Novar 1 Wind Farm Repowering

Chapter 10 - Noise

September 2026



10. Noise

10.1 Executive Summary

10.1.1. The noise assessment has considered the likely decommissioning effects of the Novar 1 Wind Farm and likely construction, operational and decommissioning effects of the repowered wind farm. Noise would be emitted by equipment and vehicles used during construction. However, due to the temporary nature of these activities, and reflecting embedded measures such as restricted hours of working and other good practice measures, no significant effects are expected for the proposed construction works.

10.1.2. Noise would also be produced by the turbines and substation equipment during operation. The design of the Proposed Development has taken account of operational noise such that suitable noise limits would be achieved at nearby sensitive receptors including when operating alongside the nearby operational Novar 2 Wind Farm and the proposed Abhainn Dubh Wind Farm. The cumulative effects of the proposed Ceislein Wind Farm have also been considered. Operational noise from the turbines would be controlled to suitable noise limits, derived following consideration of historical baseline noise levels in the area, such that no significant effects are anticipated. Operational noise from the substation has been assessed as likely to represent a negligible (not significant) noise effect.

10.2 Introduction

10.2.1. This chapter considers the likely significant effects on the noise sensitive receptors associated with the decommissioning of the existing Novar 1 Wind Farm and the construction, operation and decommissioning of the repowered wind farm.

10.2.2. The specific objectives of the chapter are to:

- Describe the existing noise baseline context and cumulative context;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the potential effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

10.2.3. The assessment of the operational noise effects accounts for the cumulative effects of the Proposed Development operating alongside the existing Novar 2 Wind Farm, the Abhainn Dubh Wind Farm and the submitted Ceislein Wind Farm (see details in **Technical Appendix 10.1: (EIAR Volume 4)**). Other, more distant wind farms have not been considered as they do not make an acoustically relevant contribution to cumulative noise levels.

10.2.4. For the construction and decommissioning phases, details of relevant working practices, traffic routes, and proposed working hours are considered, with the assessment of noise from traffic associated with construction and decommissioning, based on the assessment presented in **Chapter 11: Traffic and Access (EIAR Volume 2)**.

10.2.5. The assessment has been carried out by Hoare Lea.

10.2.6. This chapter is supported by the following figures and technical appendices:

- Volume 3a: Figures
  - Figure 10.1: Noise prediction contour map
- Volume 4: Technical Appendices
  - Technical Appendix 10.1: Novar Wind Farm Repowering Environmental Noise Assessment.

10.2.7. Figures and technical appendices are referenced in the text where relevant.

10.3 Legislation, Policy and Guidance

10.3.1. This noise assessment has been undertaken within the context of relevant legislative instruments, planning policies, and guidance documents, and these are summarised below, with full details and discussion included in **Technical Appendix 10.1 (EIAR Volume 4).**

Legislation

- Control of Pollution Act (CoPA)[1] UK Government (1974);

Policy

- Scottish National Planning Framework 4. Scottish Government (2023);
- Onshore Wind Policy Statement 2022. Scottish Government (2022).

Technical Standards and Guidance

- The Assessment and Rating of Noise from Wind Farms (ETSU-R-97)[2]. The Working Group on Noise from Wind Turbines (1997);
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (IOA GPG)[3]. Institute of Acoustics (2013);
- Planning Advice Note PAN1/2011[4], Planning & Noise. Scottish Government (2011);
- British Standard BS 5228 'Noise control on construction and open sites', Part 1[5]. British Standards Institution (2014);
- British Standard BS 4142 'Methods for rating and assessing industrial and commercial sound' British Standards Institution (2014 + A1:2019)[6];
- Calculation of Road Traffic Noise (CRTN)[7]. Department of Transport (1988); and
- Design Manual for Roads and Bridges (DMRB)[8]. Transport Scotland (2020).

10.3.2. These guidance documents and their relevance to noise is summarised below, with further detail provided in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.3.3. The ETSU-R-97 assessment procedure and associated good practice guidance (IOA GPG) are referenced in the Onshore Wind Policy Statement 2022. This guidance specifies that noise limits should be set relative to existing background noise levels at the nearest noise sensitive receptors and that these limits should reflect the variation in both turbine source noise and background noise with wind speed. ETSU-R-97 also specifies that the noise limits apply to the cumulative noise of all wind turbines, although the IOA GPG clarifies that if the contribution from other turbines is 10 dB or more below that of the wind turbines considered, this can be considered negligible and does not require further consideration.

10.3.4. Separate noise limits apply for the daytime and night-time which equate to a lower fixed limit or 5 dB above the prevailing background noise, whichever is greater. The prevailing background noise level for the daytime is derived from noise data measured during the quiet daytime periods[9] and, for the night-time from noise measured between 23:00 and 07:00 hours.

[1] 1974, HMSO, Control of Pollution Act, Part III.
[2] September 1996. The Working Group on Noise from Wind Turbines. ETSU R 97, The Assessment and Rating of Noise from Wind Farms, Final Report for the Department of Trade & Industry.
[3] M. Cand, R. Davis, C. Jordan, M. Hayes, R. Perkins, May 2013, A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, Institute of Acoustics.
[4] 2011, Planning Advice Note Planning and Noise (PAN1), The Scottish Government.
[5] BS 5228 1:2009-A:2014 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'.
[6] BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.
[7] 1988, Calculation of Road traffic Noise (CRTN), Department of Transport.
[8] November 2011, Vol 11, Revision 1, Design Manual for Roads and Bridges (DMRB), Transport Scotland.
[9] Quiet daytime periods are defined in ETSU-R-97 as: all evenings from 18:00 to 23:00, plus Saturday afternoon from 13:00 to 18:00, plus all day Sunday 07:00 to 18:00.

10.3.5. The lower fixed portion of the daytime noise limit is normally set in the range of 35 dB(A) to 40 dB(A), the precise choice of value depending on several factors:

- The number of noise-affected properties;
- The likely duration and level of exposure; and
- The consequences of the choice on the potential power generating capability of the wind farm.

10.3.6. These factors are discussed further specifically for the Proposed Development in paragraph 5.7.4 of **Technical Appendix 10.1 (EIAR Volume 4)**. Following consultation feedback (Table 10.1 below), the lowest value in the range has been adopted: 35 dB(A) (with the exception of the assessment of cumulative effects including the proposed Ceislein Wind Farm, as set out in paragraph 10.7.26 onwards).

10.3.7. The lower fixed portion of the night-time noise limit recommended in ETSU-R-97 is 43 dB(A). Following consultation feedback (Table 10.1 below), this has been reduced to 38 dB(A).

10.3.8. The UK Government Department for Energy Security and Net Zero recently published a replacement for ETSU-R-97 on 19th June 2026[10], the Assessment and Rating of Wind Turbine Noise (ARWTN). The statement accompanying the release clarifies how this document is to be used and the guidance which it provides:

'It should be used by developers of onshore wind planning applications and planning authorities across the UK when making and considering wind turbine noise assessments. It provides technical guidance for assessing and controlling operational noise from wind turbines in the planning context. It provides guidelines for the control of wind turbine noise, such that wind farm neighbours receive a reasonable degree of protection without placing unreasonable restrictions on wind farm development.'

10.3.9. ARWTN requires consideration of cumulative operational noise in a similar way as in the ETSU-R-97 guidelines, as the limits (denoted Total Noise Assessment Criteria or 'TNAC' in ARWTN) continue to apply to the noise from all wind turbines in the area, although wind farms with a contribution which is considered negligible relative to those TNAC can be excluded. ARWTN also explains that cumulative noise levels are controlled through the application of site-specific noise limits (SSNLs) at relevant noise-sensitive receptor locations in the consent of each relevant wind farm.

10.3.10. The updated guidelines include similar limits as those of the original ETSU-R-97 guidelines, although they only apply up to wind speeds of 10 m/s. In particular, the numerical values of the lower fixed limits (denoted Lower Limiting Values or 'LLVs' in ARWTN) for day and night periods are unchanged from those of ETSU-R-97. The ARWTN guidance discourages the use of standard values of the LLV and requires consideration of all relevant site-specific factors in each case: therefore, the approach adopted as set in Table 10.1 and paragraph 10.3.6 is considered precautionary.

10.3.11. The ARWTN document also endorses relevant guidance on good practice from the Institute of Acoustics. The Institute of Acoustics (IOA) has released a statement[11] which explains that the 2013 IOA Good Practice Guide (IOA GPG) remains relevant advice on good practice, until updated and approved guidance is published by the IOA.

10.3.12. The ARWTN document also recommends that clauses to assess and rate Amplitude Modulation are included as part of consent conditions for wind turbine schemes, in a similar way as tonality was taken into account in the ETSU-R-97 guidelines, but that an assessment of either feature at planning stage is not normally required.

10.3.13. The ARWTN guidance also explains that no assessment for infrasound, low frequency sound or ground-borne vibration is required, based on the extensive review of the evidence

[10]Assessment and Rating of Wind Turbine Noise, Department for Energy Security and Net Zero, Published 19th June 2026 (https://www.gov.uk/government/publications/assessment-and-rating-of-noise-from-wind-turbines-guidance). Assessment and Rating of Wind Turbine Noise, M. Cand, R. Davis, C. Jordan, M. Hayes, R. Perkins, Institute of Acoustics, May 2013.
[11] Institute of Acoustics, Statement: Wind Farm Noise Assessment, published on www.ioa.org.uk, 24/06/2026.

presented in the 2023 review document. This is consistent with the approach taken in this chapter.

10.3.14. Given the general similarities between the original ETSU-R-97 and ARWTN guidelines, and its publication as the present EIAR was being finalised, it was not considered necessary or practical to update the detailed operational assessment set out in **Technical Appendix 10.1 (EIAR Volume 4)** which remains presented in line with the ETSU-R-97 methodology but its conclusions remain applicable for the reasons set out in the above paragraphs.

10.3.15. PAN1/2011 and the Technical Advice Note[12] accompanying PAN1/2011 references the guidance of BS 5228 for the assessment and control of noise and vibration from construction and BS 4142 for assessing operational noise from equipment (other than the wind turbines). Additional guidance specific to stone extraction from borrow pits can be found in PAN50.

10.3.16. Further information on the detailed methodology undertaken in the assessment within this chapter is provided in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.4 Assessment Methodology

Overview

10.4.1. The noise assessment methodology is detailed in **Technical Appendix 10.1 (EIAR Volume 4)** and follows the principles set out in guidance referenced in the Scottish Planning Guidance as set out above.

10.4.2. The assessment is presented with reference to specific 'areas' of the Site comprising the Turbine Array and associated Access Route, as described in **Chapter 3: Site Description and Proposed Development (EIAR Volume 2)**.

10.4.3. Effects considered to be significant for the purposes of the EIA Regulations are those classified as being major or moderate.

Scope of Assessment

EIA Scoping Opinion

10.4.4. An EIA Scoping Report (presented in **Technical Appendix 1.3 Scoping Report (EIAR Volume 4)**) was submitted to ECU on 23rd January 2025 with a formal request for a Scoping Opinion on the proposed scope of the EIA and assessment methodologies. The ECU subsequently issued their Scoping Opinion on the proposed scope and methodology of the topics for assessment within the EIA on 23rd May 2025. A copy of ECU's Scoping Opinion is provided in **Technical Appendix 1.4 Scoping Opinion (EIAR Volume 4)**.

10.4.5. A summary of the key points raised in ECU's Scoping Opinion, relevant to noise, are presented in Table 10.1, including a response as to where the comments have been addressed.

Table 10.1: Summary of ECU Scoping Opinion Comments

Summary of Comment	Response or location within the EIAR where comments are addressed
3.1.7: The noise assessment should be carried out in line with relevant legislation and standards as detailed in section 9 of the scoping report. The noise assessment report should be formatted as per Table 6.1 of the IOA "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise".	The relevant approach set out in the Scoping Report has been followed in preparing this chapter. **Technical Appendix 10.1 (EIAR Volume 4)** includes all relevant details of the operational noise assessment in line with guidance in the IOA GPG. The proposed assessment approach submitted via a letter to The Highlands Council (THC) was accepted by the

[12] March 2011, PAN1/2011 Technical Advice Note – Assessment of Noise, Scottish Government.

Table 10.1: Summary of ECU Scoping Opinion Comments	
Summary of Comment	**Response or location within the EIAR where comments are addressed**
It is recommended by the Scottish Ministers that the final list of receptors in respect of noise assessment should be agreed following discussion between the Company and the Highland Council.	Environmental Health Department on the 15th August 2024, with regards to the use of historical data and new survey data from a conservative proxy location, to inform the most representative baseline noise levels at the receptors identified in the area.
3.88: The target noise limits are either a simplified standard of 35dB L_{A90} at wind speeds up to 10m/s or a composite standard of 35dB L_{A90} (daytime) and 38dB L_{A90} (night-time) or up to 5dB above background noise levels at up to 12m/s.	Operational turbine noise (in isolation and cumulatively with neighbouring sites) at receptors has been assessed against either: • The simplified 35 dB LA90 limit at wind speeds up to 10m/s, Or against the full ETSU-R-97 noise limit methodology but adapted in line with this consultation feedback: • 35dB LA90 (day-time) and 38dB LA90 (night-time) or up to 5dB above background noise levels, at up to 12m/s. The revised ARWTN noise guidance published recently discourages the approach recommended by THC, as lower limit values for day-time periods should be considered on a case-by-case basis, and the guidance confirms that a lower limit of 43 dB can be adopted for night-time periods. The more precautionary approach recommended by THC was nevertheless adopted in the assessment of the Proposed Development in line with this consultation response.
3.92: The assessment should include a map showing all wind farm developments which may have a cumulative impact and all noise sensitive properties including any for which a financial involvement relaxation is being claimed.	Figure 10.1.1 (Annex B) in **Technical Appendix 10.1 (EIAR Volume 4)** and **Figure 10.1 (EIAR Volume 3a)** illustrate the cumulative schemes that have been considered in the assessment. No financially involved receptor properties are present.
3.95: When assessing the cumulative impact from more than one wind farm, consideration must be given to any increase in exposure time. Regardless of whether cumulative levels can meet relevant criteria, if a noise sensitive property subsequently becomes affected by wind turbine noise from more than one direction this could result in a significant loss of respite.	Level and duration of exposure at receptors to the Proposed Development and cumulative sites is discussed in paragraph 5.7.6 in **Technical Appendix 10.1 (EIAR Volume 4)**. As the Proposed Development involves the repowering of an existing wind farm, the receptors remain exposed to wind turbine noise from the same direction as the existing wind farm.
3.96: If background noise surveys are required, these should be undertaken in accordance with ETSU-R-97 and the Good Practice Guide. It is recommended that monitoring locations be agreed with the Council's Environmental Health Officer. Where a monitoring location is to be used as a proxy location for another property,	Specific consultation was undertaken with THC regarding the use of historical data and new survey data from a conservative proxy location, to inform the most representative baseline noise levels in the area and exclude existing operational turbine noise, in line with ETSU-R-97 and IOA GPG methodology. All survey data referenced was not considered to

Table 10.1: Summary of ECU Scoping Opinion Comments	
Summary of Comment	**Response or location within the EIAR where comments are addressed**
particular care must be taken to ensure it is not affected by other noise sources such as boiler flues, wind chimes, etc. which are not present at that other property. 3.97: Difficulties can arise where a location is already subject to noise from an existing wind turbine development. ETSU states that background noise must not include noise from an existing wind farm. The GPG offers advice on how to approach this problem and in some cases, it may be possible to utilise the results from historical background surveys provided they have been undertaken in accordance with current best practice or otherwise adjusted	be affected by operational wind turbine noise. The proposed approach was accepted by THC on the 15th August 2024. Historical data used from the Clach Liath Wind Farm application has been adjusted in accordance with the GPG for wind shear, as detailed in Annex D of **Technical Appendix 10.1 (EIAR Volume 4)**. The cumulative noise assessment with the Ceislein Wind Farm references background measurement data at four locations from the Ceislein Wind Farm application, which were completed in line with the IOA GPG as detailed in *'Technical Appendix 12.2 – Operational Noise Report – Part 1 of 3'* in the submitted Ceislein Application (ECU ref. ECU00005174).
3.100: Operational vibration, infrasound, and low frequency noise can be scoped out from further assessment	These topics have been scoped out of the assessment.
3.105: If the application includes a proposal for a sub-station or battery storage site, a separate noise assessment may be required to demonstrate that noise will meet the following standards: - Noise arising from within the operational land of the sub-station, when measured and/or calculated as an LZeq, 5min, in the 100Hz one third octave frequency band must not exceed 30 dB, at noise sensitive premises (in the case of BESS sites, this requirement may be waived if it can be demonstrated that the noise has no tonal element). - The Rating Level of noise arising from the use of plant, machinery or equipment installed or operated within the operational land of the sub-station, must not exceed the current background noise levels at noise sensitive premises. The Rating Level should be calculated in accordance with BS 4142: 2014+A1:2019 Methods for rating and assessing industrial and commercial sound. Noise from sub-stations and battery sites would not normally be considered cumulatively with wind farms.	Operational noise from the proposed substation is considered in paragraphs 10.7.15 and 10.7.16. The specific additional criteria proposed by THC in this regard are considered stringent, but they were referenced in the analysis in addition to the general guidance of BS 4142.

Potential Impacts Scoped In

10.4.6. The scope of this chapter is set out in Table 10.2 and is based on the feedback provided in Table 10.1.

Table 10.2: Impacts Considered within the Assessment			
Impact	**Phase***		
	C	**O/M**	**D**
Construction and decommissioning noise: When assessing the effects of construction noise, the temporary nature of the associated works should also be considered. The main work locations for construction of the proposed turbines would be distant from the nearest noise sensitive residences and would be unlikely to cause significant effects. The construction and use of access tracks and some of the required infrastructure may, however, occur at lesser separation distances. The assessment of the temporary effects of construction noise is primarily aimed at understanding the need for dedicated management measures and, if so, the types of measures that are required. Decommissioning noise impacts from dismantling the existing Novar 1 Wind Farm site, during the construction phase of the repowered wind farm and its decommissioning at the end of its operational lifespan have also been scoped into the assessment.	x		x
Operational noise from the Proposed Development turbines: Once constructed and operating, wind turbines may emit two types of noise. Firstly, aerodynamic noise is a 'broad band' noise, sometimes described as having a characteristic modulation, or 'swish', which is produced by the movement of the rotating blades through the air. Secondly, mechanical noise may emanate from components within the nacelle of a wind turbine. This is a less natural sounding noise which is generally characterised by its tonal content. Traditional sources of mechanical noise comprise gearboxes or generators. Due to the acknowledged lower acceptability of tonal noise in otherwise 'natural' noise settings such as rural areas, modern turbine designs have evolved to minimise mechanical noise radiation from wind turbines. Aerodynamic noise tends to be perceived when the wind speeds are low, although at very low wind speeds the blades do not rotate or rotate very slowly and so, at these wind speeds, negligible aerodynamic noise is generated. In higher winds, aerodynamic noise is generally masked by the normal sound of wind blowing through trees and around buildings. The level of this natural 'masking' noise relative to the level of wind turbine noise provides an indication of the subjective audibility of the Proposed Development. The relationship between wind turbine noise and the naturally occurring masking noise at residential dwellings located around the Site will therefore generally form the basis of the assessment of the levels of noise against accepted standards.		x	
Substation operational noise: The proposed substation area will include electrical plant such as inverters and transformers and mechanical cooling plant which will generate noise during operation. In-combination effects with the (cumulative) noise from the wind turbines have been included.		x	
Construction and decommissioning traffic noise Noise impacts of construction and decommissioning traffic associated with the Proposed Development (both within the Site and on public roads) and with the cumulative sites identified in **Chapter 11: Traffic and Access (EIAR Volume 2)**.	x		x
Cumulative operational turbine noise		x	

Table 10.2: Impacts Considered within the Assessment			
Impact	**Phase***		
	C	**O/M**	**D**
The potential effect of noise during operation of the repowered wind turbines including cumulative noise effects with the operational Novar 2 Wind Farm and the submitted Abhainn Dubh Wind Farm. The potential effect of noise during operation of the recently submitted Ceislein Wind Farm is also considered separately in the cumulative assessment.			

*C=construction, O=operation and maintenance and D=decommissioning.

10.4.7. The chapter assesses cumulative effects as arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. The cumulative development list includes projects:

- Where an application for consent has been submitted to the relevant authorities but is under determination;
- Where consent has been refused but an appeal against that decision has been submitted and is under determination;
- Where there is an approved consent, but construction has yet to commence;
- Where construction has commenced; and
- That are operational.

10.4.8. The assessment is based on the Proposed Development as described in **Chapter 3: Site Description and Proposed Development (EIAR Volume 2)**.

Potential Impacts Scoped Out

10.4.9. The assessment focusses on likely significant effects and as such impacts that are not likely to result in significant effects have been scoped out of the assessment. A summary of the impacts scoped out, together with reasoning for scoping them out is presented in Table 10.3.

Table 10.3: Impacts Scoped Out of the Assessment	
Impact	**Reasoning**
Low frequency operational noise and vibration	The results of previous research (set out in Annex A of **Technical Appendix 10.1 (EIAR Volume 4)**) demonstrates that low frequency noise and vibration resulting from the operation of wind turbines is imperceptible at typical separation distances. Therefore, these effects during operation do not warrant detailed assessment and have not been considered further as part of this assessment. Paragraph 3.100 in the scoping opinion also confirms 'Operational vibration, infrasound, and low frequency noise can be scoped out from further assessment'. This is consistent with the recommendations of the ARWTN guidelines.
Light traffic and activities during operational phase.	Light traffic and activities which will be part of routine maintenance of the Proposed Development during operation and will be very limited, sporadic, of short duration and occur largely at relatively large distance from noise-sensitive receptors (more than 1 km) and are therefore unlikely to result in any significant effects.
Cumulative operational wind farm noise impacts	Aside from the Novar 2 Wind Farm, the Abhainn Dubh Wind Farm and the Ceislein Wind Farm, other more distant wind farms have not

Table 10.3: Impacts Scoped Out of the Assessment	
Impact	**Reasoning**
from distant wind farms	been considered in the cumulative analysis as they represent a negligible contribution to predicted noise levels.
Vibration associated with construction and decommissioning activities	The nature of works and distances involved in the construction of the Proposed Development are such that the risk of non-negligible impacts relating to ground borne vibration are very low. Occasional momentary vibration can arise when heavy vehicles pass dwellings at very short separation distances, but again this is not sufficient to constitute a risk of significant effects. Given the separation distances between the location of borrow pit areas and the nearest noise sensitive receptor (approximately 2.8 km), any blasting which may be used is likely to have negligible effects. Accordingly, vibration impacts do not warrant detailed assessment and are therefore not discussed further in this assessment.

Method of Baseline Characterisation

Extent of the Study Area

10.4.10. The study area for the assessment of operational noise includes the noise-sensitive residential properties nearest to the proposed location of the wind turbines, within or on the L_{A90} 35 dB noise prediction contour (when considering the Proposed Development turbines in addition to the cumulative schemes considered). Some of these properties are also relevant to the assessment of the proposed substation equipment. In addition, properties such as 14 Fyrish Crescent (261376/866720), located slightly further away from the turbines (outwith the study area) but along the Access route(s), have been considered in the assessment of construction noise and construction traffic noise impacts. The assessment receptor locations considered are listed in Table 10.4 and shown on **Figure 10.1 (EIAR Volume 3a).**

Table 10.4: Summary of Sensitive Receptors							
ID	**Receptor**	**X**	**Y**	**Approximate Distance to Closest Turbine (m)**	**Closest Proposed Turbine (ID)**	**Sensitivity**	**Justification**
R1	Douchan	257258	873472	2,161	RP_9	High	For noise assessments, all residential properties are considered as high sensitivity receptors. See paragraphs 10.7.7 and 10.7.8.
R2	**Glaick**	**256796**	**873737**	**2,240**	**RP_9**		
R3	Easter Ballone	257995	873460	2,584	RP_9		
R4	Eileanach Lodge	254507	868941	2,325	RP_7		
R5	West End	256298	868908	2,430	RP_7		
R6	Tighnacraig	255729	869091	2,078	RP_7		
R7	Eileanach Farm Cottage	254804	868599	2,575	RP_7		
R8	Caravan	254973	868874	2,275	RP_7		

Table 10.4: Summary of Sensitive Receptors							
ID	**Receptor**	**X**	**Y**	**Approximate Distance to Closest Turbine (m)**	**Closest Proposed Turbine (ID)**	**Sensitivity**	**Justification**
R9	Eileanach Farm House	254719	868667	2,526	RP_7		
Additional receptor considered separately in the Ceislein cumulative noise assessment scenario							
R10	Lynchork	256705	867272	4,099	RP_7	High	

10.4.11. The Loch Glass House location is not listed in Table 10.4 and was considered separately in the assessment as it is uninhabited. This is considered in further detail below at paragraph 10.7.23.

Desk Study

10.4.12. The following data sources have informed the assessment:

- Ordnance Survey information concerning the locations of all noise sensitive receptors in the vicinity of the Site;
- British Standard (BS) reference material for the sound emission characteristics of various construction activities associated with the Proposed Development;
- Manufacturer data for the Nordex N163 6.X VPC 7 MW candidate wind turbine for the Proposed Development, the installed turbine for the Novar 1 and Novar 2 Wind Farms and the candidate turbine for the Abhainn Dubh Wind Farm referenced in the cumulative analysis, as set out in Section 5.4 and Annex B of **Technical Appendix 10.1 (EIAR Volume 4)**; and
- Environmental Statement (ES) and consent information for the historical baseline measurement data (see Annex D of **Technical Appendix 10.1 (EIAR Volume 4)**) from the Clach Liath Wind Farm application (superseded by the Abhainn Dubh Wind Farm application), the Abhainn Dubh Wind Farm, the Novar 1 Wind Farm and the Novar 2 Wind Farm considered in the cumulative assessment. The Ceislein Wind Farm was considered in a separate cumulative assessment, due to the relatively recent application submission in March 2026.

Field Survey

10.4.13. A background noise survey was undertaken at the Wyvis Lodge location, to represent baseline noise at the Loch Glass House location (indicated on **Figure 10.1 (EIAR Volume 3a)**), as agreed in consultation with THC (see Table 10.1). This location was considered as not being influenced by existing turbine noise, in line with the ETSU-R-97 requirements. The baseline survey took place between 1st October and the 1st November 2024. Full details of the survey locations and analysis of background noise are presented in **Technical Appendix 10.1 (EIAR Volume 4)**. The results of the baseline background noise surveys are considered to be representative for the purposes of an ETSU-R-97 assessment and consistent with IOA GPG requirements (see details in Sections 4.2-4.3, Annex C, Annex E-Annex G of **Technical Appendix 10.1 (EIAR Volume 4)**).

Method of Assessment

Overview

10.4.14. **Technical Appendix 10.1 (EIAR Volume 4)** considers in detail the likely impacts and an assessment of their magnitude and this chapter presents the findings of the assessment of the significance of the associated effects on the receptors considered.

10.4.15. The assessment of construction noise has been completed in accordance with BS 5228-1; predicting construction noise levels using reference emissions data for typical construction plant and activities, at fixed locations (e.g. the wind turbines, Site compounds or substations etc.) as well as heavy vehicle movements within the Site and on public roads.

10.4.16. The BS 5228 calculated levels are then compared with the construction noise criteria. The relevant magnitude criteria are set out in Section 3.4 of **Technical Appendix 10.1 (EIAR Volume 4)**, with an impact scale from negligible through minor to moderate and major. The duration and nature of the construction and decommissioning activities has also been taken into account. The threshold for significant effects (moderate or major) is for construction and decommissioning noise levels to exceed 65 dB for a sustained period (more than 4 weeks) or 75 dB for a period of 1 to 4 weeks. For impacts of short duration (less than 1 week), impacts are generally unlikely to be significant but professional judgement is applied.

10.4.17. The assessment of construction and decommissioning related traffic on public roads has been completed using the methodology provided by Calculation of Road Traffic Noise (CRTN) and the guidance in the Design Manual for Roads and Bridges (DMRB). Changes of less than 1 dB(A) are considered negligible, 1 to 3 dB(A) is minor, 3 to 5 dB(A) moderate and changes of more than 5 dB(A) constitute a major impact, with changes of less than 1 dB(A) considered negligible.

10.4.18. Operational wind turbine noise has been assessed using the methodology contained in ETSU-R-97, which considers total cumulative noise from all wind turbines at each noise sensitive receptor location and compares these to noise limits derived from baseline background noise levels. Predicted noise levels have been provided following best practice guidance in the IOA GPG. For operational wind turbine noise, the assessment in **Technical Appendix 10.1 (EIAR Volume 4)** determines whether noise levels (including cumulative contributions from other wind farms) are below or above the ETSU-R-97 criteria.

10.4.19. Noise from operation of the substation has been assessed using the methodology in BS 4142, which compares noise from the specific source with typical baseline background noise levels. This uses the same magnitude scale as construction noise i.e. from negligible through minor to moderate and major.

10.4.20. Potential in-combination operational noise effects from the substation when added to the turbine noise have been assessed on the basis of professional judgment as part of the cumulative assessment.

10.4.21. For construction noise and operational noise from the substation, the magnitude of impacts translate directly to their significance, given all receptors are of high sensitivity, with a scale of significance from negligible, through minor to moderate and major. Major and moderate effects are considered significant in the context of the EIA Regulations.

10.4.22. For operational wind turbine noise, acceptable limits for wind turbine noise are clearly defined in ETSU R 97-R-97. Accordingly, predicted operational noise levels which are below the ETSU-R-97 criteria are considered not significant in the context of the EIA Regulations. If predicted noise levels are above the ETSU-R-97 criteria, effects are considered to be significant.

Limitations and Assumptions

10.4.23. Although the assessment of construction and decommissioning noise is based on general assumptions set out above, these are considered to be precautionary, and realistically, noise levels are likely to be lower than predicted for much of the construction and decommissioning periods.

10.4.24. For the operational substation noise, although the final equipment selection and installation arrangements are not known, they would need to be made on the basis of meeting the proposed noise limit. Furthermore, robust assumptions have been made - in particular, screening effects have been neglected.

10.4.25. The Nordex N163 6.X 7MW candidate turbine model was selected as representative (on a robust worst-case basis for the purpose of this noise assessment) of the type and size of turbine that would be used for the Proposed Development. Therefore, the assessment is likely to result in noise immission levels representing the upper end for the range of turbines of the dimensions proposed, higher than turbines with similar dimensions such as the Vestas V162 6.2 MW model. Similarly, the assumptions made for the Novar 2 and Abhainn Dubh Wind Farms in the cumulative analysis are robust and in line with relevant good practice guidance (IOA GPG), as detailed in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.4.26. Whilst some limitations due to the assumptions made have been identified, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant noise effects.

10.4.27. A micrositing allowance of 100 m is proposed. While the final location of infrastructure may vary within this tolerance, any such changes would remain within the parameters assessed in the EIAR and would not give rise to materially different environmental effects. Therefore, the conclusions of this assessment would remain unchanged.

10.5 Baseline Conditions

Current Baseline

10.5.1. The Proposed Development is located in an area of relatively low population density, to the north-east of Loch Glass. The noise environment in the surrounding area is generally characterised by 'natural' sources, such as wind disturbed vegetation, birds and occasional water movements from Loch Glass and watercourse noise from the River Glass. Other sources of noise observed at the uninhabited Loch Glass House location included existing wind turbine noise from the operational Novar 1 and Novar 2 Wind Farms.

10.5.2. One noise monitoring location at a proxy location (Wyvis Lodge) was determined to be representative of the background noise environment for the Loch Glass House location nearest to the Site. Baseline noise measurements were undertaken at the proxy location to exclude existing operational turbine noise observed at the Loch Glass House location, in line with the IOA GPG methodology. The use of a suitable proxy measurement location was agreed with THC prior to the measurement. The proxy survey location at Wyvis Lodge is shown on **Figure 10.1 (EIAR Volume 3a)**. Full details of the baseline measurement position, as well as details of equipment used are provided in Annex C in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.5.3. It was also agreed with THC that use of historical baseline measurement data previously undertaken at nearby receptors from the Clach Laith Wind Farm application was suitable, providing a conservative approach to assigning noise limits at relevant receptors. The use of the historical baseline data in this way is justified by having chosen assessment locations considered to have similar background noise levels, through proximity to similar background noise sources, as well as the setting and location of those properties being represented by those which were surveyed. Further details on the historical baseline data used and the conservative corrections for wind shear are presented in Annex D of **Technical Appendix 10.1 (EIAR Volume 4)**. This approach is consistent with the guidance provided by ETSU-R-97 and current good practice as set out in the IOA GPG (as well as the ARWTN guidance).

10.5.4. Survey data were analysed in accordance with the methodology in the IOA GPG (as presented in **Technical Appendix 10.1 (EIAR Volume 4)**, in Annex D to Annex G) to determine typical background noise levels and how these varied with wind speed conditions on Site. Table 5 and Table 6 of **Technical Appendix 10.1 (EIAR Volume 4)** show the resulting background noise levels measured at the Wyvis Lodge location and derived from the historical baseline measurement locations.

10.5.5. Table 7 and Table 8 in **Technical Appendix 10.1 (EIAR Volume 4)** outline the noise limits derived for both daytime and night-time periods, applicable to the assessment locations within the defined study area, based on the surveyed baseline data. The derived noise limits account for THC's preference for a lower daytime noise limit of 35 dB(A) and a lower night-time noise limit of 38 dB(A) (see **Table 10.1**). A full description of the assessment methodology and derivation of the resulting noise limits is provided in Section 5.7 of **Technical Appendix 10.1 (EIAR Volume 4)**. For receptors within the study area where no baseline noise levels were assigned, a simplified fixed noise limit of 35 dB(A) has been applied.

10.5.6. Baseline noise measurements for four of the noise assessment receptors, as reported in the Ceislein Wind Farm application, were referenced for the cumulative noise impact assessment with the Ceislein Wind Farm. Further information on the baseline measurements is detailed in the Ceislein Wind Farm application[13].

Future Baseline

10.5.7. In the absence of the Proposed Development, environmental noise levels in the area are likely to remain largely similar to those currently experienced in the short term, with the exception of any additional major developments (such as infrastructure or energy developments) which would affect these levels.

Summary of Sensitive Receptors

10.5.8. A summary of the noise-sensitive receptors considered likely to be affected by the Proposed Development and therefore scoped into the assessment are set out in Table 10.4 above, together with their associated sensitivity. All residential receptors are considered to be of high sensitivity.

10.6 Embedded Mitigation

10.6.1. Embedded mitigation includes design and standard best practice measures as described in **Chapter 3: Site Description and Proposed Development (EIAR Volume 2)** and **Chapter 4: Design Evolution and Alternatives (EIAR Volume 2)**.

10.6.2. As the embedded mitigation would form an integral part of the Proposed Development, there would be no consented scenario where the mitigation measures would not be implemented. As such, the assessment of likely significant effects assumes that these mitigation measures have been implemented.

10.6.3. A summary of the embedded mitigation considered for the noise assessment is set out in Table 10.5.

Table 10.5: Summary of Embedded Mitigation

ID	Phase*	Description	Purpose of Mitigation
Embedded Mitigation			
NO01	O/M	Turbine layout iterative design	The turbine layout has been iteratively developed to avoid significant operational wind turbine noise effects, based on a representative worst-case turbine model, whilst maintaining, as far as possible, the generating capacity of the Proposed Development (in addition to other design considerations). The noise emission levels for the initial turbine layout were calculated, and advice was provided on this basis to the design team, to ensure compliance with derived ETSU-R-97 noise limits.

[13] Ceislein Wind Farm, Volume 4, Technical Appendix 12.2 – Operational Noise Report - Part 1 of 3. TNEI/ERM, January 2026, ref. 0700578

Table 10.5: Summary of Embedded Mitigation			
ID	**Phase***	**Description**	**Purpose of Mitigation**
NO02	O/M	Substation positioning	The location of the proposed substation equipment was also determined with consideration of the proximity of noise-sensitive locations while considering other design constraints. Substation equipment was assessed at the shortest distance from the nearest receptor, to ensure that a worst-case assessment was undertaken.
NO03	C	Restriction of construction activity working hours, good practice measures.	Restriction of construction working hours as proposed in Chapter 3: Site Description and Proposed Development (EIAR Volume 2). Good practice measures (as detailed below this table) would be employed in line with good practice to minimise construction noise. This would be implemented in a Decommissioning and Construction Environmental Management Plan (DCEMP) and a Construction Traffic Management Plan (CTMP).
NO04	D	Restriction of working hours, good practice measures	Measures to be included in the DEMP.

*PC=Pre-construction, C=construction, O=operation and maintenance and D=decommissioning.

10.6.4. To reduce the potential effects of construction and decommissioning noise, the following good practice measures are proposed:

- Construction and decommissioning activities that may give rise to audible noise at the surrounding properties and heavy goods vehicle (HGV) deliveries to the Site (except for abnormal loads) would be limited to the hours 07:00 to 19:00 Monday to Friday and 08:00 to 13:00 on Saturdays, with no construction work taking place on Sundays or bank holidays. Those activities that are unlikely to give rise to noise that is audible at noise-sensitive receptors may continue outside of the stated hours, such as small deliveries or site briefings. Concrete pours for foundation or turbine component lifting may also be required outside the above working hours, but this would not include the associated preparation and mobilisation work which will be restricted to the above working hours;
- Traffic movements would be managed by a Construction Traffic Management Plan (CTMP) as part of the Decommissioning and Construction Environmental Management Plan (DCEMP) (**Technical Appendix 2.1 (EIAR Volume 4)**). Turbine and other abnormal load deliveries would only take place outside these times with the prior consent of THC and relevant authorities, and this would be controlled by an Abnormal Load Transport Management Plan as part of the CTMP;
- All construction activities would adhere to good practice as set out in BS 5228;
- All equipment would be maintained in good working order and any associated noise attenuation such as engine casing and exhaust silencers would remain fitted at all times;
- Where flexibility exists, construction activities would be separated from residential neighbours by the maximum possible distances; and
- Construction plant capable of generating significant noise and vibration levels would be operated in a manner to restrict the duration of the higher magnitude levels.

10.6.5. The above measures would be implemented as part of the DCEMP which would be secured through a planning condition and include measures to control decommissioning and construction noise as set out above.

10.6.6. Micrositing the turbines up to 100 m is not considered likely to result in acoustically important changes to predicted noise immission levels, during either construction or operation of the Proposed Development. In any case, turbines would need to operate within the noise limits defined in this chapter taking account of the final turbine location and final turbine model.

10.7 Assessment of Likely Effects

Decommissioning of Novar 1 Wind Farm and Construction of Repowered Wind Farm

10.7.1. The assessment of impacts from the decommissioning of the Novar 1 Wind Farm and the construction of the repowered wind farm are detailed in Section 5.1 of **Technical Appendix 10.1 (EIAR Volume 4)**. Predicted noise levels at the closest noise sensitive receptors for each of the key activities during the decommissioning of the Novar 1 Wind Farm, are presented in Table 9 of **Technical Appendix 10.1 (EIAR Volume 4)**.

10.7.2. Activities associated with the decommissioning of the Novar 1 Wind Farm result in predicted worst-case noise levels of no more than 44 dB L_{Aeq} at the nearest receptors and therefore do not exceed 55 dB L_{Aeq}. With reference to the construction noise criteria set out in paragraph 10.6.16 and in Table 1 of **Technical Appendix 10.1 (EIAR Volume 4)**, this results in a negligible impact. Even when accounting for the high sensitivity of the residential receptors, the temporary adverse noise effects from decommissioning of the Novar 1 Wind Farm would be negligible and **not significant**.

10.7.3. The majority of the proposed construction activities associated with the Proposed Development would generally occur at distances of at least 440 m or more from the residential properties considered, such that the resulting predicted worst-case noise levels at receptors vary between 36 and 51 dB L_{Aeq} and therefore would not exceed 55 dB L_{Aeq} for the duration of construction activities. With reference to the construction noise criteria set out in paragraph 10.6.16 and in Table 1 of **Technical Appendix 10.1 (EIAR Volume 4)**, this results in a negligible impact. Accounting for potential decommissioning activities being undertaken in the same timeframe as the construction activities would not increase the impact assessment as the predictions are made on a precautionary basis, assuming the closest separation distance from the activities to noise-sensitive receptors. Even when accounting for the high sensitivity of the residential receptors, the temporary adverse noise effects from these activities would be negligible and **not significant**.

10.7.4. Activities associated with the upgrade of the Access Route may occur at shorter distances to some properties and these are then considered in turn. Firstly, works to upgrade or widen the Access Route is likely to be relatively limited and completed in a very short time, in particular for properties such as 14 Fyrish Crescent, and the predicted noise levels (which could be up to 72 dB(A)) are likely to represent those for a very short-term period (less than 1 week) when activity is closest to these receptors. Noise levels would quickly diminish as this construction activity progresses, moving the activity further from the properties, with the impact similar in nature to common road maintenance work. The short-term nature of this activity consequently categorises the impact to be of minor magnitude at most in accordance with professional judgement. When accounting for the high sensitivity of residential receptors, the temporary adverse noise effects from these activities are minor and **not significant**.

10.7.5. In addition to on-Site construction and decommissioning activities, construction and decommissioning-related traffic would also represent a potential source of noise to surrounding properties.

10.7.6. The effect of traffic on existing public roads has been assessed using the CRTN methodology, with a maximum predicted increase of no more than 0.3 dB(A) in the day-time average noise level for locations adjoining most of the Access Route. This is detailed further in Table

11 of **Technical Appendix 10.1 (EIAR Volume 4).** Based on the DMRB criteria set out in paragraph 10.4.17, this predicted short-term change in traffic noise levels correspond to a negligible impact.

10.7.7. For heavy goods traffic movements on the two routes with reduced traffic flows (the B817 and B9176), uncertainties using the CRTN assessment methodology increase. However, the maximum changes in traffic noise levels on these routes remain below 3 dB(A). Based on the DMRB criteria, this predicted short-term change in traffic noise levels corresponds to a minor impact. Based on the prediction methodology in BS 5288 and **Chapter 11: Traffic and Access (EIAR Volume 2)**, the worst-case predicted absolute noise level due to heavy vehicles moving, was 65 dB L_{Aeq} on the B817 east of the Main Vehicular Access Point at the closest dwellings. This is detailed further in paragraph 5.1.11 of **Technical Appendix 10.1 (EIAR Volume 4)**. This corresponds to a minor impact.

10.7.8. For the remainder of the Access Route, a noise level of 53 dB L_{Aeq} is predicted at the closest receptors along the route. Based on the assessment criteria of BS 5288, this noise level corresponds to a negligible impact.

10.7.9. In conclusion, the impacts of construction and decommissioning traffic are minor at most. When accounting for the high sensitivity of residential receptors, the temporary adverse noise effects from traffic are minor and **not significant**.

10.7.10. Blasting may be employed to quarry the proposed borrow pit; however, given the separation distances between the location of borrow pit and the nearest noise sensitive receptors of more than 2.8 km, the associated effects are likely to be negligible and **not significant**.

10.7.11. The decommissioning and construction activities are therefore predicted to result in temporary negligible (**not significant**) to minor adverse (**not significant**) effects.

Operation of Repowered Wind Farm

Wind turbine operational noise

10.7.12. As discussed above in 10.4.12, the operational noise assessment is based upon the noise specifications of the Nordex N163 7 MW wind turbine model, with turbines having a hub height of 98.5 m and a tip height of 180 m. The modelled turbine layout is specified in Annex B of **Technical Appendix 10.1 (EIAR Volume 4)** and illustrated on **Figure 10.1 (EIAR Volume 3a)**.

10.7.13. The candidate wind turbines for the Proposed Development have been modelled assuming all would operate in their standard and noisiest mode 'Mode 0.b'. Predictions of operational wind turbine noise for the Proposed Development in isolation at the assessment locations are detailed in Table 12 of **Technical Appendix 10.1 (EIAR Volume 4)**. These vary between 16-26 dB(A) at low wind speeds and 27-31 dB(A) at high wind speeds.

10.7.14. Predicted levels at all assessment receptors from the Proposed Development operating in isolation are all below 35 dB(A) $L_{A90,}$ which is the lowest noise limit applicable in the ETSU-R-97 or ARWTN guidance. Therefore, wind turbine noise from the Proposed Development in isolation can remain within the ETSU-R-97 noise limits, and the operational effect of the Proposed Development in isolation is therefore considered to be **not significant**. ETSU-R-97 however requires consideration of cumulative operational noise levels, and this is considered below at paragraph 10.7.19.

Non-Wind turbine operational noise

10.7.15. Noise predictions from the substation for the Proposed Development have been made at the nearest noise-sensitive property, Easter Ballone, located at approximately 690 m from the proposed substation. As set out in Section 5.10 of **Technical Appendix 10.1 (EIAR Volume 4)**, noise from the electrical and cooling plant associated with the substation is unlikely to exceed 17 dB L_{Aeq} at Easter Ballone. When including a potential +2 dB penalty for the character of the noise, the resulting 'rated noise level' would be of 19 dB(A). When assessed in line with BS 4142, the absolute rated noise level of the substation equipment

is unlikely to exceed typically occurring background noise levels in the area and is less than 25 dB(A), which is considered very low in absolute terms. According to the criteria in Table 2 in **Technical Appendix 10.1 (EIAR Volume 4)** derived from BS 4142 guidance, this would correspond to a negligible noise impact on the nearest highly sensitive receptor, therefore representing a negligible effect which is **not significant**.

10.7.16. In addition, predicted levels at 100 Hz are likely to be well below 30 dB (unweighted) which satisfies the additional criteria proposed by THC (Table 10.1).

Decommissioning of Repowered Wind Farm

10.7.17. Decommissioning of the repowered wind farm is likely to result in less noise than the construction phase. The construction phase has been considered to have temporary minor noise impacts as a worst case. Therefore, decommissioning of the repowered wind farm at the end of its operational lifespan, would also have temporary minor noise impacts on highly sensitive receptors. This represents a minor adverse effect which is **not significant**.

Potential Cumulative Effects

Decommissioning and construction traffic noise

10.7.18. The effect of cumulative decommissioning (Novar 1 Wind Farm) and construction traffic noise with the Proposed Development traffic on existing public roads has been assessed using the CRTN methodology, based on the assessment set out in **Chapter 11: Traffic and Access (EIAR Volume 2)**. A maximum predicted increase of no more than 3 dB(A) in the day-time average noise level for locations adjoining the Access Route was concluded. This is detailed further in Table 11 of **Technical Appendix 10.1 (EIAR Volume 4)**. Based on the criteria set out in the DMRB, this predicted short-term change in cumulative decommissioning and construction traffic noise levels corresponds to a minor impact. When accounting for the high sensitivity of residential receptors, the temporary adverse noise effects from cumulative traffic are minor adverse and **not significant**.

Wind turbine operational noise

10.7.19. The applicable noise guidance requires consideration of cumulative noise levels. The calculated Proposed Development noise levels have been added to the predictions from the Novar 2 Wind Farm and Abhainn Dubh Wind Farm at each assessment location, where contributions from each cumulative site at each receptor are acoustically non-negligible[14]. See Table 13 in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.7.20. The predictions in Table 13 in **Technical Appendix 10.1 (EIAR Volume 4)** have then been compared in Section 5.6 of **Technical Appendix 10.1 (EIAR Volume 4)** with the relevant noise limits determined in line with ETSU-R-97. These limits are based on a fixed lower limit of 35 dB(A) for the day-time period. Site-specific factors set out in ETSU-R-97, including the number of noise-affected properties, the likely duration and level of exposure and the potential power generating capability of the wind farm, would likely justify a higher noise limit in the range of 35 to 40 dB(A). However, the lowest day-time limit within this range has been adopted, in line with the expressed preference of THC (see Table 10.1). For night-time periods, a fixed lower limit of 38 dB(A) has also been applied in line with THC preferences, which are more stringent than the recommendations of the ARWTN guidance. The resulting noise limits are shown in Table 7 and Table 8 in **Technical Appendix 10.1 (EIAR Volume 4)**, for day-time and night-time periods respectively.

10.7.21. Predicted operational cumulative noise levels at the receptors, shown in Table 13 in **Technical Appendix 10.1 (EIAR Volume 4)**, ranged between 20 to 34 dB(A) at low to medium wind speeds and 34 to 38 dB(A) at medium to high wind speeds. The assessment in Table 14 and Table 15 in **Technical Appendix 10.1 (EIAR Volume 4)** confirms that predicted cumulative noise levels are compliant with the noise limits at all assessment locations. Therefore, cumulative wind turbine noise from the Proposed Development,

[14] The IOA GPG clarifies that if the contribution from other turbines (i.e. a cumulative wind farm site) at a receptor is 10 dB or more below that of the wind turbines considered (i.e. the Proposed Development), this can be considered negligible and does not require further consideration.

operational Novar 2 Wind Farm and proposed Abhainn Dubh Wind Farm can remain within the derived noise limits, and the effect is therefore **not significant**.

10.7.22. Site-specific noise limits which could be applied to the Proposed Development in isolation are set out in Table 16 in **Technical Appendix 10.1 (EIAR Volume 4)**, applicable to day-time and night-time periods at all wind speeds up to 10 m/s (to provide a simplified approach). These Site-Specific Noise Limits (or SSNLs), which are reproduced below in Table 10.6, were derived by using the remaining 'noise budget' approach, which involves taking the total noise limits which apply at an assessment location and subtracting[15] the contribution from the relevant adjacent wind farms. The selection of the final turbine to be installed at the Site will be made based on enabling these Site-specific limits to be achieved at the surrounding properties. These site-specific limits (SSNLs) are considered to also be consistent with the relevant guidance of ARWTN.

Table 10.6: Site-specific noise limits applicable to the Proposed Development in isolation (L_{A90}, dB)

Property	Noise limit (≤ 10 m/s)
Douchan	32.1
Glaick	31.8
Easter Ballone	32.7
Eileanach Lodge	35.7
West End	35.7
Tighnacraig	35.7
Eileanach Farm Cottage	35.7
Caravan	35.7
Eileanach Farm House	35.7

Loch Glass House

10.7.23. Loch Glass House is one of the closest buildings to the Proposed Development, however it is uninhabited (and reportedly has not been occupied since its construction more than 30 years ago). However, it does not appear obviously uninhabitable, therefore it is considered separately as detailed in Section 5.8 of **Technical Appendix 10.1 (EIAR Volume 4)**.

10.7.24. The results in Table 18 and Chart 1 in **Technical Appendix 10.1 (EIAR Volume 4)** show the Proposed Development would not change the cumulative baseline noise situation substantially, with only a marginal (and negligible) increase on the current baseline scenario (existing Novar 1 and Novar 2 Wind Farms). In either situation, predicted levels would exceed a notional ETSU-R-97 day-time noise limit, if it were to be applicable.

10.7.25. Given that the property is currently uninhabited and its planning status is unclear, if this changed then levels experienced would likely be above the stringent noise limits derived, but this would mainly be due to the influence of the Novar 2 Wind Farm. Although the status of the uninhabited Loch Glass House is unclear, the Proposed Development does not introduce a substantial change in relation to the existing noise levels, therefore the predicted effect is **not significant**.

Cumulative operational noise with Ceislein Wind Farm

10.7.26. In the scenario where the submitted Ceislein Wind Farm application is consented, the calculated Proposed Development noise levels have been added to the predictions from the operational Novar 2 Wind Farm, and the proposed Abhainn Dubh Wind Farm and Ceislein Wind Farms at relevant assessment locations, where contributions from each cumulative

[15] This is logarithmic decibel subtraction using the equation given in IOA GPG Page 39 GN4 Clause F.

site at each receptor are acoustically non-negligible[16]. See Table 19 in **Technical Appendix 10.1 (EIAR Volume 4)**.

10.7.27. Predicted operational cumulative noise levels at relevant receptors inclusive of the Ceislein Wind Farm, are shown in Table 24 in **Technical Appendix 10.1 (EIAR Volume 4)**. They ranged between 24 to 34 dB(A) at low to medium wind speeds and 34 to 39 dB(A) at medium to high wind speeds.

10.7.28. The predictions in Table 24 in **Technical Appendix 10.1 (EIAR Volume 4)** have initially been compared in noise limits determined and assessed in line with ETSU-R-97 guidance based on a fixed lower limit of 40 dB(A) for day-time period and 43 dB(A) for the night-time period. This is consistent with the lower fixed limits applied in the Ceislein Wind Farm noise assessment. The resulting first set of noise limits are shown in Table 21 and Table 22 in **Technical Appendix 10.1 (EIAR Volume 4)**, for day-time and night-time periods respectively.

10.7.29. The assessment in Table 25 and Table 26 in **Technical Appendix 10.1 (EIAR Volume 4)** shows the predicted cumulative noise levels are compliant with these ETSU-R-97 derived noise limits. Therefore, cumulative wind turbine noise from the Proposed Development, the operational Novar 2 Wind Farm and the proposed Abhainn Dubh and Ceislein Wind Farms can remain within the ETSU-R-97 noise limits derived in the Ceislein Wind Farm noise assessment and the effect is therefore **not significant**. The site-specific noise limits of Table 10.6 remain relevant in this case to control cumulative noise levels.

10.7.30. An alternative set of cumulative noise limits were also derived with consideration of the consultation response of THC. Considering the relevant factors in ETSU-R-97, including the influence on energy generation potential of the cumulative schemes and assessment receptors exposure to potential cumulative operational turbine noise, a daytime fixed lower limit of 38 dB(A) can be justified in this case under either the ETSU-R-97 or ARWTN guidance. A similar lower limit of 38 dB(A) for night-time periods was also considered in line with THC preferences (see Table 10.1). The resulting second set of more stringent cumulative noise limits are shown in Table 27 and Table 28 in **Technical Appendix 10.1 (EIAR Volume 4)**, for daytime and night-time periods respectively.

10.7.31. The assessment in Table 25 and Table 26 in **Technical Appendix 10.1 (EIAR Volume 4)** shows that the predicted cumulative noise levels are compliant with these more stringent noise limits at all assessment locations, when accounting for likely directional effects at the Tighnacraig receptor. Therefore, cumulative wind turbine noise from the Proposed Development, the operational Novar 2 Wind Farm and the proposed Abhainn Dubh and Ceislein Wind Farms can remain within these more stringent noise limits and the effect remains **not significant**. On this basis, further consultation with THC and the Ceislein Wind Farm applicant would be necessary to agree suitable site-specific limits, in line with the latest relevant guidance, for both proposed schemes and to provide satisfactory control of cumulative noise immission levels.

Non-Wind turbine operational noise

10.7.32. Based on the above conclusions, the nature of the sources and the different guidance documents applicable in each case, it is considered based on professional judgement that there would be no additional in-combination operational noise impacts from the (cumulative) wind turbine noise in addition to that from the substation (which was considered to be negligible).

10.7.33. The assessment in Section 6.5 in **Technical Appendix 10.1 (EIAR Volume 4)** determined cumulative operational noise from sources other than the wind turbines. This included the Proposed Development substation equipment and the proposed Ceislein Wind Farm battery energy storage solution and substation compounds. The assessment determined that cumulative operational levels would correspond to a negligible impact. When accounting for

[16] The IOA GPG clarifies that if the contribution from other turbines (i.e. a cumulative wind farm site) at a receptor is 10 dB or more below that of the wind turbines considered (i.e. the Proposed Development), this can be considered negligible and does not require further consideration.

the high sensitivity of residential receptors, the adverse noise effects from operational non-turbine noise are negligible and **not significant**.

10.8 Additional Mitigation and Enhancement Measures

10.8.1. No additional mitigation is required, as the embedded mitigation measures result in no significant residual effects.

10.9 Significant Residual Effects

Decommissioning of Novar 1 Wind Farm and Construction of Repowered Wind Farm

10.9.1. The residual noise effects of the decommissioning of the Novar 1 Wind Farm and the construction of the repowered wind farm remain temporary, minor adverse at most and therefore **not significant**.

Operation of Proposed Development

10.9.2. At some locations under some wind conditions and for a certain proportion of the time, the wind farm noise may be audible; however, operational turbine noise immission levels comply with the criteria of the ETSU-R-97 guidance recommended in Scottish planning policy (Onshore Wind Policy Statement 2022) for the assessment of wind farm noise, as well as the more recent ARWTN guidance. The operational noise effect is therefore considered to be **not significant**.

10.9.3. The residual noise effects from the substation for the Proposed Development would remain negligible and therefore **not significant**.

Decommissioning of the Repowered Wind Farm

10.9.4. Residual decommissioning noise effects of the repowered wind farm remain temporary, minor adverse at most and therefore **not significant**.

Cumulative Effects

10.9.5. At some locations under some wind conditions and for a certain proportion of the time, the cumulative wind farm noise may be audible; however, operational cumulative turbine noise immission levels comply with the criteria of the ETSU-R-97 guidance recommended in Scottish planning policy (Onshore Wind Policy Statement 2022) for the assessment of wind farm noise, as well as the more recent ARWTN guidance. The cumulative operational noise effect is therefore considered to remain as **not significant**.

10.9.6. There are no additional residual in-combination significant noise effects from the substation and turbines for the Proposed Development operating simultaneously, based on professional judgement and potential noise exposure levels from the above results.

10.9.7. The residual cumulative noise effects from the substation for the Proposed Development and the BESS and substation compound from the Ceislein Wind Farm application, would remain negligible and therefore not significant.

10.10 Monitoring

Construction Phase Monitoring

10.10.1. There are no residual significant effects from construction noise, therefore no monitoring is required. The construction noise management measures in section 10.8 would be implemented as part of the DCEMP which would be secured through a planning condition and include measures to control construction noise.

Operational Phase Monitoring

10.10.2. It is proposed that if consent is granted for the Proposed Development, conditions attached to the consent would include the requirement that in the event of a noise complaint, noise levels resulting from the operation of the wind turbines on the Site are measured to demonstrate compliance with relevant site-specific noise limits (such as those of Table 10.6). Such monitoring would be undertaken in full accordance with ARWTN guidance and include penalties for characteristics of the noise (if present).

10.10.3. A planning condition attached to the consent would limit the noise from the operation of the substation on the Site to not exceed a rated noise level of 25 dB L_{Ar} at the nearest residential receptors.

Decommissioning Phase Monitoring

10.10.4. There are no residual significant effects from decommissioning noise, therefore no monitoring is required. Measures similar to those in section 10.8 would be implemented as part of the DCEMP.

Summary of Significant Residual Effects

10.10.5. No significant residual effects are predicted.