

7. Noise and Vibration

Introduction

- 7.1 This Chapter reports the outcome of the assessment of likely significant environmental effects in relation to noise and vibration.
- 7.2 The Chapter describes the technical consultation that has been undertaken during the EIA, the scope of the assessment and assessment methodology, and summarises the baseline information that has informed the assessment.
- 7.3 In line with **Chapter 2: Approach to EIA**, the assessment reports on the likely significant environmental effects and the further mitigation measures required to prevent any significant effects. The conclusions are provided in terms of whether the residual effects are considered to be significant. The assessment of effects takes into consideration both primary and tertiary mitigation (see **Chapter 2: Approach to EIA** for further details).
- 7.4 This Chapter, and its associated **Figures 7.1 – 7.3** and **Appendices 7.1 – 7.2**, is intended to be read as part of the wider FEI with particular reference to the introductory Chapters of this FEI (**Chapters 1 – 5**).
- 7.5 In addition, this Chapter should be read in conjunction with **Chapter 16: Assessment of Cumulative Effects**.

Summary of Consultation

2025 ES

- 7.6 The Project team undertook an EIA Scoping exercise (described further under the ‘Scope of Assessment’ section below) in support of the 2025 ES, which included consultation with RBC / RMBC and other stakeholders. The outcomes of this process are documented in **Chapter 2: Approach to EIA** and **Appendix 2.1. Table 7.1** provides an overview of the consultation that was undertaken to inform the Project for Assessment and the 2025 ES, including the consideration of likely significant effects and the methodology for assessment.

Table 7.1: Summary of consultation for 2025 ES

Body / organisation	Contact	Date and form of consultation	Summary
RBC	Environmental Health Department	Email, 28 August 2024	Agreed with the methodology proposed and proposed noise monitoring locations (a copy of the consultation letter and response can be found in Annex 2 of Appendix 7.2).
RMBC	Environmental Health Department	Email, 28 August 2024	To date no response to the consultation letter has been received (a copy of the consultation letter can be found in Annex 2 of Appendix 7.2).

2026 FEI ES

- 7.7 Since the submission of the 2025 ES, the Applicant has been in receipt of a number of statutory and non-statutory consultation comments. The consultation responses have been reviewed by the project team and those that are directly relevant to the ES and its supporting material have been considered, with the outcomes documented in **Appendix 2.4**. Furthermore, since the submission of the 2025 ES, further consultation has been undertaken with relevant stakeholders that is documented within **Table 7.2** below.

Table 7.2: Summary of consultation for 2026 FEI ES

Body / organisation	Contact	Date and form of consultation	Summary
RBC, RMBC	Environmental Health Department	Meeting (via Microsoft Teams), 30 March 2026	Following the review undertaken by HMP on behalf of RBC, a meeting took place between RBC, RMBC, HMP, TNEI and the Applicant to further discuss the points raised in the HMP review. TNEI proposed that a number of clarifications be included within the FEI submission, and further discussion was undertaken on the topics of cumulative noise conditions, amplitude modulation, topographic corrections and directivity. A response to each of the points raised within the HMP consultation response is included within Annex 10 of Appendix 7.2.
RBC, RMBC	Environmental Health Department	Email 08 May 2026	A summary note prepared by TNEI was issued to HMP, RBC and RMBC, confirming topics that would be addressed within the FEI. The note provided clarification on the proposed approach to directivity and sought agreement from HMP on an approach to deriving site specific noise limits.
RBC, RMBC	Environmental Health Department	Email 15 May 2026	HMP provided a copy of their topographical corrections and also provided further clarification on cumulative modelling assumptions. A copy of the consultation response is included in Annex 2 of Appendix 7.2 .
RBC, RMBC	Environmental Health Department	Email 08 July 2026	Following the publication of the 'Assessment and Rating of Wind Turbine Noise' (hereafter referred to as ARWTN) in June 2026, TNEI consulted via email

Body / organisation	Contact	Date and form of consultation	Summary
			with HMP to discuss the exclusion of a number of small scale wind turbines from the cumulative noise assessment. HMP responded to request further information on this topic, which has been included within Annex 12 of Appendix 7.2 .

Scope of the Assessment

- 7.8 An EIA Scoping Report was submitted to RMBC and RBC on 16th December 2024, as presented as **Appendix 2.1**. At the time of writing (July 2026), no Scoping Opinion has been received. Therefore, the Scope of Assessment is the same as that submitted as part of the EIA Scoping Report, with some updates to take account of the consultation comments received following the submission of the 2025 ES and the publication of the *‘Assessment and Rating of Wind Turbine Noise’* in June 2026, which replaces ETSU-R-97 as the primary technical guidance for the assessment of wind turbine noise.

Effects Unlikely / Not Significant

- 7.9 The following effects were considered unlikely / not significant as part of the EIA Scoping Report (**Appendix 2.1**) and are not considered further in this Chapter:
- Increase in road traffic noise;
 - Vibration during construction / decommissioning;
 - Infrasound and low frequency noise during operation; and
 - Amplitude Modulation during operation.
- 7.10 In relation to Amplitude Modulation and low frequency noise, additional information has been included within Section 3 of **Appendix 7.2**, and a summary of AM is included below.
- 7.11 In the context of wind turbine noise, AM describes a variation in noise level over time; for example, observers may describe a ‘whoosh whoosh’ sound, which can be heard close to a wind turbine as the blades sweep past. Modulation of aerodynamic noise is an inherent characteristic of wind turbine noise and is accounted for within the ARWTN assessment methodology.
- 7.12 In recent times the Acoustics community has sought to make a distinction between the AM which is expected at most wind farms and may be considered as ‘Normal Amplitude Modulation’ (NAM), compared to the unusual AM that has sometimes been heard at some wind farms, hereinafter referred to as ‘Other Amplitude Modulation’ (OAM). The term OAM is used to describe an unusual feature of aerodynamic noise from wind turbines, where a greater than normal degree of regular fluctuation in sound level occurs at blade passing frequency, typically once per second. In some appeal decisions it may also be referred to as ‘Excess Amplitude Modulation’ (EAM). At present, it is possible to identify AM through analysis of measured data, however there is currently no way to predict the effects in advance.

- 7.13 It is therefore not considered necessary to carry out specific assessments of AM and it has not been considered further in the noise assessment.
- 7.14 On 19th June 2026, the UK Government published updated guidance for the ARWTN. ARWTN notes that AM is best controlled through enforcement of planning conditions and provides a suggested planning condition which includes consideration of AM. The condition includes a mechanism for an AM penalty to be applied where AM over a certain level occurs and the additional guidance included in ARWTN details the methodology that should be used to do this.
- 7.15 Following the EIA Scoping process, the following additional effect is now considered unlikely / not significant and the evidence to support this determination is outlined below.

Disturbance associated with construction noise from the Electrical Grid Connection

- 7.16 For the majority of construction, noise along the Electric Grid Connection will be generated from trenching and backfill. These activities will move gradually, but continuously, along the route as the ground is being excavated for the burial of the cable. Accordingly, construction activities will only be close to sensitive properties for a short period of time, and duration of exposure to noise impacts would be very short-term and temporary in nature, i.e. only when directly passing a Noise Sensitive Receptor (NSR).
- 7.17 BS 5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open developments - Noise'¹ provides a set of threshold levels, which, if exceeded provides an indication of a 'potential significant effect'. During weekday daytimes (07:00 – 19:00) the most stringent threshold level is 65 dB LAeq (12hours), i.e. the overall sound level incident on the property must exceed 65 dBA over a 12 hour period to exceed the threshold^a. It is unlikely that this would occur unless plant was operating directly outside of a property, however, even if the threshold level is exceeded this does not mean a significant effect has occurred. Rather, BS 5228 states; *'The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect'*. Duration, in this context, is referred to in weeks or months, as opposed to hours.
- 7.18 Given that trenching and backfill activities will be continuously moving along the cable route and will not spend any significant time outside one particular receptor, noise effects related to these activities are considered unlikely / not significant.
- 7.19 Therefore, disturbance associated with construction noise from the Electric Grid Connection is unlikely to be significant and has not been considered further within the EIA or reported in this ES.

Effects Likely / Significant

- 7.20 **Table 7.3** outlines the effects that are considered likely / significant and are reported within this Chapter.

^a Due to the logarithmic nature in which noise levels are calculated, this also equates to 68 dB over a 6 hour period, 71 dB over a 3 hour period and 74 dB over a 1.5 hour period.

Table 7.3: Effects likely / significant

Likely significant effect	Receptor(s) ^b	Applicable stage(s)
Disturbance associated with construction noise*	Residential properties (a total of 12 Noise Sensitive Receptors (NSRs) were chosen as representative Construction Noise Assessment Locations (CNAL)). The CNALs are shown in Figure 7.1).	Construction / decommissioning
Disturbance associated with operational noise	Residential properties (A total of twenty one NSRs were chosen as representative operational Noise Assessment Locations (NAL). The NALs are shown on Figure 7.2).	Operation

* The construction noise assessment will be used as a 'proxy' for decommissioning.

Assessment Methodology

Legislative Framework, Policy and Guidance

7.21 The following legislation, policy and guidance have informed the assessment of effects within this Chapter and are detailed further in **Appendices 7.1** and **7.2**, where relevant:

- National Planning Policy Framework (NPPF)²;
- The Control of Pollution Act 1974³;
- PPG for Renewable and low carbon energy⁴;
- Overarching National Policy Statement for Energy (EN-1)⁵ and National Policy Statement for Renewable Energy Infrastructure (EN-3)⁶;
- Rossendale Local Plan 2019 to 2036 (2021)⁷;
- Places for Everyone Joint Development Plan (2024)⁸;
- Rochdale Core Strategy (2016)⁹;
- 'Saved' policies from Rochdale Unitary Development Plan Review 2001-2016 (2006)¹⁰;
- BS 5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open developments - Noise';
- 'Assessment and Rating of Wind Turbine Noise', UK Government, 2026¹¹;
- Institute of Acoustics (IOA) 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOA GPG, 2013)¹²; and

^b Further detail added since the EIA Scoping Report following receptor selection.

- ISO 9613-2: 2024 'Acoustics - Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure level outdoors'¹³.

Defining the Study Area

- 7.22 Prior to the commencement of the baseline noise survey, initial desktop noise modelling was undertaken in order to identify the nearest NSRs and suitable locations at which to monitor background sound. The proposed noise monitoring locations (NMLs) were included in a consultation letter issued to RMBC and RBC as part of the consultation process (see **Table 7.1**).
- 7.23 The study area extends to include the closest NSRs that surround the Project for Assessment in each direction and the Noise Assessment Locations (NALs) considered in the assessments for construction noise and operational noise are shown in **Figures 7.1** and **7.2**, respectively.
- 7.24 There are a number of operational wind turbine developments near to the Project for Assessment, including the existing Scout Moor Wind Farm located directly adjacent to the west of the Assessment Boundary, and Reaps Moss Wind to the north-east. These wind farms are shown on **Figure 7.3**. These have also influenced the extent of the study area for the purposes of the assessment reported in this Chapter.

Background Studies to Inform the ES

- 7.25 **Table 7.4** summarises all studies / surveys / analysis / evaluations undertaken to inform the assessment presented within this Chapter.

Table 7.4: Studies / surveys / analysis / evaluation undertaken to inform the ES

Study / survey / analysis / evaluation	Overview	Date of completion
Baseline noise survey (Appendix 7.2)	Baseline noise surveys undertaken at six representative NMLs. The locations of the NMLs are shown on Figure 7.2 and are summarised in Table 5.1 of Appendix 7.2 .	December 2024 – February 2025 (exact monitoring periods at each noise monitoring location are summarised in Section 5.2 of Appendix 7.2).

Assessment Process

Construction noise

- 7.26 The construction noise assessment was undertaken using guidance contained in BS 5228: Part 1 2009+A1:2014 (BS 5228). The prediction of construction noise levels was undertaken using the calculation methodology presented in ISO 9613-2:2024, together with published noise data for assumed construction plant.
- 7.27 To undertake an assessment of the construction noise impact using relevant data from BS 5228, the following steps have been undertaken:
- Identification of the NSRs near potential construction activities and select representative Construction Noise Assessment Locations (CNALs);

- Identification the applicable threshold of significant effects from BS 5228;
- Predict the noise levels for various construction noise activities;
- Compare predicted noise levels against the applicable threshold;
- Where necessary, develop suitable mitigation measures to minimise any significant effects during the construction stage; and, if required
- Assess any residual effects taking into account any identified mitigation measures.

7.28 The CNALs identified for this assessment are detailed in **Table 7.5** and their locations are shown in **Figure 7.1**.

Table 7.5: CNALs

CNAL	X Coordinate (OS Grid)	Y Coordinate (OS Grid)
CNAL01	383665	420416
CNAL02	383925	420092
CNAL03	384074	420340
CNAL04	384817	420785
CNAL05	385514	421094
CNAL06	388352	419627
CNAL07	387665	417476
CNAL08	387115	416360
CNAL09	385784	416346
CNAL10	381072	418802
CNAL11	387574	418433
CNAL12	380955	418605

- 7.29 The construction of the Project for Assessment would be undertaken in several successive phases. During each phase, the plant and equipment, and the associated traffic, would influence the noise generated. The selection of plant and equipment to be used would be determined by the appointed contractor(s) and detailed arrangements for on-site management would be decided at that time. This assessment has therefore been based upon an assumed typical selection of plant for a project of this size and assesses a number of construction scenarios which have been chosen to represent the likely noisiest activities that would occur across the construction sub-phases.
- 7.30 For each scenario the plant has been modelled operating in the closest activity areas to each receptor for any given activity, whereas in reality plant will move around the Assessment Boundary and for much of the time would be operating at more distant locations.
- 7.31 The core hours for construction activity are anticipated to be 08:00 – 18:00 Monday to Friday and 09:00 – 14:00 on Saturdays, with no working on Sundays or Public / Bank Holidays. The

requirement for out-of-hours work could arise, for example, from delivery and unloading of abnormal loads or health and safety requirements, or to ensure optimal use is made of fair weather windows for the erection of turbine blades and the erection and dismantling of cranes. No scheduled construction is anticipated during the night-time except for during the winter months. There may also be a requirement for some plant to be operational during night-time, for example, a portable generator to provide lighting. A night-time scenario has therefore also been considered within the construction noise assessment.

7.32 **Chapter 4: Development Specification** describes the outline tasks that will be undertaken during the construction period, which is estimated to last 24 months. For the purposes of this assessment noise modelling has been undertaken for a number of potential construction scenarios, which simulate the likely overlap of several tasks that will occur throughout the construction stage:

- **Scenario 01:** The laydown area on Scout Road is being established. Construction of access tracks from Scout Road to the on-site construction compound is occurring. The construction compound is being established.
- **Scenario 02:** Establishment of the Scout Road laydown area and on-site construction compound have ended and they are now in operation. Access tracks are being constructed from the construction compound to T1, T3 & T4 and to T9, T10 and T11. Materials are being delivered to the construction compound.
- **Scenario 03:** The construction compound and laydown area are in operation. Access tracks are being constructed to T14 and T15. Turbine foundations and crane pads are being constructed at T1, T3 and T4.
- **Scenario 04:** The construction compound and laydown area are in operation. Turbine foundations and crane pads are being constructed at T9, T10 and T11. Turbine delivery and erection is occurring at T1, T3 and T4.
- **Scenario 05:** The construction compound and laydown area are in operation. Turbine foundations and crane pads are being constructed at T8, T14 and T15. Turbine delivery and erection is occurring at T9, T10 and T11.
- **Scenario 06:** The construction compound and laydown area are in operation. Turbine delivery and erection is occurring at T8, T14 and T15. Construction of the on-site substation is occurring.
- **Scenario 07 (evening / night-time):** To consider potential occurrence of noise in evening / night-time outside of core hours, a scenario has been modelled with generators associated with the operation of the temporary laydown area and construction compound.

7.33 The modelled scenarios represent the assumed 'noisiest' activities. Other construction activities not included in the noise models would occur. However, the noise output from these would be less than those considered above and therefore the likely significant effects have been assessed.

7.34 The noise-generating equipment assessed for each construction sub-phase is detailed in **Appendix 7.1**. It is noted that for much of the working day the noise associated with

construction activities would likely be less than predicted, as the assessment has made 'worst-case' assumptions that all equipment is constantly operating at full power and is located at the closest point to each receptor, whereas in practice equipment load and precise location would vary.

- 7.35 To protect the amenity of local residents, construction noise activities would be controlled under the Control of Pollution Act 1974 (COPA) (HM Government, 1974)¹⁴, which includes provisions on the control of noise pollution. In particular, Part III Section 60 of the COPA refers to the control of noise on construction sites. It provides that a Local Planning Authority can serve a notice imposing requirements regarding the way in which works are to be carried out, including controlling noise from construction sites to prevent disturbance occurring. The COPA also includes provision that the Secretary of State may prepare codes of practice to give guidance on methods of minimising noise and requires the Secretary of State to approve a code of practice for carrying out works to which section 60 applies. BS-5228 has been approved as a code of practice by the Secretary of State.

Cumulative construction noise

- 7.36 There are no other proposed or consented wind farms in proximity to the Project for Assessment, however, **Table 16.2** of ES Chapter 16 Assessment of Cumulative Effects define a list of other Cumulative Projects that should be considered.
- 7.37 The development detailed in **Table 16.2** with the closest shared NSRs is RMBC 24/00581/HYBR, a housing development at Hollingworth Road and Rakewood Road, which is shown with Map ID 'J' on **Figure 16.1**. This is located at a distance of approximately 1.4 km from CNAL 10 and CNAL 12, however, noise level output from that construction site would need to be controlled to ensure no adverse impacts are occurring at NSRs located adjacent to the site, within Edenfield. As a result, noise levels from RMBC 24/00581/HYBR would be expected to be low at CNAL 10 and CNAL12, such that no cumulative construction noise impacts could occur.
- 7.38 The next closest of the developments detailed in Table 16.2 is RMBC 25/00427/CONS *Proposed battery storage facility with associated infrastructure*, which is shown with Map ID 'M' on Figure 16.1. This development is located approximately 1.75 km from CNAL 10 and CNAL 12, the nearest NSRs considered in this assessment, and is approximately 2.4 km away from the nearest significant construction activities for the Project for Assessment, which would be track laying and construction activities related to turbine (T) 14. Given the large separation distances between the two construction sites and the NSRs, no cumulative noise impacts are anticipated.

Operational wind farm noise methodology

- 7.39 In England, the PPG 'Planning for renewable and low carbon energy'¹⁵ states:

'The report, ETSU-R-97: The assessment and rating of noise from wind farms should be used by local planning authorities when assessing and rating noise from wind energy developments. Good practice guidance on noise assessments of wind farms has been prepared by the Institute of Acoustics. The Department for Energy Security and Net Zero accept that it represents current industry good practice and endorses it as a supplement to ETSU-R-97. It is available on the Department for Energy Security and Net Zero's website.'

- 7.40 Furthermore, in relation to the guidance that should be used to assess the Project for Assessment, EN-3 provides strong support to the use of ETSU-R-97¹⁶, stating:

'The Secretary of State should consider noise and vibration impacts according to Section 5.11 of EN-1 and use ETSU-R-97, or any updated versions of this guidance that may be produced, to satisfy itself that the noise from the operation of the wind turbines is within acceptable levels.'

'Where the correct methodology has been followed and a wind farm is shown to comply with ETSU-R-97 recommended noise limits, the Secretary of State should give no weight to adverse noise impacts from the operation of the wind turbines.'

- 7.41 On 19th June 2026, the UK Government published updated guidance for the ARWTN which replaces the previous guidance ETSU-R-97 but is designed to be used alongside the good practice guidance produced by the Institute of Acoustics 'A good practice guide to the application of ETSU-R-97 for the assessment and rating of wind turbine noise' (IOA GPG).

- 7.42 In relation to policy the ARWTN document itself states, in Section 1.12, that:

'Reference to ETSU-R-97 in UK planning policy or guidance should be interpreted to mean a reference to this technical guidance, which replaces ETSU-R-97.'

- 7.43 Therefore, the wind farm operational noise assessment has been undertaken in accordance with ARWTN and the IOA GPG. ARWTN provides a robust basis for determining acceptable noise limits for wind farm developments. Consequently, the test applied to operational noise is whether or not the calculated wind farm noise levels at nearby noise sensitive properties would be below the noise limits derived in accordance with ARWTN and this is used to inform the assessment of likely significant effects.

- 7.44 Limits differ between daytime and night-time periods. The daytime criteria are based upon background sound levels measured during the 'quiet periods of the day' comprising:

- All evenings from 18:00 – 23:00;
- Saturday afternoons from 13:00 – 18:00; and
- All day Sunday 07:00 – 23:00.

- 7.45 For the avoidance of doubt, the limits set based upon the background data collected during the quiet daytime period apply to the entire daytime period (07:00 – 23:00). Night-time periods are defined as 23:00 – 07:00, with no differentiation made between weekdays and weekends.

- 7.46 The wind speed range that should be considered ranges between the cut-in wind speed for the turbines (usually about 2 to 3 ms⁻¹) and up to 10 ms⁻¹, where all wind speeds are referenced to a 10 m measurement height.

- 7.47 ARWTN recommends that wind farm noise for the daytime period should be limited to 5 dB(A) above the prevailing background or a Lower Limiting Value (LLV) within the range 35 - 40 dB, whichever is the higher. The choice of daytime LLV within the range 35-40 dB is determined based on three factors which consider the planning impacts and merits of the

wind farm(s) in relation to noise. The three factors are presented below in priority order (i.e. the largest weight should be given to the first factor):

- The generating capacity of the wind farm and the likely consequence that the choice of LLV would have on the energy generation of the wind farm(s).
- The number of dwellings in the neighbourhood of the wind farm(s) and the magnitude of the levels to which these are exposed.
- The duration and level of exposure to wind turbine noise of dwellings in the neighbourhood of the wind farm(s).

7.48 The choice of daytime LLV should be considered in the national context (Scotland, England, Wales and Northern Ireland) *'...as the range of wind energy projects, national policy priorities, and population density in practice can vary in each case.'* The three factors are discussed in further detail in Section 6.3 of **Appendix 7.2**.

7.49 Following a review of the guidance in ARWTN the three factors listed above, as well as a review of the noise limits for other wind farm / turbine developments in the surrounding area, the Total Noise Assessment Criteria (TNAC) for the Project for Assessment operating in conjunction with other cumulative schemes has been set at 40 dB(A) or background plus 5 dB whichever is the greater during the daytime period and at 43 dB(A) or background plus 5 dB whichever is the greater during the night-time period.

7.50 The exception to the setting of both the daytime and night-time LLV occurs where a property occupier has a financial involvement in a wind farm development. In this case, the LLV can be increased to 45 dB.

7.51 The TNAC relates to noise from all applicable wind turbines in the area. The final list of cumulative schemes considered in the assessment were determined with due consideration of Section 2.40 of ARWTN which states:

'For the purposes of this guidance, turbines with generating capacities of 50 kW or less can be considered to have localised noise impacts and can therefore be excluded from cumulative noise assessment. Turbines with generating capacities above 50 kW and less than (for example) a few hundred kilowatts can be excluded from cumulative assessment where it can be demonstrated that noise impacts from these turbines are localised and where including these turbines in a cumulative assessment would result in disproportionate constraints on larger developments. All other wind farm developments must be considered in the cumulative assessment where their individual noise level contribution is within 10 dB of the TNAC.'

7.52 There are a number of <50 kW wind turbines in the area around the Project for Assessment, as well as turbines of less than a few hundred kW. In accordance with ARWTN, all turbines of <50 kW have not been considered in the noise assessment. A further assessment has also been undertaken to consider the turbines of less than a few hundred kW in further detail, to determine whether the noise impacts from the turbines are localised and whether their inclusion would result in a disproportionate constraint on the Project for Assessment. It was determined that the 'Sheep House Farm' turbines located to the north of the Project for Assessment (which fit in this category) were found to be having a localised impact and that their inclusion would result in a disproportionate constraint to the Project for Assessment. Therefore, the Sheep House Farm turbines have not been considered in the assessment.

Further information can be found in Annex 12 of **Appendix 7.2**. The list of wind turbines considered in the assessment are included within **Table 7.8** below.

- 7.53 The Site Specific Noise Limits have been determined through consideration of the proportion of the TNAC that is available for future wind farms taking account of operational wind farms in the area (hereafter referred to as the 'residual noise budget').
- 7.54 The residual noise budget effectively represents the maximum SSNL that it would be appropriate to allocate to the Proposed Development but ARWTN details that it may not be appropriate to allocate all of the residual noise budget to a proposed wind farm, instead it may be appropriate to only allocate a proportion of the residual noise budget to retain headroom for developments which may be proposed in the future.
- 7.55 Apportionment of the noise limits was undertaken in accordance with current good practice and ARWTN, the process of which is detailed in Technical **Appendix 7.2**.
- 7.56 The exact model of turbine to be installed will be the result of a future procurement / tendering process should planning permission be granted. Achievement of the Site Specific Noise Limits determined by this assessment will be a key determining factor in the final choice of wind turbine for the Project for Assessment. Predictions of wind turbine noise for the Project for Assessment were made, based upon the sound power level data for a single candidate wind turbine, the Nordex N149 5.7 MW with serrated blades and a hub height of 105m, as it is considered representative of the type of wind turbine that would be installed.
- 7.57 Noise predictions have been undertaken using the propagation model contained within Part 2 of International Standard ISO 9613-2, 'Acoustics – Attenuation of sound during propagation outdoors' (ISO,2024). The model calculates, on an octave band basis, attenuation due to geometric spreading, atmospheric absorption and ground effects. The noise model was set up to provide realistic noise predictions, including mixed ground attenuation ($G=0.5$) and atmospheric attenuation relating to 70 % Relative Humidity and 10 °C and a receiver height of 4m.
- 7.58 Typically wind farm noise assessments assume all properties are downwind of all wind turbines at all times (as this would result in the highest wind turbine noise levels). However, where properties are located in between groups of turbines they cannot be downwind of all wind turbines simultaneously, so it is appropriate to consider the effect of wind direction on predicted noise levels and the influence of wind directivity has been considered in the assessment. Further information on the methodology adopted where this condition comes into effect is provided in Section 6.4 of **Appendix 7.2**.
- 7.59 The wind turbine noise immission levels are based on the $L_{A90,10 \text{ minute}}$ noise indicator in accordance with the recommendations in ARWTN, which were obtained by subtracting 2 dB(A) from the turbine sound power level data (L_{Aeq} indicator).
- 7.60 In line with the IOA GPG, an assessment has been undertaken to determine whether a concave ground profile correction (+3 dB) or barrier correction (-2 dB), is required due to the topography between the turbines and the NSRs. Propagation across a valley (concave ground) increases the number of reflection paths, and in turn, has the potential to increase sound levels at a given receptor. Terrain screening effects (barrier corrections) act as blocking points, subsequently reductions in sound levels at a given receptor can potentially

be observed. A concave ground and barrier correction was found to be required for a number of turbines at a number of receptors as detailed in Annex 6, **Appendix 7.2**.

- 7.61 More information relating to all the parameters for operational noise discussed above has been provided in **Appendix 7.2**.

Cumulative wind farm noise

- 7.62 The need for a cumulative noise assessment was considered in accordance with the guidance contained within the IOA GPG. There are a number of operational wind farm within the vicinity of the Project for Assessment. As such, and where required, a cumulative noise assessment was undertaken.

- 7.63 The noise assessment, as reported in 'Assessment of Effects, Secondary Mitigation and Residual Effects' section below, was undertaken in three separate stages:

- Stage 1 – establish the TNAC for each NAL using the measured background sound levels to derive new limits;
- Stage 2 – undertake noise modelling to determine whether noise predictions from the Project for Assessment on its own are within 10 dB of the noise predictions from other wind turbines within the area. Where turbine predictions are within 10 dB then a cumulative noise assessment has been undertaken; and
- Stage 3 – establish the Site Specific Noise Limits for the Project for Assessment and compare the noise predictions from the Project for Assessment on its own against the Site Specific Noise Limits.

- 7.64 The aim of the operational noise assessment therefore is to establish the TNAC, determine the likely impacts of the Project for Assessment and other schemes at the nearest NSRs, derive Site Specific Noise Limits and to demonstrate that the Project for Assessment could meet those limits.

- 7.65 The NALs identified for the operational assessment are detailed in **Table 7.6** and their locations are shown in **Figure 7.2**.

Table 7.6: NALs

NAL	X Coordinate (OS Grid)	Y Coordinate (OS Grid)
NAL1 – Cowpe Hall Farm	383665	420416
NAL2 – Willowfield Farm	383925	420092
NAL3 – Cowpe Lodge	384074	420340
NAL4 - Height	384817	420785
NAL5 – Sheep House Farm	385514	421094
NAL6 – Cutler Lane	386037	421302
NAL7 – Deansgreave Road	387941	421215
NAL8 – Cowm Top Farm	388352	419627
NAL9 – The Old Farmhouse	387935	418320
NAL10 – Houses o’ Th’ Hill	387665	417476
NAL11 – Snipe Barn Farm	387115	416360
NAL12 – Doldrum Farm	386373	415890
NAL13 – Naden House	385784	416346
NAL14 – Knowl Farm	384705	416030
NAL15 – Higher Red Lumb Farm	384076	416138
NAL16 – Edenfield Road	382694	416438
NAL17 – Fecit Farm	382022	417649
NAL18 – Lowes Farm	381072	418802
NAL19 – Higher Mount Pleasant	381590	420567
NAL20 – Lench Fold	383086	421058
NAL21 – Limed Farm	387574	418433

- 7.66 All the wind turbines modelled in the cumulative noise assessment (Stage 2), are summarised in Annex 6 of **Appendix 7.2**. The location of the wind turbines for the Project for Assessment and the other schemes in the area are shown on **Figure 7.3**.
- 7.67 Uncertainty in sound power data for the Project for Assessment has been accounted for using the guidance contained within Section 4.2 of the IOA GPG.

Reporting of the Environmental Effect and Significance Criteria

- 7.68 The assessment of likely significant environmental effects as a result of the Project for Assessment has taken into account the construction, operational and decommissioning stages. The following sections define the approach adopted within the assessment for the determination the residual effect and its significance.

Construction Noise

- 7.69 The level of effect and significance criteria adopted for this assessment are based on Appendix E part E.3.2 of BS 5228-1:2009+A1:2014 and detailed in **Table 7.7**.

Table 7.7: Construction noise category criteria

Assessment Category and Threshold Value Period	Threshold Value LAeq,T dB		
	Category A ^(A)	Category B ^(B)	Category C ^(C)
Night-Time (23:00 – 07:00)	45	50	55
Evenings and Weekends ^(D)	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

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

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

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

(D) 19:00-23:00 weekdays, 13:00-23:00 Saturdays and 07:00 – 23:00 Sundays.

- 7.70 The threshold values in each category are to be used where the existing noise level at each location, rounded to the nearest 5 dB, is below the level given for a particular time of day. BS 5228 provides the following advice regarding the threshold limits:

‘Note: 1 A potential significant effect is indicated if the LAeq,T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

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

Note 3: Applied to residential receptors only.’

- 7.71 Therefore, the assessment of construction noise reflects a specific noise threshold for the locality for a particular period of the day, rather than an absolute noise level.
- 7.72 It should be noted that exceedance of the threshold limit does not in itself indicate a significant effect, rather, the BS 5228 states in Section E.3.2 that *‘If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.’*
- 7.73 The assessment of construction noise is made against the threshold levels set in BS 5228, which cannot be used to determine a magnitude of impact. Rather, the assessment indicates the potential for a significant effect to occur and then additional factors, such as duration of

exposure, need to be considered. Although not explicit, BS 5228 suggests that a duration of exposure to noise levels above the thresholds for more than one month is likely to be significant.

Operational Wind Farm Noise

7.74 PPG 'Planning for renewable and low carbon energy'¹⁷ states *'The report, ETSU-R-97: The assessment and rating of noise from wind farms should be used by local planning authorities when assessing and rating noise from wind energy developments.'*

7.75 ARWTN states in Section 1.12:

'Reference to ETSU-R-97 in UK planning policy or guidance should be interpreted to mean a reference to this technical guidance, which replaces ETSU-R-97.'

7.76 'Interaction with policy' is discussed in Sections 1.12-1.19 of ARWTN. Specific considerations relating to Policy in England and Northern Ireland are detailed first and then Scotland and Wales are discussed separately. The Noise Policy Statement for England introduces the principles of a LOAEL (Lowest Observed Adverse Effect Level) and a SOAEL (Significant Observed Adverse Effect Level) for noise.

7.77 In terms of defining LOAEL and SOAEL, ARWTN states:

'Defining LOAELs and SOAELs for wind turbine noise, in the context of the NPSE guidelines in England or the NPSNI in Northern Ireland, is outside the scope of this technical guidance. However, based on the current state of knowledge, the noise assessment criteria derived in this document are not expected to exceed the SOAEL, although they may be above the LOAEL in some cases.'

'When adverse but non-significant effects (above the LOAEL and below the SOAEL) are predicted following assessment and compliance with this technical guidance, further noise minimisation is not required as a matter of policy in the context of sustainable development. It is recognised that noise minimisation is likely to be achieved through iterative layout design and the selection of appropriate wind turbine technology, with the outcome of this process ultimately tested and constrained by the assessment process set out in this guidance.'

7.78 The use of the term 'significance' in this Chapter in relation to operational wind turbine noise refers to compliance / non-compliance with the ARWTN derived noise limits. For situations where predicted wind turbine noise meets or is less than the noise limits defined in ARWTN, then the noise effects are deemed to be not significant as they are not expected to exceed the SOAEL. Any breach of the ARWTN noise limits could result in an exceedance of the SOAEL and is therefore deemed to result in a significant effect.

7.79 For the purposes of this assessment, residential properties that lawfully exist or have extant planning permission are considered to be NSRs.

Baseline Conditions

- 7.80 The Project for Assessment is located within a rural location where the predominant noise sources in the area include wind induced noise (wind passing through vegetation and around buildings), local watercourses, agricultural noise and birdsong. At some receptors within / closer to the settlements near to the Assessment Boundary, the soundscape may include road traffic noise.
- 7.81 There is also noise from existing operational wind turbines, as there are a number of operational wind turbine developments near to the Project for Assessment (**Figure 7.3**). **Table 7.8** summarises the cumulative wind turbine developments in the area surrounding the Project for Assessment.

Table 7.8: Cumulative wind farm / turbine developments^c

Wind farm / wind turbine	Status	Number of turbines	Make and model of turbine considered in modelling
Scout Moor Wind Farm	Operational	26	Nordex N80 (60 m hub)
Reaps Moss Wind Farm	Operational	3	Senvion 3.4M 104 (73 m hub)

- 7.82 A background sound survey was undertaken over the period 3rd December 2024 – 11th February 2025 at six Noise Monitoring Locations (NMLs), shown in **Figure 7.2** and detailed in **Table 7.9**.

Table 7.9: Noise Monitoring Locations

NML / receptor name	Easting	Northing
NML1 – Lower Mount Pleasant Farm	381534	420739
NML2 – Lowerfold Barn	383670	420397
NML3 – Law Head	385266	421321
NML4 – New Road Farm	387576	418432
NML5 – Windy Harbour	387242	416208
NML6 – Jubarn	386386	415823

- 7.83 During an interim site visit to service the equipment in January 2025, it was discovered that at three NMLs, measurements had stopped early. This was attributed to the impact of cold weather on battery life, and the background sound survey was subsequently extended for an additional month to ensure sufficient data was captured at all measurement locations.
- 7.84 Details of the exact monitoring periods, the rationale behind the exact kit location and the dominant noise sources observed at each of the NMLs, and the equipment used in the survey

^c A number of cumulative wind farm/ turbine developments were identified, but have been excluded from assessment due to predicted noise levels from the development being more than 10 dB below the TNAC at all NALs. These sites include: Crook Hill Wind Farm, Todmorden Wind Farm, the Stand Lees Farm Turbine, the Wind Hill Farm Turbine, and the Shawfield Farm Turbine.

are detailed in the Noise Monitoring Records and installation report included in **Appendix 7.2**, Annex 3.

- 7.85 During the background sound survey, meteorological data was measured by a Lidar unit located within the Assessment Boundary (grid reference 385294, 419417) and supplemented by data from tipping bucket style rain gauges located at NML1 and NML4. This data was then correlated with the sound measurements for every 10-minute period during the survey, in order to determine typical background sound levels for various wind speeds and directions. Further detail on the survey process can be found in Section 5.4 of **Appendix 7.2**.
- 7.86 ARWTN states that background sound levels should be determined in the absence of noise from any wind turbines. The IOA GPG details that, in situations where measurement locations are potentially influenced by existing wind turbine noise, the following approaches can be adopted:
- (i) The existing wind turbines can be switched off (assuming the applicant has control of those turbines and noting that there would be associated cost implications);
 - (ii) The contribution of the wind turbines can be accounted for by filtering the measured data by direction (only including background data when a receptor is upwind of the wind turbines) or by subtracting predicted turbine noise from the measured levels;
 - (iii) Limits can be set using 'proxy' datasets measured at location(s) outside of the influence of the wind turbines; or
 - (iv) Limits can be set using data collected as part of previous background noise assessments undertaken before the wind turbines were operational, providing the equipment and both noise and meteorological data obtained are appropriate.
- 7.87 In order to take a cautious approach, a combination of both wind direction filtering (to exclude data measured when the equipment was downwind of the operational turbines) and the subtraction of predicted noise levels from operational wind turbines was used to ensure the derived background sound levels did not include operational wind turbine noise.
- 7.88 During this process, it was determined that the dataset measured at NML1 was heavily influenced by operational wind turbine noise, and as such it was not possible to apply an appropriate correction to remove this influence. Consequently, the dataset from NML1 was discarded, and data measured at NML3 (the quietest measured dataset) was used as a proxy. The measured Total Noise levels from NML are presented in **Appendix 7.2**, Figure A1.2a.
- 7.89 The process undertaken to remove the influence of operational wind turbine noise is detailed in Section 5.5 of **Appendix 7.2**, and the resulting background sound levels are presented in **Appendix 7.2**, Figures A1.2b-f and detailed in **Tables 7.10** and **7.11**.

Table 7.10: Summary of Prevailing Background Sound Levels during Quiet Daytime Periods (dB(A))

NAL	Wind Speed (ms-1) as standardised to 10m height									
	1	2	3	4	5	6	7	8	9	10
NML2 – Lowerfold Barn	31.6*	31.6*	31.6	31.6	31.7	31.9	32.1	32.5	32.8	33.2
NML3 – Law Head	26.4	28.1	29.4	30.3	31.0	31.5	32.1	32.9	34.0	35.6
NML4 – New Road Farm	26.1*	26.1*	26.1*	26.1*	26.1*	26.1	26.4	27.7	30.2	34.3
NML5 – Windy Harbour	29.5	30.0	30.6	31.2	32.0	33.0	34.3	36.0	38.1	40.7
NML6 – Jubarn	30.4	31.3	32.2	33.1	34.0	34.8	35.7	36.4	37.2	37.8

flatlined where derived minimum occurs at lower wind speeds, see Section 5.9.7 of **Appendix 7.2.*

Table 7.11: Summary of Prevailing Background Sound Levels during Night-time Periods (dB(A))

NAL	Wind Speed (ms-1) as standardised to 10m height									
	1	2	3	4	5	6	7	8	9	10
NML2 – Lowerfold Barn	29.7*	29.7*	29.7*	29.7*	29.7*	29.7*	29.7	30.1	31.3	33.4
NML3 – Law Head	20.7	23.0	24.4	25.0	25.3	25.4	25.7	26.3	27.5	29.7
NML4 – New Road Farm	23.4*	23.4*	23.4*	23.4*	23.4*	23.4	24.2	26.2	29.5	34.1
NML5 – Windy Harbour	27.3*	27.3*	27.3*	27.3	27.5	28.5	30.2	32.5	35.6	39.3
NML6 – Jubarn	29.6*	29.6	29.9	30.3	31.0	31.7	32.7	33.9	35.2	36.7

flatlined where derived minimum occurs at lower wind speeds, see Section 5.9.7 of **Appendix 7.2.*

Future Baseline

- 7.90 In general, the dominant sources contributing to the baseline sound climate were wind induced noise, local watercourses, agricultural and birdsong with road traffic noise contributing to the noise environment at some receptors closer to settlements. Such sources are unlikely to substantively change over time, except for traffic flows which are generally expected to increase in line with expectations for macro-economic expansion though vehicle noise levels are expected to reduce over time. Therefore, contributing noise sources are unlikely to fundamentally change over time in the absence of the Project for Assessment.
- 7.91 It is possible that noise propagation and resulting noise immission levels could change over the life of the Project for Assessment due to climate change (as noise attenuation is influenced by air temperature, relative humidity and ground conditions).
- 7.92 In addition, the existing operational wind turbines may be decommissioned. However, noise limits are set based on current background sound levels in the absence of wind turbine noise and would be set for the lifetime of the project. The operator would be required to meet them for the duration of the planning permission.

Primary and Tertiary Mitigation

Construction Stage

- 7.93 The primary and tertiary mitigation that has been evaluated as part of the construction stage assessment is outlined below.
- 7.94 A range of good practice measures will be detailed in the CEMP and employed to minimise noise emissions during the construction stage. Good site practices would be implemented to minimise effects. Section 8 of BS5228 recommends a number of simple control measures as summarised below that would be employed on-site during construction:
- Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;
 - Ensure that any extraordinary site work continuing throughout 24 hours of a day (for example, crane operations lifting components onto the tower) would be programmed, when appropriate, so that haulage vehicles would not arrive at or leave the construction site between 19:00 and 07:00, with the exception of abnormal loads that would be scheduled to avoid peak traffic times;
 - Ensure all vehicles and mechanical plant would be fitted with effective exhaust silencers and be subject to programmed maintenance;
 - Select inherently quiet plant where appropriate – all major compressors would be ‘sound reduced’ models fitted with properly lined and sealed acoustic covers, which would be kept closed whenever the machines are in use;
 - Ensure all ancillary pneumatic percussive tools would be fitted with mufflers or silencers of the type recommended by the manufacturers;

- Instruct that machines would be shut down between work periods or throttled down to a minimum;
- Regularly maintain all equipment used on-site, including maintenance related to noise emissions;
- Vehicles would be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and
- Ensure all ancillary plant such as generators and pumps would be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures should be provided.

Operational Stage

7.95 Operational noise has been a key consideration throughout the design process for the Project for Assessment. The design presented in this assessment is the result of an iterative process, to ensure that the final wind turbine layout and their locations strike a balance between maximising the potential for renewable energy generation while providing appropriate protection of residential amenity.

Assessment of Effects, Secondary Mitigation and Residual Effects

Construction Stage

Disturbance associated with construction noise

7.96 Construction stage works will include earthworks, turbine installation, etc. These types of work can lead to noise generation.

7.97 The construction noise modelling results are summarised in **Table 7.12**.

Table 7.12: Predicted construction noise immission levels

CNAL	Criteria A Thresholds $L_{Aeq, 12\text{ hr}}$			Immission Level, dB $L_{Aeq, t}$ for each scenario						
	Daytime and Saturday Mornings *	Evenings, Saturday afternoons and all day Sunday **	Night-time ***	01 (Day)	02 (Day)	03 (Day)	04 (Day)	05 (Day)	06 (Day)	07 (Evening/Night)
CNAL01	65	55	45	27	32	27	34	35	34	16
CNAL02	65	55	45	27	34	26	36	37	35	15
CNAL03	65	55	45	23	29	22	29	34	33	8
CNAL04	65	55	45	31	38	31	40	40	41	20
CNAL05	65	55	45	25	29	24	30	31	30	13
CNAL06	65	55	45	26	29	30	33	32	27	15
CNAL07	65	55	45	26	30	37	37	26	22	15
CNAL08	65	55	45	25	29	36	36	29	26	12
CNAL09	65	55	45	26	27	29	30	30	28	13
CNAL10	65	55	45	49	38	38	38	38	38	22
CNAL11	65	55	45	30	33	37	38	33	29	19
CNAL12	65	55	45	58	48	48	48	48	48	46

* Daytime (07:00 – 19:00) and Saturdays (07:00 - 13:00)

** Evenings (19:00-23:00 weekdays) Weekends (13:00-23:00 Saturdays and 07:00-23:00 Sundays)

*** Night-Time (23:00 - 07:00)

- 7.98 Further details of the modelling and assessment can be found in **Appendix 7.1**.
- 7.99 **Table 7.12** shows that the predicted construction noise levels are below the weekday and Saturday daytime Category A Threshold value of 65 dB(A). Although some very limited construction activities are proposed outside of daytime hours (from 13:00 to 14:00 on Saturdays), the predicted noise levels at all CNALs are well below the evening and weekend threshold level of 55 dB(A) except for at CNAL12, where the predicted noise level during Scenario 01 is 58 dB(A) as a result of the construction of the temporary laydown area on Scout Road.
- 7.100 The predicted noise levels during the night-time scenario are well below the night-time threshold level of 45 dB(A) at all CNALs, except for at CNAL12 where the noise level is predicted to be up to 46 dB(A). This is as a result of a small diesel generated lighting rig which is modelled within the temporary laydown area on Scout Road.
- 7.101 As noted in BS 5228 Section E.3.2, an exceedance of the threshold levels does not in itself indicate a significant effect. The threshold value exceedances identified in **Table 7.12** are applicable at a single CNAL, and the exceedance during scenario 01 would only occur in the event that construction works on the temporary laydown area on Scout Road take place during evening and weekend periods, which is not anticipated to occur frequently, if at all. The exceedance during scenario 07 would occur only in the event that generator-powered lighting is required during night-time periods for the duration that the laydown area on Scout Road is in use.
- 7.102 Predicted noise levels are based on a number of conservative assumptions, and it is possible that actual noise levels resulting from night-time lighting in this area (considering the tertiary mitigation measures listed above) will be lower than the predicted levels.
- 7.103 The application of micrositing allowance does have the potential to impact the predicted noise levels and compliance with the threshold values listed above. However, the assessment is based on a number of conservative assumptions (for example that activities will occur simultaneously at the closest point to each receptor) so it is considered unlikely that micrositng would result in any prolonged exceedances of the threshold values and would therefore not change the effect.

Secondary mitigation or enhancement

- 7.104 To mitigate the effects of noise, construction of the temporary laydown area on Scout Road should only occur during the weekday daytime hours (07:00 - 19:00) and Saturday daytime hours (07:00 - 13:00) (i.e. not during the evening and weekend periods).
- 7.105 Additionally, the use of diesel generators for lighting and similar, will be avoided within the temporary laydown area during BS 5228 night-time hours (23:00 - 07:00), wherever possible.
- 7.106 Should lighting be required during night-time hours, for example for safety or security reasons, additional mitigation measures will be required, such as, the implementation of an acoustic barrier in a U shape formation around any generator. This could provide between 5-10 dB(A) of attenuation at the dwelling (as detailed in F.2.2 in BS 5228), which would sufficiently lower the noise level below the 45 dB(A) night-time threshold level.
- 7.107 Careful placement of noise sources within the temporary laydown area should also be considered (where possible) to maximise screening between the noise source and the

dwelling by using the non-residential buildings situated directly opposite the laydown area as barriers.

Residual effect

7.108 Following the implementation of secondary mitigation, the residual effects for construction noise are anticipated to be the reduction in noise levels at all CNALs for all assessment scenarios to levels below the Category A Threshold values for daytime, evenings and weekends and night-time.

7.109 Application of micro-siting allowance does not change the residual effect reported above.

Significance

7.110 Construction noise levels will remain below the threshold levels for all periods therefore the effect of construction noise is considered to be **Not Significant**.

Operational Stage

Disturbance associated with operational noise

7.111 Once completed, the wind turbines within the Project for Assessment will generate noise. The assessment of such effects is set out using a staged-approach below.

Setting the Total Noise Assessment Criteria (Stage 1)

7.112 Based on the prevailing background sound levels, the TNAC have been established for each of the NALs detailed in **Table 7.6**. The TNAC are as detailed in **Tables 7.13** and **7.14** and have been based on a Lower Limiting Value of 40 dB (daytime) or background plus 5 dB, whichever is the greater and 43 dB (night-time) or background plus 5 dB, whichever is the greater. Further details on how the TNAC have been determined are provided in **Appendix 7.2**.

Table 7.13: Total Noise Assessment Criteria – applicable to the daytime period

NAL	Wind Speed (ms-1) as standardised to 10m height									
	1	2	3	4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL2 – Willowfield Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL3 – Cowpe Lodge	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL4 - Height	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.6
NAL5 – Sheep House Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.6
NAL6 – Cutler Lane	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.6
NAL7 – Deansgreave Road	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.6
NAL8 – Cowm Top Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL9 – The Old Farmhouse	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL10 – Houses o’ Th’ Hill	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL11 – Snipe Barn Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.0	41.0	43.1	45.7

NAL	Wind Speed (ms-1) as standardised to 10m height									
	1	2	3	4	5	6	7	8	9	10
NAL12 – Doldrum Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL13 – Naden House	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL14 – Knowl Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL15 – Higher Red Lumb Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL16 – Edenfield Road	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL17 – Fecit Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL18 – Lowes Farm	40.0	40.0	40.0	40.0	40.0	40.0	40.7	41.4	42.2	42.8
NAL19 – Higher Mount Pleasant	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.6
NAL20 – Lench Fold	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL21 – Limed Farm	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Table 7.14: Total Noise Assessment Criteria – applicable to the night-time period

NAL	Wind Speed (ms-1) as standardised to 10 m height									
	1	2	3	4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL2 – Willowfield Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL3 – Cowpe Lodge	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL4 - Height	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL5 – Sheep House Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL6 – Cutler Lane	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL7 – Deansgreave Road	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL8 – Cowm Top Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL9 – The Old Farmhouse	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL10 – Houses o’ Th’ Hill	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL11 – Snipe Barn Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.3

NAL	Wind Speed (ms-1) as standardised to 10 m height									
	1	2	3	4	5	6	7	8	9	10
NAL12 – Doldrum Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL13 – Naden House	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL14 – Knowl Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL15 – Higher Red Lumb Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL16 – Edenfield Road	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL17 – Fecit Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL18 – Lowes Farm	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL19 – Higher Mount Pleasant	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL20 – Lench Fold	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL21 – Limed Farm	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Predicting the likely effects and the requirement for a Cumulative Noise Assessment (Stage 2)

- 7.113 A comparison has been undertaken of the predicted wind turbine noise immission levels from the Project for Assessment alongside all other schemes in the area at each of the identified NSRs in order to demonstrate whether predictions are within 10 dB of each other; if the predictions are greater than 10 dB apart then a cumulative noise assessment was not required. Where predictions are found to be within 10 dB of each other then a cumulative assessment was required. Further detail on this process is provided in Section 6.6 of **Appendix 7.2**. The comparison identified that a cumulative assessment is required at all but six receptors (NALs 7, 15-18 & 21), however all NALs have been included within the cumulative assessment for completeness.
- 7.114 Predicted cumulative noise levels were compared to the TNAC where a cumulative assessment was required. For some turbine models considered in the cumulative assessment noise data was not available for wind speeds less than 5 ms⁻¹. Therefore, no cumulative predictions are included for wind speeds less than 5 ms⁻¹.
- 7.115 As shown in **Tables 7.15** and **7.16**, the predicted wind turbine noise immission levels from the schemes summarised in **Table 7.8** (plus wind turbines as part of the Project for Assessment) are below the TNAC under all conditions and at all NALs during both daytime and night-time periods.

Table 7.15: Total Noise Assessment Criteria – Daytime

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	33.2	36.9	38.3	38.5	38.6	38.8
	Exceedance Level	-	-6.8	-3.1	-1.7	-1.5	-1.4	-1.2
NAL2 – Willowfield Farm	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	34.1	37.8	39.1	39.3	39.5	39.6
	Exceedance Level	-	-5.9	-2.2	-0.9	-0.7	-0.5	-0.4
NAL3 – Cowpe Lodge	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	33.0	36.6	37.9	38.1	38.3	38.5
	Exceedance Level	-	-7.0	-3.4	-2.1	-1.9	-1.7	-1.5
NAL4 - Height	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.6
	Predictions L _{A90}	-	33.1	36.9	38.3	38.4	38.6	38.7
	Exceedance Level	-	-6.9	-3.1	-1.7	-1.6	-1.4	-1.9
NAL5 – Sheep House Farm	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.6
	Predictions L _{A90}	-	30.7	34.7	36.1	36.2	36.3	36.4
	Exceedance Level	-	-9.3	-5.3	-3.9	-3.8	-3.7	-4.2
NAL6 – Cutler Lane	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.6
	Predictions L _{A90}	-	29.6	33.5	34.9	35.0	35.1	35.2
	Exceedance Level	-	-10.4	-6.5	-5.1	-5.0	-4.9	-5.4

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL7 – Deansgrea ve Road	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.6
	Predictions L _{A90}	-	26.5	30.1	31.8	32.1	32.2	32.2
	Exceedance Level	-	-13.5	-9.9	-8.2	-7.9	-7.8	-8.4
NAL8 – Cowm Top Farm	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	29.5	33.5	34.9	35.0	35.1	35.2
	Exceedance Level	-	-10.5	-6.5	-5.1	-5.0	-4.9	-4.8
NAL9 – The Old Farmhouse	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	27.8	31.6	33.0	33.1	33.3	33.4
	Exceedance Level	-	-12.2	-8.4	-7.0	-6.9	-6.7	-6.6
NAL10 – Houses o’ Th’ Hill	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	Predictions L _{A90}	-	30.3	34.3	35.7	35.8	35.9	36.0
	Exceedance Level	-	-9.7	-5.7	-4.3	-4.2	-4.1	-4.0
NAL11 – Snipe Barn Farm	TNAC L _{A90}	40.0	40.0	40.0	40.0	41.0	43.1	45.7
	Predictions L _{A90}	-	29.0	32.8	34.2	34.3	34.5	34.6
	Exceedance Level	-	-11.0	-7.2	-5.8	-6.7	-8.6	-11.1
NAL12 – Doldrum Farm	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	31.9	34.7	36.1	36.5	36.9	37.2
	Exceedance Level	-	-8.1	-5.3	-4.6	-4.9	-5.3	-5.6

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL13 – Naden House	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	33.9	36.6	37.9	38.4	38.8	39.1
	Exceedance Level	-	-6.1	-3.4	-2.8	-3.0	-3.4	-3.7
NAL14 – Knowl Farm	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	34.4	37.0	38.3	38.8	39.2	39.6
	Exceedance Level	-	-5.6	-3.0	-2.4	-2.6	-3.0	-3.2
NAL15 – Higher Red Lumb Farm	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	35.0	37.4	38.7	39.2	39.7	40.1
	Exceedance Level	-	-5.0	-2.6	-2.0	-2.2	-2.5	-2.7
NAL16 – Edenfield Road	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	35.0	37.4	38.7	39.2	39.7	40.1
	Exceedance Level	-	-5.0	-2.6	-2.0	-2.2	-2.5	-2.7
NAL17 – Fecit Farm	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	37.1	39.3	40.7	41.2	41.8	42.2
	Exceedance Level	-	-2.9	-0.7	0.0	-0.2	-0.4	-0.6
NAL18 – Lowes Farm	TNAC L _{A90}	40.0	40.0	40.0	40.7	41.4	42.2	42.8
	Predictions L _{A90}	-	30.9	33.3	34.6	35.1	35.7	36.0
	Exceedance Level	-	-9.1	-6.7	-6.1	-6.3	-6.5	-6.8
TNAC L _{A90}		40.0	40.0	40.0	40.0	40.0	40.0	40.6

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL19 – Higher Mount Pleasant	Predictions L _{A90}	-	31.2	34.2	35.5	35.9	36.2	36.5
	Exceedance Level	-	-8.8	-5.8	-4.5	-4.1	-3.8	-4.1
	TNAC L _{A90}	40.0	40.0	40.0	40.0	40.0	40.0	40.0
NAL20 – Lench Fold	Predictions L _{A90}	-	30.0	33.5	34.8	35.1	35.3	35.5
	Exceedance Level	-	-10.0	-6.5	-5.2	-4.9	-4.7	-4.5
NAL21 – Limed Farm	TNAC L _{A90}	45.0	45.0	45.0	45.0	45.0	45.0	45.0
	Predictions L _{A90}	-	31.0	35.0	36.4	36.5	36.6	36.7
	Exceedance Level	-	-14.0	-10.0	-8.6	-8.5	-8.4	-8.3

Table 7.16: Total Noise Assessment Criteria – Night-time

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	33.2	36.9	38.3	38.5	38.6	38.8
	Exceedance Level	-	-9.8	-6.1	-4.7	-4.5	-4.4	-4.2
NAL2 – Willowfield Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	34.1	37.8	39.1	39.3	39.5	39.6
	Exceedance Level	-	-8.9	-5.2	-3.9	-3.7	-3.5	-3.4
NAL3 – Cowpe Lodge	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	33.0	36.6	37.9	38.1	38.3	38.5
	Exceedance Level	-	-10.0	-6.4	-5.1	-4.9	-4.7	-4.5
NAL4 - Height	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	33.1	36.9	38.3	38.4	38.6	38.7
	Exceedance Level	-	-9.9	-6.1	-4.7	-4.6	-4.4	-4.3
NAL5 – Sheep House Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	30.7	34.7	36.1	36.2	36.3	36.4
	Exceedance Level	-	-12.3	-8.3	-6.9	-6.8	-6.7	-6.6
NAL6 – Cutler Lane	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	29.6	33.5	34.9	35.0	35.1	35.2
	Exceedance Level	-	-13.4	-9.5	-8.1	-8.0	-7.9	-7.8

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL7 – Deansgreave Road	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	26.5	30.1	31.8	32.1	32.2	32.2
	Exceedance Level	-	-16.5	-12.9	-11.2	-10.9	-10.8	-10.8
NAL8 – Cowm Top Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	29.5	33.5	34.9	35.0	35.1	35.2
	Exceedance Level	-	-13.5	-9.5	-8.1	-8.0	-7.9	-7.8
NAL9 – The Old Farmhouse	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	27.8	31.6	33.0	33.1	33.3	33.4
	Exceedance Level	-	-15.2	-11.4	-10.0	-9.9	-9.7	-9.6
NAL10 – Houses o’ Th’ Hill	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	30.3	34.3	35.7	35.8	35.9	36.0
	Exceedance Level	-	-12.7	-8.7	-7.3	-7.2	-7.1	-7.0
NAL11 – Snipe Barn Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	44.3
	Predictions L _{A90}	-	29.0	32.8	34.2	34.3	34.5	34.6
	Exceedance Level	-	-14.0	-10.2	-8.8	-8.7	-8.5	-9.7
NAL12 – Doldrum Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	31.9	34.7	36.1	36.5	36.9	37.2
	Exceedance Level	-	-11.1	-8.3	-6.9	-6.5	-6.1	-5.8

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL13 – Naden House	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	33.9	36.6	37.9	38.4	38.8	39.1
	Exceedance Level	-	-9.1	-6.4	-5.1	-4.6	-4.2	-3.9
NAL14 – Knowl Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	34.4	37.0	38.3	38.8	39.2	39.6
	Exceedance Level	-	-8.6	-6.0	-4.7	-4.2	-3.8	-3.4
NAL15 – Higher Red Lumb Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	35.0	37.4	38.7	39.2	39.7	40.1
	Exceedance Level	-	-8.0	-5.6	-4.3	-3.8	-3.3	-2.9
NAL16 – Edenfield Road	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	35.0	37.4	38.7	39.2	39.7	40.1
	Exceedance Level	-	-8.0	-5.6	-4.3	-3.8	-3.3	-2.9
NAL17 – Fecit Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	37.1	39.3	40.7	41.2	41.8	42.2
	Exceedance Level	-	-5.9	-3.7	-2.3	-1.8	-1.2	-0.8
NAL18 – Lowes Farm	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Predictions L _{A90}	-	30.9	33.3	34.6	35.1	35.7	36.0
	Exceedance Level	-	-12.1	-9.7	-8.4	-7.9	-7.3	-7.0
TNAC L _{A90}		43.0	43.0	43.0	43.0	43.0	43.0	43.0

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height						
		1 - 4	5	6	7	8	9	10
NAL19 – Higher Mount Pleasant	Predictions L _{A90}	-	31.2	34.2	35.5	35.9	36.2	36.5
	Exceedance Level	-	-11.8	-8.8	-7.5	-7.1	-6.8	-6.5
	TNAC L _{A90}	43.0	43.0	43.0	43.0	43.0	43.0	43.0
NAL20 – Lench Fold	Predictions L _{A90}	-	30.0	33.5	34.8	35.1	35.3	35.5
	Exceedance Level	-	-13.0	-9.5	-8.2	-7.9	-7.7	-7.5
	TNAC L _{A90}	45.0	45.0	45.0	45.0	45.0	45.0	45.0
NAL21 – Limed Farm	Predictions L _{A90}	-	31.0	35.0	36.4	36.5	36.6	36.7
	Exceedance Level	-	-14.0	-10.0	-8.6	-8.5	-8.4	-8.3
	TNAC L _{A90}	45.0	45.0	45.0	45.0	45.0	45.0	45.0

Operational stage – Derivation of Site Specific Noise Limits for the Project for Assessment (Stage 3)

- 7.116 In order to protect residential amenity, the IOA GPG (2013) recommendations are that cumulatively, all schemes operate within the TNAC. To allow this to occur, a set of Site Specific Noise Limits for the Project for Assessment are required and these have been derived for each NAL. The apportionment options provided in the IOA GPG were considered to determine the most appropriate option for each NAL.
- 7.117 The apportionment calculation described above determines the proportion of the TNAC that is available for future wind farms taking account of operational wind farms in the area (hereafter referred to as the 'residual noise budget').
- 7.118 The residual noise budget effectively represents that maximum Site Specific Noise Limit that it would be appropriate to allocate to the Proposed Development but ARWTN details that it may not be appropriate to allocate all of the residual noise budget to a proposed wind farm, instead it may be appropriate to only allocate a proportion of the residual noise budget to retain headroom for developments which may be proposed in the future.
- 7.119 The approach to deriving Site Specific Noise Limits at each of the NALs is summarised in Table 6.9 of **Appendix 7.2**,
- 7.120 The Site Specific Noise Limits and noise predictions for the Project for Assessment on its own, based on a Nordex N149, 5.7 MW, are summarised in **Tables 7.17** and **7.18**.
- 7.121 The results show that the predicted wind turbine noise levels from the Project for Assessment operating on its own meet the Site Specific Noise Limits under all conditions at all of the NALs during both daytime and night-time periods, with the exception of NAL2 and NAL4 during the daytime period.
- 7.122 At NAL2, predicted noise levels from the Project for Assessment would remain below the Site Specific Noise Limits under all conditions except 7 – 10 ms⁻¹ under worst-case downwind directions during the daytime.
- 7.123 At NAL4, predicted noise levels from the Project for Assessment would remain below the Site Specific Noise Limits under all conditions except 7 ms⁻¹ under worst-case downwind directions during the daytime.
- 7.124 As such, secondary mitigation will be required to comply with the requirements of ARWTN for these particular wind conditions.

Table 7.17: Site Specific Noise Limit – Compliance Table – Daytime

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	Site Specific Noise Limit L _{A90}	34.0	34.0	34.0	34.0	34.1	36.9	37.1	37.5	37.8	37.7
	Predictions L _{A90}	-	-	-	26.5	31.1	35.5	36.9	36.9	36.9	36.9
	Exceedance Level	-	-	-	-7.5	-3.0	-1.4	-0.2	-0.6	-0.9	-0.8
NAL2 – Willowfield Farm	Site Specific Noise Limit L _{A90}	34.8	34.8	34.8	34.8	34.9	36.9	37.1	36.8	36.0	35.3
	Predictions L _{A90}	-	-	-	27.3	31.9	36.3	37.7	37.7	37.7	37.7
	Exceedance Level	-	-	-	-7.5	-3.0	-0.6	0.6	0.9	1.7	2.4
NAL3 – Cowpe Lodge	Site Specific Noise Limit L _{A90}	33.5	33.5	33.5	33.5	33.6	36.9	37.1	37.5	37.8	37.7
	Predictions L _{A90}	-	-	-	26.0	30.6	35.0	36.4	36.4	36.4	36.4
	Exceedance Level	-	-	-	-7.5	-3.0	-1.9	-0.7	-1.1	-1.4	-1.3
NAL4 - Height	Site Specific Noise Limit L _{A90}	33.5	33.5	33.5	33.8	34.5	36.5	37.1	37.9	38.5	39.2
	Predictions L _{A90}	-	-	-	26.9	31.5	35.9	37.3	37.3	37.3	37.3
	Exceedance Level	-	-	-	-6.9	-3.0	-0.6	0.2	-0.6	-1.2	-1.9
NAL5 – Sheep House Farm	Site Specific Noise Limit L _{A90}	34.2	34.2	34.2	34.5	35.2	36.5	37.1	37.9	38.2	39.8
	Predictions L _{A90}	-	-	-	24.8	29.4	33.8	35.2	35.2	35.2	35.2
	Exceedance Level	-	-	-	-9.7	-5.8	-2.7	-1.9	-2.7	-3.0	-4.6

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL6 – Cutler Lane	Site Specific Noise Limit L _{A90}	34.9	34.9	34.9	35.2	35.9	36.4	37.0	37.8	38.9	40.5
	Predictions L _{A90}	-	-	-	23.6	28.2	32.6	34.0	34.0	34.0	34.0
	Exceedance Level	-	-	-	-11.6	-7.7	-3.8	-3.0	-3.8	-4.9	-6.5
NAL7 – Deansgreave Road	Site Specific Noise Limit L _{A90}	30.0	30.0	30.0	30.0	30.4	30.9	31.5	32.3	33.4	34.1
	Predictions L _{A90}	-	-	-	18.1	22.7	27.1	28.5	28.5	28.5	28.5
	Exceedance Level	-	-	-	-11.9	-7.7	-3.8	-3.0	-3.8	-4.9	-5.6
NAL8 – Cowm Top Farm	Site Specific Noise Limit L _{A90}	32.6	32.6	32.6	32.6	32.6	35.0	35.0	35.0	35.2	36.9
	Predictions L _{A90}	-	-	-	23.5	28.1	32.5	33.9	33.9	33.9	33.9
	Exceedance Level	-	-	-	-9.1	-4.5	-2.5	-1.1	-1.1	-1.3	-3.0
NAL9 – The Old Farmhouse	Site Specific Noise Limit L _{A90}	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	35.0	39.1
	Predictions L _{A90}	-	-	-	21.4	26.0	30.4	31.8	31.8	31.8	31.8
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.2	-7.3
NAL10 – Houses o' Th' Hill	Site Specific Noise Limit L _{A90}	33.7	33.7	33.7	33.7	33.7	35.0	35.0	35.0	35.2	38.0
	Predictions L _{A90}	-	-	-	24.6	29.2	33.6	35.0	35.0	35.0	35.0
	Exceedance Level	-	-	-	-9.1	-4.5	-1.4	0.0	0.0	-0.2	-3.0

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL11 – Snipe Barn Farm	Site Specific Noise Limit L _{A90}	31.6	31.6	32.2	32.8	33.6	34.6	35.9	37.6	39.7	42.3
	Predictions L _{A90}	-	-	-	22.5	27.1	31.5	32.9	32.9	32.9	32.9
	Exceedance Level	-	-	-	-10.3	-6.5	-3.1	-3.0	-4.7	-6.8	-9.4
NAL12 – Doldrum Farm	Site Specific Noise Limit L _{A90}	31.2	32.1	33.0	33.9	34.2	34.2	34.6	35.4	36.3	37.0
	Predictions L _{A90}	-	-	-	21.2	25.8	30.2	31.6	31.6	31.6	31.6
	Exceedance Level	-	-	-	-12.7	-8.4	-4.0	-3.0	-3.8	-4.7	-5.4
NAL13 – Naden House	Site Specific Noise Limit L _{A90}	35.2	35.6	35.6	35.6	35.6	35.6	35.6	36.5	37.7	38.6
	Predictions L _{A90}	-	-	-	22.2	26.8	31.2	32.6	32.6	32.6	32.6
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.9	-5.1	-6.0
NAL14 – Knowl Farm	Site Specific Noise Limit L _{A90}	33.7	33.7	33.7	33.7	33.7	33.7	33.8	34.9	35.1	36.3
	Predictions L _{A90}	-	-	-	21.7	26.3	30.7	32.1	32.1	32.1	32.1
	Exceedance Level	-	-	-	-12.0	-7.4	-3.0	-1.7	-2.8	-3.0	-4.2
NAL15 – Higher Red Lumb Farm	Site Specific Noise Limit L _{A90}	30.0	30.0	30.0	30.0	30.0	30.0	30.7	31.4	32.2	32.8
	Predictions L _{A90}	-	-	-	19.6	24.2	28.6	30.0	30.0	30.0	30.0
	Exceedance Level	-	-	-	-10.4	-5.8	-1.4	-0.7	-1.4	-2.2	-2.8

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL16 – Edenfield Road	Site Specific Noise Limit L _{A90}	30.0	30.0	30.0	30.0	30.0	30.0	30.7	31.4	32.2	32.8
	Predictions L _{A90}	-	-	-	16.2	20.8	25.2	26.6	26.6	26.6	26.6
	Exceedance Level	-	-	-	-13.8	-9.2	-4.8	-4.1	-4.8	-5.6	-6.2
NAL17 – Fecit Farm	Site Specific Noise Limit L _{A90}	30.0	30.0	30.0	30.0	30.0	30.0	30.7	31.4	32.2	32.8
	Predictions L _{A90}	-	-	-	17.2	21.8	26.2	27.6	27.6	27.6	27.6
	Exceedance Level	-	-	-	-12.8	-8.2	-3.8	-3.1	-3.8	-4.6	-5.2
NAL18 – Lowes Farm	Site Specific Noise Limit L _{A90}	30.0	30.0	30.0	30.0	30.0	30.0	30.7	31.4	32.2	32.8
	Predictions L _{A90}	-	-	-	15.9	20.5	24.9	26.3	26.3	26.3	26.3
	Exceedance Level	-	-	-	-14.1	-9.5	-5.1	-4.4	-5.1	-5.9	-6.5
NAL19 – Higher Mount Pleasant	Site Specific Noise Limit L _{A90}	32.6	32.6	32.6	32.9	33.6	34.1	34.7	35.1	35.1	35.9
	Predictions L _{A90}	-	-	-	21.3	25.9	30.3	31.7	31.7	31.7	31.7
	Exceedance Level	-	-	-	-11.6	-7.7	-3.8	-3.0	-3.4	-3.4	-4.2
NAL20 – Lench Fold	Site Specific Noise Limit L _{A90}	35.5	35.5	35.5	35.5	35.6	35.8	36.0	36.4	36.7	37.1
	Predictions L _{A90}	-	-	-	22.6	27.2	31.6	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-	-12.9	-8.4	-4.2	-3.0	-3.4	-3.7	-4.1

NAL		Wind Speed (ms^{-1}) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL21 – Limed Farm	Site Specific Noise Limit L_{A90}	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8
	Predictions L_{A90}	-	-	-	25.4	30.0	34.4	35.8	35.8	35.8	35.8
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0

Table 7.18: Site Specific Noise Limit – Compliance Table – Night-time

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL1 – Cowpe Hall Farm	Site Specific Noise Limit L _{A90}	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
	Predictions L _{A90}	-	-	-	26.5	31.1	35.5	36.9	36.9	36.9	36.9
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL2 – Willowfield Farm	Site Specific Noise Limit L _{A90}	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.7	40.7
	Predictions L _{A90}	-	-	-	27.3	31.9	36.3	37.7	37.7	37.7	37.7
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL3 – Cowpe Lodge	Site Specific Noise Limit L _{A90}	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4
	Predictions L _{A90}	-	-	-	26.0	30.6	35.0	36.4	36.4	36.4	36.4
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL4 - Height	Site Specific Noise Limit L _{A90}	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3
	Predictions L _{A90}	-	-	-	26.9	31.5	35.9	37.3	37.3	37.3	37.3
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL5 – Sheep House Farm	Site Specific Noise Limit L _{A90}	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2	38.2
	Predictions L _{A90}	-	-	-	24.8	29.4	33.8	35.2	35.2	35.2	35.2

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL6 – Cutler Lane	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
	Site Specific Noise Limit L _{A90}	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
	Predictions L _{A90}	-	-	-	23.6	28.2	32.6	34.0	34.0	34.0	34.0
NAL7 – Deansgreave Road	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
	Site Specific Noise Limit L _{A90}	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions L _{A90}	-	-	-	18.1	22.7	27.1	28.5	28.5	28.5	28.5
NAL8 – Cowm Top Farm	Exceedance Level	-	-	-	-14.9	-10.3	-5.9	-4.5	-4.5	-4.5	-4.5
	Site Specific Noise Limit L _{A90}	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9	36.9
	Predictions L _{A90}	-	-	-	23.5	28.1	32.5	33.9	33.9	33.9	33.9
NAL9 – The Old Farmhouse	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
	Site Specific Noise Limit L _{A90}	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8
	Predictions L _{A90}	-	-	-	21.4	26.0	30.4	31.8	31.8	31.8	31.8
NAL10 – Houses o’ Th’ Hill	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
	Site Specific Noise Limit L _{A90}	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
	Predictions L _{A90}	-	-	-	24.6	29.2	33.6	35.0	35.0	35.0	35.0
		Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL11 – Snipe Barn Farm	Site Specific Noise Limit L _{A90}	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	37.2
	Predictions L _{A90}	-	-	-	22.5	27.1	31.5	32.9	32.9	32.9	32.9
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-4.3
NAL12 – Doldrum Farm	Site Specific Noise Limit L _{A90}	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6
	Predictions L _{A90}	-	-	-	21.2	25.8	30.2	31.6	31.6	31.6	31.6
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL13 – Naden House	Site Specific Noise Limit L _{A90}	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6
	Predictions L _{A90}	-	-	-	22.2	26.8	31.2	32.6	32.6	32.6	32.6
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL14 – Knowl Farm	Site Specific Noise Limit L _{A90}	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1
	Predictions L _{A90}	-	-	-	21.7	26.3	30.7	32.1	32.1	32.1	32.1
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL15 – Higher Red Lumb Farm	Site Specific Noise Limit L _{A90}	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions L _{A90}	-	-	-	19.6	24.2	28.6	30.0	30.0	30.0	30.0
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL16 – Edenfield Road	Site Specific Noise Limit L _{A90}	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions L _{A90}	-	-	-	16.2	20.8	25.2	26.6	26.6	26.6	26.6
	Exceedance Level	-	-	-	-16.8	-12.2	-7.8	-6.4	-6.4	-6.4	-6.4
NAL17 – Fecit Farm	Site Specific Noise Limit L _{A90}	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions L _{A90}	-	-	-	17.2	21.8	26.2	27.6	27.6	27.6	27.6
	Exceedance Level	-	-	-	-15.8	-11.2	-6.8	-5.4	-5.4	-5.4	-5.4
NAL18 – Lowes Farm	Site Specific Noise Limit L _{A90}	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
	Predictions L _{A90}	-	-	-	15.9	20.5	24.9	26.3	26.3	26.3	26.3
	Exceedance Level	-	-	-	-17.1	-12.5	-8.1	-6.7	-6.7	-6.7	-6.7
NAL19 – Higher Mount Pleasant	Site Specific Noise Limit L _{A90}	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
	Predictions L _{A90}	-	-	-	21.3	25.9	30.3	31.7	31.7	31.7	31.7
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0
NAL20 – Lench Fold	Site Specific Noise Limit L _{A90}	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0
	Predictions L _{A90}	-	-	-	22.6	27.2	31.6	33.0	33.0	33.0	33.0
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0

NAL		Wind Speed (ms^{-1}) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL21 – Limed Farm	Site Specific Noise Limit L_{A90}	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8	38.8
	Predictions L_{A90}	-	-	-	25.4	30.0	34.4	35.8	35.8	35.8	35.8
	Exceedance Level	-	-	-	-13.4	-8.8	-4.4	-3.0	-3.0	-3.0	-3.0

- 7.125 As noted above, a minor exceedance of the Site Specific Noise Limits is predicted at NAL2 and NAL4 under worst-case downwind conditions during speeds of 7 - 10 ms⁻¹. Therefore, there would be a direct long term but temporary effect at two locations without appropriate mitigation measures put in place.

Secondary mitigation or enhancement

- 7.126 Secondary mitigation would be required in the form of wind turbine mode management, applicable to a limited number of turbines for a specific range of wind speeds and directions to ensure that the Site Specific Noise Limits are met. Following confirmation of the choice of turbine to be installed on-site, an Operational Noise Management Plan will be devised and enacted to ensure that no exceedances of the Site Specific Noise Limits will occur. This will take the form of a scheme of low noise operational modes to be used under specific wind conditions.
- 7.127 Low noise operational modes are available for the candidate wind turbine, the Nordex N149 5.7 MW, offering up to a 10 dB reduction compared to 'full mode' noise levels. The available modes reduce the turbine noise level in increments of between 0.5 and 1 dB, allowing for flexibility of operation. Further detail on the specific turbines which would require mitigation and the turbine modes necessary to meet the Site Specific Noise Limits are provided in Section 6.11 of **Appendix 7.2**.
- 7.128 The Nordex turbine model was chosen as it is considered to be representative of the type of turbine that could be installed. There are a number of wind turbine makes and models that may be suitable for the Project for Assessment. Should the proposal receive planning permission, the final choice of turbine would be subject to a competitive procurement / tendering process. However, the final choice of turbine would have to meet the noise limits determined and contained within any condition imposed.
- 7.129 A set of suggested Noise Conditions are presented within **Appendix 7.2** Annex 9 which present Site Specific Noise Limits for all NALs.
- 7.130 Predicted noise levels inclusive of secondary mitigation are presented in **Table 7.19** and show that predicted noise levels from the Project for Assessment meet the Site Specific Noise Limits.

Table 7.19: Site Specific Noise Limits Compliance Table – Inclusive of Mitigation - Daytime

NAL		Wind Speed (ms ⁻¹) as standardised to 10 m height									
		1	2	3	4	5	6	7	8	9	10
NAL2 – Willowfield Farm	Site Specific Noise Limit LA90	34.8	34.8	34.8	34.8	34.9	36.9	37.1	36.8	36.0	35.3
	Predictions LA90	-	-	-	27.3	31.9	36.3	37.1*	36.8*	36.0*	35.3*
	Exceedance Level	-	-	-	-7.5	-3.0	-0.6	0.0*	0.0*	0.0*	0.0*
NAL4 - Height	Site Specific Noise Limit LA90	33.5	33.5	33.5	33.8	34.5	36.5	37.1	37.9	38.5	39.2
	Predictions LA90	-	-	-	26.9	31.5	35.9	37.1*	37.3	37.3	37.3
	Exceedance Level	-	-	-	-6.9	-3.0	-0.6	0.0*	-0.6	-1.2	-1.9

*Predicted wind turbine noise level inclusive of mitigation

Residual effect

7.131 Following the implementation of secondary mitigation in the form of wind turbine mitigation (low noise operational modes), the Site Specific Noise Limits would be met at all locations during daytime and night-time periods. As such, there would be no significant residual effects.

7.132 Wind turbine noise would need to meet the noise limits set out in any planning permission regardless of the final choice of turbine and any turbine micro-siting. Accordingly, application of micro-siting allowance does not change the effect reported above.

Significance

7.133 This effect of operational noise is considered to be **Not Significant**.

Limitations and Assumptions

7.134 To ensure transparency within the EIA process, the following limitations and assumptions have been identified.

- A candidate wind turbine has been used for predictions of operational noise from the Project for Assessment. The final model of wind turbine to be used may differ from that utilised within the modelling / assessment. However, the operational noise levels from the Project for Assessment would have to comply with the noise limits imposed within the noise condition attached to any planning permission.

Summary

- 7.135 **Table 7.19** provides a summary of the effects, receptors, residual effects and conclusions of significance considered within the Chapter.
- 7.136 The table only provides a summary of the residual effects identified within the assessment and details of all primary, secondary and tertiary mitigation measures that have been taken into account are set out in detail within the Chapter and summarised in the Environmental Management Plan included in **Volume 3: Environmental Management Plan**.

Table 7.20: Summary of residual effects

Effect	Receptor	Is the residual effect Significant?
Construction stage		
Disturbance associated with construction noise	Residential properties (CNALs are shown in Figure 7.1)	No
Operational stage		
Disturbance associated with operational noise	Residential properties (NALs are shown in Figure 7.2)	No

References

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- ¹ British Standard BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' – Part 1: Noise
- ² Ministry of Housing, Communities and Local Government (2024) National Planning Policy Framework.
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- ⁴ Department for Levelling Up, Housing and Communities and Ministry for Local Government, Communities and Housing (online) PPG. Available at: <https://www.gov.uk/government/collections/planning-practice-guidance>. Date Accessed 05/06/2026.
- ⁵ Department for Energy Security & Net Zero. Overarching National policy Statement for Energy (EN-1) (2025). Available at: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1-2025/overarching-national-policy-statement-for-energy-en-1-2025-accessible-webpage>. Date Accessed 05/06/2026.
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- ⁷ Rossendale Borough Council (2021) Rossendale Local Plan 2019 to 2036.
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- ⁹ Rochdale Metropolitan Borough Council (2016) Rochdale Core Strategy.
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- ¹¹ UK Government. The Assessment and Rating of Wind Turbine Noise (2026). Department of Energy Security and Net Zero.
- ¹² IOA (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'. UK: Institute of Acoustics.
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- ¹⁴ HM Government. Control of Pollution Act 1974.
- ¹⁵ Government (2023). Guidance 'Renewable and low carbon energy'. Available at: [Renewable and low carbon energy - GOV.UK](#) Date Accessed: 07/04/2025.
- ¹⁶ The Working Group on Noise from Wind Turbines (1996). ETSU-R-97 The Assessment and Rating of Noise From Wind Farms. UK: Energy Technology Support Unit
- ¹⁷ Government (2023). Guidance 'Renewable and low carbon energy'. Available at: [Renewable and low carbon energy - GOV.UK](#). Date Accessed: 07/04/2025.