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Introduction

14.1 This Chapter considers any remaining environmental topics that are within the scope of the Environmental Impact Assessment (EIA), but do not require consideration within an individual chapter of the EIA Report. These topics include:

- shadow flicker;
- climate and carbon balance;
- noise;
- risk of accidents and other disasters;
- population and human health;
- air quality;
- aviation;
- telecommunications and other infrastructure;
- television reception; and
- waste and environmental management.

14.2 This Chapter is accompanied by the following Technical Appendices:

- **Technical Appendix 14.1: Carbon Calculator:**
- **Technical Appendix 14.2: Noise Glossary of Terms;**
- **Technical Appendix 14.3: Edinburgh Airport IFP Assessment:**
- **Technical Appendix 14.4: Glasgow Airport IFP Assessment:**
- **Technical Appendix 14.5: Aviation Report**.

14.3 Planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

Shadow Flicker

14.4 This section considers the potential impact on receptors from shadow flicker generated by the proposed Windburn Wind Farm (the 'proposed development'), during the operational phase of the project.

14.5 Shadow flicker may occur under certain combinations of geographical position and time of day, when the sun passes behind the rotors of a wind turbine and casts a shadow over neighbouring properties. As the blades rotate, the shadow flicks on and off, an effect known as shadow flicker. The effect can only occur inside buildings, where the flicker appears through a window opening.

14.6 The likelihood and duration of the effect depends upon:

- The direction and aspect of the property relative to the turbine(s): in the UK, only properties within 130 degrees either side of north, relative to the turbines, can be affected, as turbines do not cast long shadows on their southern side;
- distance from turbine(s): the further the building is from the turbine, the less pronounced the effect would be, given the shadow fades with distance. Flicker effects

are known to be strongest and most likely to have the potential to cause significant effects within ten rotor diameters of a turbine location;

- turbine height and rotor diameter;
- time of year and day; and
- weather conditions (i.e. cloudy days reduce the likelihood of effects occurring).

14.7 If shadow flicker cannot be avoided through layout changes, then technical mitigation solutions are available, such as shutting down the turbines which cause the effect when certain conditions prevail.

14.8 Shadow flicker effects are only considered during the operational phase of a wind farm development.

Scope of Assessment

14.9 The Scottish Government online advice (Onshore wind turbines: planning advice, 2014) states that in most cases "*where separation is provided between wind turbines and nearby dwellings (as a general rule, 10 rotor diameters), 'shadow flicker' should not be a problem."*. The advice states, that where shadow flicker could be a problem i.e. when the distance between a turbine and a dwelling is less than 10 rotor diameters, developers should provide calculations to quantify the effect.

14.10 In line with the best practice guidance outlined above, a study area based on a distance of 10 rotor diameters from the proposed wind turbines has been employed to determine the zone of potential shadow flicker incidence of a proposed development. The turbines for the proposed wind turbines have a rotor diameter of 138m, which results in a study area of 1,380m from the turbines. In addition to this a further 50m area was added to the 10 times rotor diameter distance, in order to account for potential micrositing should the proposed development receive consent (total study area = 1,430m).

14.11 There are no inhabited residential properties within 1,430m (1.43km) of any of the wind turbines that form part of the proposed development. The closest residential property, Carim Lodge (this property is financially involved in the proposed development), is located approximately 2.7km from the nearest proposed turbine (Turbine no.13).

14.12 There are therefore no residential properties within the shadow flicker study area, and no further shadow flicker assessment is required.

Summary

14.13 As per the Scottish Government online advice (Onshore wind turbines: planning advice, 2014), shadow flicker effects are largely confined to instances where wind turbines are located within 10 rotor diameters of a residential property. In the case of the proposed development this would be 1.43km (including 50m micrositing allowance). The actual distance between any turbine that forms part of the proposed development, and the nearest residential property, is approximately 2.7km.

14.14 The separation distance between the nearest proposed turbine and residential property is therefore approximately 1.27km greater than the 10 times rotor diameter (plus 50m micrositing) study area for shadow flicker, as set out in the guidance. Therefore, shadow flicker is not considered to be a constraint, and no further shadow flicker assessment is required.

14.15 It is therefore not considered likely that shadow flicker, as a result of the proposed development, would result in any significant effects.

Climate and Carbon Balance

14.16 This section of the chapter details the calculations to work out carbon dioxide (CO_2) emissions from the proposed development. In addition to generating electricity, the Scottish Government sees wind farms as an important mechanism for reducing the UK's CO_2 emissions. This section estimates the CO_2 emissions associated with the manufacture and construction of the proposed development as well as estimating the contribution the proposed development would make to reducing CO_2 emissions, to give an estimate of the whole life carbon balance of the proposed development. The assessment is based on a detailed baseline description of the proposed development and its location. All calculations are based on site specific data, where available. Where site specific data is not available approved national/regional information has been used.

14.17 A standalone assessment on the vulnerability of the proposed development to climate change has not been included, as it is considered that none of the identified climate change trends would affect the proposed development, with the possible exception of increased windstorms. Mitigation with regards to extreme weather events, including windstorms, is detailed in paragraphs 14.136 - 14.139. The effects of climate change on environmental receptors has been considered in each of the relevant environmental topic chapters of this EIA Report (Chapters 7 to 13)

14.18 Each unit of wind generated electricity would displace a unit of conventionally generated electricity, therefore, saving power station emissions. **Table 14-2** provides a breakdown of the estimated emissions displaced per annum and over the assumed lifespan of 40 years for the proposed development.

Carbon and Peatland

14.19 Wind farms in upland areas tend to be sited on peatlands which hold stocks of carbon and so have the potential to release carbon into the atmosphere in the form of CO_2 if disturbed. The proposed development is located predominantly in an area of Class 1 and Class 2 Priority Peatland Habitat (SNH, 2016).

14.20 In order to minimise the requirement for the extraction of peat, the site design process (described in **Chapter 2: Site Description and Design Evolution**) has avoided areas of deeper peat. Peat probing was carried out onsite and peat depth mapped, as shown in **Figure 10.1.6a-g** and **Figure 10.1.7a-g** of **Technical Appendix 10.1: Peat Landslide and Hazard Risk Assessment**. This enabled wind turbines and associated infrastructure to be located in areas of shallower peat where possible. Where it has not been possible to avoid deeper areas of peat, floated track (approximately 1.68km) has been proposed as part of the site layout.

14.21 Paragraphs 14.22 to 14.31 detail how the whole life carbon balance assessment for wind farms on peatlands is calculated. Including the input of emissions due to liberation of CO_2 from carbon stored in peat as a result of construction.

Effects of Carbon Emissions from Construction

14.22 Emissions arising from the fabrication of the turbines and the associated components are based on a full life analysis of a typical turbine and include CO_2 emissions resulting from

transportation, erection, operation, dismantling and removal of turbines and foundations and transmission grid connection equipment from the existing electricity grid system.

14.23 With respect to turbines, emissions from material production are the dominant source of CO_2. Emissions arising from construction (including transportation of components, quarrying, building foundations, access tracks and hard standings) and commissioning are also included in the calculations. The assessment has used Nayak et al (2008) default values for 'turbine life' emissions, calculated with respect to installed capacity.

14.24 A number of technical papers (detailed in Nayak et al, 2008) have reported a wide range of emissions values from wind farms, these being between 6 and 34 tonnes CO_2 GWh-1. From this, a calculation of additional CO_2 payback time due to production, transportation, erection and operation of the proposed development that this represents can be compared. The additional CO_2 payback time for the best case scenario of 6t CO_2 GWh-1 would be approximately 0.22 years assuming replacement of coal fired power generation[1] and approximately 12 months (1 year) assuming a replacement of grid mix (the combination of electricity suppliers, including coal, gas and oil generation, used for grid balancing and the type of power generation most likely to be replaced by wind generated power). For the worst-case scenario (34t CO_2 GWh-1), this would increase to approximately 0.7 years and 3.1 years additional CO_2 payback respectively.

14.25 These increases are considerable and so it is essential that they are taken into account for the calculation of CO_2 payback time for a proposed development. However, it should be noted that this may still compare very favourably with the life cycle analysis of other means of non-fossil fuel-based power generation, such as nuclear, particularly when the full energy costs of construction, operation, maintenance and decommissioning, uranium mining and transportation and long term waste management are taken into account.

Characteristics of Peatland

14.26 The loss of carbon from the carbon fixing potential from plants and vegetation on peat land is small, but is calculated for the area from which peat is removed and the area affected by drainage. The carbon stored in the peat itself represents a much larger potential source of carbon loss.

14.27 When flooded, peat soils emit less carbon dioxide but more methane than when they are drained. In flooded soils, carbon emissions are usually exceeded by plant fixation, so the net exchange of carbon with the atmosphere is negative and soil stocks increase. When soils are aerated, carbon emissions usually exceed plant fixation, so the net exchange of carbon with the atmosphere is positive.

14.28 To calculate the carbon emissions attributable to the removal or drainage of the peat, emissions occurring if the soil had remained in situ and undrained are subtracted from the emissions occurring after removal or drainage.

14.29 The indirect loss of CO_2 uptake (fixation) by plants originally on the surface of the site, but eliminated by construction activity including the destruction of active bog plants on wet sites and felling, is calculated on site specific data collected as part of the EIA process and based on blanket bog.

[1] It is noted that there has been no UK coal fired electricity generation since late 2024, however electricity generated from coal can still form part of the UK electricity grid mix through imports.

14.30 Emissions due to the indirect, long term liberation of CO_2 from carbon stored in peat due to drying and oxidation processes caused by construction of the site, can also be calculated from site specific data for the proposed development. This figure is a worst-case scenario, as the peat would be reused onsite to minimise carbon losses.

14.31 Data from turbine manufacturers and the construction related activity is included as part of the assessment to address payback periods, however the two previous sources (from peat and the losses from loss of plant uptake) are a much more significant contributor to CO_2 emissions and the overall CO_2 debt where peat is disturbed onsite.

Methodology

14.32 In Scotland, applications submitted under Section 36 of the Electricity Act 1989 are required to undertake the carbon balance assessment using the Scottish Government's carbon calculator tool. The Scottish Government's carbon calculator tool is currently offline (as of the finalisation of this chapter in May 2025). In the absence of the online Carbon Calculator Tool this assessment has been undertaken in accordance with the associated guidance using the offline version spreadsheet provided by the Energy Consents Unit. The methodology to calculate carbon emissions generated in the construction, operation and decommissioning of a wind farm is based on 'Calculating carbon savings from windfarms on Scottish peat lands - A New Approach' (Nayak et al, 2008), prepared for the Scottish Government Science, Policy and Co-ordination Division. This was superseded in 2011 by the document 'Calculating Carbon Savings from Wind Farms on Scottish Peatlands - A New Approach', (Nayak et al, 2008 and 2010) and (Smith et al, 2011). In terms of carbon footprint, the aforementioned 'carbon calculator' is the Scottish Government's tool provided to support the process of determining the carbon impact of wind farm developments in Scotland.

14.33 To undertake this assessment the following parameters were considered, which encompass a full life cycle analysis of the proposed development. These parameters include:

- emissions arising from fabrication of wind turbines and associated components;
- emissions arising from construction, (including transportation of components; quarrying; building foundations, access tracks and hard standings; and commissioning);
- the indirect loss of CO_2 uptake (fixation) by plants originally on surface of the Site but eliminated by construction activity (including the destruction of active bog plants on wet sites) and felling;
- emissions due to the indirect, long term liberation of CO_2 from carbon stored in peat due to drying and oxidation processes caused by construction; and
- loss of carbon due to drainage and from forestry clearance.

14.34 The offline spreadsheet version of the Scottish Government's carbon calculator tool provides generic values for CO_2 emissions associated with some components (such as turbine manufacture) and requires site specific information for other components (such as habitat type, extent of peat disturbance and ground water levels). The calculation evaluates the balance of total carbon savings and carbon losses over the life of the proposed development. The potential carbon savings and carbon costs associated with wind farms are as follows:

- carbon emission savings due to generation (based on displacing emissions from different power sources);

- lifetime costs associated with manufacture of turbines and construction;
- loss of carbon from backup power generation;
- loss of carbon-fixing potential of peatland;
- loss and/or saving of carbon stored in peatland (by peat removal or changes in drainage);
- loss and/or saving of carbon-fixing potential as a result of forestry clearance; and
- carbon gains due to proposed habitat improvements such as bog restoration.

14.35 This assessment draws on information detailed in the EIA Report, **Chapter 8: Ecology** and **Chapter 10: Hydrology, Hydrogeology and Geology**. For the purpose of this assessment, it is assumed that all the embedded good practice measures outlined in **Chapter 8: Ecology**, and **Chapter 10: Hydrology, Hydrogeology and Geology**, would be employed.

14.36 The final wind turbine choice is not yet known, but is anticipated to be approximately a 5MW machine, and the proposed development would consist of 13 turbines. The greenhouse gas savings and carbon payback are based on these input parameters. Figures are based on currently available turbines and assume a consistent supplier for all turbine locations (i.e. turbine types are chosen by manufacturer). Note that, within the calculation spreadsheet, the expected, maximum and minimum values have been adjusted to suit the input parameter.

14.37 The recommended site specific capacity factor within the calculation spreadsheet is 40%. This figure is based on the collection and analysis of onsite wind data from an 80m meteorological mast.

Assessment of Significance

14.38 All emissions contribute to climate change. To determine whether effects are significant under the EIA Regulations, it is appropriate to consider the sensitivity (value and resilience) of the receptor and the magnitude of the impact, taking into account uncertainty. This is based on the professional judgement of the assessor and uses the matrix set out in **Table 14-1**.

Table 14-1: Significance Evaluation Matrix

Sensitivity/Importance/Value		Magnitude of Change			
		Very High	High	Medium	Low
	Very High	Major (Significant)	Major (Significant)	Moderate (Probably Significant)	Minor (Not Significant)
	High	Major (Significant)	Major (Significant)	Moderate (Probably Significant)	Minor (Not Significant)
	Medium	Major (Significant)	Major (Significant)	Moderate (Probably Significant)	Minor (Not Significant)
	Low	Moderate (Probably Significant)	Moderate (Probably Significant)	Minor (Not Significant)	Minor (Not Significant)

14.39 Climate and the atmosphere are considered to have Very High sensitivity to changes in green house gas emissions.

14.40 Effects assessed can be both beneficial (positive) and adverse (negative). Sensitivity of climate change receptors is inherently linked to the magnitude of the impact. Whilst receptors may be considered *"high-value"*, a non-material magnitude of the impact would result in any effect being considered not significant (IEMA, 2020).

14.41 Effects assessed can be both beneficial (positive) and adverse (negative) as a result of the proposed development. Sensitivity of climate change receptors is inherently linked to the magnitude of change. Whilst receptors may be considered *''Very-high''* or *"high"* value, a medium magnitude of change for a low sensitivity receptor and a low magnitude of change for all classifications of receptor would result in any effects being considered not significant.

Existing Conditions

14.42 As the site is currently largely undeveloped, baseline carbon emissions to the atmosphere are considered to be minimal. However, it is widely acknowledged that peatlands sequester, and store carbon and the amount sequestered by peat bog varies depending on its condition.

14.43 The current baseline is that of the current climate. Between the years of 1991 and 2020 at the Strathallan Airfield climate station[2], the average maximum summer temperature was 19.63^{0}C and the average minimum summer temperature was 8.79^{0}C. For the same location and over the same time period, the average maximum winter temperature was 7.31^{0}C and the average minimum winter temperature was 0.17^{0}C. The average annual rainfall between 1991 and 2020, at the same location noted above, was 1,012.16mm. A mean annual wind speed (at 10m) of 6.31 knots was recorded at this climate station between 1991 and 2020.

Results

14.44 This section presents a summary of the carbon assessment which has been undertaken in respect of the proposed development. The purpose of the 'carbon calculator' is to assess, in a comprehensive and consistent way, the carbon impact of wind farm developments. This is undertaken by comparing the carbon costs of wind farm developments with the carbon savings attributable to the wind farm. An assessment has been undertaken to calculate the carbon emissions which would be generated in the construction, operation and decommissioning of the proposed development.

14.45 The carbon calculations spreadsheet and further detail on the carbon pay-back period for the proposed development is provided in **Technical Appendix 14.1: Carbon Calculator**. A summary of the anticipated carbon emissions and carbon payback of the proposed development are provided in **Table 14-2**.

[2] https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gfj27juds

Table 14-2: CO_2 Emissions and Payback Time

Results	Exp.	Min.	Max.
Net emissions of carbon dioxide (t CO2 eq.) (total CO2 emitted due to wind farm construction minus the CO2 reductions due to site improvements)	130,209	46,557	145,675
Carbon Payback Time			
Coal-fired electricity generation (years)	0.6	0.22	0.7
Grid-mix of electricity generation (years)	2.8	1.0	3.1
Fossil fuel - mix of electricity generation (years)	1.3	0.47	1.5
Ratio of CO2 eq. emissions to power generation (g / kWh) (TARGET ratio by 2030 (electricity generation) < 50g /kWh)	14	5	16

Interpretation of Results

14.46 The calculations of total carbon dioxide emission savings and payback time for the proposed development indicates that the overall payback period will be approximately 1.3 years when compared to the fossil fuel mix of electricity generation. This means that the proposed development is anticipated to take around 1.3 years to repay the carbon exchange to the atmosphere (the CO_2 debt) through construction; the proposed development would in effect be in a net gain situation following this time period and could then claim to contribute to national emissions reduction objectives thereafter for its remaining operational life.

14.47 The potential savings in CO_2 emissions due to the proposed development replacing other electricity sources over the lifetime of the wind turbines (assumed to be 40 years for the purpose of the carbon calculator) are approximately:

- 215,233 tonnes of CO_2 per year over coal-fired electricity (approximately 8.6 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator);
- 47,146 tonnes of CO_2 per year over grid-mix of electricity (approximately 1.8 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator); and
- 99,531 tonnes of CO_2 per year over a fossil fuel mix of electricity (3.9 million tonnes assuming a 40 year lifetime for the purposes of the carbon calculator).

14.48 The Scottish Government (2020) Climate Change Plan states that by 2030 Scotland will have a largely decarbonised electricity system with a grid carbon intensity of 50g CO_2/kWh of generation.

14.49 An update to the Climate Change Plan was issued in 2020 through the Securing a Green Recovery on a Path to Net Zero: Climate Change Plan 2018–2032 – Update. The update confirmed that the carbon intensity of electricity generated in Scotland had consistently fallen to less than 50g CO_2/kWh.

14.50 The proposed development is expected to have a carbon intensity (**Table 14-2**) of 14g CO_2/kWh. This is below the achieved carbon intensity target. Therefore, the proposed development is anticipated to further support Scotland's Climate Change Plan by maintaining and succeeding the target already achieved.

14.51 This is considered a Low magnitude of effect i.e., a slight, detectable, alteration of the baseline condition.

14.52 Climate and the atmosphere is considered to have Very High sensitivity to changes in greenhouse gas emissions. The proposed development is therefore assessed to have Minor beneficial environmental effects, that is not significant under the EIA Regulations.

Summary of Significant Effects

14.53 A carbon balance assessment has been undertaken using the offline spreadsheet version of the Scottish Government's carbon calculator tool. This has found that there is a moderate (beneficial) influence of the proposed development to Climate Change and national and international targets to combat climate change.

14.54 The influence of the proposed development to Climate Change is therefore not significant under the EIA Regulations.

Noise

14.55 This section of the Chapter presents the noise assessment for the proposed development.

14.56 Wind turbines may emit two types of noise when operating. Firstly, aerodynamic noise produced as the blades pass through the air. Secondly, mechanical noise from components within the nacelle of a wind turbine. Aerodynamic noise can be characterised as a more natural 'swish' sound, whereas mechanical noise is generally characterised by its tonal content. Over the years mechanical noise has been engineered to much lower levels, owing to its reduced acceptability when compared with aerodynamic noise. At very low wind speeds the turbine blades do not rotate or rotate very slowly and so negligible aerodynamic noise is generated. In higher winds, background noise, such as wind disturbed vegetation, will increase, along with aerodynamic noise from the turbine blades. The subjective audibility of the proposed development will be determined by the relative difference between background noise and wind turbine aerodynamic noise. This difference, as experienced at nearby dwellings, forms the basis of the noise assessment.

14.57 Whilst reasonable effort has been made to ensure that this section of the Chapter is easy to understand, it is technical in nature, and so to assist the reader, a glossary of terminology is included as **Technical Appendix 14.2**.

Statutory and Policy Context

14.58 The legislation, guidance and planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**. However, to summarise, the following are considered most applicable to this assessment:

- Environmental Protection Act 1990;
- Control of Pollution Act 1974;
- National Planning Framework 4;
- Scottish Government Online Planning Advice: Planning Advice Note 1/2011 and Technical Advice Note;
- Onshore Wind – Policy Statement 2022;
- Supplementary Guidance 2 – Onshore Wind Energy, Clackmannanshire Council; and

- Draft Supplementary Guidance 2019 – Renewable and Low Carbon Energy, Perth & Kinross Council.

14.59 The above documents confirm that although the UK Government has been considering the extent to which ETSU R-97 (The Assessment and Rating of Noise from Windfarms (ETSU-R-97)) may require updating to ensure it is aligned with the potential effects from more modern turbines, that until such guidance is produced ETSU-R-97 should continue to be followed by applicants and used to assess and rate noise from wind energy developments.

Consultation

14.60 Consultation, with regards the scope of the noise assessment, has been undertaken with both Clackmannanshire Council, and Perth and Kinross Council, particularly their Environmental Health departments.

Scoping

14.61 A Scoping Report was submitted to consultees in March 2023, with responses received from Clackmannanshire Council in April 2023, and Perth and Kinross Council in May 2023.

14.62 The Scoping Report proposed the following areas (with regards noise) to be scoped out of the assessment:

- construction noise and vibration, including associated traffic, due to the distances between the turbine locations and the identified noise-sensitive receptors (NSRs);
- operational traffic noise, due to the number of vehicle movements expected being not significant in the context of the existing road network;
- decommissioning noise and vibration, which is expected to be no more than the construction noise and vibration (scoped out above); and
- infrasound and low frequency noise.

14.63 **Table 14-3** below sets out the responses from key consultees to the Scoping Request.

Table 14-3: Scoping Consultation Responses

Consultee	Scoping Responses / Opinion
The Scottish Government Energy Consents Unit	*"The noise assessment should be carried out in line with relevant legislation and standards as detailed in section 11 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."*
Clackmannanshire Council (CC)	*"The assessment should demonstrate there would be no significant risk of nuisance to settlements in the Hillfoots, notably Alva."*
Perth and Kinross Council (PKC)	*"PKC agrees with the proposed noise modelling predictions and assessment methodology. It is recommended that the applicant consult with PKC Environmental Health directly to agree the Noise Sensitive Receptors, as early as possible. However, noting the remote location and the limited number of receptors it is likely that that the correct receptors have already been identified."*

Further Consultation

14.64 Further post-Scoping consultation was undertaken with the Environmental Health departments at Clackmannanshire Council, and Perth and Kinross Council, in order to further refine the scope of assessment and the NSRs to consider. Emails were sent to both councils in September 2023 to request feedback (and reach agreement) on the proposed scope, however with no response was received from either council. A subsequent follow-up email sent to both councils in October 2023, resulted in a response from Clackmannanshire Council.

14.65 Clackmannanshire Council agreed, on 19 December 2023, that noise and vibration from the battery energy storage system (BESS) and substation could be scoped out of the assessment, along with construction and decommissioning noise, and vibration for the wind turbines during operation.

14.66 Several further efforts were made by phone and email in early March 2024 to obtain a response from Perth and Kinross Council (and reach agreement on the scope of noise assessment), however none was received.

Standards and Guidance

14.67 This noise assessment has taken cognisance of the following best practice guidelines and guidance.

ETSU-R-97

14.68 ETSU-R-97 *The Assessment and Rating of Noise from Windfarms* (ETSU-R-97) was written by a Noise Working Group including developers, noise consultants and environmental health officers, set up in 1995 by the Department of Trade and Industry through ETSU (the Energy Technology Support Unit).

14.69 ETSU-R-97 presents a consensus view of the working group and was prepared to present a common approach to the assessment of noise from wind turbines. The document states that noise from wind turbines or wind farms should be assessed against site specific noise limits.

14.70 Noise limits are derived based on a series of acceptable lower limits and based on an allowable exceedance above the prevailing background noise level, including consideration of a variety of different prevailing wind speed conditions. The noise limits should be derived for external areas used for relaxation, or areas where a quiet noise environment is highly desirable. Separate limits are required for night-time and daytime periods. Night-time limits are derived drawing upon measured night-time background noise levels, whilst daytime limits are derived drawing upon the background noise levels arising during ‘quiet daytime’ periods.

14.71 Night-time is defined as the period between 23:00 and 07:00 hours, whilst quiet daytime periods are defined as:

- 18:00 to 23:00 hours on all days;
- 13:00 to 18:00 hours on Saturdays and Sundays; and
- 07:00 to 13:00 hours on Sundays.

14.72 For daytime, the suggested limits are 5 dB above the prevailing background noise level determined during quiet daytime periods, or 35 to 40 dB(A), whichever is the higher. The absolute criterion between the 35 to 40 dB(A) range is selected taking account of:

- the site environs (e.g. number of local receptors);
- the energy generation capacity (e.g. number of kWh that can be generated) of the proposed development; and
- the associated duration and level of exposure.

14.73 During night-time, the suggested limits are 5 dB above the prevailing night-time background noise level or 43 dB(A), whichever is the higher. The absolute criterion for the night-time is higher than that for the daytime, as the derivation of this limit is based on preventing sleep disturbance within a building whereas for the daytime, limits are based on occupation of external spaces used for relaxation.

14.74 It is required that the prevailing background noise levels be determined in terms of the $L_{A90,10min}$ noise index for both quiet daytime and night-time periods, for wind conditions ranging from $2ms^{-1}$ to $12ms^{-1}$.

14.75 The noise limits are calculated by undertaking a regression analysis of the LA90,10min noise levels and the prevailing average wind speed for the same 10-minute period, when measured or determined at 10m above ground at the location of the proposed turbines. The allowable limit is then defined at +5 dB above the average noise level at each wind speed (as defined by the regression analysis), or the absolute noise level lower limit, whichever is the higher (assuming no financial involvement within the scheme).

14.76 ETSU-R-97 also provides a simplified fixed noise limit of 35 dB $_{LA90,10min}$ at all wind speeds, which may be applied to avoid the need to measure background noise levels. The 'simplified ETSU limit' typically applies both during the daytime and night time period.

14.77 Where a property has a financial involvement in the scheme, the document allows a relaxation of the derived noise limits, stating that *"It is widely accepted that the level of disturbance or annoyance caused by a noise source is not only dependent upon the level and character of noise but also the receiver's attitude towards the noise source in general. If the residents at the noise-sensitive properties were financially involved in the project, then higher noise limits will be appropriate"*. The guidance goes on to state that it is *"recommended that both the day and night-time lower fixed limits can be increased to 45 dB(A) and the consideration should be given to increasing the permissible margin above background where the occupier of the property has some financial involvement in the wind farm"*. The amount by which the permissible margin above background can be relaxed is not specified, but the allowable relaxation to 45 dB(A) of the lower limits is an increase of (at least) 5 dB during the daytime and 2 dB during the night-time, so similar levels of relaxation might also be applied to the background related element of the noise level limits.

14.78 The ETSU guidance states that the derived limits should be applied to noise from the proposed wind farm or turbines in terms of the $L_{A90,T}$ index, and that the $L_{A90,T}$ of the wind farm noise is typically 1.5 dB to 2.5 dB lower than the $L_{Aeq,T}$ measured over the same period.

14.79 The derived noise limits are applicable to both the aerodynamic (e.g. 'blade swish') and mechanical (e.g. generator related) components of wind farm noise.

14.80 Where noise from the wind farm is tonal, a correction of between 2 dB and 5 dB is to be applied to the wind farm noise. Guidance is provided on how to determine the level of correction required, but typically, for proposed developments, the need for any applicable correction is confirmed by the independent wind turbine-specific noise tests, following standard test procedures, provided by manufacturers.

14.81 It is stated within the ETSU-R-97 guidance that *"The Noise Working Group is of the opinion that absolute noise limits and margins above background should relate to the cumulative effect of all wind turbines in the area which contribute to the noise received at the properties in question. It is clearly unreasonable to suggest that because a wind farm was constructed in the vicinity in the past which resulted in increased noise levels at some properties, that residents of those properties are now able to tolerate still higher noise levels. The existing wind farm should not be considered as part of the prevailing background noise"*. Accordingly, where an existing wind farm contributes to the prevailing background noise levels, it is necessary to either include for the contribution of this wind farm when comparing against the allowable noise limit or correct for this contribution when deriving a limit applicable to the proposed development acting alone.

Good Practice Guide to the Application of ETSU-R-97

14.82 The Institute of Acoustics' Good Practice Guide to the Application of ETSU-R-97 (IoA GPG) presents the report of a 'noise working group' (NWG) assembled in response to a request from the former Department of Energy & Climate Change (DECC). The guide is intended to represent current good practice in applying the ETSU-R-97 method to assessing the noise impact of wind turbine developments with a power rating of over 50kW.

14.83 In addition to detailed consideration of various issues and factors concerned with current 'state of the art' knowledge of UK wind turbine noise assessment, a series of 'summary boxes' (SBs) highlighting key guidance points are included.

14.84 The SBs provide clarification and updated guidance on a range of matters relating to ETSU R-97 noise assessments, including consultation with relevant stakeholders, background noise survey methodology, noise survey data analysis, derivation of noise limits, noise prediction model input data, algorithms and parameters, cumulative impact assessment procedures, assessment reporting, planning conditions and amplitude modulation. A set of supplementary guidance notes (SGNs) also form part of the publication and include further specific detail for different technical areas.

14.85 The detail of the IoA GPG has been considered in the preparation of this assessment. Some of the key considerations relevant to this assessment are summarised as follows:

- background noise surveys should be carried out for sufficient duration to obtain a suitably-sized dataset; as a guideline, it is suggested that no fewer than 200 data points be obtained within each of the night-time and amenity hour periods for a given survey location, with no fewer than five data points within each contiguous wind speed integer interval (for pitch regulated turbines), up to the wind speed at which the maximum sound power level is reached. Where the data has been filtered by wind direction the guideline values are reduced;
- background noise survey data should be analysed, and anomalous periods of noise removed from the dataset; anomalous noise might include rain-affected periods and increased noise from watercourses following rainfall, seasonal effects such as early-morning birdsong ('dawn chorus'), atypical traffic movements and other unusual noise sources affecting measured levels;
- due to the potential for non-standard site-specific wind shear (i.e. differences in wind speed at different heights above the ground – a 'standard' profile increases logarithmically with height) background noise levels should be correlated with 10 m height wind speeds derived using a method that 'standardises' the wind speeds using the assumed shear profile. Since wind turbine sound power levels are determined

using the same shear profile, this procedure ensures a link between the predicted sound levels at a given hub height wind speed and the background noise levels at receptors near the ground under the same wind speed conditions (obtained using the 'standardised' 10 m height wind speed);

- derivation of the prevailing background noise levels should be carried out using polynomial regression analysis, of order one to four, depending on the nature of the noise environment. The regression curve used should reach minimum and maximum values at the lowest and highest wind speeds for which the dataset is valid, respectively;
- calculations of predicted wind turbine noise may be carried out using ISO 9613 2 *Acoustics – Attenuation of Sound during Propagation Outdoors* (International Organization for Standardization, 1996 – this has been superseded by a 2024 version, which is yet to be adopted by industry practice); preferred receptor heights, meteorological and ground absorption input parameters for this calculation procedure are given;
- turbine sound power level source data should include appropriate uncertainty corrections. Guidance is given for determining when such uncertainty corrections have been inherently included in turbine source emission data;
- a correction for topographic screening of a maximum -2 dB may be applied where there is no line of sight between the turbine (tip) and the receptor (4 m above ground level);
- a correction for constructive reflection within valleys of +3 dB should apply where concave topography is determined to lie between the turbine and the receptor point; and
- 'excess amplitude modulation' (i.e. where the wind turbine noise has higher variability with momentary time than the 2 – 3 dB(A) considered within ETSU R-97) is still the subject of research; current practice (at the time of publishing of the IoA GPG) in relation to determining applications for wind turbine developments is to not impose a planning condition specific to this phenomenon.

14.86 In addition to the above, the IoA GPG confirms that the ETSU-R-97 noise level limits should be applied cumulatively and provides guidance on appropriate assessment methods for a variety of different cumulative scenarios. These scenarios include 'concurrent applications', 'existing wind farm consented with less than total ETSU-R-97 limits', 'existing wind farm/s consented to the total ETSU-R-97 limits currently operating', and 'permitted wind farms consented to total ETSU-R-97 limits but not yet constructed'.

14.87 In the section titled 'existing wind farm/s, consented to the total ETSU-R-97 limits, currently operating' it is stated that *"In the first instance, the consented noise limits should be used within the cumulative noise impact calculations unless otherwise agreed with the local authority. Provided the sum of the noise limits derived for the proposed site when added to those already consented for the operational sites does not exceed the limits that would otherwise be within the requirements of ETSU R-97 for the cumulative impact, then the noise limits derived for the proposed site can be applied directly"*.

14.88 In practical terms this can be achieved by ensuring that the noise limit for the proposed development is set 10 dB or more below that permitted to be generated by the existing development.

14.89 It is, however, then discussed that this may not always be necessary, e.g. where there is a 'controlling property', whereby compliance with the noise limit at that controlling property

would result in noise levels never realising the noise level limit 'in full' at another property (e.g. because the second property is further removed from the existing development), thereby leaving a proportion of the limits available for use at the second property by the subsequently proposed development. Another reason that is discussed is where there is no realistic prospect of the existing wind farm producing noise levels up to the consented limit, again thereby leaving a proportion of the limit available for the subsequently proposed development.

14.90 The process provided in the IoA GPG for determining appropriate noise limits applicable at specific properties is summarised as follows:

- identify cumulative developments, i.e. those from which the predicted level at properties within the study area are within 10 dB of the proposed development. Developments from which the predicted levels are 10 dB or greater different to that of the proposed development may be scoped out of further analysis;
- determine the consented noise limits for other developments applicable at properties where cumulative effects may occur;
- predict noise levels from cumulative developments and identify controlling properties (typically those closest to the specific wind farm/turbine without financial involvement; assuming compliance with noise limits at these properties will limit the maximum noise level possible at more distant properties); and
- confirm that the predicted levels from cumulative developments do not exceed noise limits at controlling properties.

Assessment Methodology

Scope of Assessment

14.91 As per the Scoping and post Scoping consultation with Clackmannanshire Council, and Perth and Kinross Council (particularly their environmental health departments), this assessment will consist of an assessment of the operational noise from the wind turbines, using methodology from ETSU-R-97 and the IoA GPG.

Study Area

14.92 The site (as defined by the application boundary) is located within the northern Ochill Hills across the administrative boundaries of both Clackmannanshire and Perth & Kinross Councils approximately 2.9km north of the hillfoots village of Alva and centred on NGR NN 87737 02889. The site area covers approximately 1,474 hectares of open moorland.

14.93 The study area for this assessment has been informed by maps and aerial images of the site and its surroundings. A sample of the closest, and therefore potentially worst-affected, NSRs to the proposed development have been identified and adopted for the evaluation of noise impacts. These have been selected to represent a geographic spread across the local area. NSRs identified are either single dwellings or representative of a group or cluster of dwellings.

14.94 Determination of the study area for a wind farm typically requires that the 35 dB L_{A90} noise contour is predicted, and NSRs which lie beyond the contour are assumed to meet the most stringent ETSU noise limit and are therefore scoped out and discounted from further consideration. NSRs which are identified within the 35 dB L_{A90} noise contour are scoped in, and noise impacts are assessed further.

14.95 The 35 dB L_{A90} operational noise contour for the proposed development in isolation (i.e. without cumulative developments) at the wind speed at which the proposed turbines generate their maximum sound power level, is shown in **Figure 14.2**. This contour does not include any corrections for topography.

14.96 **Figure 14.1** shows that the area surrounding the proposed development is sparsely inhabited; there are no identified properties within the 35 dB contour and three NSRs (or groups of) slightly outside the 35 dB noise contour. The representative NSRs considered in the assessment are listed in **Table 14-4.**

Table 14-4: Identified Representative NSRs

NSR Name / Number	Distance/ Direction to Nearest Turbine	Grid Reference	
		Easting	Northing
Carim Lodge - NSR01	2.7km north west of T13	285831	705184
East Biggs Farm - NSR02	3.2km north west of T13	286922	706612
Various properties in Alva (the closest is Rhodders Farm) - NSR03	3.3km south of Rhodders Farm	288738	697461

14.97 It should be noted that Carim Lodge is financially involved with the proposed development. It should also be noted that, as per the Burnfoot East Wind Farm Environmental Statement (JLL, 2017), Backhills Farm (Grid Reference 291249, 703546) is unoccupied and therefore is not considered further.

Potentially Cumulative Developments

14.98 Potentially cumulative wind farms have been identified within the vicinity of the proposed development. Cumulative noise has therefore been considered at a selection of representative NSRs. Where the difference in noise level at a given NSR between the proposed development and other developments is 10 dB or greater, cumulative effects will be negligible.

14.99 Nearby developments which have been evaluated for potential cumulative effect with the proposed development are listed in **Table 14-5** and shown in **Figure 14.3**, along with the cumulative 35 dB contour.

Table 14-5: Identified Potentially Cumulative Wind Farms

Wind Farm	Turbine Type and Number	Hub height(s), m	Approximate distance and direction from proposed development turbines
Burnfoot Hill	Senvion MM92/2050 x 13	60	1.2km ENE
Burnfoot Hill North	Senvion MM82/2050 x 2	60	1.5km NE
Burnfoot Hill East	Vestas V112 3.6 MW x 3	80	2.1km ENE
Rhodders Wind Farm	Senvion MM82/2050 x 6	60	0.5km ENE

Sensitivity of the Environment

14.100 The sensitivity/importance of the environment is defined in **Table 14-6**. The sensitivity/importance of the receptor is a major consideration within the assessment and will be used to inform the significance of effect, as shown in **Table 14-9**.

Table 14-6: Sensitivity / Importance of the Environment

Receptor Sensitivity/Importance	Description/Reason
High	Residential properties, schools and healthcare buildings (day-time). Designated Ecological Sites such as Special Areas of Conservation (SAC), SPA, SSSI.
Medium	Leisure facilities, and Designated Ecological Sites such as Special Areas of Conservation (SAC), SPA, SSSI.
Low	Offices and other non-noise producing employment areas.
Negligible	Industrial areas.

Overall Impact Magnitude

14.101 The overall magnitude of impact is defined in **Table 14-7**. The impact magnitude categories outlined below will be used to inform the significance of effect, as shown in **Table 14-7**.

Table 14-7: Overall Impact Magnitude Definitions

Magnitude	Description/reason
High	Fundamental, permanent/irreversible changes over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Medium	Considerable, permanent/irreversible changes over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Low	Discernible, temporary (throughout project duration) change over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness.
Negligible	Discernible, temporary (for part of the Project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness.

Wind Turbine Noise Impact Magnitude

14.102 The impact of operational noise from the wind turbines upon existing residential receptors will be determined with reference to ETSU-R-97. Based on the guidance presented in ETSU-R-97, the impact of operational noise upon existing residential receptors is detailed in **Table 14-8**.

Table 14-8: Operational Noise Impact Magnitude

Magnitude	Description/reason
High	Assessment level is 5 dB L_{A90} or more above the ETSU limit.
Medium	Assessment is between 3 and 4 dB L_{A90} above the ETSU limit.
Low	Assessment is between 1 and 2 dB L_{A90} above the ETSU limit.
Negligible	Rating level is between 9 dB L_{A90} below and equal to the ETSU limit.
No change	Rating level is 10 dB L_{A90} or more below the ETSU limit.

Significance of Effect

14.103 Sensitivity of the receptor and magnitude of impact have then been considered collectively to determine the potential effect and its significance. The collective assessment represents a 'considered assessment' by the assessor, based on the likely sensitivity of the receptor to the change (e.g., is a receptor present which would be affected by the change), and then the magnitude of that change.

14.104 **Table 14-9** is used as a guide to determine the level of effect; 'major' and 'moderate' effects are considered to be 'significant' in terms of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).

14.105 It is considered that the proposed development would not lead to any beneficial noise and vibration effects; therefore, this has not been considered within **Table 14-9**.

Table 14-9: Noise Significant of Effects

	Significance of Effects				
Sensitivity of Receptor		**Magnitude of Impact**			
	No Change	**Negligible**	**Low**	**Moderate**	**High**
Negligible	Negligible	Negligible	Negligible	Minor	Minor
Low	Negligible	Negligible	Minor	Minor	Moderate
Moderate	Negligible	Minor	Minor	Moderate	Major
High	Negligible	Minor	Moderate	Major	Major

Limitations to Assessment

14.106 The assessment of operational impacts associated with the wind turbines has been undertaken adopting source noise levels for the candidate turbine model, which is the Nordex N133/4.8. Following completion of the tendering process, it is possible that the precise turbine make / model adopted and / or the operational mode will change from that adopted within the assessment. It should be noted, however, that the final turbine model chosen will be selected to ensure compliance with the derived noise level limits.

Baseline Conditions

14.107 Based on the consultation undertaken with Clackmannanshire Council, and Perth and Kinross Council, no baseline sound surveys have been undertaken. Instead, the lower

bound of operational noise limits given in ETSU-R-97 is proposed: 35 dB $L_{A90,10min}$ for the daytime period, and 43 dB $L_{A90,10min}$ for the night-time period.

14.108 For Carim Lodge, which is financially involved in the project, a flat operational noise limit of 45 dB $L_{A90,10min}$ is proposed, in accordance with ETSU-R-97.

14.109 A summary of these simplified assessment operational noise limits for the receptors identified in **Table 14-4** is presented in **Table 14-10**.

Table 14-10: Simplified Operational Noise Limits

NSR Name	NSR D	Simplified Operational Noise Limit, dB $L_{A90,10min}$	
		Daytime	Night-time
Carim Lodge	NSR01	45	
East Biggs Farm	NSR02	35	43
Properties in Alva (the closest is Rhodders Farm)	NSR03	35	43

Operational Noise Assessment

Operational Noise Emissions

14.110 Operational noise immission levels at the NSRs presented in **Table 14-11** will be predicted for comparison against the operational noise limits presented in **Table 14-10**.

14.111 The A-weighted sound power levels (as stated by the manufacturer or presented in similar EIA noise assessments) for the candidate turbine (Nordex N133/4.8 Mode 0 at 83.4m hub height, assumed no serrated trailing edge) and the turbines in the cumulative assessment, as presented in **Table 14-5**, are shown for integer wind speeds in **Table 14-11** below. It should be noted that these levels are prior to applying a +2 dB uncertainty correction, in accordance with the requirements of the IoA GPG.

Table 14-11: Wind Turbine Operational Noise Imission Levels at Integer Wind Speeds

Wind Turbine	Stated operational noise emission level, dB L_{WA}, at wind speed, ms^{-1}									
	3	4	5	6	7	8	9	10	11	12
Nordex N133	95.0	95.5	101.0	105.2	107.5	107.5	107.5	107.5	107.5	107.5
Senvion MM92/2050	-	95.0	100.4	102.3	103.2	103.2	103.2	103.2	103.2	103.2
Senvion MM82/2050	88.9	94.1	99.7	103.6	104.0	104.0	104.0	104.0	104.0	104.0
Vestas V112 3.6 MW	94.5	97.3	100.9	104.3	106	106.5	106.5	106.5	106.5	106.5

14.112 The maximum octave-band sound power levels of the wind turbines for use in the noise model have either been taken from existing literature, or a reference spectrum for the turbine model has been shifted to the maximum operational noise immission level for the turbine in **Table 14-11**. These are presented in **Table 14-12** below. Again, it should be

noted that these levels are prior to applying a +2 dB uncertainty correction, in accordance with the requirements of the IoA GPG.

Table 14-12: A-Weighted Octave-Band Sound Power Levels

Wind Turbine	A-weighted octave-band sound power levels, dB L_{WA}									
	31.5Hz	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	dB(A)
Nordex N133	79.4	89.0	94.8	98.0	100.4	102.3	101.4	96.0	82.2	107.5
Senvion MM92/2050	-	84.6	91.7	96.6	98.2	97.8	92.1	83.6	73.2	103.2
Senvion MM82/2050	-	84.0	91.9	98.9	99.2	96.1	93.6	89.0	79.5	104.0
Vestas V112 3.6 MW	75.7	90.6	94.5	97.9	100.5	101.3	98.8	92.2	76.2	106.5

Operational Noise Modelling

14.113 Operational noise immissions at the NSRs have been calculated using the proprietary software package CadnaA®, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2 (1996 version, as the 2024 version is yet to be implemented in commercial noise modelling packages) have been used and the model assumes the following, in line with the IoA GPG:

- mixed ground absorption factor of G = 0.5;
- air absorption based on temperature of 10°C and 70% relative humidity;
- receiver height 4m; and
- downwind propagation assumed between all turbines and receivers.

14.114 The model accounts for the attenuation due to geometric spreading, atmospheric absorption, and ground effects. All attenuation calculations have been made on an octave band basis and therefore account for the sound frequency characteristics of the turbines.

14.115 In accordance with the IoA GPG, an uncertainty correction of +2 dB has been added to the sound power levels given in **Table 14-12**. In addition, a correction of -2 dB has been added to convert the sound levels from the L_{Aeq} index to the L_{A90} index.

14.116 The IoA GPG gives guidance on how topography should affect predictions of operational noise immission levels. It states that topographical screening effects should be limited to a correction of -2 dB, and that, should the path between the turbine and receptor be across concave ground, a correction of +3 dB should be applied, due to the presence of additional reflection paths when wind turbine noise propagates across a valley that are not present over more flat ground. The following formula has been used to determine if concave ground is present:

$$h_m \geq 1.5\left(\frac{abs(h_s - h_r)}{2}\right)$$

14.117 Where hm is the mean height above the ground of the direct line of sight from the receiver to the source, and hs and hr are the heights above local ground level of the source and receiver respectively.

14.118 This method is consistent with the recommendations of the IOA GPG. The IOA GPG also allows for directional effects to be included within the noise modelling: under upwind propagation conditions the wind farm noise immission level at a receiver can be as much as 10 dB(A) to 15 dB(A) lower than the level predicted using the ISO 9613-2 model. However, as noted above, predictions have been made assuming downwind propagation from every turbine to every receptor at the same time as a worst case.

Operational Noise Immissions

14.119 The predicted operational noise immission levels of the proposed development, nearby wind farms, noise limit and margin, at each the identified receptors are presented numerically in **Table 14-13** below. The margin shown is to the daytime (more onerous) limit as shown in **Table 14-13**. Noise immission levels have been rounded to whole numbers in the table.

Table 14-13: Predicted Noise Immission Levels

Receptor	Predicted Noise Immission Level at Receptor, dB $L_{A90,10min}$					
	Burnfoot Hill	Burnfoot Hill Ext	Burnfoot East	Rhodders	Windburn	Total
NSR01	21	16	17	21	28	30
NSR02	22	17	17	20	26	29
NSR03	20	10	15	18	25	27

14.120 With reference to **Table 14-12** and **Table 14-13**, **Table 14-14** below shows the impact magnitude and significance of effect of the wind turbine operational noise.

Table 14-14: Assessment Magnitude of Impact and Significance of Effect

Receptor	Predicted Cumulative Noise Immission Level at Receptor, dB $L_{A90,10min}$	Limit	Margin	Impact Magnitude	Sensitivity	Significance of Effect
NSR01	30	45	-15	No change	High	Negligible
NSR02	29	35	-6	Negligible	High	Minor
NSR03	27	35	-8	Negligible	High	Minor

14.121 It can be seen from **Table 14-14** that during the day-time, and therefore the night-time, magnitude of impact would be negligible for high sensitivity receptors, giving rise to a temporary ‘minor adverse’ worst-case level of effect at the representative NSRs from wind turbine operations, which is not significant in terms of the EIA Regulations.

Summary

14.122 From early modelling exercises, it was determined that no noise sensitive receptors were within the 35 dB L_{A90} contours for either the proposed development or the cumulative noise of the proposed development and the existing turbines. Therefore, in accordance

with the IoA GPG, no baseline sound surveys were undertaken, and simplified operational noise limits were set, as in **Table 14-10**.

14.123 Utilising known sound power levels for the existing cumulative wind turbines and the proposed wind turbines, the operational noise immission levels at the NSRs have been predicted, following the modelling guidance in the IoA GPG. Topographical effects have been accounted for and then applied to these modelled levels following the guidance in the IoA GPG. The noise immission levels from each wind farm and the cumulative levels are presented in **Table 14-5**.

14.124 The predicted cumulative noise immission levels at the NSRs are significantly below the simplified operational noise limits. As shown in **Table 14-14**, the maximum magnitude of impact predicted is negligible, which, for the high sensitivity residential receptors, results in a maximum significance of effect of 'minor adverse', which is not significant in terms of the EIA Regulations.

14.125 It is therefore considered that there is no significant residual impact from noise on the surrounding receptors.

Risk of Accidents and Other Disasters

14.126 The vulnerability of the proposed development to major accidents and natural disasters, such as flooding, sea level rise, or earthquakes, is considered to be low due to its geographical location and the fact that its purpose is to ameliorate some of these issues.

14.127 In addition, the nature of the proposals and remoteness of the Site means there would be negligible risks on the factors identified by the EIA Regulations. For example:

- population and human health – the site is remote with low population density and the required safety clearances around turbines has been a key consideration throughout the design process;
- biodiversity – receptors and resources would be unaffected as there would be little risk, following implementation of appropriate mitigation, of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely);
- land, soil, water, air and climate – there would be little risk, following implementation of appropriate mitigation, of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely); and
- material assets, cultural heritage and the landscape – there would be no adverse effects on these features in a turbine failure scenario (highly unlikely).

14.128 Despite the risk of major accidents and natural disasters being considered as low, the vegetation and openness of the site does present a potential, albeit remote, fire risk. **Technical Appendix 3.1: Outline CEMP** contains measures for reducing the risk of fires occurring during the construction of the proposed development and these are considered to be appropriate to the level of potential risk. Follow implementation of these measures contained within the CEMP, the risk of major accidents is concluded to **not result in a significant effect**.

Public Safety and Access

14.129 The Renewable UK Onshore Wind Health and Safety Guidelines (2015) note that wind farm development and operation can give rise to a range of risks to public safety including:

- traffic (especially lorries during construction, and abnormal loads for the transport of wind turbine components; including beyond the Site boundary);
- construction site hazards (particularly to any people entering the Site without the knowledge or consent of the site management);
- effects of catastrophic wind turbine failures, which may on rare occasions result in blade throw, tower topple or fire; and
- ice throw, if the wind turbine is operated with ice build-up on the blades.

14.130 The RenewableUK guidance (2015) states that *"Developers should ensure that risks to public safety are considered and managed effectively over the project lifecycle, and should be prepared to share their plans for managing these risks with stakeholders and regulators; effective engagement can both build trust, and help to reduce the level of public safety risk by taking account of local knowledge"*.

14.131 Site security and access during the construction period would be governed under Health and Safety at Work Act 1974 and associated legislation. Public access along the Sheriffmuir road would remain in place as far as possible during construction, and would reopen to the public fully once construction of the proposed development is complete. No public access would be permitted along new access tracks to the site during construction. However, the Land Reform (Scotland) Act 2003 which came into effect in February 2005 establishes statutory rights of responsible access on and over most land. The legislation offers a general framework of responsible conduct for both those exercising rights of access and for landowners. Once the construction period and commissioning of the proposed development is complete, no special restrictions on access are proposed.

14.132 Appropriate warning signs would be installed concerning restricted areas such as the substation compound, switchgear and metering systems. All onsite electrical cables would be buried underground with relevant signage. Follow implementation of the required measures, the risk to public safety is concluded to **not result in a significant effect**.

Traffic

14.133 Accident data for the A9 (main road near to the site which the construction traffic will be using) has been reviewed and is presented in **Technical Appendix 12.2**. An assessment of the potential effects on road safety has been undertaken and is presented in **Chapter 12: Traffic and Transport**. In summary, the proposed development would create an increase to HGV traffic levels within the study area but these levels would remain within the design capacity of the local road network. The accident records for the study area (within 350m of the site entrance) show there were no accidents (0 slight, 0 serious and 0 fatal) occurring over the five year study period (2018 to 2022). Therefore, the level of effect is considered not significant, following the implementation of a comprehensive Construction Traffic Management Plan, together with onsite route signage and an access management plan.

Construction

14.134 With regard to risks and accidents during the construction phase, the construction works for the proposed development would be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015 which will include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations.

14.135 Nonetheless, the risk of accidents and other disasters is covered where relevant in individual topic Chapters, for instance, the potential for environmental incidents and accidents such as spillages are considered in **Chapter 8: Ecology**, **Chapter 9: Ornithology** and **Chapter 10: Hydrology, Hydrogeology and Geology**. Flood risk is also assessed with Chapter 10. The level of effect is considered **not significant**, following the implementation of a health and safety requirements.

Extreme Weather

14.136 As far as the risk of turbine failure during high winds is concerned, the turbines would cut-out and automatically stop as a safety precaution in wind speeds over 50m/s.

14.137 Wind turbines can be susceptible to lightning strike due to their height and appropriate measures are taken into account in the design of turbines to conduct lightning strikes down to earth and minimise the risk of damage to turbines. Occasionally however, lightning can strike and damage a wind turbine blade. Modern wind turbine blades are manufactured from a glass-fibre or woodepoxy composite in a mould, such that the reinforcement runs predominantly along the length of the blade. This means that blades will usually stay attached to the turbine if damaged by lightning and in all cases turbines will automatically shut down if damaged by lightning.

14.138 Ice build-up on blade surfaces occurs in cold weather conditions. Wind turbines can continue to operate with a very thin accumulation of snow or ice, but will shut down automatically as soon as there is a sufficient build up to cause aerodynamic or physical imbalance of the rotor assembly. Potential icing conditions affecting turbines can be expected two to seven days per year (light icing) in Scotland (WECO, 1999). The potential for ice throw to occur after start up following a turbine shut down during conditions suitable for ice formation is high. There are monitoring systems and protocols in place to ensure that turbines that have been stationary during icing conditions are restarted in a controlled manner to ensure public safety. The risk to public safety is considered to be very low due to the few likely occurrences of these conditions along with the particular circumstances that can cause ice throw.

14.139 The risk to the environment and the public, from the proposed development, as a result of extreme weather is considered **not significant**.

Seismic Activity

14.140 There are no records of any earthquakes occurring in the vicinity of the site within the last 25 years (Earthquake Track). Earthquakes in Scotland are typically no greater than 3 on the Richter Scale and, therefore, minor and unlikely to cause significant damage to buildings and infrastructure.

14.141 It is very unlikely that an earthquake would occur in the vicinity of the site resulting in any damage to the proposed development. Should a wind turbine be damaged, the risk to public safety is considered to be negligible due to the relatively remote location and careful design layout of the infrastructure. Therefore, the risk to the environment and the public, from the proposed development, as a result of seismic activity is considered **not significant**.

Population and Human Health

14.142 **Chapter 7: Landscape and Visual Amenity**, **Chapter 10: Hydrology, Hydrogeology and Geology**, **Chapter 12: Traffic and Transport**, **Chapter 13: Noise** and **Chapter 14:**

Socio-economics, Tourism, Recreation and Land Use contain assessments which relate to the health and wellbeing of the local population. These chapters assess the effects of the proposed development, both positive and negative, provide an analysis of the significance of these effects and also put forward measures to mitigate against negative effects on people and their health.

14.143 **Chapter 15: Schedule of Commitments**, provides an overview of the mitigation put forward as part of these assessments in order to reduce any negative effects of the proposed development to an acceptable level.

14.144 Further to the topics covered in **Chapters 7 – 15**, including this chapter, it is not expected that there will be any other effects from the proposed development which would have significant effects on population and human health.

Air Quality

14.145 Construction activities can result in temporary effects from dust if unmanaged. This can result in nuisance effects such as soiling of buildings and, if present over a long period of time, can affect human health. As the nearest, non-financially involved property, is over 400m away from any substantial construction works (e.g. wind turbines, substation compound, borrow pits, new tracks) effects associated with dust or vehicle emissions are considered to be unlikely. In addition to this, it is expected that dust mitigation measures would be included within the full Construction Environment Management Plan for the proposed development. Therefore, the effects of dust and vehicle emissions from the construction and operation of the proposed development was scoped out of this assessment.

Aviation

14.146 This section considers the potential operational effects of the proposed development on existing and planned military and civil aviation activities, including those resulting from impacts to radar. The development of wind turbines has the potential to cause a variety of adverse effects on aviation during turbine operation. These include but are not limited to:

- physical obstructions; and
- adverse effects on performance of Communications, Navigation and Surveillance (CNS) equipment including the generation of unwanted returns on Primary Surveillance Radar (PSR) which would have a demonstrated detrimental impact on the provision of a safe and efficient air traffic service.

14.147 Rather than following an EIA process of assessing the significance of effects, the primary consideration is the actual or likely position of the specific aviation stakeholders, and the evidence brought forward by each stakeholder to support the position adopted. The assessment of effects on these receptors is therefore one of technical analysis and consultation and seeks to identify if any identified effects are likely to be 'acceptable' or 'not acceptable' to the asset owner, and if not acceptable establish any potential and proportionate technical mitigation solutions.

14.148 In reviewing the interaction between the proposed development and aviation stakeholders, the UK Government's position with regards to the aviation and renewables industry is an important consideration. The UK Government recognises the national interests and legitimate interests of both the wind energy and aviation industries (CAP764, Foreword, fifth paragraph, page 8). The expectation, at national level, is for the aviation industry to 'engage positively' in the process of developing solutions to potential conflicts

of interest. Additionally, the 2023 release of the Scottish Government's Onshore Wind Sector Deal, whereby aviation consultees were encouraged to facilitate renewable energy targets through transparent, fair and equitable processes, and reduced costs, is relevant.

14.149 It is accepted that technical impacts need to consider the existing systems and mitigation solutions already applied in the aviation environment. However, wind turbines are now acknowledged to be part of the built environment and essential for delivering Net Zero and affordable clean energy to consumers, as most recently set out in the UK's Clean Power 2030 Action Plan. Further, Clean Power 2030 Action Plan states that UK Government Department for Energy Strategy and Net Zero (DESNZ) and its Onshore Wind Industry Taskforce is working with the Department for Transport and the Civil Aviation Authority and aviation to *"agree a transparent and fair process for resolving objections."*.

14.150 The Onshore Wind Aviation Radar Delivery 2030 Group (OnWARD 2030) has been formed at the request of, and to support the objectives of, the Aviation Management Board (AMB) which is Chaired by DESNZ and reports to the DESNZ Secretary of State. The Scottish Ministers sit on OnWARD 2030. In addition to working towards co-existence between the onshore wind and aviation industries, one of the formal functions of the OnWARD group is to develop a strategy and identify the responsibilities of stakeholders in the delivery of a series of cost neutral mitigation solutions to be implemented by 2030.

14.151 Planning policies of relevance to this assessment are provided in **Technical Appendix 4.1: Legislation, Planning Policy and Guidance**.

Baseline

14.152 The airspace over the proposed development is Class G (uncontrolled) from ground level up to 4,000 feet (ft) above sea level. From 4,000ft to 6,000ft is the Class E controlled airspace of the Scottish Terminal Control Area (TMA). From 6,000ft to Flight Level 195 (approximately 19,500ft above mean sea level) is the Class D controlled airspace of the Scottish TMA. Above Flight Level 195 is Class C controlled airspace. NATS (En Route) (hereafter NATS) operating out of the NATS Prestwick Centre is the controlling authority throughout this area of controlled airspace. Further to this, transponder carriage is mandatory for all aircraft over 6,000ft above mean sea level.

14.153 The proposed development is within an area classified by the Ministry of Defence (MOD) as Low Flying Area 14, an area within which fixed wing aircraft may operate as low as 76.2 metres above ground level to conduct low level flight training.

Consultation

14.154 Consultation was undertaken with the following aviation stakeholders, as part of pre-Scoping, Scoping, and post Scoping consultation:

- Aberdeen Airport;
- Defence Infrastructure Organisation (DIO), part of the Ministry of Defence (MOD);
- Edinburgh Airport;
- Glasgow Airport;
- Glasgow Prestwick Airport;
- Highlands and Islands Airports Limited (HIAL); and
- NATS Safeguarding.

14.155 Scoping responses from the above consultees are detailed in **Table 14-15**.

Table 14-15: Consultee Scoping Responses

Consultee	Scoping Responses / Issues	Response / Action
Aberdeen International Airport 03 April 2023	*"This proposal is located outwith the consultation zone for Aberdeen Airport. As such we have no comment to make and need not be consulted further."*	Noted.
Edinburgh Airport 10 April 2023	*"This proposal has been examined from an aerodrome safeguarding perspective and conflicts with safeguarding criteria.* *We therefore object to the development on the following grounds:* ***Instrument Flight Procedure (IFP) Assessment*** *No turbine tower of any turbine may be erected, unless and until such time as the Scottish Ministers receive confirmation from the Airport Operator in writing that: (a) an IFP Assessment has demonstrated that an IFP Scheme is not required; or (b) if an IFP Scheme is required such a scheme has been approved by the Airport Operator; and (c) if an IFP Scheme is required the Civil Aviation Authority has evidenced its approval to the Airport Operator of the IFP Scheme (if such approval is required); and (d) if an IFP Scheme is required the scheme is accepted by NATS AIS for implementation through the AIRAC Cycle (or any successor publication) (where applicable) and is available for use by aircraft."*	An IFP Assessment was undertaken by Osprey Consulting Services, see **Technical Appendix 14.3**. The conclusions of the IFP Assessment are that the proposed development would not impact Edinburgh Airport's IFPs. See additional detail provided below in paragraphs 14.161-14.162.
Glasgow Airport 19 April 2023	*"The scoping report submitted has been examined from an aerodrome safeguarding perspective and we would make the following observations:* *The site is outwith the obstacle limitation surfaces for Glasgow Airport;* *It is within the radar and instrument flight procedures safeguarding areas and may impact. Detailed assessments will be required.* *Our position with regard to this proposal will only be confirmed once the turbine details are finalized and we have been consulted on a full planning application. At that time we will carry out a full safeguarding impact assessment and will consider our position in light of, inter alia, operational impact and cumulative effects."*	An IFP Assessment was undertaken by IFP Design Ltd, see **Technical Appendix 14.4**. The conclusions of the IFP Assessment are that the proposed development would not impact Glasgow Airport's IFP's. See additional detail provided below in paragraphs 14.161-14.162.

Consultee	Scoping Responses / Issues	Response / Action
Glasgow Prestwick Airport 31 March 2023	*"On behalf of Glasgow Prestwick Airport (GPA), I have reviewed the documentation available on the ECU portal for the Windburn Wind Farm (ECU00004782). The proposed development lies outside the GPA safeguarding area and as such we would have no comment or valid objection to make."*	Noted.
Highlands and Islands Airports Limited 25 April 2023	*"With reference to the above proposal, our preliminary assessment shows that, at the given position and height, this development would not infringe the safeguarding criteria and operation of Dundee Airport.* *Therefore, Highlands and Islands Airports Limited has no objections to the proposal."*	Noted.
Defence Infrastructure Organisation 04 May 2023	*"I am writing to advise you that the MOD has concerns with the proposal.* *The proposal concerns a development of 15 turbines with a maximum blade tip height of 149.90 metres above ground level. The proposed development has been assessed using the location data (Grid References) provided in the applicants Environmental Impact Assessment – Scoping Report dated March 2023.* *The principal safeguarding concerns of the MOD with respect to this development of wind turbines relates to their potential to create a physical obstruction to air traffic movements.* ***Physical Obstruction*** *In this case the development falls within Low Flying Area 14 (LFA 14), an area within which fixed wing aircraft may operate as low as 250 feet or 76.2 metres above ground level to conduct low level flight training. The addition of turbines in this location has the potential to introduce a physical obstruction to low flying aircraft operating in the area.*	See detail provided below in paragraphs 14.156-14.157 and 14.165-14.166.

Consultee	Scoping Responses / Issues	Response / Action
	To address the impact up on low flying given the location and scale of the development, the MOD would require that conditions are added to any consent issued requiring that the development is fitted with aviation safety lighting and that sufficient data is submitted to ensure that structures can be accurately charted to allow deconfliction. *As a minimum the MOD would require that the perimeter turbines are fitted with both 25cd visible and infra-red (IR) COMBI lighting."*	
NATS Safeguarding 21 April 2023	*"The proposed development has been examined by our technical safeguarding teams and conflicts with our safeguarding criteria. Accordingly, NATS (En Route) plc objects to the proposal. The reasons for NATS's objection are outlined in the attached report TOPA SG35103.* ***TOPA SG35103*** *Predicted Impact on Lowther RADAR* *Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.* *Predicted Impact on Kincardine RADAR* *Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.* *En-route operational assessment of RADAR impact*	See **Technical Appendix 14.5: Aviation Report**, and see additional detail provided below in paragraphs 14.158 and 14.163-14.164.

<table>
<tr><th>Consultee</th><th>Scoping Responses / Issues</th><th>Response / Action</th></tr>
<tr><td></td><td>Where an assessment reveals a technical impact on a specific NATS' RADAR, the users of that RADAR are consulted to ascertain whether the anticipated impact is acceptable to their operations or not.
<table>
<tr><th>Unit or Role</th><th>Comment</th></tr>
<tr><td>Prestwick Centre ATC</td><td>Unacceptable</td></tr>
<tr><td>Military ATC</td><td>Acceptable</td></tr>
</table>
<u>Predicted Impact on Navigation Aids</u>
No impact is anticipated on NATS' navigation aids.
<u>Predicted Impact on the Radio Communications Infrastructure</u>
No impact is anticipated on NATS' radio communications infrastructure."</td><td></td></tr>
</table>

DIO/MOD

14.156 Following the DIO response detailed in the above **Table 14-15**, the applicant received further advice from the project aviation consultant (Straten CSL) regarding the need for visible aviation lighting. The advice from the aviation consultant is that visible aviation wind turbine lighting is not required for the proposed development due to the following:

- the requirement for wind turbines under 150m to have visible aviation lighting is not consistent with other wind farms consented within Low Flying Areas in Scotland and the UK;
- the proposed wind turbine tip heights are, at 149.9m, below the Air Navigation Order criteria for wind turbines to be lit (with visible aviation lighting); and
- the proximity to neighbouring Low Flying Areas, and proximity to two major Scottish Airports, meaning the likelihood of the area over the proposed development being used for low flying is very low.

14.157 This position was put to the DIO/MOD in September 2023 and following discussions between (representatives of) the applicant and the DIO/MOD in November 2023 regarding the need for visible aviation lighting, the DIO/MOD advised the following: *"if a lighting proposal is submitted as part of the application stating that all turbines will be fitted with an IR beacons and charted, then consideration will be given to see if the removal of 25cd visible lighting is acceptable to MOD requirements"*. On the basis of this response the aviation lighting proposal set out below (paragraphs 14.159-14.160) is put forward.

NATS

14.158 Extensive consultation and engagement has been ongoing between the applicant (and their representatives) and NATS, first commencing in 2021, regarding the potential for the proposed development to impact NATS assets and their operations. A review of the

information and evidence provided by NATS to date in support of their position (see Scoping Response in **Table 14-15**), was produced by Straten CSL and is provided as **Technical Appendix 14.5: Aviation Report**. This Aviation Report was issued to NATS on 7 May 2025 inviting comment on the Report and for further evidence regarding the findings of the Technical and Operational Advice (TOPA) to be shared.

Aviation Lighting Proposal

14.159 Following consultation carried out with the DIO/MOD in November 2023 (see above) the Aviation Lighting Proposal for the proposed development is as follows:

- all 13 wind turbines will be fitted with Infrared lighting beacons (not visible to the naked eye) and charted.

14.160 It is not proposed to install any visible aviation lighting in the wind turbines forming the proposed development.

Assessment of Effects

Radar and Aviation

Edinburgh and Glasgow Airports

14.161 Consultation with stakeholders (see **Table 14-15**) has shown that both Edinburgh Airport and Glasgow Airport had concerns regarding potential impacts from the proposed development on their Instrument Flight Procedures.

14.162 An Instrument Flight Procedure Assessment has been carried out for both Edinburgh Airport (carried out by Osprey Consulting Services) and Glasgow Airport (carried out by IFP Design Ltd). Both IFP Assessments (see **Technical Appendices 14.3** and **14.4**) concluded that the proposed development would not impact on the IFPs of either airport.

NATS

14.163 An Aviation Report for the proposed development, which focused on the concerns raised by NATS within TOPA SG35103 at Scoping stage (see **Table 14-15**), was carried out by the Straten CSL in April 2025. The Aviation Report is contained in **Technical Appendix 14.5** and has reviewed the proposed development and its potential impact on NATS infrastructure from both a technical and operational perspective. The Aviation Report concludes that due to the prevailing wind direction at the site and the location of the Radar being considered, the proposed development is very unlikely to produce 'clutter' (i.e. turbines would be visible to Radar) for either the Lowther Hill radar or the Kincardine radar. Therefore, it is highly unlikely to that either radar site would be impacted on a regular basis. Should there be instances where clutter from the proposed wind turbines could be formed, it is anticipated that existing technologies such as radar processing and the application of radar trackers would automatically eliminate clutter.

14.164 Despite the findings of the Aviation Report provided in **Technical Appendix 14.5**, should evidence be brought forward to establish that the proposed development would likely impact NATS infrastructure to a degree that required mitigation, the applicant is prepared to support the implementation of specific and proportionate mitigation measures, identified to address the evident impacts of the proposed development. In this instance, the determinations by Scottish Ministers on other onshore wind farm developments, such as

Clauchrie Windfarm and Sanquhar II Wind Farm, are relevant with regards to aviation mitigation and the resultant appropriate costs to be borne by the developer.

Physical Obstruction

14.165 There is no statutory requirement to apply visible lighting to the proposed development, because the proposed wind turbines are under 150m tall.

14.166 Infrared aviation lighting is proposed to be installed in all wind turbines as per paragraphs 14.159 and 14.160. The implementation of the Aviation Lighting Proposal would mitigate potential physical obstruction risks to aviation interests arising as a result of the proposed development.

Summary

14.167 The proposed development would not impact the instrument flight procedures of either Edinburgh or Glasgow Airports.

14.168 No visible aviation lighting is proposed; however, Infrared aviation lighting would be installed on all wind turbines forming part of the proposed development. This would mitigate potential physical obstruction risks to aviation interests arising as a result of the proposed development.

14.169 The Aviation Report undertaken by Straten CSL (see **Technical Appendix 14.5**) concludes that the proposed development would not cause an unacceptable impact with regards to NATS infrastructure. However, should further information be brought forward by NATS to suggest that there may be impacts on their infrastructure from the proposed development, which require mitigation, options for appropriate mitigation are available, the implementation of which would be considered in line with the precedent established in other recent wind farm determinations (e.g. Clauchrie and Sanquhar II Wind Farms).

Telecommunications and Other Infrastructure

14.170 Wind turbines can potentially cause interference to telecommunication links through reflection and shadowing to electro-magnetically propagated signals including terrestrial fixed microwave links managed by telecommunications operators.

14.171 Early constraints mapping (pre-Scoping) identified no fixed links running through, or near to the site.

14.172 The following telecommunications organisations were contacted in March 2023 as part of the Scoping process:

- Ofcom;
- Vodafone;
- British Telecom (BT);
- Virgin Media / O2; and
- MBNL.

14.173 All of these organisations confirmed that they had no communications links in or near to the site that may be affected by the proposed development[3].

14.174 Wind turbines also have the potential to adversely affect analogue television reception through either physical blocking of the transmitted signal or, more commonly, by introducing multi-path interference where some of the signal is reflected through different routes.

14.175 The proposed development is located in an area which is now served by a digital transmitter and, therefore, television reception is unlikely to be affected by the proposed development as digital signals are rarely affected. In the unlikely event that television signals are affected by the proposed development, reasonable mitigation measures would be considered by the applicant.

14.176 Consultation has been undertaken which confirms that no fixed telecommunications links should be affected by the proposed development. Further to this, television signals are unlikely to be affected by wind turbines, and should unexpected adverse effects on television reception arise, technical solutions are available. Therefore, no significant effects are predicted on telecommunications and tv reception.

Waste and Environmental Management

14.177 **Chapters 7** to **14** put forward suggestions on how to mitigate any negative impacts from the proposed development with regards to waste and environmental management. These are summarised in **Chapter 15: Schedule of Commitments**.

14.178 The outline CEMP (**Technical Appendix 3.1**) provides a general overview on how waste and other environmental issues would be managed during the construction phase. **Technical Appendix 10.2: Peat Management Plan** also details how excavated peat is controlled, stored, re-used and disposed of during the construction phase of the proposed development.

14.179 It is expected that a site specific waste management plan for the control and disposal of waste generated onsite would be required by condition, should the proposed development receive consent. Therefore, it is not considered necessary for waste to be assessed further within this EIA Report and is scoped out for further assessment.

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[3] Ofcom advised that they no longer respond to Scoping requests and instead recommended that we look at the mapping available on their website. This mapping indicated that no fixed links run through or near to the site.

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