily be mitigated to non-significant levels with standard and readily feasible control and management measures.

16.9.39 As such, with control and management measures incorporated into the works, no residual significant adverse effects are expected from construction vibration.

Potential movement of pylons within the LoD

16.9.40 The potential implications of moving pylons within the LoD have been reviewed. The assessment has identified 16 additional locations where moving pylons within the LoD may lead to significant adverse effects from construction vibration, without mitigation. In all cases, either:

- The exceedance above the threshold is relatively small and can be readily mitigated; or/and
- A pylon could not or would not feasibly be constructed at the location in question, noting that the LoD also includes the overhead line, as well as pylons.

16.9.41 As such, moving pylons within the LoD would not introduce significant adverse effects from construction vibration. Any movement of works within the LoD would be captured by Main Works Contractor(s) as part of their detailed assessments secured by commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**. The assessments, together with any required mitigation and control measures, will be documented in the final NVMP and agreed with the relevant local planning authority prior to the start of works.

Construction Vibration on Buildings and Structures

16.9.42 No buildings or structures (including river banks and canals) have been identified where there is potential for damage from vibratory construction activities. This will be reviewed by the Main Works Contractor(s) as part of their detailed assessments, as per commitment NV01 of **Application Document 7.3 Register of Environmental Actions and Commitments**, and specific mitigation measures would be identified to reduce any potential effects.

16.9.43 If construction vibration levels are predicted to approach or exceed the threshold for potential damage, even with mitigation (although this is considered unlikely), pre- and post-condition surveys would be undertaken of the building or structure, and any damage deemed to be caused by the works would be rectified, as per commitment NV04 of **Application Document 7.3 Register of Environmental Actions and Commitments**.

Construction Traffic Noise

16.9.44 An assessment of construction traffic noise is provided in **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment**. The assessment has considered construction traffic on the public highway and on construction access tracks.

16.9.45 The assessment of construction traffic on the public highway indicates that there is a small or negligible magnitude increase in noise levels on all construction traffic routes apart from one (Primary Access Route (PAR) 43), shown in **Application Document 6.4.F2 Figure 4.2 Construction Traffic Routes**, where a medium magnitude

increase is expected. However, at this location, both existing and future predicted traffic flows and associated noise levels are low despite the medium magnitude change and would therefore not be significant.

16.9.46 Additionally, there are no small, medium or large magnitude changes in noise levels on routes which are NIAs. As such, significant adverse effects of noise from construction traffic on the public highway are not expected.

16.9.47 The assessment of construction traffic on construction access tracks indicates that construction traffic noise would be below the SOAEL at all nearby NSRs for all construction access tracks. As such, significant adverse effects of noise from construction traffic on the construction access tracks are not expected.

Construction Traffic Vibration

16.9.48 An assessment of construction traffic vibration is provided in **Application Document 6.16.A4 Appendix 16.4 Construction Traffic Noise and Vibration Assessment**. The assessment indicates that significant adverse effects from construction traffic vibration are not expected where the road surface is well maintained and free of irregularities, such as potholes, even at very small distances between traffic and NSRs.

16.9.49 **Application Document 7.4 Outline Construction Traffic Management Plan** and **Application Document 7.3 Register of Environmental Actions and Commitments** include commitments relating to the maintenance of construction access tracks and the public highway.

16.9.50 **Application Document 7.4 Outline Construction Traffic Management Plan** includes for pre- and post-condition surveys of the existing highway network to be used as abnormal indivisible load and heavy goods vehicle routes. The results of these pre-condition surveys will be shared with the local highway authority prior to works commencing, including pre-commencement works relating to the highway. Commitment NV09 of **Application Document 7.3 Register of Environmental Actions and Commitments** ensures that construction access tracks would be well maintained.

16.9.51 As such, significant adverse effects from construction traffic vibration are not expected.

Operational Noise from the Proposed Overhead Line

16.9.52 A ‘triple Araucaria’ conductor is proposed for the majority of the route. The ‘triple Araucaria’ conductor system is low noise, and significant adverse and adverse effects from operational noise are not expected, even directly underneath the line under wet conditions. Based on this, operational noise from proposed overhead lines strung with triple Araucaria conductors is scoped out of the assessment as agreed in **Application Document 6.5.A2 Appendix 5.2 Scoping Opinion**. However, further information regarding noise from the ‘triple Araucaria’ system is presented in **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment**, for information.

16.9.53 There are two locations where ‘triple Araucaria’ is not proposed or cannot be committed to at this stage due to potential operational constraints. These are:

- The River Ouse between proposed pylons 4AF76 and 4AF80; and

- The realignment of the existing ZDA route between Ealand and west of Keadby (between proposed pylons ZDA119A and ZDA120C).

16.9.54 The conductor bundle for the proposed realignment of the existing ZDA route between Ealand and west of Keadby is 'twin Rubus', which is a 'like-for-like' replacement.

16.9.55 Detailed assessments of operational noise from proposed overhead line and the realignment of the existing ZDA route are provided in **Application Document 6.16.A5 Appendix 16.5 Operational Overhead Line Noise Assessment** for the various conductor types.

River Ouse crossing overhead line noise assessment

16.9.56 As a conductor type has not been fixed for the River Ouse crossing, the assessment has been based on the worst-case likely conductor type and arrangement with regards to noise, namely 'twin Warwick'. An alternate feasible conductor type would therefore result in lower operational noise levels. The assessment indicates that potential adverse effects are not expected beyond approximately 52 m of a proposed overhead line centre line using 'twin Warwick'.

16.9.57 The nearest NSR is located at a distance of approximately 80 m to the west of the proposed overhead line centre line, between pylons 4AF79 and 4AF80 at Ousefleet. As such, adverse effects from operational noise from the proposed overhead line at the River Ouse crossing are not expected as it is outside the distance for potential adverse effects.

16.9.58 Taking account of potential flexibility within the LoD, the centre of the pylon could move approximately 30 m either side of the centre line subject to topography and local conditions. At a worst-case at the extreme of the LoD, the nearest NSR would therefore be approximately 50 m from the centre line. This falls just within the distance for potential adverse effects, requiring a BS 4142 (BSI, 2019) assessment.

16.9.59 The BS 4142 assessment indicates that operational noise during dry conditions is negligible to low at the nearest NSR (R_2150) during daytime and night-time periods, respectively. For wet conditions, the assessment indicates a potential negligible to medium magnitude of impact, depending on context. However, when considering context, the duration of wet noise is very infrequent (rainfall >0.2 mm/h occurs for approximately 6.8% of the time at this location, and notably less for rainfall >1.0 mm/h for the onset of corona discharge noise), and the change in average noise level over the course of a year is approximately 1 dB during both daytime and night-time periods, which constitutes a small magnitude increase.

16.9.60 The overall magnitude, considering context, is therefore small, and not significant, even considering the worst-case potential conductor type at the extent of the LoD closest to the nearest NSR.

16.9.61 Operational noise effects from the proposed overhead line between pylons 4AF76 and 4AF80 at the River Ouse crossing would therefore be not significant.

Realignment of the existing ZDA overhead line noise assessment

16.9.62 The assessment indicates that potential adverse effects are not expected beyond approximately 33 m of the overhead line centre line for a 'twin Rubus' conductor.

16.9.63 The nearest NSR is located at a distance of approximately 200 m from the centre line of the proposed realignment of the overhead line. As such, adverse effects from operational noise due to the realignment of the ZDA overhead line are not expected.

16.9.64 Taking account of potential flexibility within the LoD, the centre of the pylon could move approximately 30 m either side of the centre line subject to topography and local conditions. At a worst-case at the extreme of the LoD, the nearest NSR would therefore be approximately 180 m from the centreline. This still falls outside the distance for potential adverse effects.

16.9.65 As operational noise from realignment of the existing ZDA overhead lines would be below the threshold for potential adverse effects, significant adverse effects are not expected, even taking account of the LoD.

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