EDF Energy Renewables Ltd

# Dunside Wind Farm
## EIA Scoping Report

**Draft report**
Prepared by LUC
February 2022

**EDF Energy Renewables Ltd**

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| Version | Status | Prepared | Checked | Approved | Date |
|---|---|---|---|---|---|
| 1. | Draft | Z.Whitley | J. Wotton | M. Fryday | 01.02.2022 |
| 2. | Final draft following client review | J. Wotton / Z.Whtiley | J. Wotton | M. Fryday | 18.02.2022 |
| 3. | Final for issue | J.Wotton | J. Wotton | M. Fryday | 22.02.2022 |

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Land Use Consultants Ltd
Registered in England
Registered number 2549296
Registered office:
250 Waterloo Road
London SE1 8RD

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FS566056
EMS566057
OHS627041

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# Chapter 1
# Introduction

## Project Background

**1.1** EDF Energy Renewables Ltd (EDF-ER) (hereinafter referred to as 'the applicant') is proposing to develop the Dunside Wind Farm (hereinafter referred to as 'the Proposed Development'). The Proposed Development is located within the Scottish Borders administrative area. The location of the Proposed Development is shown on **Figure 1.1**. Further details on the Site and a description of the Proposed Development are provided in **Chapter 3** below.

## Application for Section 36 Consent

**1.2** At this early stage in the development process, it is necessary to consider the maximum parameters that the wind farm may represent in terms of site area, turbine numbers and tip heights to identify a robust scope for the EIA. These aspects will be refined as the EIA and design progress. The Proposed Development currently comprises up to 20 wind turbines, and tip heights of up 260m will be considered. The application will be made to the Scottish Government Energy Consents Unit (ECU) as the Proposed Development will have a generation capacity in excess of 50 megawatts (MW). The applicant therefore intends to apply to the ECU for Section 36 (S36) consent for the Proposed Development under the Electricity Act 1989 ('the Act'). In addition, a direction will be sought for deemed planning permission under Section 57(2) of the Town and Country Planning (Scotland) Act 1997, as amended.

**1.3** It is acknowledged that the Proposed Development should be subject to an Environmental Impact Assessment (EIA) under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) ('the EIA Regulations'), and the application for S36 consent will be accompanied by an EIA Report. Further details on the approach to the EIA are provided in **Chapter 2**.

**1.4** The EIA Regulations provide for obtaining a Scoping Opinion from Scottish Ministers as to the environmental effects to be considered in the EIA (Regulation 12). This document accompanies the applicant's written request to the Scottish Government for a 'Scoping Opinion' as to which environmental effects are to be considered in the EIA. It provides details of the Proposed Development, the Site and surrounding area, and the environmental desk-based and field survey work undertaken to date. Likely significant effects as a result of the Proposed Development are identified and the proposed approach to assessing these is outlined.

## The Applicant

**1.5** The applicant is EDF Energy Renewables Ltd (EDF-ER), part of one of the world's largest electricity companies. EDF-ER has an operating portfolio of 37 wind farms as well as battery storage units providing new affordable, low carbon electricity to the UK. EDF-ER is operated within the United Kingdom under the brand EDF Renewables.

## Document Structure

**1.6** The remainder of this report is structured as follows:

- **Chapter 2** provides information on the EIA process and assessment methodology;
- **Chapter 3** provides a brief description of the Site and the nature and purpose of the Proposed Development;
- **Chapters 4 to 12** outline the topic areas to be considered in the EIA; and
- **Chapter 13** provides a summary of topics scoped in/out.

**1.7 Appendix A** details the consultees that will be approached by the ECU to inform the scope of the EIA, as well as those that will be approached for information to inform the EIA, whilst **Appendix B** provides a consolidated list of the questions put forward to the consultees to focus the response to the Scoping Report and which are also included at the end of each chapter.

## EIA Team

**1.8** The EIA is being coordinated by LUC, and the following topics have been identified for detailed assessment for the Proposed Development. The organisations undertaking the specialist assessments are also noted below:

- Landscape and Visual Amenity (LUC);
- Hydrology, Hydrogeology and Peat (Kaya Consulting and East Point Geo);
- Ecology (LUC);
- Ornithology (MacArthur Green);
- Cultural Heritage (LUC);
- Noise (Hoare Lea);
- Traffic and Transport (Pell Frischmann);
- Aviation (Wind Power Aviation Consultants (WPAC)); and
- Other Issues (including human health, climate change, major accidents and disasters and telecommunications) (LUC).

# Chapter 2
# The EIA Process and Assessment Methodology

## What is EIA?

**2.1** EIA is the process of systematically compiling, evaluating and presenting all the likely significant environmental effects, both beneficial and adverse, of a Proposed Development, to assist the determining authority in considering the application. It enables the significance of these effects, and the scope for reducing adverse, or enhancing beneficial, effects to be clearly understood. The information compiled during the EIA is presented within an EIA Report to accompany the application for consent. Early detection of potentially adverse environmental effects informs iterations to the design of the Proposed Development to avoid or reduce effects.

**2.2** EIA is an iterative process and runs in tandem with project design. As potential effects are identified, the design of the Proposed Development will be adjusted to reduce or avoid adverse effects where possible, and mitigation measures will be proposed as appropriate.

## The EIA Process

**2.3** The EIA will be conducted in accordance with current Scottish Government regulations, policy and guidance, and the process usually follows the following stages:

- Screening may be the first stage of the EIA process where the relevant authorities need to decide whether EIA is required.
- Once it has been agreed that EIA is required, scoping can be undertaken to define what should be assessed as part of the EIA and reported in the EIA Report.
- With the scope set, relevant information on the environmental baseline conditions is collected. This information is then used initially to understand the likely environmental effects and to inform the design of the development to minimise the potential for significant adverse effects.
- The formal assessment process is undertaken on the final design to identify the likely significant effects of the development.
- Where significant adverse effects cannot be minimised through alterations to the design, mitigation measures are considered.
- Monitoring to measure the actual significance of the effect during and post-construction is proposed, to allow management of mitigation, will be recommended where considered appropriate.
- Once the EIA is completed, the EIA Report is submitted to the determining authority for consideration with the application for consent.

## Screening

**2.4** Development projects that are described within Schedule 1 of the EIA Regulations will always require EIA and are referred to as 'Schedule 1 Developments'. Development projects listed in Schedule 2 that are located in a 'sensitive area', or which exceed one of the relevant criteria or thresholds given in Schedule 2 are referred to as 'Schedule 2 Developments'. Not all Schedule 2 Developments require EIA as only a development project that is likely to have significant environmental effects by virtue of its size, location or nature will require assessment. A development project that requires EIA is referred to as 'EIA development'.

**2.5** In this case, the Proposed Development (as described further in **Chapter 3**) is of a type described within Schedule 2 as an *"installation for the harnessing of wind power for energy production (wind farms)"*. It is not located within a 'sensitive area' as defined by the EIA Regulations; however, the project would exceed both of the applicable thresholds as it involves more than

two wind turbines with hub heights of more than fifteen metres. The requirement for EIA is therefore determined on the basis of whether the project would be likely to give rise to significant effects on the environment by virtue of its size, nature or location.

**2.6** The scale, nature and location of the Proposed Development are such that, to allow the environmental effects of the project to be appropriately considered, the Applicant has taken the decision to prepare an EIA. As such, no Screening Opinion has been sought from the ECU.

## Scoping

**2.7** The purpose of scoping is to focus the EIA on the likely and relevant significant environmental effects associated with the Proposed Development. On the basis of the expert judgement of the assessment team, experience from similar projects, as well as additional policy, guidance and standards of relevance, each topic chapter within this report will outline both:

- Potential likely significant effects associated with the construction and/or operation of the Proposed Development, identified for detailed consideration within the EIA Report (as noted in paragraph 3.12, effects associated with decommissioning will be similar to construction effects and will not be assessed in detail in the EIA Report).
- Effects which are considered unlikely to be significant and requiring no further assessment. Whilst these topics fall outside of the scope of assessment, they will be referred to in turn within the EIA Report.

## Baseline Conditions

**2.8** The EIA Regulations require that aspects of the environment which are likely to be significantly affected by the Proposed Development are clearly defined within the EIA Report. To achieve this, it is necessary to gather environmental information on the current and existing status of each topic proposed for consideration as part of the EIA, i.e., 'baseline conditions'.

**2.9** Baseline conditions are not static, and it is often necessary to update them with further baseline surveys to ensure that the data upon which the EIA is based is up to date and accurately reflects the current situation of the receiving environment. For the purposes of the assessment, the baseline is considered to be the existing Site which is currently undeveloped. Details on the existing conditions of the Site, and the surveys which have been undertaken for each topic are detailed in **Chapters 4** to **12** below.

**2.10** In accordance with the 2017 EIA Regulations, climate change will also be considered in the context of understanding how baseline conditions for each topic area could change during the lifetime of the Proposed Development.

## Assessment of Effects

**2.11** For each topic that is identified as requiring further study, a detailed technical assessment will be carried out in line with the scope and methodology agreed upon with relevant consultees. Individual technical assessment will be undertaken by a competent and appropriately qualified expert in which technical standards and relevant guidance will be adhered to. A range of relevant and appropriate methodologies will be employed to assess the potential effects associated with the Proposed Development. These assessments will take both the construction and operational phases of the Proposed Development into account and will be carried out in relation to the Site and surrounding area.

## Assessing Significance

**2.12** The EIA Regulations do not define significance and it is, therefore, necessary to define this for the Proposed Development. The methods for predicting the nature and magnitude of any potential effects vary according to the topic assessed. Quantitative methods of assessment can predict values that can be compared against published thresholds and indicative criteria in Government guidance and standards. However, it is not always possible to ascribe values to environmental assessments and thus qualitative assessments are also used. Such assessments rely on previous experience and professional judgement. The methodologies used for assessing each topic area will be described within the individual chapters of the EIA Report.

**2.13** The following criteria will be used to evaluate the significance of potential effects of the Proposed Development:

- sensitivity, importance or value of the resource or receptor;
- extent and magnitude of the effect;

- duration of the effect;
- nature of the effect; and
- performance against environmental quality standards.

## Cumulative Assessment

**2.14** An assessment will be made of the likely significant cumulative effects of the Proposed Development in combination with other wind farms and large-scale developments where relevant. These will include:

- schemes which have been submitted to the relevant authorities but not yet determined;
- schemes which are consented; and
- schemes which are under construction.

**2.15** The scope and methodology for the cumulative assessment will be agreed with the relevant statutory consultees, including The Scottish Borders Council and NatureScot. Study areas will be defined separately for each topic assessed in the EIA to reflect the likely extent of potential effects.

## Approach to Mitigation

**2.16** Part 7 of Schedule 4 of the EIA Regulations notes that the EIA Report should include details of proposed mitigation measures to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, set out monitoring measures which will be put in place.

**2.17** To ensure a proportionate approach is taken to the EIA process, the EIA will assume in many cases that mitigation measures are embedded within the Proposed Development. This can include appropriate siting and design of the Proposed Development. Embedded mitigation can also include 'standard' practices and procedures, such as implementing a Construction Environmental Management Plan (CEMP) and use of good practice construction techniques to minimise environmental effects thereby reducing, as far as practicable, the need for additional mitigation measures or environmental controls. Further detail on embedded mitigation is provided in each technical chapter below.

**2.18** Where necessary, additional mitigation measures will be identified to reduce the significance of potential effects, and these will be set out in detail in the EIA Report where relevant.

## Assumptions and Limitations

**2.19** The EIA process is designed to enable good decision-making based on the best possible information about the environmental effects of a Proposed Development. There will, however, always be an element of uncertainty as to the exact scale and nature of the effects. These may arise through shortcomings in available information or due to the limitations of the professional judgement process. As required in Schedule 4, Part 6 of the EIA Regulations, it is important that such uncertainty is explicitly recognised and detailed in the EIA Report, and this will be highlighted in each specialist chapter where relevant.

## EIA Report Structure

**2.20** The EIA Report will be structured as follows, subject to any changes to the scope identified through the consultation process:

- description of the EIA process, including details of consultation which has taken place;
- description of the Proposed Development;
- details of the planning and renewable energy policy context that is relevant to the Proposed Development; and
- individual environmental assessment topic chapters, including a description of the mitigation measures required to prevent, reduce and, where possible, offset any significant adverse effects on the environment; enhancement measures where appropriate will also be included.

**2.21** Each chapter of the EIA Report, where practicable, will adopt a consistent format. This will ensure compliance with the EIA Regulations regarding completeness and accuracy. Each chapter will comprise an opening introduction to the topic followed by:

- Methodology, Consultation and Legislation/Policy/Guidance;
- Environmental Baseline (derived from desk studies and surveys undertaken);
- Effects Assessment (identification of the effects and their significance);
- Mitigation (and monitoring as appropriate);
- Residual Effects (assessment of effect significance once mitigation has been incorporated); and
- Summary.

**2.22** The EIA Report will also include a Non-Technical Summary (NTS) and supporting technical appendices including tables, figures and reports.

**2.23** The EIA Report will be accompanied by:

- a Pre-Application Consultation (PAC) Report which will detail the consultation which has been undertaken throughout the EIA process;
- a specialist Socio-Economic study will be undertaken to quantify and elaborate on the benefits of the Proposed Development;
- a Planning Statement which will include details of the planning and renewable energy policy context that is relevant to the Proposed Development, and how the Proposed Development aligns with policy; and
- a Design and Access Statement which will explain the design principles and concepts that have been applied to the Proposed Development, and how the design has evolved through the EIA process.

# Chapter 3
# Project and Site Description

## The Site and Surroundings

**3.1** The Site is located within the Lammermuir Hills, within the administrative boundary of Scottish Borders Council. The Site comprises a remote upland area on gently undulating moorland dominated by heather. The Dye Water (a tributary of the River Tweed) runs west-east through the Site. Notable hills within the Site include: Meikle Law (468m AOD) in the north-west; Byrecleugh Ridge (440m AOD) in the north, Dunside Hill (437m AOD) in the south-east, and Wedder Lairs (486m AOD) in the west. The main land uses are sheep grazing and moorland managed for grouse shooting with the adjacent land to the north-west used for renewable energy production (the operational Fallago Rig Wind Farm). The northern Site boundary is also the boundary between the Scottish Borders and East Lothian.

**3.2** The Site is approximately 6km north of the settlement of Westruther and 7km to the west of the settlement of Longformacus (to the nearest indicative turbine location).

## The Proposed Development

**3.3** For the purposes of EIA Scoping, the Applicant is illustrating a wind farm development comprising up to 20 turbines with a maximum height to blade tip of 260m which are amongst the largest on-shore turbines currently available. Whilst it is expected that the turbine numbers and heights will reduce as the design develops, the final proposal must reflect the turbines that will be available when the wind farm is expected to become operational in 2027. These are likely to be over 200m to tip, enabling renewable electricity generation at a cost comparable with non-renewable sources. The principal elements of the Proposed Development are described in further detail below. An initial layout which has been developed for the purpose of scoping is shown on **Figure 3.1**.

**3.4** The key elements of the Proposed Development are summarised as follows:

- up to 20 wind turbines, each up to a maximum tip height of 260m, each potentially with an external transformer;
- foundations supporting each wind turbine;
- associated crane hardstandings at each turbine location;
- a network of onsite tracks and associated watercourse crossings;
- a network of underground cables to connect the turbines and a connection to the existing substation in Fallago Rig Wind Farm;
- a control building and substation;
- a permanent anemometer mast for wind monitoring, including associated foundations and hardstandings;
- temporary construction compound(s), laydown area(s) and a car park; and
- temporary borrow pits.

**3.5** The layout presented in **Figure 3.1** has been developed with the aim of defining a reasonable likely maximum 'envelope' for scoping and to ensure that all potentially relevant environmental effects can be considered for the purposes of adopting a Scoping Opinion. It has taken into account various known and potential constraints. However, it will be subject to change during (and in response to information gathered and generated in) the EIA process.

**3.6** It is proposed that a 100m micrositing allowance will be applied for and assessed as part of the EIA. This is required in the event that unforeseen ground conditions are identified once construction commences and would allow for movement of the infrastructure by 100m in any direction, without the need to obtain consent or notify consultees. Where micrositing a particular

piece of infrastructure is not considered feasible for any reason at the EIA stage (due to known constraints for example) this will be identified in the EIA Report.

### Access

**3.7** Access to the Site is anticipated to mirror that used for Fallago Rig Wind Farm, with access taken from the main road (B6456) to the east of Westruther. Using the existing access will minimise the amount of new infrastructure required to access the site from the public road. New wind farm tracks would need to be constructed onsite to link turbines and associated infrastructure which form the Proposed Development. A new section of track linking Dunside to the existing access to Fallago Rig Wind Farm may also be proposed.

**3.8** Access from the port of entry, assumed to be Rosyth at the time of writing, will be via the A720, A68 and A697. The potential requirement for alterations to the existing Fallago Rig Wind Farm access route to accommodate larger turbine components, including any works required to the public highway or land required to facilitate access, will be investigated as part of the EIA.

### Grid Connection

**3.9** The Applicant is reviewing potential options for connection to the electricity transmission network. It is anticipated that the Applicant will connect into the network at the existing Fallago Rig Wind Farm substation which given its proximity to the Proposed Development, would minimise the requirement for extensive new grid connection infrastructure with the added benefit of retaining all required grid infrastructure within the Site boundary and the existing Fallago Rig Wind Farm site.

**3.10** Any new grid connection infrastructure may require a separate application for consent by Scottish Power Transmission. As a result, potential environmental effects associated with the grid connection infrastructure will not be considered in detail in the EIA Report. However, a high level appraisal of the likely route of the connection will be included as an appendix to the EIA Report. This will be informed by a desk-based review only.

### Construction Works

**3.11** It is estimated that it would take up to 18 months to construct the Proposed Development. Where possible, construction activities will be carried out concurrently to reduce the overall length of the construction programme. Phasing of the construction process may result in civil engineering works progressing in some areas of the Site whilst turbines are being erected elsewhere. To minimise disruption to land use, site restoration would be undertaken as early as possible.

**3.12** A detailed programme of works would be produced by the construction contractors prior to the commencement of works onsite. Should consent for the Proposed Development be granted, it is likely that construction hours would be restricted by means of a deemed planning permission condition.

### Wind Farm Life and Decommissioning

**3.13** The expected operational life of the Proposed Development is 30 years from the date of commissioning. Towards the end of this period, a decision would be made as to whether to refurbish, remove, or replace the turbines. If refurbishment or replacement were to be chosen, relevant applications for consent would be made.

**3.14** The EIA Report will include high level information on the likely process that will be undertaken to decommission the Proposed Development at the end of its lifespan. However, it is not proposed to undertake a detailed assessment of the decommissioning effects associated with the Proposed Development as the future baseline conditions (environmental and other developments) cannot be predicted accurately at this stage; the detailed proposals for refurbishment/decommissioning are not currently known; and as decommissioning is in essence a reversal of the construction process, for a shorter period, the effects of decommissioning can in general be anticipated to be no greater than those arising from construction.

**Questions for Consultees**

**Q3.1:** Confirmation is requested on the proposed approach to the assessment of decommissioning.

# Chapter 4
# Landscape and Visual Amenity

## Introduction

**4.1** This chapter sets out the proposed approach to the assessment of potential direct and indirect effects on landscape and visual amenity (including cumulative effects) during construction and operation of the Proposed Development.

**4.2** The Landscape and Visual Impact Assessment (LVIA) will investigate and consider the effects of the Proposed Development on landscape character, resources, and designated landscapes. The impact on existing views and associated visual amenity will also be considered, including views from recreational routes like the Southern Upland Way. The cumulative effects of the Proposed Development, including turbines and all associated infrastructure (e.g., access tracks, permanent anemometer masts, transformers) will be assessed during the construction and subsequent operational phases.

**4.3** The LVIA will be undertaken following the approach set out in the Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)[1]. The assessment will also draw upon current good practice guidance issued by NatureScot and the Landscape Institute.

## Study Area

**4.4** An initial study area of 45km from the outermost turbines in all directions is proposed for the LVIA to identify the relevant landscape and visual receptors, as recommended in current guidance for turbines over 150m to blade tip[2]. More detailed study areas are referenced in the sections which follow.

## Existing Conditions

### The Site

**4.5** The Site is located within the Lammermuir Hills in the Scottish Borders, approximately 6km north of the settlement of Westruther and 7km to the west of the settlement of Longformacus (to the nearest indicative turbine location). The topography of the Site consists of hills ranging between 300m and 500m Above Ordnance Datum (AOD), separated by the steep sided valley of the Dye Water (a tributary of the River Tweed) which runs west-east through the Site. Notable hills within the Site include: Meikle Law (468m AOD) in the north-west; Byrecleugh Ridge (440m AOD) in the north, Dunside Hill (437m AOD) in the south-east, and Wedder Lairs (486m AOD) in the west. Multiple smaller watercourses join the Dye Water and further dissect the Site – these small watercourses are generally oriented north-south, and include Green Cleugh, Wood Cleugh, Kersons Cleugh, and Foul Cleugh.

**4.6** The landcover on the Site consists mainly of heather moor and acid grassland. Tree cover is sparse, especially so on the upper plateau where heather moorland dominates. Large areas of the Site have been managed for shooting, and the mosaic pattern of the vegetation reflects the management practice of selective muirburn. There are no Core Paths within the Site, however the Southern Upland Way runs approximately 1km to the south of the nearest indicative turbine location and across the existing access to Fallago Rig.

**4.7** As noted above, the closest settlements to the Site are Westruther, which is on the B6456 to the south, and Longformacus, which is on the Longformacus/Duns road which crosses the Lammermuir Hills to the east. The B6355 runs broadly parallel to this minor road, and the two join at Wanside Rig to the north of the Site. There are three dwellings at Byrecleugh to the east of

[1] Landscape Institute and Institute of Environmental Management & Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition
[2] Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance, Version 2.2

the Site, accessed via a private track. Other residential properties within 2-3km of the Site include Trottingshaw Lodge, Trottinshaw Cottage, Dunside Cottage and Dye Cottage to the east and Killpallet to the north.

**4.8** The operational Fallago Rig Wind Farm (48 turbines, 125m height to tip) is immediately to the north-west of the Site. The access track to Fallago Rig runs through the Site, along the valley of the Dye Water.

### Zone of Theoretical Visibility (ZTV)

**4.9** Zone of Theoretical Visibility (ZTV) plans have been prepared for the 20 turbine scoping layout (**Figure 4.1** (Maximum Blade Tip Height (260m) ZTV and Suggested Viewpoint Locations); and **Figure 4.2** (Hub Height (170m) ZTV and Suggested Viewpoint Locations). The ZTVs will be used to identify which landscape and visual receptors within the study area require consideration in the assessment, and which can be scoped out because they are unlikely to experience theoretical intervisibility with the Proposed Development and therefore, significant effects.

### Landscape Character

**1.1** The Site is located within the Dissected Plateau Moorland Landscape Character Type (LCT 90), as shown on **Figure 4.3**. Part of the access track is within the Rolling Farmland – Borders LCT (LCT 99). Notable characteristics of the Dissected Plateau Moorland LCT as described by NatureScot's National Landscape Character Assessment[3] include:

- *"Plateau landform consisting of a series of level-topped hills and ridges;*
- *Strong topographic identity and overall grandeur of scale;*
- *Individual hill masses separated by steep sided valley features of different scales;*
- *Semi-natural peatland, heather moorland and grassland communities dominant, with a high degree of perceived naturalness of vegetation cover;*
- *Very low settlement density with isolated, dispersed pattern;*
- *Scattered prehistoric settlement and burial mounds above water courses;*
- *Sense of wildness created by wide horizons and long distance, unobstructed views."*[4]

**1.2** The LVIA will consider the potential for direct effects upon the LCT within the Site boundary and for indirect effects upon LCTs in the study area from which potential visibility is indicated by ZTVs. This is likely to focus on LCTs within approximately 20km from where there is the potential for significant effects to arise.

**1.3** Additional information on landscape character and capacity to accommodate wind farm development is set out in the Scottish Borders Landscape Capacity and Cumulative Impact Study (2016)[5]. The findings of the study, along with site specific field work, will be used to inform judgements on the sensitivity of LCTs to wind farm development within the study area.

### Designated Landscapes

**1.4** The Site is entirely located within the Lammermuir Hills Special Landscape Area (SLA), and borders the Lammermuir Moorland SLA in East Lothian to the north. There are a number of other SLAs within the study area as listed in **Table 4.1**. The nationally designated Eildon and Leaderfoot National Scenic Area (NSA) lies in the south of the study area, at a distance of approximately 18km from the Site. Given the proximity of some of these designated landscapes, and the presence of theoretical visibility of the Proposed Development from within them, an assessment of the potential effects on their relevant special qualities[6,7] will be included in the LVIA.

[3] https://www.nature.scot/professional-advice/landscape/landscape-character-assessment/landscape-character-assessment-scotland
[4] https://www.nature.scot/sites/default/files/LCA/LCT%20090%20-%20Dissected%20Plateau%20Moorland%20-%20Final%20pdf.pdf
[5] Ironside Farrar (2016) Scottish Borders Landscape Capacity and Cumulative Impact Study
[6] Scottish Natural Heritage (2010). The special qualities of the National Scenic Areas. Scottish Natural Heritage Commissioned Report No.374 (iBids and Project no 648).
[7] Scottish Borders Council (August 2012) Supplementary Planning Guidance Local Landscape Designations

**1.5** For designated landscapes beyond approximately 20km, theoretical inter-visibility with the Proposed Development will be described in the LVIA and used as a means of identifying which require further assessment if significant effects are deemed likely. Designated landscapes within approximately 20km of the Site are listed below and shown on **Figure 4.4**.

**Table 4.1: Designated Landscapes within 20km**

| Name | Approximate Distance and Direction from Site Boundary |
|---|---|
| **National Scenic Areas** | |
| Eildon and Leaderfoot NSA | 18km to the south |
| **Special Landscape Areas** | |
| Lammermuir Hills SLA | Within Site boundary |
| Lammermuir Moorland SLA | <1km to the north |
| Lammer Law, Hopes to Yester SLA | 3km to the west |
| Whiteadder SLA | 3km to the north-east |
| Danskine to Whitecastle SLA | 5km to the north |
| Whittingehame to Deuchrie SLA | 9km to the north-east |
| Monynut to Blackcastle SLA | 10km to the north-east |
| Humbie Headwaters SLA | 11km to the east |
| Halls to Bransly Hill SLA | 12km to the north-east |
| Linplum SLA | 12km to the north-west |
| Fala Rolling Farmland and Policies SLA | 13km to the west |
| Traprain and Tyne Valley SLA | 13km to the north |
| Doonhill to Chesters SLA | 14km to the north-east |
| Fala Moor SLA | 14km to the west |
| Bolton SLA | 14km to the north-west |
| Morham SLA | 14km to the north |
| Clerkington and Tyne Walk SLA | 15km to the north-west |
| Biel and Belton SLA | 15km to the north |
| Samuelston SLA | 16km to the north-west |
| Garleton Hills SLA | 16km to the north-east |
| Belhaven Bay SLA | 16km to the north-east |

| Name | Approximate Distance and Direction from Site Boundary |
|---|---|
| Orniston Yew and Fountainhall SLA | 18km to the west |
| Tyne Valley SLA | 19km to the west |
| Gladhouse Reservoir and Moorhouse SLA | 20 km to the west |
| Tweed Lowlands SLA | 20km to the south |

### Visual Receptors and Visual Amenity

**1.6** The LVIA will consider potential effects upon visual receptors within the study area, i.e. the people affected by changes in views resulting from the Proposed Development. Visual receptors to be considered will include:

- people within settlements, including individual properties within 2km of the nearest turbine;
- people travelling on major roads and railways;
- people using walking routes and cycle routes; and
- people visiting areas of interest such as visitor attractions, scenic viewpoints and hill summits.

**1.7** ZTV analysis will determine which settlements, roads and recreational routes within the study area are to be included in the LVIA. The following settlements and routes in **Table 4.2** are within 20km of the nearest proposed turbine and will have theoretical visibility of the Proposed Development as indicated by the ZTV.

Table 4.2: Settlements and Routes within 20km (with Theoretical Visibility)

| Name | Approximate Distance to and Direction from Nearest Indicative Turbine Location |
|---|---|
| **Settlement** | |
| Westruther (Scottish Borders) | 6km to the south |
| Longformacus (Scottish Borders) | 7km to the east |
| Gifford (East Lothian) | 10km to the north-west |
| Greenlaw (Scottish Borders) | 13km to the south-east |
| Lauder (Scottish Borders) | 12km to the south-west |
| Gordon (Scottish Borders) | 14km to the south |
| Bolton (East Lothian) | 14km to the north-west |
| East Saltoun (East Lothian) | 14km to the north-west |
| Nether Blainslie (Scottish Borders) | 14km to the south-west |
| Haddington (East Lothian) | 16km to the north-west |
| Preston (Scottish Borders) | 17km to the east |
| Glenkinchie (East Lothian) | 17km to the north-west |

| Name | Approximate Distance to and Direction from Nearest Indicative Turbine Location |
|---|---|
| Pencaitland (East Lothian) | 18km to the north-west |
| Gladsmuir (East Lothian) | 18km to the north-west |
| Athelstaneford (East Lothian) | 19km to the north-west |
| **Roads** | |
| Minor road via Longformacus | 2km to the north-east |
| B6355 | 5km to the north |
| B6456 | 7km to the south |
| A697 | 9km to the south / south-west |
| A6089 | 9km to the south |
| A68 | 10km to the south-west |
| B6370 | 10km to the north-west |
| B6362 | 12km to the south-west |
| B6368 | 12km to the north-west |
| A6105 | 14km to the south |
| A6093 | 16km to the north-west |
| A1 | 16km to the north-west |
| A199 | 16km to the north-west |
| B1347 | 16km to the north-west |
| A198 | 16km to the north |
| B6460 | 16km to the south-east |
| B6392 | 17km to the south |
| A6137 | 17km to the north-west |
| A6112 | 17km to the east |
| B6458 | 18km to the west |
| B6363 | 18km to the north-west |
| **Recreational Route** | |
| Southern Upland Way | <1km to the south |

| Name | Approximate Distance to and Direction from Nearest Indicative Turbine Location |
|---|---|
| National Cycle Network Route 76 | 15km to the north |
| National Cycle Network Route 196 | 15km to the north-west |
| John Muir Way | 17km to the north |

## Design Considerations

**4.10** The following sensitivities have been identified to date, and will be key design considerations for the Proposed Development from a landscape and visual perspective going forward:

- effects on the special qualities of the Lammermuir Hills SLA which the Site is located within;
- effects on the special qualities of other designated landscapes in proximity to the Site, including the Lammermuir Moors SLA immediately to the north and the more distant Eildon and Leaderfoot NSA to the south;
- visual effects on sensitive residential receptors within nearby settlements and scattered farmsteads particularly along the Dye Water valley;
- visual effects on receptors travelling along the road network including the B6355 (which crosses the Lammermuir Hills to the north of the Site) and the B6456 to the south of the Site;
- visual effects on sensitive recreational receptors using the Core Path network, long distance routes, and at nearby hill summits, including on the Southern Upland Way; and
- cumulative landscape and visual effects, with particular consideration given to the relationship with Fallago Rig Wind Farm.

## Proposed Surveys and Assessment Methodologies

### Guidance

**1.8** The LVIA will be undertaken in line with current guidance and good practice to produce a robust and reliable assessment. This will be achieved using LUC's most recent methodologies which have been developed in accordance with GLVIA3, drawing on subsequent technical clarifications published by the Landscape Institute, and LUC's extensive experience in the field. The following guidance will be referred to where appropriate:

- Landscape Institute and the Institute of Environmental Management and Assessment (2013), Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3);
- Scottish Borders Council (2018), Renewable Energy Supplementary Guidance;
- Scottish Borders Council (2016), Landscape Capacity and Cumulative Impact Study;
- SNH (2021), Assessing the Cumulative Impacts of Onshore Wind Energy Developments;
- SNH (2017), Siting and Designing Wind Farms in the Landscape, Version 3a;
- Landscape Institute (2019), Visual Representation of Development Proposals - Technical Guidance Note 06/19;
- Landscape Institute (2019), Residential Visual Amenity Assessment (RVAA) – Technical Guidance Note 02/19;
- SNH (2017), Visual Representation of Wind Farms Guidance, Version 2.2; and
- SNH (2015), Spatial Planning for Onshore Wind Farms: Natural Heritage Considerations.

## Proposed Study Area

**1.9** An initial study area of 45km from the outermost turbines in all directions is proposed for the LVIA to identify the relevant landscape character types (LCTs), designated landscapes and cumulative wind farm pattern in the wider area, as recommended in current guidance for turbines over 150m to blade tip[8]. A study area of 45km will be used for the assessment of effects on visual amenity in relation to representative viewpoints, although this will be reduced to circa. 20km to assess the visual effects on settlements and transport routes. As mentioned below, it is proposed that the assessment of effects on landscape character and landscape designations will focus on a 20km study area, to identify potential significant effects. The cumulative assessment will focus on wind energy developments considered to have potential to give rise to significant cumulative effects. This is likely to primarily be those wind farms in the more immediate landscape context within circa 20km (see below).

## Assessment Method

### Landscape Effects

**1.10** Predicted changes on both the physical landscape of the Site and landscape character within the 45km study area will be identified. However, it is anticipated that potential significant direct and indirect effects will be limited to a more focussed area within circa 20km of the Site.

**1.11** Effects will be considered in terms of the magnitude and type of change to the landscape, including its key characteristics as set out in NatureScot's national landscape character assessment. The sensitivity of the landscape will also be taken into account, acknowledging value placed on the landscape through designation.

### Visual Effects

**1.12** Visual effects are experienced by people at different locations throughout the study area, at static locations (for example settlements or viewpoints) and transitional locations (such as sequential views from routes, including roads, footpaths and cycleways). Visual receptors are the people who will be affected by changes in views at these places, and they are usually grouped by what they are doing at those places (for example residents, motorists, recreational users etc.).

**1.13** GLVIA3 states that the nature of visual receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to change in views/visual amenity and the value attached to particular views. The magnitude of the effect should be assessed in terms of the size and scale, geographical extent, duration and reversibility of the effect. These aspects will all be considered to inform a judgement regarding the overall significance of effect.

**1.14** Assessment of the visual effects of the Proposed Development will be based on an analysis of the ZTVs, field studies and assessment of representative viewpoints. **Figure 4.1** shows a maximum turbine blade tip height (260m) ZTV of the indicative turbine layout, which will be subject to further refinement, with proposed assessment viewpoint locations. The assessment viewpoint locations have been selected to provide a representative range of viewing distances and viewing experiences, including views from settlements, points of interest and sequential views from routes. A list of proposed viewpoints for the assessment is set out in **Table 4.3.** Viewpoints will be subject to further refinement in the field and agreement through consultation with NatureScot, Scottish Borders Council and East Lothian Council.

**1.15** Effects on settlements and sequential effects from key routes (focusing on main transport corridors and long distance walking trails) are likely to focus on those receptors within 20km and with actual visibility of the Proposed Development, which are more likely to be subject to significant visual effects.

[8] Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance, Version 2.2

Table 4.3: Proposed LVIA Viewpoints

| No | Name | Easting | Northing | Distance from Nearest Turbine (km) | Reasons for Selection |
|---|---|---|---|---|---|
| 1 | Twin Law Cairns | 362501 | 654820 | 1.9 | Represents recreational receptors on the Southern Upland Way at a popular summit within the Lammermuir Hills. In the Lammermuir Hills SLA. |
| 2 | Minor road Lammermuirs | 365157 | 660936 | 3.4 | Represents road users and the local community on the minor road which crosses the Lammermuir Hills, north-east of the Site. In the Lammermuir Hills SLA. |
| 3 | Wanside Rig junction* | 360865 | 664100 | 4.1 | Represents road users and the local community from the junction between the B6355 and the minor road which crosses the Lammermuir Hills to the north of the Site. In the Lammermuir Moorland SLA. |
| 4 | Watch Water Reservoir, Southern Upland Way | 366463 | 656437 | 4.5 | Represents sequential views of recreational receptors on the Southern Upland Way. In the Lammermuir Hills SLA. |
| 5 | Braidshawrig, Southern Upland Way | 358317 | 652900 | 4.7 | Represents sequential views of recreational receptors on the Southern Upland Way. In the Lammermuir Hills SLA. |
| 6 | Westruther* | 364111 | 650236 | 6.7 | Represents residential receptors in the settlement of Westruther. |
| 7 | Lammer Law | 352400 | 661800 | 7.7 | Represents recreational receptors at a popular summit within the Lammermuir Hills. In the Lammer Law, Hopes to Yester SLA. |
| 8 | Dirrington Great Law | 369792 | 654920 | 8.0 | Represents recreational receptors at the summit of Dirrington Great Law. In the Lammermuir Hills SLA. |
| 9 | Edgarhope Wood, Southern Upland Way | 355800 | 649382 | 9.0 | Represents sequential views of recreational receptors on the Southern Upland Way. In the Lammermuir Hills SLA. |
| 10 | Minor road between Longformacus and Duns* | 372292 | 654518 | 10.5 | Represents views of road users and the local community from the minor road which crosses the Lammermuir Hills between Longformacus and Duns. |
| 11 | A6015 near Greenlaw | 372289 | 648600 | 13.0 | Represents views of road users and the local community on the A6015 near Greenlaw. |
| 12 | B6362 above Lauder | 351363 | 647400 | 13.1 | Represents road users on the B6362 and residential receptors on the outskirts of Lauder. |

| No | Name | Easting | Northing | Distance from Nearest Turbine (km) | Reasons for Selection |
|---|---|---|---|---|---|
| 13 | Traprain Law | 358200 | 674670 | 14.8 | Represents recreational receptors at the summit of Traprain Law. In the Traprain and Tyne Valley SLA. |
| 14 | Garleton Hills north of Haddington | 350238 | 676095 | 18.9 | Represents recreational receptors in the Garleton Hills. In the Garleton Hills SLA. |
| 15 | Tranent | 341250 | 672000 | 22.2 | Represents road users and residents on the outskirts of Tranent. |
| 16 | Eildon Hills | 355461 | 632964 | 24.3 | Represents recreational receptors at the summit of Eildon Hill North. In the Eildon and Leaderfoot NSA. |
| 17 | North Berwick Law | 355642 | 684216 | 24.6 | Represents recreational receptors at the summit of North Berwick Law. In the North Berwick Law SLA. |
| 18 | Torfichen Hill | 333650 | 653270 | 26.3 | Represents recreational receptors at the summit of Torfichen Hill in the Moorfoot Hills. In the Gladhouse Reservoir and Moorfoot Scarp SLA. |

*Denotes which viewpoints will be used to assess night-time lighting visual effects

### Night-Time Assessment

**4.11** In the interests of aviation safety, structures of ≥ 150m (including wind turbines), require visible aviation lighting.[9] Potential visual effects arising from visible lighting (typically consisting of 2000 candela red lights mounted on the wind turbine nacelle and intermediate 32 candela lights mounted on the wind turbine tower) will be a key consideration. Informed by NatureScot's Visual Representation of Wind Farms Guidance (2017) the assessment of landscape and visual effects will consider the effects of aviation lighting.

**1.16** The assessment will be carried out as part of the LVIA and included within the assessment or as a Technical Appendix to the EIA Report, and will be informed by a hub height ZTV as a starting point to illustrate the areas from which visibility of turbine hubs may be visible. Visibility of turbine lighting from each LVIA assessment viewpoint will be considered, however it is suggested that the assessment will be supported by night-time visualisations from three viewpoints noted in **Table 4.3**, namely:

- Viewpoint 3: Wanside Rig Junction;
- Viewpoint 6: Westruther; and
- Viewpoint 10: Minor road between Longformacus and Duns.

**1.17** These viewpoints are more likely to be frequented after dark and represent residential and sequential views from roads within 5km of the Site where significant effects would be more likely to occur.

**1.18** The baseline night-time context and presence of existing artificial lighting at these locations will be described, with the related sensitivity identified and the magnitude of change arising from the proposed aviation lighting assessed. The predicted effects of aviation lighting on the visual amenity at these viewpoints will be drawn on to provide general comment on the likely effects across the wider study area. The night time assessment will be supported by hub lighting and lighting intensity level ZTV (calculated by considering vertical elevation and distance to each viewpoint). As discussed in **Chapter 11**, the Applicant will seek to negotiate a reduced lighting scheme with the CAA and other aviation stakeholders prior to the assessment being undertaken, and the night-time visualisations will be prepared showing the calculated lighting intensity and number of turbines to be lit.

[9] Civil Aviation Authority (2016) CAP 764: CAA Policy and Guidelines on Wind Turbines

### Cumulative LVIA (CLVIA) Methodology

**1.19** The cumulative landscape and visual assessment (CLVIA) will be carried out in accordance with the principles contained in NatureScot's Assessing the Cumulative Impact of Onshore Wind Energy Developments (March 2021), and will be informed through consultation with NatureScot, Scottish Borders Council and East Lothian Council.

**1.20** A review of patterns of development will be provided for operational, consented and proposed wind farms which are the subject of a valid planning application, up to 60km from the Site, following NatureScot guidance.

**1.21** The CLVIA will focus on wind energy developments considered to have potential to give rise to significant cumulative effects. This is likely to primarily be those wind farms in the more immediate landscape context within circa 20km for the consideration of cumulative landscape and visual effects. The closest operational wind farm to the Site is Fallago Rig (immediately to the north-west). Turbines under 50m to tip and single turbines beyond 5km from the Site will not be included.

**1.22** The LVIA will consider the potential effects of the addition of the Proposed Development to the existing landscape against a baseline that includes existing wind farms and those under construction. The CLVIA will consider the potential additional effects of the Proposed Development, against different baseline scenarios that include wind farms that may or may not be present in the landscape in the future, such as:

- wind farms which are not included in the LVIA baseline that are consented but unbuilt; and
- undetermined planning applications including wind farms subject to an application for a variation in tip height.

**1.23** Consideration will also be given to 'total' cumulative effects (assessment which considers all current and future proposals, including the Proposed Development). Wind farm proposals that have been refused but that are subject to appeal will also be considered in the assessment. Schemes at scoping stage and which are near to the Proposed Development, where there is potential for significant effects, will be included in the cumulative assessment where it is deemed appropriate and sufficient design information is available in the public domain.

**1.24 Table 4.4** presents all known wind energy developments within 45km that fit the cumulative criteria discussed above, and these wind farms are shown on **Figure 4.5**. This list will be used to select those that will be considered within the CLVIA, and as a starting point for consultation. It is anticipated that the CLVIA will consider wind farms within 20km of the Site to focus on the potential for significant cumulative interactions. It is accepted that the cumulative situation will change in time and this will be considered during consultation and updated within the assessment.

**Table 4.4: Cumulative Wind Farms to be Considered in the Assessment**

| Name | Status | No of Turbines | Tip Height (m) | Distance between Site centres (km) |
|---|---|---|---|---|
| Fallago Rig | Operational | 48 | 125 | 3.9 |
| Newlands Hill | Scoping | 23 | 230 | 6.0 |
| Crystal Rig - Phase 4 | Consented | 11 | 200 | 10.7 |
| Crystal Rig - Phase 1a | Operational | 5 | 100 | 11.0 |
| Crystal Rig - Phase 2 | Operational | 56 | 125 | 11.1 |
| Crystal Rig - Phase 2a | Operational | 9 | 110 | 11.4 |
| Black Hill | Operational | 22 | 78 | 11.4 |
| Crystal Rig - Phase 1 | Operational | 20 | 100 | 11.8 |
| Crystal Rig - Phase 3 | Operational | 7 | 125 | 12.7 |
| Aikengall IIa | Operational | 19 | 145 | 13.2 |

| Name | Status | No of Turbines | Tip Height (m) | Distance between Site centres (km) |
|---|---|---|---|---|
| Aikengall II - Wester Dod | Operational | 19 | 145 | 13.5 |
| Keith Hill | Operational | 5 | 76 | 13.7 |
| Aikengall | Operational | 16 | 125 | 13.7 |
| Pogbie Extension | Operational | 6 | 74 | 14.2 |
| Pogbie | Operational | 6 | 76 | 14.2 |
| Dun Law - Phase 2 | Operational | 35 | 75 | 14.5 |
| Dun Law - Phase 1 | Operational | 26 | 63.5 | 14.7 |
| Ferneylea Farm | Operational | 2 | 71 | 16.5 |
| Hoprigshiels | Operational | 3 | 125 | 16.5 |
| Toddleburn | Operational | 12 | 125 | 17.1 |
| Quixwood | Operational | 13 | 115 | 17.5 |
| Kinegar Quarry (Neuk) | Operational | 2 | 110 | 19.0 |
| Brockholes | Operational | 3 | 84 | 20.5 |
| Longpark | Operational | 18 | 100 | 21.1 |
| Penmanshiel | Operational | 14 | 100 | 22.5 |
| Greystone Knowe | Application Submitted | 14 | 180 | 22.9 |
| Howpark Farm | Consented | 8 | 100 | 23.3 |
| Drone Hill | Operational | 22 | 76 | 24.4 |
| Moorhouse Farm | Operational | 2 | 77.9 | 24.5 |
| Carcant | Operational | 3 | 99.7 | 26.2 |
| Bowbeat | Operational | 24 | 80 | 34.5 |
| Barmoor | Operational | 6 | 110.5 | 41.6 |
| Cloich Forest | Application Submitted | 12 | 149.9 | 43.0 |
| Langhope Rig | Operational | 10 | 121.5 | 42.7 |

### Residential Visual Amenity Assessment

**1.25** A Residential Visual Amenity Assessment (RVAA) will be prepared to accompany the LVIA. This will be prepared in accordance with the Landscape Institute's Residential Visual Amenity Assessment Technical Guidance Note 2/19 (2019).

**1.26** A detailed assessment of potential visual effects on residential properties within a 2km study area (measured from the nearest proposed turbines) will be undertaken as follows:

- A ZTV will be prepared for the 2km radius study area, including the location of all residential properties (with grid reference) indicated as having theoretical visibility of the Proposed Development.
- A detailed description of existing and proposed views from the primary orientation of residential properties (or groups of properties where they are close together) will be prepared, taking consideration of the distance and direction to the Proposed Development, proportion of attainable view occupied and the context/ baseline situation at the residence (for example number of floors or the presence of vegetation within the curtilage) to determine the nature of the predicted change to residential visual amenity.
- The assessment will be supported by wireframes from each property / property group.

#### Visualisations

**4.12** Wireframes and photomontages will be used to consider and illustrate changes to views. Photomontages will involve overlaying computer-generated perspectives of the Proposed Development over the photographs of the existing situation to illustrate how the views will change against the current baseline. Other (cumulative) wind farms visible from each of the viewpoints will be shown on the wireframes. Visualisations will be prepared in accordance with NatureScot's Visual Representation of Wind Farms Guidance (2017).

**1.27** Ancillary elements such as access tracks and the onsite substation will be shown in photomontages for viewpoints within 5km when they would be visible. Beyond 5km it is considered unlikely that these ancillary elements would form more than a minor element of the Proposed Development when compared to the turbines.

**4.13** As mentioned above, night-time photomontages will be prepared to inform the assessment of visual effects of night-time aviation lighting. It is proposed that these will be prepared for Viewpoints 3 (Wanside Rig Junction), 6 (Westruther) and 10 (Minor road between Longformacus and Duns).

## Potential Significant Effects

### Potential Effects Scoped into Assessment

**1.28** At this preliminary stage, potential landscape and visual effects, including cumulative effects, associated with the construction and/or operation of the Proposed Development include:

- Landscape Effects
  - effects on the Site;
  - effects on the Dissected Plateau Moorland LCT (LCT 90), Plateau Moorland - Lothians LCT (LCT 266), and other LCTs within a 20km radius where there may be potential for significant effects (including cumulatively); and
  - effects on the special qualities of the Lammermuir Hills SLA, Eildon and Leaderfoot NSA and other locally designated landscapes within a 20km radius where there may be potential for significant effects (including cumulatively).
- Visual Effects
  - effects on individual properties within 2-3km of the nearest turbine;
  - effects (including cumulatively) on people within settlements out to 20km including Westruther and Longformacus;
  - effects (including cumulatively) on people travelling on major roads and railways within 20km including the A697 and B6355;
  - effects (including cumulatively) on people using walking routes and cycle routes within 20km including the Southern Upland Way and other Core Paths within the Lammermuir Hills; and
  - effects (including cumulatively) on people visiting areas of interest such as visitor attractions and scenic viewpoints within the 20km.

### Potential Effects Scoped out of Assessment

**1.29** It is proposed that the following effects are scoped out:

- effects on landscape and visual receptors that have minimal or no theoretical visibility (as predicted by the ZTV) and are therefore unlikely to be subject to significant effects;
- effects on viewpoints beyond a 45km radius of the Site;
- effects on settlements and routes beyond a 20km radius of the Site;
- effects on LCTs beyond a 20km radius of the Site;
- effects on designated landscapes beyond a 20km radius of the Site and with no or limited theoretical visibility;
- effects associated with decommissioning the Proposed Development as detailed in Chapter 3 above;
- cumulative effects in relation to turbines under 50m to blade tip height, single turbines beyond 5km from the proposed turbines and wind farms at design/scoping stage (except where otherwise stated); and
- given their transient nature, landscape effects on LCTs beyond the Site boundary, visual effects during the construction phase, and cumulative landscape and visual effects during the construction phase.

## Approach to Mitigation

**1.30** The primary form of mitigation for landscape and visual effects is through iterative design of the layout of the turbines and infrastructure, as seen from key viewpoints. Design of the development will be set out in detail in the design strategy that will form part of the EIA Report.

**1.31** Further mitigation will be considered to improve the landscape, habitats and recreational accessibility of the development area. This may include peat or moorland restoration, management or enhancement; consideration of native woodland restoration or extension; ways in which the network of recreational access could be enhanced; potential improvements or interpretation of heritage assets etc. Such mitigation will be considered alongside the ongoing requirements of estate use and management.

## Consultee List

**4.14** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- Scottish Borders Council;
- East Lothian Council; and
- NatureScot.

**Questions for Consultees**

**Q4.1:** Are there any comments on the overall methodology proposed to assess effects on landscape and visual receptors, or to assess cumulative effects?

**Q4.2:** Are there any comments on the proposed list of assessment viewpoint locations?

**Q4.3:** Are there any additional wind farm sites, to those shown on **Figure 4.5**, to consider as part of the cumulative assessment?

**Q4.4:** Has the consultee identified any further landscape or visual receptors to be considered within the assessment (i.e. where it is expected that significant effects may occur)?

**Q4.5:** Are there any other relevant consultees who should be consulted with respect to the LVIA?

# Chapter 5
# Hydrology, Hydrogeology and Peat

## Introduction

**5.1** This chapter sets out the proposed approach to the assessment of potential effects on hydrology, hydrogeology and peat during construction and operation of the Proposed Development. The assessment will be carried out in line with relevant legislation and standards.

## Study Area

**5.2** The study area for hydrology and hydrogeology comprises the Site and watercourses and catchments upstream and downstream of the Site. **Figure 5.1** shows the main watercourses and water features within and close to the Site. The study area for peat comprises the area within the Site boundary. **Figure 5.1** also shows the NatureScot (2016) carbon and peatland classes. Existing conditions of the study area are described below.

## Existing Conditions

**5.3** A desk-based review of 1:25,000 scale Ordnance Survey maps, 1:50,000 scale British Geological Survey (BGS) Geology maps, 1:250,000 scale Soils Maps of Scotland and 1:250,000 SNH (now NatureScot) Carbon and Peatland 2016 Map has been undertaken to identify watercourses and ground conditions within the vicinity of the Proposed Development.

**5.4** The Site is located in a varied topographic setting of heavily managed moorland with numerous river valleys, steep sloping hillsides and gently sloping hilltop areas which predominantly drain into the Dye Water catchment. The Dye Water flows to the east through the centre of the Site and joins the Whiteadder Water downstream of the Site. The Dye Water valley is surrounded by adjacent summits which comprise a series of rounded hilltops aligned roughly from west to east, producing pronounced undulating topography along each side of the valley. Numerous small burns (e.g., Hall, Burn, Wood Cleugh, Kersons Cleugh, Foul Cleugh, Green Cleugh etc) flowing from these hills towards the Dye Water, resulting in several defined hill spurs on either side of the valley.

**5.5** The southern part of the Site, south and west of Dunside Hill, drains southwards into the Watch Water catchment, a headwater stream that flows into Watch Water Reservoir (a drinking-water reservoir). It is understood that the reservoir is also used for sports fishing and is stocked with brown and rainbow trout. There are several small watercourses within the Site that flow into the Watch Water (e.g., Bell Burn, Wester Grain, Easter Grain and Sheil Burn). The southern Site boundary runs adjacent to the Watch Water for approximately 2.2km and the existing access track crosses the Watch Water approximately 800m upstream of the reservoir. Downstream of the reservoir, the Watch Water joins the Dye Water close to the village of Longformacus.

**5.6** The Geology of the Site is comprised of deep marine sedimentary rock (Gala Group Wacke). These detrital sedimentary rocks dominate the entirety of the Site and are derived from deep sea, continental shelf origins, with graded bedding from coarse-grained to fine-grained sedimentary debris slurries. Additionally, there are several different intrusive (magmatic), igneous formations, all of which form dyke suites. These include the North Britiain Siluro-Devonian, Calc-Alakline Dyke Suit (composed of porphyritic microgranodiorite), dykes from the same suite but much less common on site are composed of microdiorite, and lastly the Central Scotland Late Carboniferous Tholeiitic Dyke Swarm (composed of microgabbro).

**5.7** The drift deposits at the Site are dominated by unconsolidated fluvial Alluvium (silt sand and gravel), with some small pockets of Devensian till with diamicton, which are glaciagenic in origin (BGS 1:50K superficial deposits map), which dominate the lower lying ground around the valley floor and the watercourses. The higher ground and hilltops generally have no drift deposits based on the BGS mapping, with the exception of numerous pockets of peat on either side of the Dye Water valley, from Dunside Hill and Pyatshaw Ridge (eastern part of Site) to Wedder Lairs (western part of Site).

**5.8** The 2016 Carbon and Peatland Map (shown in **Figure 5.1**) indicates large areas of the high ground in the north and south of the Site are Class 5 peatland, with smaller areas of Class 4 peatland at lower elevations. With the exception of these aforementioned areas, the lower lying sections of the Site around the base of the river valleys are classed as mineral soil (Class 0), with no peat indicated. The relevant Class descriptions are below:

- Class 4 – Area unlikely to be associated with peatland habitat or wet and acidic type. Are unlikely to include carbon-rich soils.
- Class 5 – Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.

**5.9** A review of the SEPA Flood Map indicates that there are some areas identified to be at risk of flooding in a 1 in 200-year event within the Site, along the banks of the Dye Water, including close to the access track. Flood risk areas will be identified within the baseline of the EIA.

**5.10** SEPA has characterised surface water quality status under the terms of the Water Framework Directive. Classification by SEPA considers water quality, hydromorphology, biological elements including fish, plant life and invertebrates, and specific pollutants known to be problematic. The classification grades through High, Good, Moderate, Poor, and Bad status. This provides a holistic assessment of ecological health. There are two watercourses within the Site which are large enough to be classified. The Dye Water (Waterbody ID 5122) was classified as 'Poor' in 2020 and the Watch Water (Waterbody ID 5124) was classified as 'Bad' in 2020.

**5.11** The Dye Water within the Site boundary is designated as part of the River Tweed Special Area of Conservation (SAC) as are all the watercourses downstream of the Site. The River Tweed SAC is designated for biological reasons, including Annex 1 habitats (watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation) and Annex 1 species (Atlantic salmon and otter).

**5.12** The Fallago Rig Wind Farm is located within the upper headwaters of the Dye Water immediately upstream (west) of the Site and its presence will be considered in the assessment of effects on the Dye Water and downstream watercourses.

## Design Considerations

**5.13** Where possible a 50m buffer (as shown on **Figure 5.1**) will be applied to all watercourses to minimise the risk of potential impacts due to changes in runoff, sedimentation, or water quality.

**5.14** All components of the Proposed Development will be kept outwith the estimated 1 in 200-year fluvial flood extent. Watercourse crossings will be designed to accommodate the 1 in 200-year flow.

**5.15** Where possible infrastructure will avoid areas of deeper (> 1m) peat. This reduces the volume of peat required to be excavated (reducing displaced carbon) and, dependent on baseline ecological conditions, may have benefits for habitats as well as reducing the potential to interrupt localised shallow subsurface flow-paths.

**5.16** Where possible, all excavations <1m should be over 100m away from any groundwater abstractions, private water supplies (PWS) or Ground Water Dependent Terrestrial Ecosystems (GWDTEs) as per SEPA guidance[10]. Excavations >1m (e.g., turbine bases) will where possible be over 250m away from these receptors.

## Proposed Surveys and Assessment Methodologies

**5.17** In addition to the desk-based surveys undertaken to date, consultation with Scottish Borders Council, East Lothian Council, Scottish Water, SEPA and NatureScot will be undertaken to obtain relevant flood, water supply and peat information, including abstractions and private water supplies (PWS). Relevant flow and water quality data will also be obtained from SEPA.

**5.18** A walkover hydrological survey of the Proposed Development site will be carried out to supplement the desk-based work and data collection to identify the existing baseline conditions, including identifying and documenting watercourse crossings (proposed and existing); identifying other water features such as wetlands and springs; undertaking an overview assessment of areas identified as floodplain within the SEPA Flood Maps; and providing a general overview of landscape and land cover of

[10] SEPA (2017) Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems

importance to hydrology and peat. Private water supply visits will also be undertaken following consultation with the private water supply owners to verify the source location. GWDTEs will be identified based on habitat mapping and ecology surveys and reviewed by hydrologists in the field (see **Chapter 6: Ecology**).

**5.19** Peat depth surveys are proposed within the Site where peat deposits are shown on the geological, soil and carbon and peatland mapping to delineate the spatial coverage and depth of peat within the study area.

**5.20** The proposed frequency for peat probing and coring will follow relevant guidance[11], as follows:

- 100m x 100m grid survey for Phase 1 probing over the Site – where there is a clearly visible absence of peat over extensive areas (e.g., on the lower and steeper side slopes) in locations where no infrastructure will be proposed, the grid may be reduced in density.
- Targeted high frequency probing will be undertaken along tracks, at turbines/hard standings, turning points and passing places, site compounds, substation, borrow pits and met mast locations.
- Probes will be taken at 50m spacing both along the centre line of any access tracks and at 10m offsets.
- Detailed probing survey on a 10m-by-10m grid basis will be undertaken around the centre of each proposed turbine base and additional proposed infrastructure.
- Cores will be undertaken at representative locations to verify the actual peat depth, the thickness of the acrotelm and catotelm, determine the mineral soil characteristics and allow for Von Post tests to be undertaken.

**5.21** The data obtained from the Site investigations will be used to produce maps of peat depths within the Site and around proposed infrastructure. A shaded contour interval of 0-0.25m, >0.25-0.5m, >0.5m-1m, >1m-1.5m, >1.5m-2m, >2m-2.5m, etc. will be used to illustrate the occurrence of peat across the Site.

**5.22** The findings of the survey work and baseline assessment will contribute to environmental constraints mapping and will provide input and feedback into design iterations and subsequent environmental assessment.

**5.23** The peat survey results will also be used to inform the preparation of a peat management plan and peat landslide hazard and risk assessment.

**5.24** The peat management plan will follow relevant guidance and identify potential excavation volumes of peat (both acrotelm and catotelm). Early calculations will be used to optimise infrastructure locations with respect to peat depth (in balance with other constraints). Detailed calculations of excavation and reuse of acrotelmic and catotelmic peat will be undertaken using the design-freeze layout and opportunities to reuse peat will be explored based on infrastructure and site conditions. This may include integration of peat reuse measures with habitat management proposals to improve site conditions where this would be beneficial.

**5.25** A peat landslide hazard and risk assessment will be undertaken according to Scottish Government guidance and will assess the likelihood of peat instability in association with wind farm construction. Early calculations will be used to minimise overlap with areas of higher natural likelihood. Assessment of the design-freeze layout will consider all relevant receptors and provide mitigation measures and good practice recommendations to minimise risks associated with peat landslides.

## Potential Significant Effects

**5.26** Potentially significant effects are considered most likely to occur during the construction phase. The Applicant is committed to avoiding areas of deep peat where site conditions allow and implementing good practice construction methods throughout the construction phase. The Applicant has extensive working knowledge of best practice construction methods having constructed several projects in moorland settings in Scotland.

### Potential Effects Scoped into Assessment

**5.27** Potential effects on hydrology, hydrogeology and peat will be assessed as part of the EIA process. This will include the identification of both generic effects of construction (e.g., sediment release, pollution, fuel spills etc.) and effects on specific locations such as sensitive habitats (i.e., GWDTEs, private water supplies (PWS), peatland habitats or watercourse crossings),

[11] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland

which are sensitive to pollution risk and / or disturbance from required engineering works. Given the sensitivity of the downstream water environment, potential impact on water quality is likely to be a key issue.

**5.28** Taking account of the findings of the work undertaken to date, and professional experience, whilst still adopting a precautionary approach at this preliminary stage, potential effects associated with the construction and/or operation of the Proposed Development include:

- Pollution of surface water, including private drinking water supplies caused by releases of sediment to watercourses from excavated/stockpiled material during construction, or because of stream crossings or works near streams.
- Pollution of surface water and groundwater, including drinking water supplies, through operation of machinery (e.g., spillage of fuels, oils etc.) during site preparation and construction.
- Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk during construction and operation.
- Effects on peat (including potential peat instability).

### Potential Effects Scoped out of Assessment

**5.29** Potential effects on geology are scoped out of the assessment.

**5.30** Effects associated with decommissioning will be similar to construction effects and are also scoped out of the assessment as noted in Chapter 3 above.

## Approach to Mitigation

**5.31** In addition to the careful siting of infrastructure components and given the Applicant's commitment to, and prior experience of, implementing accepted good practice during construction and operation, together with the current regulatory context, many potential effects on the water environment can be avoided or reduced. With respect to the current regulatory context, since the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) came into force, CAR authorisation will be required in relation to a number of activities e.g., engineering works in inland waters and wetlands. A Construction Site Licence (CSL) is also likely to be required for the works under the CAR Regulations. Consultation with SEPA throughout the EIA process will be undertaken in relation to those activities for which a licence or registration is required.

**5.32** Several good practice pollution prevention and control measures will be put in place during construction. These will be embedded into the project design and will reflect best practice guidance and recognised industry standards (e.g., SEPA guidance, including their Guidance for Pollution Prevention (GPPs), CIRIA SUDS Manual[12] and Control of Water Pollution from Construction Sites Guidance[13] and the joint publication Good Practice during Windfarm Construction[14] amongst others).

**5.33** Therefore, a number of embedded mitigation measures are considered to be an integral part of the design/construction process as part of good practice; and it is proposed that these will be taken into account prior to assessing the likely effects of the Proposed Development. However, where appropriate and in response to likely significant effects, more tailored and specific mitigation measures will be identified prior to determining the likely significance of residual effects.

[12] CIRIA SUDS Manual (2015) C753
[13] CIRIA Control of water pollution from construction sites. Guidance for consultants and contractors, (2001) C532
[14] Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland and Historic Environment Scotland (2019): Good Practice during Wind Farm Construction

## Consultee List

**5.34** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- SEPA;
- NatureScot;
- Scottish Water;
- Scottish Borders Council;
- East Lothian Council; and
- River Tweed Commission.

**Questions for Consultees**

**Q5.1:** Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, and peat?

**Q5.2:** Is the proposed methodology appropriate, including the approach to peat probing across the 100m grid?

**Q5.3:** Are the proposed list of effects which are scoped in appropriate?

**Q5.4:** Is the proposed approach to mitigation appropriate?

# Chapter 6
# Ecology

## Introduction

**6.1** This chapter sets out the proposed approach to the assessment of potential effects on ecology during the construction and operation of the Proposed Development.

**6.2** Ecological features scoped into the assessment have been informed by key legislative and policy drivers, as they relate to nature conservation in Scotland, and include:

- Sites designated for their nature conservation value via:
  - the Conservation (Natural Habitats, &c) Regulations (1994);
  - the Wildlife and Countryside Act (1981);
  - National/local planning policy; and
  - National/local nature conservation policy (including the Ancient Woodland Inventory (AWI)).
- Species and habitats offered legislative or policy protection via:
  - the Conservation (Natural Habitats, &c) Regulations (1994);
  - the Wildlife and Countryside Act (1981); and
  - National/local planning policy.

**6.3** The assessment will follow the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment in the UK (2018)[15].

## Study Area

**6.4** The study area is the Site boundary plus a 10 km buffer for Statutory designated sites and a 5km buffer for Non-Statutory Designated Sites. Survey buffers for habitats and individual protected species will be determined by survey best practice as detailed below.

## Existing Conditions

**6.5** No ecological field surveys in respect of the Proposed Development have been undertaken at the time of submission of this Scoping Report. Ecology baseline surveys are scheduled for the 2022 survey season: April to September inclusive.

**6.6** The majority of the Site is mapped as peatland Classes 4 and 5[16] therefore it is anticipated that the Site supports a mosaic of upland habitats such as heathlands. Other upland nationally important habitats underlain by peat deposits, such as bog and mire, may be present as localised patches within the Site, though current land management practices are likely to have degraded the quality of these habitats.

**6.7 Figure 3.1** shows the Site boundary and proposed turbine layout. At present the ecology survey area (across which baseline ecology surveys will be undertaken) mirrors this boundary (including the access where widening or other works will be required), however it is anticipated this will be reduced in size and a defined 'developable area' identified by the time the surveys commence, through the iterative design process.

[15] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland
[16] Scotland's Soils Website Carbon and Peatland map (2016) available online at: https://map.environment.gov.scot/Soil_maps/?layer=10#.

### Designated Sites

**6.8** One statutory designated site, the River Tweed Special Area of Conservation (SAC), is present within the Site boundary, crossing the Site in two locations; on the main access from the public road which crosses the Wedderlie Burn, and the Dye Water which flows through the centre of the Site parallel to the access to Fallago Rig Wind Farm. There is one other SAC within 10 km of the Site boundary; Dogden Moss SAC.

**6.9** The Wedderlie Burn where it is designated as an SAC as noted above is also designated as the River Tweed Site of Special Scientific Interest (SSSI). A further eight SSSIs are present within 10 km of the Site boundary, as listed in **Table 6.1** below.

**6.10** Two Local Biodiversity Sites (LBS; designated by Scottish Borders Council) are present within the Site boundary[17]; Byrecleuch Burn, Stot Cleugh, and Corby Scar and upper Watch Water with a further 27 LBS present within 10 km of the Site boundary. One Local Nature Conservation Site (LNCS; designated by East Lothian Council) is present immediately north of the Site boundary[18]; Lammermuir.

**6.11** There are no ancient woodlands within the Site boundary, though there are 43 within 10km of the Site boundary; the closest being 625m west of the Site access track. The majority of these are located around Gifford to the north-west of the Site.

**6.12 Table 6.1** below summarises the Statutory and Non-Statutory Designated Sites within 10km of the Site boundary. **Figure 6.1** presents both the statutory and non-statutory sites designated for their ecological interest, within 10km of the Site boundary.[19]

**6.13** There are also Special Protection Areas and Ramsar Sites within the 10km of the Site boundary, but as these are designated for birds, they are covered within **Chapter 7: Ornithology**.

**Table 6.1: Statutory and Non-Statutory Designated Sites within 10km of the Site boundary**

| Name | Designation | Qualifying Features | Approximate Distance and Orientation from Site Boundary |
|---|---|---|---|
| River Tweed | SAC | Annex 1 habitats (primary reason for selection):<br>■ Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation<br>Annex 2 species (primary reason for selection):<br>■ Atlantic Salmon<br>■ Otter<br>Annex 2 species (present as qualifying feature, but not primary reason for selection):<br>■ Sea lamprey<br>■ Brook lamprey<br>■ River lamprey | Within the Site boundary, the river itself crosses the Site west to east, but only the eastern half (approximately) of the length is designated, see **Figure 6.1**.<br>The access track also crosses the River Tweed SAC in a separate location; see **Figure 6.1**. |
| Dodgen Moss | SAC | Annex 1 habitats (primary reason for selection): | 2.7km east |

[17] Scottish Borders Council (2020) Proposed Local Development Plan Local Biodiversity Technical Note. Available online at: https://www.scotborders.gov.uk/downloads/file/7554/local_biodiversity_technical_note
[18] East Lothian Council (2018) Local Development Plan 2018 Documents: Technical Note 10: Planning for Biodiversity. Available online at: https://www.eastlothian.gov.uk/downloads/file/27787/technical_note_10_planning_for_biodiversity
[19] Note that shapefiles were not available for the Local Nature Conservation Sites or Local Biodiversity Sites therefore these are not included on **Figure 6.1**.

| Name | Designation | Qualifying Features | Approximate Distance and Orientation from Site Boundary |
|---|---|---|---|
| | | ■ Active raised bogs | |
| River Tweed | SSSI | Trophic range river/stream<br>Vascular plant assemblage<br>Atlantic salmon<br>Brook lamprey<br>River lamprey<br>Sea lamprey<br>Otter<br>Beetle assemblage<br>Fly assemblage | Within the Site boundary |
| Greenlaw Moor | SSSI | Raised bog<br>Breeding bird assemblage<br>Pink-footed goose | 2.4km east |
| Lammer Law | SSSI | Blanket bog<br>Sub-alpine dry heath<br>Juniper scrub<br>Upland assemblage | 3km west |
| Crook Burn, Dyeshaugh | SSSI | Fen meadow | 4.7km east |
| Gordon Moss | SSSI | Wet woodland | 7.5km south |
| Papana Water | SSSI | Upland mixed ash woodland | 7.6km north |
| Danskine Loch | SSSI | Fen woodland | 7.8km north |
| Langtonless Cleugh | SSSI | Upland mixed ash woodland | 9.2km west |
| Lintmill Railway Cutting | SSSI | Raised bog<br>Breeding bird assemblage<br>Pink-footed goose | 9.3km southeast |
| Rammer Cleugh | SSSI | Upland oak woodland<br>Quaternary geology and geomorphology | 9.8km north |
| Byercleuch Burn, Stot Cleugh (site ref 71) | LBS | Cleughs and burnsides with nationally scarce plants and locally rare plants and moths. | Within the Site boundary |
| Corby Scar and upper Watch Water (site ref 76) | LBS | Acid burnsides with a high diversity of grassland plant species, including several local rarities. | Within the Site boundary |
| Lammermuir | LNCS | Acid, neutral, calcareous grassland. | 0m north |

| Name | Designation | Qualifying Features | Approximate Distance and Orientation from Site Boundary |
|---|---|---|---|
| | | Heathland, blanket bog. | |
| Various LBS sites | LBS | A further 27 LBS are present within 10 km of the Proposed Development. These sites are typically designated for their habitats and rare plant assemblages. | Next closest LBS outside the Proposed Development Site boundary: 580m west. |

### Habitats and Vegetation

**6.14** Following analysis of aerial imagery, it is considered likely that the upland topography of the Site will give rise to a complex habitat assemblage and as a result, habitats of conservation concern[20] are likely present within the Site boundary.

**6.15** Aerial imagery shows three small, isolated blocks of woodland within the Site boundary, all of which appear to be relatively new plantations.

**6.16** The River Dye, which runs through the centre of the Site from west to east, forms part of the River Tweed SAC, therefore all watercourses within the Site are hydrologically connected to the River Tweed SAC.

### Protected Species

**6.17** From a desk-based assessment of aerial mapping, the Site constitutes an open expanse of likely bog, heath and grassland habitats, with a number of watercourses within the Site boundary. This habitat is considered unlikely to support many protected species, though otter are likely present on the River Dye (part of the River Tweed SAC) and both otter and water vole are likely present on the smaller tributary watercourses.

#### Bats

**6.18** A small number of buildings are present within the Site and surrounding 2km, all of which are clustered around the existing access track and over 300m from the nearest proposed turbine location. Given the distance between the proposed infrastructure and these buildings, any bats roosting within these structures are unlikely to be affected by the works. Furthermore, due to the absence of woodlands and trees and suitable manmade structures within the Site boundary and within 2km, it is considered unlikely that bats are roosting within the Site. The River Dye (part of the River Tweed SAC) and its tributary watercourses may provide some linear commuting and foraging habitat.

#### Otter

**6.19** Otter are a designated feature of the River Tweed SAC and therefore potentially present in the tributaries within the Site boundary.

#### Water Vole

**6.20** Based on analysis of available aerial imagery it is anticipated that water vole may be present within the Site boundary, particularly along smaller and slower-flowing watercourses.

#### Badger

**6.21** Habitats on Site are likely to be wet, therefore not well suited to sett building as badger prefer dry-well draining habitats for sett building. Further, badger are known to prefer mosaic woodland and grassland habitats for foraging which are absent from this Site. Field surveys will confirm the habitats present and the likely presence of badger.

[20] Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the Local Biodiversity Action Plan.

### Pine Marten

**6.22** Due to the lack of suitable woodland habitat with the Site boundary, pine marten are considered unlikely to be present.

### Red Squirrel

**6.23** Due to the lack of suitable woodland habitat with the Site boundary, red squirrel are considered unlikely to be present.

### Fisheries and Freshwater Pearl Mussel

**6.24** Watercourses within the Site boundary are expected to provide suitable habitat for a range of fish species, including the River Dye which is part of the River Tweed SAC. Notably, Atlantic salmon, river lamprey, brook lamprey and sea lamprey are designated species of the River Tweed SAC.

## Design Considerations

**6.25** Design considerations relevant to ecological features include:

- avoidance of all watercourse which form part of the River Tweed SAC maintaining a minimum 50m buffer between them and all infrastructure;
- where possible, maintaining a minimum 50m buffer between turbine locations and watercourses/bodies shown on 1:50,000 scale Ordnance Survey mapping;
- minimisation of watercourse crossings;
- mammal-passable watercourse crossings;
- avoidance of the most ecologically important habitats such as Ground Water Dependent Terrestrial Ecosystems (GWDTEs);
- avoidance of deep peat deposits and the use of floating track construction methods where deep peat deposits cannot be avoided; and
- avoidance of protected species' resting sites (including best practice buffers where appropriate).

## Proposed Surveys and Assessment Methodologies

**6.26** Prior to the commencement of field work, a desk study will be undertaken to identify:

- statutory and non-statutory designated sites within 10km of the Site (**Figure 6.1**); and
- records of extant protected species populations within 5km of the Site (records from 2000 onwards).

**6.27** Field surveys will include:

- Phase 1 habitat, and National Vegetation Classification (NVC)[21] survey of habitats of conservation concern (including GWDTE).
- Protected Species walkover[22] including:
  - otter – detailed survey including upstream and downstream of features within 200m of the Site boundary (or developable area once confirmed);
  - water vole – detailed survey, including upstream and downstream of features within 50m of the Site boundary (or developable area once confirmed;
  - great crested newt – habitat suitability surveys; and

[21] Rodwell et al. National Vegetation Classification (vols 1 – 5). 1991 – 2002.
[22] Species-specific survey methods to comply with best practice, as defined by CIEEM and described www.cieem.net, including appropriate buffers ranging from 50m – 200m.

  - fisheries and freshwater pearl mussel – habitat suitability surveys only.
- Bat activity surveys in compliance with current good practice methods[23], to include the deployment of up to 14 static full-spectrum bat detectors for a minimum of 10 nights in each of spring, summer and autumn 2022.

**6.28** Field surveys within the Site boundary (or developable area once confirmed) will be carried out in accordance with best practice methods described and endorsed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and NatureScot.

**6.29** All field surveys will be completed by competent, professionally qualified ecologists, within accepted ecological survey windows.

**6.30** Detailed surveys for fisheries and freshwater pear mussel will be scoped out of the assessment on the basis of good practice design considerations, for example offsetting all infrastructure from watercourses and waterbodies. The opportunity to discuss this further with consultees including NatureScot will be welcomed.

**6.31** All data collected through field surveys will be analysed and interpreted in compliance with good practice methods[24].

## Potential Significant Effects

### Potential Effects Scoped into Assessment

**6.32** The Ecology Chapter of the EIA Report will include a detailed assessment of potential effects, following current best practice, as defined by CIEEM[25].

**6.33** The assessment will consider the potential effects associated with construction and operation of the Proposed Development as detailed below:

- potential effects on designated sites structurally or functionally connected to the Site, during construction;
- potential effects on habitats of conservation concern[26], during construction;
- potential effects on protected species recorded within the Site, during construction; and
- potential effects on bats, during operation.

### Potential Effects Scoped out of Assessment

**6.34** The assessment will not consider the following:

- effects on ecological features during operation (excluding bats);
- effects on red squirrel;
- effects on pine marten;
- effects on freshwater pearl mussel;
- effects on fisheries; and
- effects associated with decommissioning the Proposed Development as detailed in Chapter 3 above.

[23] NatureScot (2019). Bats and onshore wind turbines – survey, assessment and mitigation.
[24] Kitchener A. C. (2012). UK BAP mammals. Interim guidance for survey methodologies, impact assessment and mitigation. Cresswell W. J., Birks J. D. S., Dean M., Pacheco M., Trewhella W. J., Wells D. & Wray S. (Eds). The Mammal Society, Southampton.
[25] Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the Local Biodiversity Action Plan.
[26] Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the Local Biodiversity Action Plan.

## Cumulative Assessment

**6.35** The effects of the Proposed Development will be assessed in isolation and in combination with predicted effects of other consented wind farm developments within 10km of the Site boundary.

## Approach to Mitigation

**6.36** Ecological baseline data will be used to inform the emerging design process.

**6.37** Where effects are assessed as being significant, within the context of the EIA regulations, mitigation measures will be identified and agreed. All mitigation measures will be developed on the basis of robust science, drawing on current and emerging good practice, and its likely efficacy and success will be considered.

**6.38** Mitigation measures may include:

- design iteration to avoid or reduce impacts on ecological features (embedded mitigation);
- on-site construction support to advise on, and monitor, impact reduction on ecological features; and
- post construction monitoring to ensure mitigation remains successful and proportionate.

## Consultee List

**6.39** It is proposed that the following stakeholders will be consulted in relation to the assessment, as field data becomes available:

- NatureScot;
- Scottish Borders Council;
- East Lothian Council.

**Questions for Consultees**

**Q6.1:** Do consultees agree with the survey scope set out above?

**Q6.2:** Do consultees agree with the assessment method (including scoped in/scoped out features)?

**Q6.3:** Do consultees hold any existing ecological data relating to the Site that may further inform the ecological baseline?

**Q6.4:** Are consultees aware of any local nature conservation organisation with whom further consultation should be undertaken?

# Chapter 7
# Ornithology

## Introduction

**7.1** This section of the Scoping Report describes the relevant guidance and legislation, existing conditions, design considerations, proposed scope and methodology of surveys and assessment, potential effects and approach to mitigation associated with the Proposed Development in relation to ornithological features.

**7.2** The assessment will be undertaken in line with the EU Birds Directive, the Habitats Directive and the EIA Directive[27] as well as the following national legislation and policy:

- The Wildlife and Countryside Act 1981 (as amended);
- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011; and
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations).

**7.3** The following guidance will be considered as part of the assessment:

- CIEEM (2018) Guidelines for Ecological Impact Assessment[28];
- NatureScot guidance on assessment of effects of wind farms on birds (SNH 2000[29]; 2009[30]; 2016[31]; 2017[32]; 2018a[33]; 2018b[34]; 2018c[35]; 2019[36]; NatureScot 2020[37]);
- Scottish Executive Rural Affairs Department (SERAD) (2000[38]);
- The Scottish Borders Local Biodiversity Action Plan (2018-2028[39]);
- Stanbury *et al.* (2021[40]); and
- The Scottish Biodiversity List[41].

[27] Directive 2009/147/EC on the Conservation of Wild Birds, Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended), and the Environmental Impact Assessment Directive 2014/52/EU.
[28] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester.
[29] Scottish Natural Heritage (2000). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note.
[30] Scottish Natural Heritage (2009) Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees.
[31] Scottish Natural Heritage (2016) Assessing connectivity with Special Protection Areas (SPAs).
[32] Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms.
[33] Scottish Natural Heritage (2018a) Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas.
[34] Scottish Natural Heritage (2018b) Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note.
[35] Scottish Natural Heritage (2018c) Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.
[36] Scottish Natural Heritage joint publication (2019) Good Practice during Wind Farm Construction. 4th Edition.
[37] NatureScot (2020) General Pre-application and Scoping Advice to Developers of Onshore Wind Farms.
[38] SERAD (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('the Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995.
[39] Available at: https://www.scotborders.gov.uk/downloads/file/928/local_biodiversity_action_plan
[40] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations:the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114:723-747.
[41] Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list. Accessed on: 07/01/2022.

## Study Area

**7.4** The ornithology assessment will consider the following study areas which will be generated based on the final turbine layout and associated infrastructure (with the exception of the Natural Heritage Zone (NHZ) scale as these are pre-defined by NatureScot):

- Designated sites: the Proposed Development and a 20km study area buffer (SNH 2016[31]);
- Collision risk modelling: the results of the flight activity surveys will be used to inform collision modelling. A Collision Risk Analysis Area (CRAA) will be created using GIS Delaunay triangulation[42] from the proposed turbine locations to create a wind farm area which will then be buffered by 500m (as per SNH 2017[32]);
- Scarce[43] breeding birds: the Proposed Development and a 2 km study area buffer (SNH 2017[32]);
- Black grouse: the Proposed Development and a 1.5km study area buffer (SNH 2017[32]);
- Breeding upland waders and wintering waders, raptors, owls and wildfowl: the Proposed Development and a 500m study area buffer (SNH 2017[32]);
- Cumulative assessment: as per NatureScot guidance (SNH 2018[34]), the NHZ level is considered practical and appropriate for breeding species of wider countryside interest.

## Existing Conditions

### Designated Sites

**7.5** There are no statutory designations with ornithological features within the Site, however there are four Special Protection Areas (SPAs) (alongside the associated Sites of Special Scientific Interest (SSSIs) and Ramsar sites that underpin these SPAs) within 20km of the Proposed Development (**Figure 7.1**).

- Greenlaw Moor SPA (underpinned by the Greenlaw Moor SSSI and Ramsar): approximately 9km to the southeast, designated for non-breeding pink-footed goose.
- Fala Flow SPA (underpinned by the Fala Flow SSSI and Ramsar): approximately 14km to the west, designated for non-breeding pink-footed goose.
- Firth of Forth SPA (underpinned by the Firth of Forth SSSI and Ramsar): approximately 18km to the north, designated for non-breeding bar-tailed godwit, common scoter, cormorant, curlew, dunlin, eider, golden plover, goldeneye, great crested grebe, grey plover, knot, lapwing, long-tailed duck, mallard, oystercatcher, pink-footed goose, red-breasted merganser, red-throated diver, redshank, ringed plover, sandwich tern (passage), scaup, shelduck, Slavonian grebe, turnstone, velvet scoter, wigeon and waterfowl assemblage.
- Outer Firth of Forth and St Andrews Bay Complex SPA: approximately 19km to the northeast, designated for non-breeding black-headed gull, common gull, common scoter, eider, goldeneye, guillemot, herring gull, kittiwake, little gull, long-tailed duck, razorbill, red-breasted merganser, red-throated diver, shag, Slavonian grebe, velvet scoter, seabird assemblage, waterfowl assemblage; breeding arctic tern, common tern, gannet, guillemot, herring gull, kittiwake, Manx shearwater, puffin, shag and seabird assemblage.

### Ornithological Activity: 2021 Breeding Season

**7.6** Flight activity surveys between March and August 2021 recorded eight target species (greylag goose, red kite, marsh harrier, goshawk, golden plover, short-eared owl, merlin and peregrine falcon), collectively accounting for 142 flight events, which may be included in any collision risk modelling, depending on their location in relation to the final turbine layout.

[42] Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here: https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html
[43] Scarce breeding birds are those listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and in the case of the Proposed Development consists of any raptor and owl species listed on either Annex 1 or Schedule 1.

**7.7** Breeding raptor surveys in 2021 recorded evidence of breeding merlin and short-eared owl within the 2km survey area[44], with barn owl, red kite, hen harrier, goshawk and peregrine falcon also recorded during surveys but with no evidence of breeding. Moorland breeding bird surveys recorded breeding oystercatcher, golden plover, lapwing, curlew, common sandpiper and snipe, with redshank also recorded but with no evidence of breeding.

## Design Considerations

**7.8** Breeding locations and key foraging locations of target species will be taken into consideration during the Proposed Development design process, to minimise the risk of disturbance, displacement and collision effects. This will include the results of baseline surveys as well as a desk study.

## Proposed Surveys and Assessment Methodologies

### Proposed Surveys

**7.9** Baseline surveys commenced in March 2021 and are currently ongoing (scheduled to be completed in August 2022). This will provide two breeding seasons (2021 and 2022) and one non-breeding season (2021/2022) of data which is considered appropriate to undertake a robust assessment.

**7.10** The following surveys were undertaken by Wood between March and August 2021 with reference to survey methodology from NatureScot (SNH 2017[32]), Brown and Shepherd (1993[45]) and Hardey *et al.* (2013[46]).

- flight activity surveys: six Vantage Points (VPs), 42 hours per VP, **Figure 7.2**;
- raptor surveys: monthly visits between April and July 2021, 2km survey area[44] (1km for goshawk); and
- moorland breeding bird surveys: monthly visits between April and July 2021, 500m survey area[44].

**7.11** MacArthur Green was commissioned to undertake baseline surveys for the 2021/2022 non-breeding season and the 2022 breeding season. The surveys listed below will be undertaken across the period with reference to survey methodology from NatureScot (SNH 2017[32]), Brown and Shepherd (1993[45]), Hardey *et al.* (2013[46]) and Gilbert *et al.* (1998[47]).

- flight activity surveys: six VPs, 36 hours per VP for both the 2021/2022 non-breeding season and 2022 breeding season (i.e., 72 hours in total per VP), **Figure 7.2**;
- winter walkover surveys: three visits between November 2021 and February 2022, 500m survey area[44];
- black grouse surveys: monthly visits in April and May 2022, 1.5km survey area[44];
- scarce breeding bird surveys: monthly visits between March and August 2022, 2km survey area[44]; and
- moorland breeding bird surveys: monthly visits between April and July 2022, 500m survey area[44].

### Proposed Scope of Assessment

**7.12** The assessment will consider the potential direct, indirect, and cumulative impacts that the construction and operation of the Proposed Development could have on Important Ornithological Features (IOFs, as per CIEEM 2018[28] guidance). The assessment will be supported by a technical appendix that will include details of survey methodologies, all survey data and outputs from any collision risk modelling.

**7.13** The assessment will be informed by the baseline ornithology surveys as summarised above. A further desk study will be undertaken to gather any other relevant information, e.g., from other nearby wind farm EIAs or scientific studies, and the Lothian and Borders Raptor Study Group (LBRSG) will also be contacted to request historical breeding raptor data for the area.

[44] It should be noted that survey areas have been created by buffering (as required for the survey type, e.g., 500m for breeding waders) a developable area that was provided by the applicant at the time of the survey (as opposed to the study areas which are buffered from the finalised turbine locations and associated infrastructure at the assessment stage).
[45] Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding waders. Bird Study, 40: 189-195.
[46] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh.
[47] Gilbert, G., Gibbons, D. W. and Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.

**7.14** The assessment will include the following elements:

- baseline conditions;
- scoping in/out of ornithological features and impacts;
- assessment of potential impacts during construction and operational phases;
- mitigation;
- residual effects;
- cumulative effects assessment; and
- summary of effects.

**7.15** Consideration of SPAs will be undertaken within a Habitats Regulations Appraisal (HRA) context, with information to inform an appropriate assessment being included, should any likely significant effects to any qualifying features be identified.

### Assessment Methodology

**7.16** Effects on IOFs will be assessed in relation to the species' reference population, conservation status, range and distribution. The assessment of potential effects will follow guidelines published by CIEEM (2018) and NatureScot (listed above).

**7.17** The assessment involves the following process:

- identifying potential impacts of the Proposed Development;
- considering the likelihood of occurrence of potential impacts;
- defining the nature conservation importance and conservation status of relevant populations for each IOF to determine overall sensitivity;
- establishing the magnitude of the likely impact (both spatial and temporal) on each IOF;
- based on the above information, making a judgement as to whether or not the consequent effect is significant with respect to the EIA Regulations;
- if a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required;
- considering opportunities for enhancement where appropriate; and
- concluding residual effects after mitigation, compensation, or enhancement.

**7.18** Where appropriate, the assessment will use recommended methods of analysis such as collision risk modelling using the Band *et al.* (2007[48]) model.

## Potential Significant Effects

**7.19** Potential Effects Scoped into Assessment

**7.20** The assessment will consider the potential impacts associated with construction and operation of the Proposed Development as detailed below.

**7.21** Construction impacts:

- temporary and permanent habitat loss/alteration/fragmentation associated with the Proposed Development infrastructure, including loss of nesting, lekking, roosting or foraging habitat; and
- visual and noise disturbance associated with construction activities.

[48] Band, W., Madders, M. and Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at Windfarms. In: de Lucas, M., Janss, G.F.E. and Ferrer, M. (eds.) Birds and Windfarms: Risk Assessment and Mitigation. Pp. 259-275. Quercus, Madrid.

**7.22** Operational impacts:

- displacement from nesting, lekking, roosting or foraging habitats around operational turbines and other permanent infrastructure, including barrier effects;
- risk of collisions with operational wind turbine blades or any other permanent infrastructure; and
- potential lighting effects on birds.

**7.23** Where appropriate, these construction and operational impacts will also be considered in a cumulative assessment.

**7.24** Greenlaw Moor SPA, Fala Flow SPA and Firth of Forth SPA (and these SPAs' associated SSSIs/Ramsars) will be scoped in to the assessment as there is the potential for a likely significant effect to the pink-footed goose populations associated with these SPAs. Information to inform an appropriate assessment will be provided within the chapter (including in-combination effects where required).

### Potential Effects Scoped out of Assessment

**7.25** On the basis of baseline data, experience from other relevant projects and policy guidance or standards (e.g., SNH 2018a[33]), the following species will be 'scoped out' since significant effects are unlikely:

- common and/or low conservation species not recognised in statute as requiring special conservation measures (i.e., not listed as Annex 1/Schedule 1 species);
- common and/or low conservation species not included in non-statutory lists (i.e., not listed as Amber or Red-listed BoCC[40] species), showing birds whose populations are at some risk either generally or in parts of their range;
- passerine species, not generally considered to be at risk from wind farm developments (SNH 2016[31], 2017[32]), unless being particularly rare or vulnerable at a national level; and
- effects associated with decommissioning of Proposed Development as noted in Chapter 3 above.

**7.26** Following the desk study of designated sites containing ornithological features within 20km and on the basis of the SPA connectivity guidance provided by NatureScot (SNH 2016[31]), there is considered to be no connectivity between the Proposed Development and the Outer Firth of Forth and St Andrews Bay Complex SPA and Firth of Forth SPA as all the species for which these SPAs are designated (listed above) are either considered to be true seabirds or are migratory waterfowl for whom the Site is unsuitable[49] - the exception to this is the non-breeding pink-footed goose population included in the Firth of Forth SPA designation, which may be at risk of collisions, and therefore a likely significant effect cannot be discounted. Consequently, it is proposed to scope out the Outer Firth of Forth and St Andrews Bay Complex SPA and the Firth of Forth SPA (and associated SSSI and Ramsar site) for all species listed bar pink-footed goose.

## Approach to Mitigation

**7.27** Good practice during construction and operation of the Proposed Development will include the following measures, regardless of the conclusions of the assessment:

- a Bird Disturbance Management Plan (BDMP) would be implemented as part of a Construction Environmental Management Plan (CEMP) or similar during the construction phase, to ensure that all reasonable precautions are taken to adhere to the relevant wildlife legislation;
- pre- and during-construction surveys carried out by an Ecological Clerk of Works or suitably qualified ornithologist would take place as part of the BDMP; and
- a Habitat Management Plan (HMP) would be developed and agreed with consultees, to mitigate or enhance habitat for IOFs and to provide wider biodiversity improvements.

**7.28** Where unmitigated significant effects on IOFs are identified, additional measures to prevent, reduce and where possible offset these adverse effects will be proposed, to conclude a non-significant residual effect.

[49] the Site is located well inland from the SPA and would not be located within any flyways for these species between the SPA and their feeding areas, nor is there considered to be suitable habitat for these species within the Site.

## Consultee List

**7.29** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- NatureScot;
- RSPB Scotland; and
- Scottish Borders Council.

**Questions for Consultees**

**Q7.1:** Do consultees agree that the methodology and scope of the assessment is appropriate?

**Q7.2**: Do consultees agree that the data obtained via field surveys (March to August 2021 and October 2021 to August 2022), as well as a desk study is sufficient to inform a robust impact assessment?

**Q7.3:** Do consultees agree that, subject to further information coming to light from the field surveys and desk study, the scope of IOFs, including designated sites, to be included in the assessment is appropriate?

**Q7.4**: Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ornithology assessment?

# Chapter 8
# Cultural Heritage

## Introduction

**8.1** This chapter sets out the proposed approach to the assessment of potential effects on cultural heritage assets (hereafter 'heritage assets') during the construction and operation of the Proposed Development. The assessment will consider the potential for direct physical effects, effects arising as a consequence of setting change, and cumulative effects.

## Study Area

**8.2** Due to the maximum turbine height under consideration (260m to tip), a precautionary approach has been adopted in defining appropriate study areas. It will be key to develop a methodology that is proportionate and effects for the likely scale of effects arising from turbines of this height, however the preliminary study area adopted is based on application of a bare-ground ZTV out to 20km. An open and productive dialogue will be established with Historic Environment Scotland (HES), Scottish Borders Council and East Lothian Council and consultation will be ongoing as the proposal takes shape, and greater certainty on layouts becomes available.

**8.3** In preparation of this Scoping Report, all designated assets within the Site and out to 15km from the Site boundary (**Figure 8.1 and Figure 8.2**) have been reviewed, with assets likely to have particular sensitivities to setting change, due to characteristics related to their type, function or known designed relationships, out to 20km included at this stage. In practice, it is likely that very few assets beyond 10km are likely to experience significant effects. Nevertheless, this will be tested through the preparation of wireframe visualisations and visits to key assets early in the design process.

**8.4** The following cultural heritage study areas are proposed:

- A Primary study area consisting of the land within the Site boundary. All heritage assets lying within this area will be considered for physical effects and setting effects where relevant.
- An Inner study area consisting of the land lying within a 5km buffer from the Site boundary. All heritage assets lying within this area will be considered for the potential for significant effects due to setting change.
- An Outer study area consisting of land lying between the 5 and 10km buffers from the Site boundary, and assets identified as being sensitive to setting change and having theoretical visibility of the Proposed Development at greater distances, or where specific in-combination views may be affected. Designated heritage assets lying within this area will be considered for the potential for effects due to setting change.

## Existing Conditions

**8.5** This section outlines the preliminary cultural heritage baseline of the Site, informed by the following sources:

- Historic Environment Scotland (HES) designated asset GIS data for the search area noted above.
- HES National Record of the Historic Environment ('Canmore') GIS data for the search area noted above.
- Scottish Borders Council and East Lothian Council HER data, made available through the HES 'PastMap' service.[50]
- Historic and current Ordnance Survey mapping available via online sources.
- Aerial photography, available from online sources including Google Earth™.
- Historic Land-use Assessment (HLA) data.

[50] Requests for spatial data and database records have been lodged with both HERs, but have not been fulfilled at the time of writing.

- ZTV, based on the scoping layout.

**8.6** The Site lies within the Lammermuir Hills and despite its relative proximity to Edinburgh and the settled coastal plain of East Lothian, it is an area that feels comparatively remote, with few major roads and no significant settlement. There are a number of operational and proposed wind farms in the vicinity, most notably Fallago Rig which abuts the western boundary of the Site, the very extensive Crystal Rig and Aikengall schemes to the northeast, and Dun Law straddling the A68.

### The Site

**8.7** The rolling moorland and steeply-incised valleys of the Dye Water and its tributaries dissect the Site, creating a distinct series of plateaux on which the scoping layout is concentrated. Current land cover is predominantly heather moorland, managed for sheep production and driven grouse shooting, and rough grazing. The lower slopes and valley bottoms are interspersed with some field enclosures but generally a sense of remoteness predominates. The moorland is characterised by patterns of muirburn within a very open and gently undulating landscape.

**8.8** There are a number of designated assets within the Site boundary, relating to the prehistory of the area, pre-improvement settlement and agriculture, and its later sporting uses. These comprise:

- Mutiny Stones long cairn [SM361]: a particularly large and southerly example of an early Neolithic long cairn. One of very few long mounds in the southeast of Scotland, this asset is well-preserved – despite extensive historical stone-robbing – and an impressive presence in its immediate environs.
- Dunside cairn [SM12507]: late-Neolithic or Bronze Age round cairn, with some evidence of adaptation for later re-use as a sheep fold and more recent marker cairn. The prehistoric component of the cairn appears to be relatively intact, suggesting it retains its archaeological value although its form and presence in the landscape have been obscured by the superimposed c.2m high marker cairn.
- Byrecleuch farmstead and cultivation remains [SM4508]: pre-Improvement farmstead comprising at least three building footings, scooped courts and extensive areas of rig-and-furrow (extending outside the designated area). While readily visible on the surface, this suite of assets appears to be less well-preserved than RCAHMS aerial imagery from the late 1990s suggests. Careful field investigation will therefore be required.
- Byrecleuch farmstead [SM4549]: remains of six rectilinear buildings, and an indeterminate number of potentially older, less well-defined buildings and an area of rig-and-furrow cultivation. Excavation of building adjacent to this asset as part of the pre-construction works for Fallago Rig recovered a range of items relating to the early medieval period, suggesting multi-period occupation of the Site.
- Former Beaters' cottage [LB8348]: Category C-listed 19th century two-storey cottage, associated with the now-demolished adjacent shooting lodge.

**8.9** These assets are located within a wider landscape of non-designated pre-Improvement features concentrated along the valley of the Dye Water. These settlement remains generally do not extend beyond the 360m AOD contour. The upland areas are therefore 'empty' of domestic assets. Instead, prehistoric ritual and funerary monuments are the main evidence of past communities – these assets are interpreted as being intentionally located in liminal areas away from contemporaneous settlement.

## Design Considerations

**8.10** There are a number of heritage assets which could be affected by the Proposed Development either from direct physical effects or effects related to setting change, as well as cumulative effects from nearby planned or operational wind farms. Where possible, direct effects on heritage assets will be avoided by design, and consideration will be given to the effects on setting from the Proposed Development as the turbine layout evolves, informed by additional consultation where necessary.

## Proposed Surveys and Assessment Methodologies

### Legislation and Policy

**8.11** There is a range of relevant national and local historic environment related legislation and policies applicable to examining the potential effects of the Proposed Development on cultural heritage assets:

- Town and Country Planning (Listed Buildings and Conservation Areas) (Scotland) Act (1997), as amended;
- Ancient Monuments and Archaeological Areas Act (1979), as amended;
- HES (2014), Our Place in Time; and
- HES (2019), Historic Environment Policy for Scotland.

### Guidance

**8.12** The assessment of effects of the Proposed Development will be carried out in accordance with the principles contained within the following documents, including:

- HES (2016) 'Managing Change in the Historic Environment Guidance Notes – Setting'.
- HES (2019), Designation Policy and Selection Guidance.
- Planning Advice Note 2/2011: Planning and Archaeology.
- SNH & HES (2018), EIA Handbook.
- IEMA, CIfA and IHBC (2021), Principles of Cultural Heritage Impact Assessment in the UK.
- The Chartered Institute for Archaeologists (2014), 'Code of Conduct'.
- The Chartered Institute for Archaeologists (2017), 'Standard and guidance for historic environment desk-based assessment'.

### Desk Study

**8.13** A desk-based assessment (DBA) will be undertaken to gather baseline data to inform the scope of the assessment of potential effects to cultural heritage assets. Various sources will be reviewed to inform understanding of baseline conditions and potential effects, including but not limited to:

- HES designated asset GIS data;
- HER data;
- Conservation Area Appraisals;
- Canmore (National Record of the Historic Environment database);
- Historic Land-use Assessment (HLA) data;
- Ordnance Survey maps (principally 1st and 2nd Editions) and other published historic mapping held in the Map Library of the National Library of Scotland;
- Aerial Photographs – HES National Collection of Aerial Photography (NCAP) holdings (oblique, vertical) and Google Earth™;
- available reports from other recent archaeological work undertaken in the area ('grey literature');
- relevant archive material held by the local authorities, HES, NLS, Registers of Scotland etc.;
- where available, publicly accessible LiDAR data;
- ZTV / cumulative ZTV; and
- findings of other topics (including the LVIA, peat depth and ground conditions).

### Visualisations

**8.14** A ZTV plan has been produced to turbine tip height (260m) to illustrate the theoretical visibility of the indicative 20 turbine layout (**Figure 4.1 and 4.2**). This has been used to identify which heritage assets require detailed assessment and which can be scoped out because they are unlikely to be affected. Consideration has also been given to including assets where, even though a ZTV indicates that no direct intervisibility would be possible, there is the potential for turbines to appear in in-combination views with these assets.

**8.15** Wireframe visualisations will be used in tandem with the ZTV to understand the likely nature of change in the setting of heritage assets. Initial review of asset distributions against the scoping ZTV has identified the following heritage assets where wireframe visualisations will be beneficial in understanding change in their setting. These assets are listed in **Table 8.1** with the locations from which the wireframe is proposed.

**Table 8.1: Cultural Heritage Assets and Proposed Visualisation Locations**

| VP_ID | Viewpoint name | Designation | Wireframe / photomontage | X | Y |
|---|---|---|---|---|---|
| CH001 | Twin Law | Non-designated | Photomontage (LVIA) | 362482 | 654852 |
| CH002 | Mutiny Stones | SM | Photomontage | 362273 | 659031 |
| CH003 | Mutiny Stone - in-combination | SM | Photomontage | 362637 | 659106 |
| CH004 | Byrecleugh, farmstead and rig | SM | Photomontage | 362730 | 657735 |
| CH005 | Byrecleugh, farmstead - in-combination | SM | Wireframe | 361207 | 658888 |
| CH006 | Dunside, cairn | SM | Wireframe | 363024 | 656850 |
| CH007 | Dunside, cairn - in-combination | SM | Photomontage | 363149 | 656788 |
| CH008 | Dabshead Hill, fort and standing stone | SM | Wireframe | 354714 | 651236 |
| CH009 | Borrowston Rig, stone circles and cairns | SM | Photomontage | 355734 | 652349 |
| CH011 | Johnscleugh, Crow Stones, stone setting | SM | Wireframe* | 361836 | 665208 |
| CH010 | Johnscleugh, Nine Stones, stone setting | SM | Wireframe | 362549 | 665494 |
| CH012 | Johnscleugh, Kingside Burn, stone setting | SM | Wireframe | 362581 | 665186 |
| CH013 | Traprain Law, fort | SM | Photomontage (LVIA) | 358080 | 674661 |
| CH014 | Hillhouse, fort | SM | Wireframe | 350541 | 655402 |
| CH015 | Wrunklaw, fort | SM | Wireframe | 367238 | 658451 |
| CH015 | Byrecleugh, Beaters' cottage - in-combination | LB | Photomontage | 362897 | 657970 |
| CH016 | Longformacus House | LB | Wireframe* | 369587 | 657315 |
| CH017 | Lauder Conservation Area | CA | Wireframe* | 353130 | 647535 |
| CH018 | Gifford Conservation Area | CA | Wireframe* | 353385 | 668015 |

* denotes preliminary location to be confirmed by fieldwork, and superseded by photomontage if necessary.

**8.16** Visualisation approach and locations will be agreed with relevant consultees as the EIA progresses. While a number of Inventory-listed Historic Gardens and Designed Landscapes have a small measure of theoretical visibility, this is generally confined to relatively small areas of the outer policies, rather than the estate core and/designed views.

### Field Surveys

**8.17** A walkover field survey, targeting the construction footprint of the Proposed Development, will be conducted within the development footprint and an appropriate micro-siting allowance (i.e. 100m), including any areas required to be widened along the existing access to the operational Fallago Rig Wind Farm. This will allow for the verification of all known heritage assets, confirming their interpretation, location and likely sensitivity to change, and the potential effects on those assets to inform consideration of any potential mitigation measures. Informed by baseline data and judgements on archaeological potential, the walkover will also seek to identify any previously unrecognised assets on site, using a transect-based approach. Any such assets will be recorded to Historic England/RCAHMS Level 1.[51]

**8.18** Selected assets in the vicinity of the Site will also be visited to gather baseline information regarding their setting. Selection will be informed by the ZTVs and judgements on the likely sensitivity to setting change of assets with theoretical visibility or the potential for in-combination views that contribute to their significance.

### Assessment of Potential Effects

**8.19** The process for the assessment of potential effects to cultural heritage assets will begin by appropriately identifying the heritage assets that may be affected, based on the baseline data indicated above. These will be examined to provide a description of the cultural significance for each asset, including any contribution made by setting, and establishing its sensitivity to change, before identifying the likely effects the development could have on that significance. Cultural significance will be ascribed under the following criteria:

- **High:** assets of national importance, comprising designated heritage assets and non-designated assets of demonstrable value.
- **Medium:** assets of regional importance, for example those identified by regional research priorities, via engagement with relevant consultees or through the assessment of their significance.
- **Low:** assets of local importance.

**8.20** A full assessment of the significance of effects will be undertaken alongside identifying opportunities to mitigate the effects. All effects will be assessed to reflect the way in which the Proposed Development has the potential, either through physical effects or setting change, to affect the cultural significance of the asset. In articulating effects, a judgement will be made on the level of harm or benefit a historic asset will experience as a result of the Proposed Development, supported by an appropriate narrative explaining how the cultural significance of the asset will be changed. The criteria for the assessment of effects will be informed by guidance published in Appendix 1 of SNH (now NatureScot) and HES 'EIA Handbook'.

**8.21** In addition, assessment of effects related to change in setting and cumulative impacts with other wind farm developments will be informed by review of ZTVs for the Proposed Development and visualisations, such as wirelines and photomontages. The use of photomontages to support reporting of effects to particular assets will be agreed in the course of the assessment with the relevant consultee, along with the necessary visualisation standards. Assessment of effects related to setting change will be undertaken using the staged approach laid out in the HES 'Managing Change in the Historic Environment: Setting' guidance.

## Potential Significant Effects

**8.22** In terms of cultural heritage impact assessment, impacts are considered in terms of the change to an asset's cultural significance. Impacts can be beneficial or adverse, temporary or permanent, avoidable or unavoidable, individual or cumulative, amongst many factors. There are three principal impact pathways that can affect cultural heritage assets:

- **Physical impact**: Direct physical effects to assets occur when, as a result of Proposed Development, the fabric of the asset is removed or damaged; this will be permanent and generally occurs during the construction phase. There is greater risk to the disturbance of undiscovered assets, including buried remains of archaeological interest, which could be partially or totally removed. Indirect physical effects can also occur at any stage of development to assets which lie outside the proposed site. For instance, adverse impacts can include such as increased erosion or damage to walls from vibration arising from construction traffic, which is likely to be permanent. Assets to be taken forward for assessment will be

[51] Position (OS NGR and relevant GPS data), photographic record, key measurements and, where appropriate, sketch plans

identified through analysis of the development footprint and, where relevant, access routes to site, and informed by a walkover survey.

- **Setting change**: 'Setting' is the way the surroundings of an asset or place contribute to how it is understood, appreciated and experienced in the landscape. All heritage assets have a setting, but the contribution that this makes to their cultural significance varies in line with the location, form, function and preservation of the asset and its surroundings. Effects related to setting change are direct and result from how a development proposal alters an asset's setting in a way which affects its significance or how it is perceived. Such changes are often visual, but can also relate to disruptions of historical, functional or symbolic relationships (including intervisibility between assets or historic patterns of land use) or sensory factors such as noise, odour or emissions. Indirect impacts on setting can also occur away from the proposal, such as changes in traffic around an asset. This type of impact can occur at any stage of development and may be permanent, reversible or temporary. Assessment of setting impacts of the Proposed Development will be based on analysis of ZTVs, field visits and assessment of agreed visualisations.
- **Cumulative impacts**: Impacts of a cumulative nature can relate to the physical fabric or setting of assets. This can be a result of impact interactions between different impacts of the proposal or in combination with impacts of other projects. Alternatively, they may be additive impacts from incremental changes caused by the proposal together with other extant projects or those already in the planning system. The cultural heritage assessment will consider the potential effects to heritage assets against a baseline that includes existing or consented wind farms (see **Figure 4.5**), in line with the schemes agreed for inclusion in the cumulative assessment. Visualisations, as discussed above, will be used to inform the assessment.

### Potential Effects Scoped into Assessment

**8.23** Based on the existing understanding of baseline conditions, it is proposed that the following are scoped into the assessment:

- direct effects and effects due to setting change for all assets lying within the Primary study area;
- effects due to setting change for all assets within the Inner Setting study area identified as being of sensitive to setting change;
- effects due to setting change for designated assets identified as being sensitive to setting change within the Outer Setting study area;
- effects due to setting change for specific designated assets at longer distances identified as being sensitive to setting change; and
- cumulative effects.

### Potential Effects Scoped out of Assessment

**8.24** Based on baseline conditions, theoretical visibility and distance from the Proposed Development, it is proposed that the following are scoped out:

- physical effects to assets outside the Primary study area;
- effects upon non-designated heritage assets lying beyond the Inner study area;
- effects upon designated heritage assets lying beyond the Outer study area, except where specifically identified/agreed with consultees; and
- effects associated with decommissioning the Proposed Development.

## Approach to Mitigation

**8.25** Owing to the nature of the Proposed Development, it is envisaged that mitigation is likely to focus on addressing direct effects to cultural heritage assets, including prevention of accidental damage or potential destruction to heritage assets, which will be avoided where possible through the design process. The approach to mitigation will be guided by industry common

practice and appropriate procedures as laid out in the relevant standards and guidance documents from the Chartered Institute for Archaeologists.

**8.26** Avoiding change to the setting of cultural heritage assets is particularly challenging for tall structures like wind turbines. Screening by vegetation, whether existing or proposed, is rarely considered to be effective mitigation. Planting is, in any case, temporary and can be removed through subsequent land use decisions. Due to the heritage assets being primarily affected by operational and/or cumulative effects as a consequence of setting change, the main opportunity for mitigation will relate to layout refinement and, where feasible, turbine dimensions (within the scope of available machines and the viability of the project).

## Consultee List

**8.27** The consultees below will be approached for information to inform the EIA:

- Historic Environment Scotland;
- Scottish Borders Council historic environment service; and
- East Lothian Council historic environment service.

**Questions for Consultees**

**Q8.1:** Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on cultural heritage?

**Q8.2:** Is the proposed methodology appropriate, including approach to study areas and field surveys?

**Q8.3:** Are the proposals to scope out certain elements of cultural heritage from detailed assessment appropriate?

**Q8.4:** Are there further specific heritage assets that should be considered in the impact assessment?

**Q8.5:** Are there further assets or locations which you wish to see visualisations for?

# Chapter 9
# Noise and Vibration

## Introduction

**9.1** This chapter sets out the proposed approach to the assessment of potential noise and vibration effects on noise-sensitive residential receptors during construction and operation of the Proposed Development.

**9.2** A detailed assessment will be completed of construction and operation of the Proposed Development following relevant guidance and standards for the assessment of wind farm noise applicable in Scotland.

**9.3** The noise assessment will consider the effects of construction (including traffic) of the Proposed Development and operational noise of the wind turbines on nearby noise-sensitive receptors (including cumulatively with nearby windfarms as necessary). The assessment will identify where significant effects may occur, what mitigation measures may be necessary, what residual effects there may be and what post-commissioning monitoring may be required.

## Study Area

**9.4** Assessment of construction noise will consider noise-sensitive residential properties nearest to the operational wind turbines around the periphery of the Site as well as those which may be located alongside the proposed site access tracks and associated construction traffic routes.

**9.5** The study area for the assessment of operational noise will include noise-sensitive residential properties nearest to the operational wind turbines around the periphery of the Site. Additional noise-sensitive receptor locations may be included to consider cumulative effects of operating the Proposed Development with neighbouring wind farms, in particular Fallago Rig Wind Farm. Most of the receptors are located in the local authority area of the Scottish Borders, whilst some are located within East Lothian.

## Existing Conditions

**9.6** The Proposed Development is surrounded by a relatively sparsely populated area, particularly to the south and west where there are largely no dwellings in close proximity to the Site. Some isolated dwellings are located north and east of the Site, and settlements such as Longformacus and Westruther are located more than 5km away from the Site boundary.

**9.7** The noise environment surrounding these receptors is expected to be dominated by ‘natural’ sources, such as wind disturbed vegetation and forestry, watercourses (in places), birds and farm animals, with contribution from local road traffic in some cases, and existing vehicles within the estate and accessing Fallago Rig Wind Farm.

## Design Considerations

**9.8** During construction, noise could arise from both on-site activities, such as, the construction of on-site access tracks, turbine foundations, the control building (substation) etc., and also from the movement of construction-related traffic both on-site and travelling on public roads to and from the Site. Assessment of the temporary effects of construction noise is primarily aimed at understanding the need for dedicated management measures and, if so, the types of measures that are required.

**9.9** During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise is caused by the interaction of the turbine blades with the air. Mechanically generated noise is caused by the operation of internal components, such as, the gearbox and generator, which are housed within the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level. The wind turbine layout will be developed such that applicable noise limits (see below) can be achieved in practice, including cumulatively.

## Proposed Surveys and Assessment Methodologies

### Guidance

**9.10** The noise assessment will be undertaken with reference to the following documents:

- ETSU-R-97 The Assessment and Rating of Noise from Wind Farms (The Working Group on Noise from Wind Turbines, 1996);
- PAN 01/2011 Planning and Noise and associated Technical Advice Note (Scottish Government, 2011);
- Onshore Wind Turbines: Planning Advice. Online planning advice, Scottish Government, last updated 28 May 2014;
- A Good Practice Guide to the Application of ETSU R 97 for the Assessment and Rating of Wind Turbine Noise (Institute of Acoustics, 2013) (IOA GPG);
- BS 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites (British Standards Institution, 2014);
- HMSO Department of Transport (1988). Calculation of Road Traffic Noise (CRTN); and
- The Highways Agency, Transport Scotland (2019). Design Manual for Roads and Bridges, LA 111 (DMRB).

### Desk and Field Survey Method

**9.11** Consideration will be given to data previously gathered as part of the assessment of the adjacent Fallago Rig Wind Farm, and whether sufficient and representative baseline background noise levels have already been obtained. This may be sufficient to appropriately define background noise levels for several of the relevant noise-sensitive receptor locations.

**9.12** This may be supplemented by an additional background noise survey at a representative number of residential receptor locations around the Proposed Development. The selection of these locations and the number of locations will be carefully chosen, in combination (if relevant) with historical data, to provide representative baseline levels sufficient for an assessment in accordance with ETSU-R-97 and the IOA GPG. The latter guidance requires that any background noise survey measurements are not substantially influenced by operational wind turbine noise and so this will represent a consideration in any new survey.

**9.13** The proposed approach and any new proposed survey locations will be set out in consultation with the Environmental Health department of the Scottish Borders and East Lothian Councils (or their appointed consultant), with a view to agreeing these in advance of any survey. Representatives of the Council and/or their appointed consultant will be invited to attend during setup of the equipment for these surveys to agree measurement positions.

### Assessment Method

**9.14** The assessment of construction noise effects would be undertaken in accordance with the guidance contained within BS 5228 part 1 (noise) for fixed and mobile construction plant as well as traffic passing along haul routes within the Site. An assessment of potential impacts arising from any changes in traffic flows as a result of the proposed Development will also be undertaken as part of the construction noise assessment using CRTN and DMRB. Where necessary, appropriate levels of mitigation would be identified, in accordance with best practice, to ensure that noise levels are acceptable during the construction phase. Significant construction vibration effects are unlikely, but this will be considered with reference to BS 5228 part 2 (vibration).

**9.15** The assessment of operational noise effects will be undertaken using ETSU-R-97 ‘The Assessment of Rating of Noise from Wind Farms' (The Working Group on Noise from Wind Turbines, 1996), which is the methodology recommended in the Online planning advice on ‘Onshore wind turbines’. The report defines a procedure for assessing and rating wind farm noise.

**9.16** ETSU-R-97 recommends that noise limits should be set relative to existing background noise levels at the nearest receptors and that these limits should reflect the variation in background noise with wind speed. Separate noise limits apply for day-time and for night-time periods. Day-time limits are chosen to protect a property’s external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

**9.17** Based upon quiet day time and night-time wind varying background noise levels for each identified noise sensitive receptor, noise limits will be derived in accordance with the methodology set out in ETSU-R-97. The significance of the predicted noise levels at noise-sensitive receptors will then be determined against these criteria.

**9.18** A representative wind turbine will be determined for the assessment of noise from the operational wind farm and meet the design requirements. A computer model will be constructed and used to predict noise levels resulting from the operation of the proposed Development, based on the methodology detailed in ISO 9613-2:1996, with the specific modelling procedure defined in the IOA GPG.

**9.19** The noise limits derived according to ETSU-R-97 guidance, for each noise-sensitive receptor, apply to the total noise produced by all wind farms. Therefore, potential cumulative operational noise levels, including consented and application wind turbines in the area, must be assessed relative to these limits.

**9.20** The assessment methodology, in particular with regards to cumulative impacts, will also be discussed with the Environmental Health department of the Scottish Borders and East Lothian Councils.

## Potential Significant Effects

### Potential Effects Scoped into Assessment

**9.21** During construction, noise could arise from both onsite activities, such as the construction of onsite access tracks, turbine foundations, the substation/control building etc., and from the movement of construction related traffic both onsite and travelling on public roads to and from the Site. Vibration effects would be localised to some activities and considered where relevant. If blasting is required in onsite borrow pits[52], the associated impacts would also be considered.

**9.22** During operation, wind turbines have the potential to create noise effects through both aerodynamic noise and mechanical noise. Noise emitted from other operational elements of the development are likely to be negligible, and so the operational noise assessment will focus on the noise emitted from the proposed wind turbines.

### Potential Effects Scoped out of Assessment

**9.23** Ground-borne vibration resulting from the operation of wind turbines is imperceptible at typical receptor separation distances and is therefore proposed to be scoped out from the noise assessment.

**9.24** Noise associated with routine maintenance visits and operational traffic is likely to be negligible, and therefore will be scoped out of the noise assessment.

**9.25** With regard to infrasound and low frequency noise, the above-referenced online planning advice note, Onshore wind turbines, refers to a report for the UK Government which concluded that *"there is no evidence of health effects arising from infrasound or low* frequency *noise generated by the wind turbines that were tested"*. The current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms.

**9.26** It is therefore not proposed to undertake specific assessments of infrasound and low frequency noise, but the noise chapter will consider the latest supporting information on these subjects and the topic of wind turbine blade swish or Amplitude Modulation (AM).

**9.27** Effects associated with decommissioning will be similar to construction effects and are scoped out of the assessment as detailed in Chapter 3 above.

## Approach to Mitigation

**9.28** For construction noise, relevant working practices, traffic routes, management procedures and proposed working hours would be set out in the EIA Report.

**9.29** Mitigation of operational noise would be achieved through the design of the project, such that the relevant ETSU-R-97 noise limits can be achieved at the surrounding properties with commercially available wind turbines, taking into account the noise emissions from cumulative wind farms in the area. The layout of the wind turbines on the Proposed Development would be iteratively designed with feedback provided on the noise predicted such that this can be achieved in practice.

## Consultee List

**9.30** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- Scottish Borders Council (Environmental Health); and
- East Lothian Council (Environmental Health).

**Questions for Consultees**

**Q9.1:** Confirmation is requested as to whether it is agreed that the approach to assessment of noise from construction, and operation as set out above meets the requirements of Scottish Borders and East Lothian Councils.

# Chapter 10
# Traffic and Transport

## Introduction

**10.1** The section covers the predicted transport and access issues that may arise from the construction of the Proposed Development, the significance of these effects and what suitable mitigation can be put in place to avoid, minimise or offset any adverse impacts.

**10.2** The Transport & Access EIA Report Chapter will be supported by a Transport Assessment report, Abnormal Load Route Survey and technical figures.

**10.3** The key issues for consideration as part of the assessment will be:

- the temporary change in traffic flows and the resultant, temporary effects on the study network during the construction phase;
- the physical mitigation associated with the delivery of abnormal indivisible loads (AILs);
- the design of new access infrastructure; and
- the consideration of appropriate and practical mitigation measures to avoid, minimise or offset any temporary effects.

## Study Area

**10.4** The study area will comprise the road network that will be used for import of raw materials, construction staff commuting and the proposed AIL route to the Site. The study area is therefore proposed to include:

- A68 between the A720 and Lauder;
- A697 between Carfraemill and Greenlaw; and
- B6456 between Whiteburn and Choicelee.

**10.5** Locally sourced material or materials won on site will be used wherever feasible and traffic will avoid impacting on local communities as far is possible.

## Existing Conditions

**10.6** Access to the Site will mirror that used for Fallago Rig Wind Farm, with access taken from the B6456 to the east of Westruther. Access from the port of entry (currently assumed to be Rosyth) will be undertaken via the A720, A68 and A697.

**10.7** The existing access junction will need to be reviewed to confirm if any mitigation works are required to allow access for the proposed turbine loads.

**10.8** A site visit will be undertaken as part of the AIL route survey. This will also review general road infrastructure and condition.

## Design Considerations

**10.9** The following policy and guidance documents will be used to inform the EIA Report Chapter:

- Transport Assessment Guidance (Transport Scotland, 2012);
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
- SPP (Scottish Government, 2014); and
- Scottish Borders Council Local Transport Strategy.

**10.10** The existing junction of the Fallago Rig access track and the B6456, and the access track itself, may require upgrades to cater for general construction traffic, abnormal loads deliveries and ongoing operational access to the Proposed Development. This will be described in the EIA Report and an indicative layout plan junction and track amendments will be provided.

**10.11** AILs associated with the turbine components will be examined in a Route Survey Report that will be appended to the EIA Report. Swept path assessments and traffic management requirements necessary for the safe and efficient delivery of the loads will be detailed in this report.

## Proposed Surveys and Assessment Methodologies

**10.12** Existing traffic count data will be used from the Department for Transport (DfT) database for the A68 (sites 30735, 50727 and 30734) and for the A697 (sites 50943 and 10871). A new ATC survey for the B6456 will commissioned and located at Westruther for one week to record classified traffic data for a 'neutral' month (i.e., outwith holiday periods etc.).

**10.13** Three years of traffic accident data will be collected using the online resource crashmap.co.uk for the A697 and B6456 to inform the baseline review.

**10.14** Online sources such as the National Cycle Route map and Ordnance Survey maps will be used to obtain details of the sustainable travel network.

**10.15** The Guidelines for the Environmental Assessment of Road Traffic (IEMA 1993) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on:

- Potential impacts (of changes in traffic flows) on local roads and the users of those roads; and
- Potential impacts (of changes in traffic flows) on land uses and environmental resources fronting these roads, including the relevant occupiers and users.

**10.16** The following rules taken from the guidance will be used as a screening process to define the scale and extent of the assessment:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

**10.17** Increases below these thresholds are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level predicted as a consequence of the Proposed Development will therefore be assumed to result in no discernible environmental impact and as such no further consideration will be given to the associated environment effects.

**10.18** The estimated traffic generation of the Proposed Development will be compared with baseline traffic flows, obtained from existing traffic survey data, to determine the percentage increase in traffic.

**10.19** Potentially significant environmental effects will then be assessed where the thresholds as defined above are exceeded. Suitable mitigation measures will be proposed, where appropriate.

**10.20** Committed development traffic, i.e., those from proposals with planning consent, will be included in baseline traffic flows, where traffic data for these schemes is considered significant and is publicly available. Developments that are proposed or at Scoping would not be included.

**10.21** It is not anticipated that a formal Transport Assessment will be required as these are not generally considered necessary for temporary construction works.

**10.22** Each turbine is likely to require between 11 and 14 AILs to deliver the components to site. The components will be delivered on extendable trailers which will then be retracted to the size of a standard HGV for the return journey.

**10.23** Detailed swept path analyses will be undertaken for the main constraint points on the route from the port of entry through to the Site access junction to demonstrate that the turbine components can be delivered to site and to identify any temporary road works which may be necessary.

## Potential Significant Effects

### Potential Effects Scoped into Assessment

**10.24** Potential impacts that may arise during the assessment may include the following for users of the road and those resident along the delivery routes:

- severance;
- driver delay;
- pedestrian delay;
- pedestrian amenity;
- fear and intimidation; and
- accidents and safety.

**10.25** The impacts on receptors within the study area will be reviewed during the construction phase, with a peak construction period assessment undertaken. This will review the maximum impact and presents a robust assessment of the effects of construction traffic on the local and trunk road networks.

**10.26** The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above.

### Potential Effects Scoped out of Assessment

**10.27** Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits would be made to the wind farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the wind farm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed.

**10.28** Effects associated with decommissioning will be similar to construction effects and are scoped out of the assessment as detailed in Chapter 3 above.

## Approach to Mitigation

**10.29** Standard embedded mitigation measures that are likely to be included in the assessment are:

- production of a Construction Traffic Management Plan;
- the design of suitable access arrangements with full consideration given to the road safety of all road users;
- a Staff Sustainable Access Plan; and
- a Framework Abnormal Load Transport Management Plan.

**10.30** Additional mitigation will be included should the assessment reveal criteria that are significant following the application of standard mitigation measures.

## Consultee List

**10.31** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- Scottish Borders Council as local roads authority;
- Transport Scotland as trunk roads agency; and
- Structures owners / operators along the Site access route via the ESDAL consultation undertaken as part of the AIL assessment.

**Questions for Consultees**

**Q10.1:** Is the proposed methodology is acceptable?

**Q10.2:** Are the methods proposed for obtaining traffic flow data are acceptable?

**Q10.3:** Is the use of Low National Road Traffic Forecasts (NRTF) is acceptable for the whole of the study?

**Q10.4:** What committed development schemes should be included in the assessment?

# Chapter 11
# Aviation

## Introduction

**11.1** Wind turbines have the potential to affect civil and military aviation. This section covers the methodology that will be used to undertake the aviation safeguarding assessment, lists the aviation references and describes the aviation baseline condition, consultation requirements and mitigation to be applied if required and reported in the EIA Report.

**11.2** There are a number of aviation publications relevant to the interaction of wind turbines and aviation containing guidance and legislation, which cover the complete spectrum of aviation activity in the UK as shown below:

- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6, Feb 2016;
- CAP 168 Licensing of Aerodromes, Version 11 March 2019;
- CAP 670 ATS Safety Requirements Version 3 June 2019;
- CAP 774 UK Flight Information Services, Ed 3 May 2017;
- CAP 738 Safeguarding of Aerodromes Version 2 Dec 2006;
- CAP 793 Safe Operating Practices at Unlicensed Aerodromes Ed 1 July 2010;
- CAP 493 Manual of Air Traffic Services Part 1 Ed 7.0 2017;
- CAP 660 Parachuting Ed 5 March 2020;
- Military Aviation Authority Regulatory Article 2330 (Low Flying);
- UK Military Aeronautical Information Publication (MIL AIP);
- UK Aeronautical Information Publications (AIP);
- CAA 1:250,000 and 1:500,000 VFR Charts; and
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level dated 01/06/17.

## Study Area

**11.3** The assessment of effects of the proposed turbines will be based upon the guidance laid down in CAA Publication CAP 764 *Policy and Guidelines on Wind Turbines* Version 6 Dated February 2016. Consultation criteria for aviation stakeholders is defined in Chapter 4. These distances inform the size of the study area and include:

- Airfield with a surveillance radar – 30km;
- Non radar licensed aerodrome with a runway of more than 1,100 metres – 17km;
- Non radar licensed aerodrome with a runway of less than 1,100 metres – 5km;
- Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- Unlicensed aerodromes with runways of more than 800 metres – 4km;
- Unlicensed aerodromes with runways of less than 800 metres – 3km;
- Gliding sites – 10km ; and

- Other aviation activity such as parachute sites and microlight sites within 3km – in such instances developers are referred to appropriate organisations.

**11.4** CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders and will be reported upon in the EIA Report. For example, in the case of Edinburgh Airport they have stated that they wish to be consulted in relation to wind farms out to 40km.

**11.5** It is necessary to take into account the aviation and air defence activities of the Ministry of Defence (MOD) as safeguarded by the Defence Infrastructure Organisation (DIO). The types of issues that will be addressed in the EIA Report include:

- Ministry of Defence Airfields, both radar and non-radar equipped;
- Ministry of Defence Air Defence Radars;
- Ministry of Defence Meteorological Radars; and
- Military Low Flying.

**11.6** It is necessary to take into account the possible effects of wind turbines upon the National Air Traffic Services En Route Ltd (NERL) communications, navigation and surveillance (CNS) systems – a network of primary and secondary radars and navigation facilities around the country.

**11.7** As well as examining the technical impact of wind turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine whether a Proposed Development will breach obstacle clearance criteria. This will also be reported on in the EIA Report but initial surveys show there are no physical safeguarding issues associated with this proposal.

## Radar Modelling Methodology

**11.8** The radar calculation results shown in this report have been produced using specialist propagation prediction software (Rview Version 5).

## Existing Conditions

**11.9** The Proposed Development is located 45km to the south-east of Edinburgh International Airport in a location that is relatively remote from significant aviation operations and infrastructure. It is also located immediately to the south-east of the operating Fallago Rig Wind Farm. As shown in **Figure 11.1** Dunside Wind Farm is over 13km to the east of the Edinburgh Control Area (CTA) and in unregulated Class G airspace. In military terms the Site is well to the north of the RAF Spadeadam range and operating area and there are no military airfields in this area.

### Licensed Aerodromes

**11.10** An initial review undertaken by WPAC using the above criteria shows that there are no civil licensed aerodromes within consultation distance, however, Edinburgh Airport is 45km to the north-west and is routinely consulted about wind farm proposals within the region. Initial radar line of sight (RLOS) modelling has been undertaken against the Primary Surveillance Radar (PSR) with the results reported in **Table 11.1** below.

**Table 11.1: Edinburgh Airport PSR Results (metres AGL)**

| Turbine | RLOS | Turbine | RLOS | Turbine | RLOS |
|---|---|---|---|---|---|
| 1 | 130.3 | 8 | 232.9 | 15 | 229.3 |
| 2 | 165.7 | 9 | 212.1 | 16 | 148 |
| 3 | 179.9 | 10 | 143.4 | 17 | 164.2 |
| 4 | 165.5 | 11 | 149.3 | 18 | 168.9 |

| Turbine | RLOS | Turbine | RLOS | Turbine | RLOS |
|---|---|---|---|---|---|
| 5 | 219.9 | 12 | 254.4 | 19 | 196.4 |
| 6 | 176.8 | 13 | 179.6 | 20 | 208.3 |
| 7 | 253.6 | 14 | 253.4 | | |

**11.11** These results can be interpreted as assuming that where the RLOS figure is less than the turbine tip height of 260 metres (in every case) the turbines will be fully or partially visible to the radar at Edinburgh and may generate radar 'clutter' on the displays, however in this location and positioned 'behind' the Fallago Rig Wind Farm in respect to the radar, it is unlikely that the effect will cause an unacceptable operational impact., Notwithstanding this, consultation will be undertaken with Edinburgh Airport and the results reported in the EIA Report.

**11.12** There are no other radar equipped licensed aerodromes within or close to consultation distance. Initial radar modelling confirms that none of the turbines will be visible to Glasgow International Airport and at a distance of over 100km, consultation is not required.

### Unlicensed Aerodromes

**11.13** There are no unlicensed aerodromes marked on aviation charts of known within consultation distance, the closest is at Charterhall, over 19km to the south. Consultation is not required and this issue can be scoped out of the EIA Report.

### Ministry of Defence

#### Military Air Traffic Control

**11.14** There are no military airfields in the region, however, the RAF Spadeadam Electronic Warfare Training Facility, 60km to the south, has two ATC radars, one at Deadwater Fell and one at Berryhill. Initial radar modelling has been undertaken against both radars which show that the turbines are completely screened by terrain as Radar Line of Sight is in excess of 550 metres AGL across the landholding and will have no effect on the performance of the radars. The MOD will be consulted to confirm this and the response reported in the EIA Report.

#### Military Air Defence Radar

**11.15** The closest air defence radar is located at RRH Brizlee Wood, near Alnwick. Radar modelling has been undertaken with the results shown in **Table 11.2** below. It is clear that all the turbines will be visible to the radar at Brizlee Wood. The turbines at Fallago Rig are already visible to the radar and technical mitigation has been applied. It is likely that the same mitigation will be suitable for the Proposed Development, the MOD will be consulted and the results reported in the EIA Report.

**Table 11.2: RAF Brizlee Wood Lockhead Martin TPS-77 Radar Results**

| Turbine | RLOS | Turbine | RLOS | Turbine | RLOS |
|---|---|---|---|---|---|
| 1 | 1.7 | 8 | 18 | 15 | 107.6 |
| 2 | 2.3 | 9 | 0 | 16 | 107.4 |
| 3 | 10 | 10 | 88.3 | 17 | 105.2 |
| 4 | 0 | 11 | 36.1 | 18 | 117.8 |
| 5 | 1.8 | 12 | 71.4 | 19 | 4.6 |
| 6 | 0.3 | 13 | 21 | 20 | 35.5 |

| Turbine | RLOS | Turbine | RLOS | Turbine | RLOS |
|---|---|---|---|---|---|
| 7 | 60.1 | 14 | 64.8 | | |

### MOD Low Flying

**11.16** The Proposed Development is located within Low Flying Area (LFA) 16, a busy low flying area shown as 'Amber' on MOD low flying wind farm maps. Amber is defined as 'An area where regular military low flying takes place and where mitigation may be necessary to resolve concerns'. The MOD will be consulted and the outcome reported in the EIA Report but it is likely that the mitigation will consist of an arrangement of infra-red lighting to MOD specifications.

### NATS En Route Ltd (NERL)

**11.17** An initial assessment has been conducted to predict any effect of the Proposed Development on NERL communications, navigation and surveillance infrastructure. The closest radars in the system are at Lowther Hill and Great Dun Fell. Initial radar modelling shows that the turbines will be visible to the Great Dun Fell radar as shown in the results in **Table 11.3**. The turbines will all be screened by terrain from Lowther Hill as radar line of sight is in excess of 370 metres AGL. NERL will be consulted to confirm this result and to explore mitigation options; the outcome will be reported in the EIA Report.

**Table 11.3: NERL Great Dun Fell Radar Results**

| Turbine | RLOS | Turbine | RLOS | Turbine | RLOS |
|---|---|---|---|---|---|
| 1 | 158.9 | 8 | 194.7 | 15 | 167.7 |
| 2 | 203.4 | 9 | 227.4 | 16 | 130.1 |
| 3 | 186.6 | 10 | 171.2 | 17 | 152.5 |
| 4 | 181.8 | 11 | 189.9 | 18 | 167.7 |
| 5 | 164.5 | 12 | 234 | 19 | 170.7 |
| 6 | 155.1 | 13 | 201.9 | 20 | 210.6 |
| 7 | 232.1 | 14 | 213 | | |

### Met Office Radars

**11.18** The Met Office safeguards its network of radars using a European methodology known as OPERA. In general they will object to any turbine within 5km in line of sight and will examine the impact of any turbines within 20km. In this case the closest Met Office radar is at Holehead, over 100km to the north-west. There will be no Met Office radar objection to this proposal and consultation is not required. This issue will therefore be scoped out of the EIA Report.

### Aviation Obstruction Lighting

**11.19** A wind farm with tip heights in excess of 150 metres will need to be illuminated at the hub of selected turbines with medium intensity red aviation obstruction lighting. WPAC will design a lighting layout which minimises the number of lit turbines whilst fulfilling flight safety requirements and gain approval for the lighting layout from the CAA. This will be reported on in the EIA Report within a technical appendix to describe the effect of aviation lighting on the environment and to inform the Landscape and Visual Impact Assessment. It will also articulate the mitigation techniques available taking into account the extant legislation and guidance. An infra-red lighting layout to fulfil MOD requirements will also be designed and approval obtained from the MOD and reported in the EIA Report.

## Potential Significant Effects

### Potential Effects Scoped into Assessment

**11.20** There are two potential significant effects, the effect of the turbines on the MOD Air Defence radar at Brizlee Wood and the NERL Great Dun Fell radar. Both issues are likely to be mitigatable and will be reported upon in the EIA Report.

## Consultee List

**11.21** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- Ministry of Defence – Defence Infrastructure Organisation (MOD DIO);
- Edinburgh International Airport Safeguarding Department;
- NATS En Route Ltd (NERL); and
- Civil Aviation Authority (CAA) for aviation lighting approval.

**Questions for Consultees**

**Q11.1:** Are there any other aviation stakeholders that will need to be consulted?

# Chapter 12
# Other Issues

## Introduction

**12.1** It is proposed that a single EIA Report chapter will be prepared to draw together the assessments of the Proposed Development on other topics that are not dealt with within the other technical chapters of the EIA Report, or alternatively, to explain why these topics have been scoped out.

**12.2** It is anticipated that this chapter would include discussion of the following issues:

- Communications and Telecommunications;
- Shadow Flicker;
- Climate Change including Carbon Balance;
- Socio-economics;
- Population and Human Health (including dust); and
- Major Accidents and Disasters.

**12.3** Predicted effects for these topics will be determined through a standard method of assessment based on professional judgement. Where a 'significant effect' is identified, this will be considered as significant in the context of the EIA regulations.

## Communications and Telecommunications

**12.4** Wind turbines can cause electromagnetic interference through physical and electrical interference. Physical interference can cut across electromagnetic signals resulting in a 'ghosting' effect which largely affects television signals and radar. Electrical interference arises as a result of the operation of the generator within the nacelle of the turbine and can also affect communication equipment in proximity to the turbines. Where possible, any potential effects on radio-communication links and television will be mitigated at the turbine layout design stage by the use of exclusion zones around any link paths. Alternative options (in particular link re-routing) are available to mitigate effects upon communications links where these cannot be avoided by turbine siting.

**12.5** The Office of Communications (Ofcom) is responsible for the licensing of two-way radio transmitters and holds a register of most microwave links. However, because not all microwave links are published, system operators will be individually consulted on the Proposed Development's potential to cause electromagnetic interference. In the event that no effects upon communications infrastructure are identified via this consultation process, then effects upon communications links will be subject to brief descriptive treatment in the EIA Report but scoped out of detailed assessment. If consultation identifies the potential for interference with communications links that cannot be addressed via re-design of the Proposed Development, then alternative mitigation will be explored and proposed or available mitigation measures described within the EIA Report. Effects that will result in material compromise to the operations of communications infrastructure and that cannot feasibly be mitigated will be treated as significant; all other effects will be treated as non-significant.

## Shadow Flicker

**12.6** Shadow flicker is a phenomenon where, under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off. It only occurs inside buildings where the flicker is apparent through a narrow window opening.

**12.7** A shadow flicker assessment is generally required if any properties lie within 10x rotor diameter of the wind farm. This is in line with Scottish Government online renewables planning advice on 'onshore wind turbines' which states that *"where separation*

*is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), 'shadow flicker' should not be a problem*".

**12.8** In the event that turbines are proposed within 10 x rotor diameter of a property, the potential for effects from shadow flicker to arise will be considered.

## Climate Change, including Carbon Balance

**12.9** By its very nature, the Proposed Development will reduce demand for fossil fuel electricity generation and therefore contribute to the Scottish Government's carbon reduction targets.

**12.10** A carbon balance assessment for the Proposed Development will be undertaken using Scottish Government guidance produced by Aberdeen University and the Macaulay Land Use Research Institute and the latest version of the carbon calculator spreadsheet produced by the Scottish Government (currently version 1.6.1).

**12.11** The main aims of the calculation are: to quantify sources of carbon emissions associated with the Proposed Development (i.e. from construction, operation and transportation of materials, as well as loss of peat); to quantify the carbon emissions which will be saved by operating the Proposed Development; and to calculate the length of time for the project to become a 'net avoider', rather than a 'net emitter' of carbon dioxide emissions.

**12.12** With respect to climate adaptation, consideration will be given to the resilience of the wind farm to projected climate change and to the likely consequences of climate change for the baseline conditions/assessment findings reported elsewhere in the EIA Report, and the resilience of proposed mitigation measures to any projected changes. The latest climate change projections (UKCP18) will be used, which allow climate change to be projected at the regional level; in this case, southwest Scotland.

## Socioeconomics

**12.13** There is no established guidance for undertaking a social and economic assessment as part of a wider EIA for a wind farm and, in LUC's professional experience, there are rarely any significant adverse effects associated with this development type. As such, it is proposed that this topic is scoped out of the EIA, on the basis that there is no likelihood of significant effects occurring. Commentary will be provided within the Development Description Chapter of the EIA Report on the likely socio-economic offer associated with the project, and this will also be considered within the Planning Statement. Potential impacts on tourism and recreation receptors will be addressed through other technical assessments, including noise and LVIA. Given the potential socio-economic benefits of the Proposed Development a specialist Socio-Economic study will be undertaken to quantify and elaborate on the benefits of the Proposed Development. This will be submitted in parallel with the EIA Report as part of the application for consent.

## Population and Human Health, including Dust

**12.14** The assessment of potential health effects will be undertaken in the context of noise and shadow flicker where scoped into the EIA.

**12.15** The assessment will also consider the health effects of dust emissions of construction activities on nearby receptors. The Design Manual for Roads and Bridges (DMRB), Volume 11 Environmental Assessment Techniques, Part 1, Air Quality states that dust generated during construction should be mitigated and that the locations of 'sensitive receptors' within 200m of construction activities should be identified and mitigation measures to reduce dust effects be applied. As such, all receptors within 200m of potential dust sources will be considered as potential receptors. Particular attention will be paid to any vulnerable populations or individuals who could be susceptible to potential health effects.

## Major Accidents and Disasters

**12.16** The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events, and peat slide risk will be covered fully in **Chapter 6**: Hydrology, Hydrogeology and Peat. The construction and operation of the Proposed Development would also be managed within the requirements of a number of health and safety related Regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974.

**12.17** As the development is not considered vulnerable to any major accidents or disasters that could result in likely significant environmental effects, it is proposed that this topic is scoped out from further assessment within the EIA Report.

## Consultee List

**12.18** It is proposed that the following stakeholders will be consulted in relation to the assessment:

- British Horse Society;
- BT;
- Joint Radio Company;
- Scottish Rights of Way and Access Society (ScotWays); and
- Visit Scotland.

**Questions for Consultees**

Q12.1: Is the approach to the assessment of the topics above considered to be appropriate, including the proposal to scope out some topics?

Q12.2: Are there any other relevant consultees who should be consulted on the assessment?

# Chapter 13
# Summary of EIA Scope

**13.1 Table 13.1** below provides a summary of the environmental topics to be scoped in and out of the EIA.

**Table 13.1: Proposed Topics Scoped in and out of the EIA**

| Topic | Scoped In | Scoped Out |
|---|---|---|
| Landscape and Visual Amenity | ■ Landscape Effects:<br>– effects on the Site;<br>– effects on the Dissected Plateau Moorland LCT (LCT 90), Plateau Moorland - Lothians LCT (LCT 266), and other LCTs within a 20km radius where there may be potential for significant effects (including cumulatively); and<br>– effects on the special qualities of the Lammermuir Hills SLA, Eildon and Leaderfoot NSA and other locally designated landscapes within a 20km radius where there may be potential for significant effects (including cumulatively).<br>■ Visual Effects:<br>– effects on individual properties within 2-3km of the nearest turbine;<br>– effects (including cumulatively) on people within settlements out to 20km including Westruther and Longformacus;<br>– effects (including cumulatively) on people travelling on major roads and railways within 20km including the A697 and B6355;<br>– effects (including cumulatively) on people using walking routes and cycle routes within 20km including the Southern Upland Way and other Core Paths within the Lammermuir Hills; and<br>– effects (including cumulatively) on people visiting areas of interest such as visitor attractions and scenic viewpoints within the 20km. | ■ Effects on landscape and visual receptors that have minimal or no theoretical visibility (as predicted by the ZTV) and are therefore unlikely to be subject to significant effects.<br>■ Effects on viewpoints beyond a 45km radius of the Site.<br>■ Effects on settlements and routes beyond a 20km radius of the Site.<br>■ Effects on LCTs beyond a 20km radius of the Site.<br>■ Effects on designated landscapes beyond a 20km radius of the Site and with no or limited theoretical visibility.<br>■ Cumulative effects in relation to turbines under 50m to blade tip height, single turbines beyond 5km from the proposed turbines and wind farms at design/scoping stage (except where otherwise stated).<br>■ Given their transient nature, landscape effects on LCTs beyond the Site boundary, visual effects during the construction phase, and cumulative landscape and visual effects during the construction phase.<br>■ Effects associated with decommissioning of the Proposed Development. |

| Topic | Scoped In | Scoped Out |
|---|---|---|
| Hydrology, Hydrogeology and Peat | ■ Pollution of surface water, including private drinking water supplies caused by releases of sediment to watercourses from excavated/stockpiled material during construction, or because of stream crossings or works near streams.<br>■ Pollution of surface water and groundwater, including drinking water supplies, through operation of machinery (e.g., spillage of fuels, oils etc.) during site preparation and construction.<br>■ Modifications to natural drainage patterns, changes to runoff rates and volumes and consequent increase in flood risk during construction and operation.<br>■ Effects on peat (including potential peat instability). | Potential effects on geology |
| Ecology | ■ Potential effects on designated sites structurally or functionally connected to the Site, during construction.<br>■ Potential effects on habitats of conservation concern[53], during construction.<br>■ potential effects on protected species recorded within the Site, during construction.<br>■ potential effects on bats, during operation. | ■ Effects on ecological features during operation (excluding bats).<br>■ Effects on red squirrel.<br>■ Effects on pine marten.<br>■ Effects on freshwater pearl mussel.<br>■ Effects on fisheries.<br>■ Effects associated with decommissioning of the Proposed Development. |
| Ornithology | Construction impacts:<br>■ temporary and permanent habitat loss/alteration/fragmentation associated with the Proposed Development infrastructure, including loss of nesting, lekking, roosting or foraging habitat; and<br>■ visual and noise disturbance associated with construction activities.<br>Operational impacts:<br>■ displacement from nesting, lekking, roosting or foraging habitats around operational turbines and other permanent infrastructure, including barrier effects; | Effects on the following:<br>■ common and/or low conservation species not recognised in statute as requiring special conservation measures (i.e., not listed as Annex 1/Schedule 1 species);<br>■ common and/or low conservation species not included in non-statutory lists (i.e., not listed as Amber or Red-listed BoCC[40] species), showing birds whose populations are at some risk either generally or in parts of their range; and<br>■ passerine species, not generally considered to be at risk from wind farm developments (SNH 2016[31], 2017[32]), unless being |

[53] Habitats included on Annex 1 of the Nature Conservation (Habitats, &c.) Regulations (1994), the Scottish Biodiversity List and/or the Local Biodiversity Action Plan.

| Topic | Scoped In | Scoped Out |
|---|---|---|
| | ■ risk of collisions with operational wind turbine blades or any other permanent infrastructure; and<br>■ potential lighting effects on birds.<br>Where appropriate, these construction and operational impacts will also be considered in a cumulative assessment.<br>Greenlaw Moor SPA, Fala Flow SPA and Firth of Forth SPA (and these SPA's associated SSSIs/Ramsars) will be scoped in to the assessment as there is the potential for a likely significant effect to the pink-footed goose populations associated with these SPAs. | particularly rare or vulnerable at a national level.<br>■ Effects associated with decommissioning of the Proposed Development.<br>Following the desk study of designated sites containing ornithological features within 20km and on the basis of the SPA connectivity guidance provided by NatureScot (SNH 2016[31]), there is considered to be no connectivity between the Proposed Development and the Outer Firth of Forth and St Andrews Bay Complex SPA and Firth of Forth. Consequently, it is proposed to scope out the Outer Firth of Forth and St Andrews Bay Complex SPA and the Firth of Forth SPA (and associated SSSI and Ramsar site) for all species listed bar pink-footed goose. |
| Cultural Heritage | ■ Direct effects and effects due to setting change for all assets lying within the Primary study area.<br>■ Effects due to setting change for all assets within the Inner Setting study area identified as being of sensitive to setting change.<br>■ Effects due to setting change for designated assets identified as being sensitive to setting change within the Outer Setting study area.<br>■ Effects due to setting change for specific designated assets at longer distances identified as being sensitive to setting change.<br>■ Cumulative effects. | ■ Physical effects to assets outside the Primary study area.<br>■ Effects upon non-designated heritage assets lying beyond the Inner study area.<br>■ Effects upon designated heritage assets lying beyond the Outer study area, except where specifically identified/agreed with consultees.<br>■ Effects associated with decommissioning of the Proposed Development. |
| Noise and Vibration | ■ During construction noise could arise from both onsite activities, such as the construction of onsite access tracks, turbine foundations, the substation/control building etc., and from the movement of construction related traffic both onsite and travelling on public roads to and from the Site. Vibration effects would be localised to some activities and considered where relevant. If blasting is required in onsite borrow pits, the associated impacts would also be considered.<br>■ During operation, wind turbines have the potential to create noise effects through both aerodynamic noise and mechanical noise. Noise emitted from other operational elements of the development are likely to be negligible, and so the operational noise | ■ Ground-borne vibration resulting from the operation of wind turbines is imperceptible at typical receptor separation distances and is therefore proposed to be scoped out from the noise assessment.<br>■ Noise associated with routine maintenance visits and operational traffic is likely to be negligible, and therefore will be scoped out of the noise assessment.<br>■ Effects associated with decommissioning of the Proposed Development.<br>■ With regard to infrasound and low frequency noise, the above-referenced online planning advice note, Onshore wind turbines, refers to |

| Topic | Scoped In | Scoped Out |
|---|---|---|
| | assessment will focus on the noise emitted from the proposed wind turbines | a report for the UK Government which concluded that *"there is no evidence of health effects arising from infrasound or low frequency noise generated by the wind turbines that were tested"*. The current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms.<br>■ It is therefore not proposed to undertake specific assessments of infrasound and low frequency noise, but the noise chapter will consider the latest supporting information on these subjects and the topic of wind turbine blade swish or Amplitude Modulation (or AM). |
| Traffic and Transport | Potential impacts that may arise during the assessment may include the following for users of the road and those resident along the delivery routes:<br>■ severance;<br>■ driver delay;<br>■ pedestrian delay;<br>■ pedestrian amenity;<br>■ fear and intimidation; and<br>■ accidents and safety.<br>The impacts on receptors within the study area will be reviewed during the construction phase, with a peak construction period assessment undertaken. This will review the maximum impact and presents a robust assessment of the effects of construction traffic on the local and trunk road networks.<br>The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above. | ■ Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly or weekly visits would be made to the wind farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the wind farm for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed.<br>■ Effects associated with decommissioning of the Proposed Development. |
| Aviation | ■ The effect of the turbines on the MOD Air Defence radar at Brizlee Wood.<br>■ Effect on the NERL Great Dun Fell.<br>■ Effects on licensed aerodromes (Edinburgh).<br>■ Effects of aviation lighting. | ■ Effects on met office radars.<br>■ Effects on unlicensed aerodromes.<br>■ Effects on all other aviation receptors. |
| Other issues | ■ Shadow Flicker (depending on final design).<br>■ Climate Change, including Carbon Balance. | ■ Communications and Telecommunications. |

| Topic | Scoped In | Scoped Out |
|---|---|---|
| | ■ Population and Human Health, including Dust. | ■ Socioeconomics (a specialist study will be undertaken and submitted alongside the EIA Report as part of the application for consent).<br>■ Major Accidents and Disasters. |

# Appendix A

## Consultee List

**A.1** The consultees listed below are proposed to be consulted as part of the EIA Scoping process:

- The Scottish Borders (Statutory)
- Nature Scot (Statutory)
- SEPA (Statutory)
- HES (Statutory)
- BAA Aerodrome Safeguarding (Edinburgh Airport)
- East Lothian Council
- British Horse Society
- BT
- Civil Aviation Authority (CAA)
- Crown Estate Scotland
- Defence Infrastructure Organisation (DIO)
- Fisheries Management Scotland
- Joint Radio Company
- John Muir Trust
- Mountaineering Scotland
- NATS Safeguarding
- River Tweed Commission DSFB
- RSPB
- Scottish Water
- Scottish Rights of Way and Access Society (ScotWays)
- Scottish Wildlife Trust
- Transport Scotland
- Visit Scotland
- Relevant Community Councils
  - Lammermuir Community Council
  - Gordon & Westruther Community Council
  - Gifford Community Council
  - Garvald & Morham
  - Lauder Community Council
  - Lauderdale Community Council
  - Gavinton, Fogo & Polwarth Community Council

# Appendix B

## Questions for Consultees

**B.1** Comments from consultees are invited in relation to the following questions as detailed within the EIA Scoping Report.

| Scoping Report Chapter | Questions |
|---|---|
| Chapter 3 Approach to EIA | Q3.1: Confirmation is requested on the proposed approach to the assessment of decommissioning. |
| Chapter 4 Landscape and Visual | Q4.1: Are there any comments on the overall methodology proposed to assess effects on landscape and visual receptors, or to assess cumulative effects? |
| | Q4.2: Are there any comments on the proposed list of assessment viewpoint locations? |
| | Q4.3: Are there any additional wind farm sites, to those shown on Figure 4.5, to consider as part of the cumulative assessment? |
| | Q4.4: Has the consultee identified any further landscape or visual receptors to be considered within the assessment (i.e. where it is expected that significant effects may occur)? |
| | Q4.5: Are there any other relevant consultees who should be consulted with respect to the LVIA? |
| Chapter 5 Geology, Hydrology and Hydrogeology | Q5.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on hydrology, hydrogeology, and peat? |
| | Q5.2: Is the proposed methodology appropriate, including the approach to peat probing across the 100m grid? |
| | Q5.3: Are the proposed list of effects which are scoped in appropriate? |
| | Q5.4: Is the proposed approach to mitigation appropriate? |
| Chapter 6 Ecology | Q6.1: Do consultees agree with the survey scope set out above? |
| | Q6.2: Do consultees agree with the assessment method (including scoped in/scoped out features)? |
| | Q6.3: Do consultees hold any existing ecological data relating to the Site that may further inform the ecological baseline? |
| | Q6.4: Are consultees aware of any local nature conservation organisation with whom further consultation should be undertaken? |
| Chapter 7 Ornithology | Q7.1: Do consultees agree that the methodology and scope of the assessment is appropriate? |

| Scoping Report Chapter | Questions |
|---|---|
| | Q7.2: Do consultees agree that the data obtained via field surveys (March to August 2021 and October 2021 to August 2022), as well as a desk study is sufficient to inform a robust impact assessment? |
| | Q7.3: Do consultees agree that, subject to further information coming to light from the field surveys and desk study, the scope of IOFs, including designated sites, to be included in the assessment is appropriate? |
| | Q7.4: Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ornithology assessment? |
| Chapter 8 Cultural Heritage | Q8.1: Are there any additional sources of baseline information which should be referred to, to inform the appraisal of effects on cultural heritage? |
| | Q8.2: Is the proposed methodology appropriate, including approach to study areas and field surveys? |
| | Q8.3: Are the proposals to scope out certain elements of cultural heritage from detailed assessment appropriate? |
| | Q8.4: Are there further specific heritage assets that should be considered in the impact assessment? |
| | Q8.5: Are there further assets or locations which you wish to see visualisations for? |
| Chapter 9 Noise and Vibration | Q9.1: Confirmation is requested as to whether it is agreed that the approach to assessment of noise from construction, operation and decommissioning as set out above meets the requirements of Scottish Borders and East Lothian Councils. |
| Chapter 10 Traffic and Transport | Q10.1: Is the proposed methodology is acceptable? |
| | Q10.2: Are the methods proposed for obtaining traffic flow data are acceptable? |
| | Q10.3: Is the use of Low National Road Traffic Forecasts (NRTF) is acceptable for the whole of the study? |
| | Q10.4: What committed development schemes should be included in the assessment? |
| Chapter 11 Aviation | Q11.1: Are there any other aviation stakeholders that will need to be consulted? |
| Chapter 12 Other Chapter | Q12.1: Is the approach to the assessment of the topics above considered to be appropriate, including the proposal to scope out some topics? |
| | Q12.2: Are there any other relevant consultees who should be consulted on the assessment? |