Fred. Olsen Renewables

natural power

Natural Power acting as lead consultants on behalf of Fred. Olsen Renewables.

Lees Hill Energy Park

Scoping Report

July 2022

Fred. Olsen Renewables Limited

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on behalf of Fred. Olsen Renewables.

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Contents

1. Introduction 1
Purpose of this Scoping Report 1
2. The Applicant 2
3. The Proposed Development 2
Project Design 4
Wind Turbines, Foundations, Transformers and Crane Pads 4
Solar Panels 4
Battery Storage 4
Access Tracks 5
Substation, External Transformer and Grid Connection 5
Borrow Pits 6
Temporary Construction and Storage Compounds, and Ancillary Infrastructure 6
Construction Environment Management Plan 6
4. Approach to Environmental Impact Assessment 7
What will the EIA Assess? 8
Gathering Baseline Information 8
Prediction of Impacts and Evaluation of Effects 8
Mitigation of Environmental Effects 9
5. Consultation 10
Community Consultation 10
Other Stakeholder Consultation 11
6. Policy and Climate Change Context 11
7. Environmental Impact Assessment Report (EIAR) 17
8. Embedded Mitigation and Further Layout Iterations 18
9. Landscape and Visual 19
Introduction 19
Existing Conditions 19
Proposed Surveys and Assessment Methodologies 22
Potential Significant Effects of the Development 28
Approach to Mitigation 29
Questions 30
10. Ecology 30
Legislation and Guidance 31
Methods 33
Results 36
Proposed Assessment Methodologies 46
Proposed Mitigation 46
Discussion 47
Conclusions 50
Questions to Consultees 51
11. Ornithology 51
Introduction 51

Methods 54
Results 61
Proposed Assessment Methodologies 68
Approach to Mitigation 69
Potential Impacts Scoped In to the Assessment 69
Potential Impacts Scoped Out of the Assessment 74
Conclusions 78
Questions 80
12. Hydrology, Geology and Hydrogeology 80
Introduction 80
Embedded Mitigation and Layout Iterations 81
Mitigation by Design 81
Good Practice Mitigation 82
Legislation and guidance 83
Survey Work Undertaken 87
Baseline results 88
Summary of Likely Impacts on Baseline Receptors 93
Method of Assessment and Reporting 96
13. Cultural Heritage 98
Introduction 98
Legislation, Policy and Guidance 99
Baseline 100
Proposed Surveys and Assessment Methodologies 102
Assessment Methodology 104
Potential Effects 105
Approach to Mitigation 106
Effects Scoped Out 106
14. Traffic and Transport 106
Introduction 106
Legislation, Policy and Guidance 107
EIA - Traffic and Transport Chapter 107
Consultation 107
Study Area 108
Traffic Impact Assessment 109
Effects Scoped Out 109
Assessment Methodology 109
Cumulative assessment 110
AIL Route Survey Report 111
Preliminary Traffic Management Plan 111
Consultee Questions 111
15. Aviation and Existing Infrastructure 112
Telecommunications and Radiocommunications 114
Utilities 114
Public Access 114
Consultee Questions 114
16. Noise 114
Introduction 114

Assessment methodology 115
Discussion 117
17. Socioeconomics 120
Introduction 120
Baseline Description 120
Study Areas 121
Relevant Guidance and Legislation 121
Proposed Scope of Survey and Assessment 122
Potential Impacts 122
Questions 123
18. Other Issues 123
Shadow Flicker 123
Glint and Glare 124
Climate Change 124
Population and Human Health 126
Major Accidents and Disasters 126
Ice Throw 126
Lightning 126
Questions 126
19. Residual, Synergist Effects and Mitigation 127
20. EIAR Accompanying Documents 127
25 Conclusion 128
26 Summary of all the Questions for Consultees 128
27 Responding to this Scoping Report 130

Appendices 131
A. List of Figures 131
B. Transport Assessment Form 133
Lees Hill Ecology Confidential Appendix A

1. Introduction

This Scoping Report has been prepared by Natural Power Consultants Limited (Natural Power) on behalf of Fred. Olsen Renewables Ltd (FORL) in anticipation of an application under Section 36 of the Electricity Act 1989 for Lees Hill Energy Park, an energy park development (consisting of wind, solar and battery storage) located approximately 5 km west of Duns, in the Scottish Borders Council (SBC) area (herein referred to as the Proposed Development).

Under the statutory procedures set out in the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations), it is proposed that any such application is accompanied by an Environmental Impact Assessment Report (EIAR). Under regulation 12 of the EIA Regulations, a formal opinion of the information to be supplied in the EIAR is sought from Scottish Ministers.

The purpose of this Scoping Report is to provide information to the Scottish Ministers and consultees for determining the scope of the Environmental Impact Assessment (EIA) and EIAR. Where FORL (herein referred to as the Applicant) is proposing to 'scope out' particular elements from the EIAR, sufficient information and justification has been provided in this report. The intention is to ensure the focus within the EIAR is on any receptors impacted by the Proposed Development that may experience significant effects.

Consultees will note that the Scoping Report contains a number of questions, for which it would be useful to receive feedback on. Not all questions will be relevant to all consultees, therefore we request that consultees provide feedback only on those questions appropriate to them. The questions should not be considered an exhaustive list, and consequently feedback is welcome on any issue considered relevant to the Proposed Development. If consultees elect not to respond, the Applicant will assume that consultees are satisfied with the approach adopted or proposed. Further consultation will take place with relevant stakeholders throughout the EIA process, including with local communities.

The design of the Proposed Development to date is a result of maximising the potential wind and solar resource on site whilst recognising site-specific and broader constraints as they are understood at the date of submitting this Scoping Report. The layout of the Proposed Development presented in the Scoping Report is expected to be further refined during the EIA process and through further consultation as required. Therefore, it should be noted that any amendments to the design are unlikely to increase the likelihood of a significant effect. However, should any changes occur that are likely to result in a significant or unknown effect on an important feature or impact previously scoped out, then this will be scoped back into the EIA process. Changes of this nature will be discussed with the relevant consultees to ensure that they too are in agreement with the Applicant's understanding and before altering the inclusion or exclusion of features from the EIA.

Purpose of this Scoping Report

This Scoping Report is a request to the Scottish Ministers to adopt a Scoping Opinion and is submitted in accordance with the EIA Regulations.

For this application we propose to begin stakeholder consultation at the scoping stage in order to provide information on the Proposed Development Area's baseline conditions and the possible impacts from the development. Therefore, this report utilises the existing information and data gathered to date to focus on key areas and likely significant effects in agreement with consultees. Potential **minor and non-significant issues are proposed to be scoped out**, and therefore will not be included within the final submission in the EIAR.

As a consequence of the extensive use of existing data, this Scoping Report provides an in-depth understanding of the baseline and provides evidence to enable key consultees to focus on key areas, likely significant effects and to the 'scoping out' of minor and not significant issues.

Whilst this larger Scoping Report will inevitably require more engagement from key consultees at an early stage, the eventual EIAR submitted should be more streamlined and **focus on only likely significant effects**. This approach is very much supported by the EIA Regulations and by determining authorities such as the Energy Consent Unit (ECU). The Applicant will ensure that regular and continued liaisons with key stakeholders (including the community) are carried out and documented to agree the assessment baseline, methodology and therefore ensuring the EIA process and final EIAR documents will be more efficient and streamlined.

Question 1: Do the consultees agree with proposed approach to scoping and the purpose of the Scoping Report?

2. The Applicant

The Applicant, FORL, has been developing and operating wind farms in the UK since the mid 1990's demonstrating long term commitment to the renewable energy generation market in the UK, and more specifically in Scotland. The company's operational wind farm portfolio, all in Scotland, comprises Rothes 1 and Rothes II (92 MW), Paul's Hill (64.4 MW), Mid Hill (75.9 MW) Crystal Rig, Crystal Rig II and Crystal Rig III (247.3 MW), Windy Standard I (21.6 MW) and Windy Standard II (61.5 MW) giving a total generating capacity of 529.7 MW. FORL's portfolio also consists of consented wind farms, comprising of Windy Standard III, Crystal Rig IV and Pauls Hill II which will add to the total generating capacity of the wind farms owned and managed by FORL when operational.

3. The Proposed Development

The Proposed Development site (NT723531) lies approximately 5 km west of Duns, in the Scottish Borders.

The land available for development at Lees Hill is located to the south of the Lammermuir Hills. The valley side rises relatively gently from the west to east to a height of approximately 265 m Above Ordnance Datum (AOD). The southern edge of the Proposed Development Area is bound by the B6456 and to the north by an unnamed road between Longformacus and Duns. There is also an existing wind farm to the north of the Proposed Development on Blackhill.

Figure 3.1 shows the location of the Proposed Development. Figure 3.2 illustrates the current proposed turbine layout with the solar PV and battery search area. Figure 3.3 shows the regional context of the Proposed Development.

Figures 9.1 and 9.2 show the Zone of Theoretical Visibility (ZTV) for the current site layout (wind and solar respectively).

The Proposed Development has been through a number of design iterations but will continue to evolve as the EIA progresses.

At time of writing, the Proposed Development is for:

- Up to 7 wind turbines up to 200 m to tip height (current candidate turbine model specifications have hub heights of 119 m and rotor diameters of 162 m);

- Turbine foundations and hardstandings;
- External transformer housing;
- Crane pads;
- Ground-mounted solar photovoltaic (PV) panels;
- Access tracks;
- Underground electricity cables;
- Battery storage;
- Permanent anemometry mast;
- Temporary borrow pits;
- Temporary construction and storage compounds and ancillary infrastructure;
- Site signage;
- Onsite substation and control building;
- Temporary construction gatehouse; and
- Waste water and drainage attenuation measures (as required).

The Proposed Development location has a good wind resource and consequently a project located here will significantly contribute to the UK and Scottish Government's renewable energy targets. Wind farm design with turbines up to 200 m tip height is considered reflective of Scottish Government aspirations for demonstrably better energy yields from sites optimised with higher tip heights.

Table 3.1: Current Proposed Turbine Coordinates (Indicative)

Turbine	Easting	Northing
1	372540	651904
2	372151	652250
3	371884	652685
4	371793	653349
5	372508	653873
6	372477	653302
7	372757	652873

Source: Natural Power (050422_7t_A)

The lifespan of the Proposed Development is proposed to be 35 years, following which decommissioning of this project would be undertaken.

It is anticipated that the Proposed Development will have a combined total installed capacity of up to 100 megawatt (MW), with up to an additional 60 MW of battery storage.

Project Design

During the review process for the Proposed Development Area, assessment has been carried out on the wind resource at the site and the key landscape and visual constraints. Key considerations to the scheme are as follows:

- A viable development in terms of energy yield;
- Relationship to the surrounding landscape; and
- Technical and environmental constraints.

Numerous iterations of the design were considered consisting of a range of turbine heights. The layout presented for scoping is considered, at this point, to be the most optimal following an iterative design process which has taken all known constraints (at the time) and wind yield analysis into consideration. The layout design will continue to evolve throughout the assessment period.

A micro siting allowance of 90 m is proposed to allow maximum flexibility to deploy the most efficient layout possible.

Wind Turbines, Foundations, Transformers and Crane Pads

The specific turbine model has not yet been selected but it is expected to be a horizontal axis machine with three rotor blades. Current models have approximately 6 – 7 (MW) generating capacity and by the time the project is constructed, such wind turbine models may be capable of generating more. Any turbines selected are also likely to have external transformers placed adjacent to each turbine. The candidate turbine model chosen for assessment only is the Vestas V162.

The turbines will be fixed to reinforced concrete foundations. The foundations will be formed in excavations approximately 3.5 m deep, depending upon ground conditions. Detailed design specifications for each foundation would depend on ground conditions, the specific turbine used and various other engineering considerations.

Crane pads would be left in-situ following erection of turbines to allow for maintenance and replacement of parts as necessary during the lifetime of the project.

Solar Panels

The Proposed Development comprises of the installation of solar PV panels, fixed to a mounting structure (frame) to form arrays across the application site. These frames are strong, robust and not easily damaged, allowing them to withstand environmental pressures.

It is expected the PV modules mounted onto static frames will be orientated to face the south. The metal racks would be pile driven into the ground, and therefore would not require concrete foundations. This construction method limits the footprint associated with the Proposed Development and allows for the remaining land beneath and between the arrays to remain accessible. Figure 3.2 shows the current search area for both the solar PV panels and battery storage. The exact location and layout is still to be confirmed but will be identified within the EIAR.

Battery Storage

A battery energy storage facility, primarily consisting of containers with external ancillary equipment, is also proposed to store excess electricity generated by the Proposed Development and support its export when required. It is likely to be similar in size and shape to a shipping container with lithium-ion battery cells inside. Figure 3.2 shows the current search area for both the battery storage and solar PV. The exact location and layout is still to be confirmed and will be identified within the EIAR.

Access Tracks

Existing access tracks will be utilised and upgraded where possible, but additional site tracks will also be required. The routes for the tracks will be chosen to minimise potential impacts on the environment, while taking account of other site-specific constraints. The EIAR will include a rationale for their final location.

The construction of the site tracks falls under two main categories, which can be categorised as follows:

- 'Cut' track – superficial layers are removed, along with soft subsoils until reaching a competent bearing layer, which can be used as a formation level using methods including blasting of rock.
- 'Floating' track – superficial layers and subsoils are left in-situ with the track built off the existing ground level, utilising geotextiles and geogrids to reinforce the track materials. This technique is generally used where there are deep soft underlying materials e.g., peat or soft clays.

Watercourse crossings will be minimised as far as possible and where these cannot be avoided then suitable water crossings will be identified within the EIAR and assessed.

Substation, External Transformer and Grid Connection

The wind turbines would produce electricity at 660 – 1,000 Volts. The electricity would then be transformed to 33,000 Volts (33 kV) via a transformer which is likely to be immediately adjacent to the tower of each turbine. The transformers would be linked to an onsite substation via high voltage underground cables placed in trenches which would generally follow the route of the onsite tracks (dimensions to be determined by the ground conditions but typically 0.5 m x 1 m deep). Where trenching alongside onsite tracks are not feasible, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.

The exact location of the transformer may differ depending on the final turbine model used.

The solar arrays would produce electricity at low voltage DC, which would be converted to low voltage AC via inverters, each with an output of approximately 800 volts (0.8kV). The electricity would then be transformed to 33,000 Volts (33 kV) via transformers positioned amongst the PV arrays in order to reduce electrical losses. The transformers would be linked to an onsite substation via high voltage underground cables placed in trenches which would generally follow the route of the onsite tracks (dimensions to be determined by the ground conditions but typically 0.5 m x 1 m deep). Where trenching alongside onsite tracks are not feasible, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.

The exact location of the 33/0.8kV inverter transformers may differ depending on the size and layout of the site.

The underground 33 kV cables routed from the turbines and solar PV panels would be brought together via the existing substation at Eccles. The detailed construction methods, layout of cables and contents of the onsite substation compound would be provided within the Proposed Development Construction Environmental Management Plan (CEMP).

Connection of the Proposed Development to the national grid will be subject to a separate application.

Borrow Pits

The Proposed Development would require crushed stone to construct the new tracks, improve the existing tracks if necessary, create hard standing areas for the cranes and lay the foundations. It is the intention that suitable stone and aggregate would be sourced from onsite borrow pits. Borrow pits on site may be used to reduce the potential effects on the environment and transport network, associated with transporting stone to

the site. Borrow pit areas of search will be identified within the EIAR. These will be temporary in nature and restored following use.

Temporary Construction and Storage Compounds, and Ancillary Infrastructure

To provide a secure area for site office facilities and storage of materials and components temporary compounds may be required and would be located strategically across the site, likely adjacent to the site track. They would be surrounded by a security fence and locked gates which would be removed at the end of the construction phase with the hardcore base retained but allowed to re-vegetate.

Infrastructure ancillary to the construction and operation of the Proposed Development will be required. These would be constructed in accordance with best practice and relevant guidelines, to minimise environmental impact.

Construction Environment Management Plan

A CEMP would be created and agreed with Local Planning Authority, SBC, prior to construction commencing through an appropriately worded suspensive condition in order to ensure the impacts from construction are kept to a practical minimum. The CEMP would set out the method statements for constructing site infrastructure, measures that would be undertaken by contractors to ensure good site practice with regards to construction practices and environmental management. Such measures would include for the transport and storage of potentially polluting substances such as oils and lubricants as well as waste management, for example.

Should the Proposed Development be consented best practice guidelines and method statements will be adopted to ensure that the development does not impact negatively on the local environment. No development shall take place (including demolition, ground works, vegetation clearance) until a CEMP, incorporating a Construction Method Statement (CMS), has been submitted to and approved in writing by the local planning authority.

No development shall commence until the role and responsibilities and operations to be overseen by an appropriately competent Ecological Clerk of Works (ECoW) have been submitted to and approved in writing by the local planning authority. The appointed person shall undertake all activities, and works shall be carried out, in accordance with the approved management plans. The ECoW will ensure that during construction impacts to ecological features are minimised through best practice, including ensuring water quality is maintained and the potential for disturbance or risk of injury/death is minimised for protected species which may be using the site on an occasional basis.

Question 2: Do the Energy Consents Unit consider that the battery storage element of the proposal should be included in the total installed capacity and if so, how would this impact on the planning application fee?

Question 3: Do consultees accept a micro siting allowance of 90 m to allow flexibility within the project design?

4. Approach to Environmental Impact Assessment

The EIA is a statutory procedure which draws together in a systematic way an assessment of the likely significant environmental effects arising from a Proposed Development.

As the process has numerous steps as set out below, it allows for the opportunity to 'design out' or avoid significant adverse environmental effects at an early stage through the design of the project..

An iterative design approach is already in process for this project and will continue to be adopted throughout the EIA process, which will allow the Proposed Development to have adopted a design that works well for both the local environment and environmental resources within the area as well as being an economically viable scheme, with the ability to deliver on Scottish, UK and international renewable energy targets.

The steps taken for informing and developing the EIA process are identified in the flow diagram below (Figure 4.1).

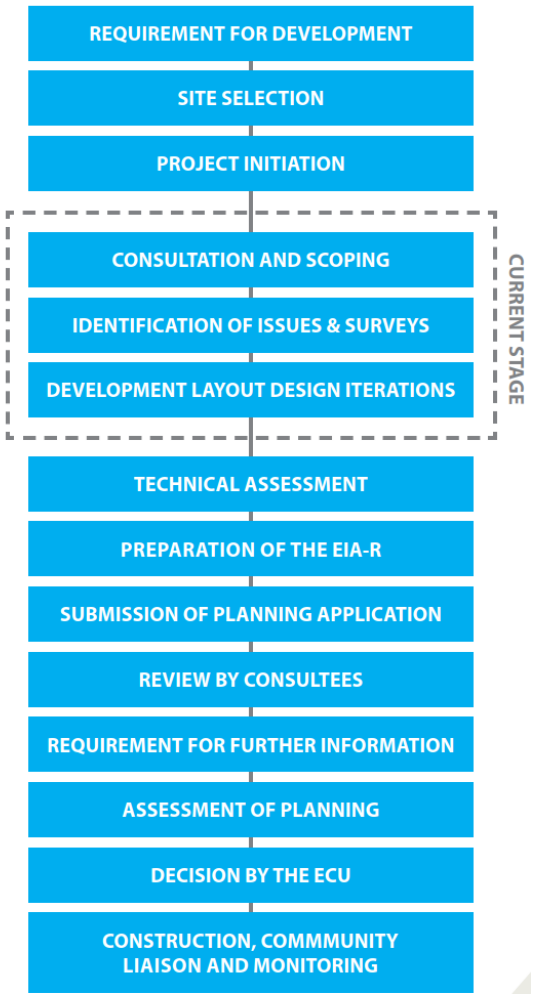

Figure 4.1 EIA Process

For this particular project the collection of the baseline data has, for the majority been completed. Therefore the Applicant has a comprehensive understanding of the site and the local vicinity. This has allowed for the design identified within the Scoping Report to have 'designed out' impacts to the environment already.

Consultees are requested to respond where possible to scope in those features and topics that are likely to experience a significant impact, and thus scope out the rest. In doing so the impact assessment will be focussed on those effects that will influence the determination.

The impact assessment will determine for those assessed receptors what the effect, either directly or indirectly will be from the project, by comparing the baseline conditions with the conditions that would prevail should the Proposed Development be constructed, operated and subsequently decommissioned. The environmental effects of the project will be predicted in relation to environmental receptors (e.g. people), built resources and natural resources.

A distinction will be made in the assessments between impacts and effects, where:

- Impacts are defined as the predicted change to the baseline environment attributable to the scheme; and
- Effects are the consequence of impacts on environmental resources or receptors.

What will the EIA Assess?

The EIA will address the construction phase of the wind farm, the operational phase which would last approximately 35 years, and the decommissioning phase. The geographical coverage of the EIA will take account of the following:

- The physical extent of the proposed works;
- The nature of the baseline environment and the manner in which effects are propagated; and
- National and Local planning and policy context for the Proposed Development.

Gathering Baseline Information

The vast majority of baseline data has already been collected for this project, and the assessment team will ensure that sufficient data is obtained to enable a robust assessment, appropriate to the nature and scale of the Proposed Development. The extent of the baseline assessment will be determined using both professional judgement and industry best practice. The EIA will also identify areas where the baseline may change, prior to the construction and operational phases of the Proposed Development from current conditions (for example, maturation of landscaping).

The baseline data consists of desk study assessments (including the use of data gathered for the previous developments in the area), consultation, field survey and monitoring which will be clearly reported in the subsequent sections, and within the EIAR (should there be an expected significant impact from the development). In line with the regulations, the EIAR will also indicate any difficulties encountered in compiling environmental baseline conditions, such as not being granted permission to access areas where surveys were required.

Prediction of Impacts and Evaluation of Effects

The prediction of impacts examines the change to the baseline environment that could result from the construction and operation of the Proposed Development. To guide the evaluation of effects, the effects will be classified into one or more of the following:

- Positive effects that have a beneficial influence, negative effects that have an adverse influence;
- Temporary effects that persist for a limited period only, due for example to particular construction activities;
- Permanent effects that result from an irreversible change to the baseline environment or which persist for the foreseeable future;
- Direct effects that arise from activities that form an integral part of the Proposed Development;
- Indirect effects that arise from activities not explicitly forming part of the Proposed Development;
- Secondary effects that arise as a result of an initial effect of the scheme; and

- Cumulative effects that arise from the combination of different impacts at a specific location, the recurrence of impacts of the same type at different locations, the interaction of different impacts over time, or the interaction of impacts arising from the scheme in conjunction with other development projects.

There is no statutory definition of what constitutes a significant effect although each EIA discipline aims to provide its own guidance. A significant effect may be broadly defined as an effect which, either in isolation or combination with others, should be taken into account in the decision-making process. This general definition will be used as the basis against which the significance criteria for environmental disciplines will be developed. The threshold of significance of effects tends to vary between the environmental topics. The assessment team will ensure that the approach taken for each discipline is clearly explained.

Mitigation of Environmental Effects

Mitigation measures will be considered for each significantly adverse effect. The EIAR will include a description of the measures envisaged to prevent, reduce and where possible remedy any significant adverse effects. In line with the regulations, when identifying mitigation measures, the Proposed Development will take into account the practicability and cost effectiveness of the proposals and their efficiency in reducing environmental impacts.

Where practical, the implementation of mitigation measures will be set out as commitments. Where the effects of the impact are found to be significant, and where there is uncertainty in the mitigation proposed, monitoring may be proposed to ensure that the mitigation is both required and effective. Monitoring will allow for adaptation of the mitigation measures to ensure that they are fit for purpose. Monitoring will be proportionate to the level of significance experienced.

Once the final design has been adopted and account has been taken of any mitigation measures, residual effects will be listed. The significance of a residual effect will be determined by correlating the magnitude of the change (or impact) arising from the scheme with the sensitivity of the particular attribute under consideration. The magnitude of change will be evaluated in accordance with the following table, Table 4.1, unless a specific magnitude of change table is presented for that discipline in this Scoping Report.

Table 4.1: Magnitude of Change

Magnitude	Description
High	Total loss or major alteration to key elements/features of the baseline conditions
Medium	Partial loss or alteration to one or more key elements/features of the baseline conditions
Low	Minor shift away from the baseline conditions
Negligible	Barely discernible change from baseline conditions

Where applicable in carrying out individual assessments, a scale of increasing sensitivity of the resource or receptor will be defined. This may be defined in terms of quality, value, rarity or importance and can be classed as ‘Low’, ‘Medium’ or ‘High’. For certain assessment areas, guidance will be taken from the value attributed to elements through designation or protection under law. Where assessment of this nature takes place the correlation of magnitude against sensitivity will determine a qualitative expression for the significance of the residual effect. This is demonstrated in the matrix below in Table 4.2.

Table 4.2: Significance of Effect

Sensitivity of Resource / Receptor	Low	Medium	High
Magnitude of Impact			
High	Moderate	Moderate / Major	Major
Medium	Low / Moderate	Moderate	Moderate / Major
Low	Low	Low / Moderate	Moderate
Negligible	Negligible / Low	Low	Low / Moderate

Those residual adverse **effects indicated as Major and Moderate/Major will be regarded as being significant** effects in terms of the relevant legislation. However, other factors may have to be considered including the duration and the reversibility of the effect, which will be discussed within each topic chapter. Positive effects will also be discussed.

We intend to focus the EIAR on significant effects and will therefore seek agreement that non-significant effects can be scoped out.

Securing Commitments and Mitigation Through Planning Conditions

Commitments to deliver mitigation proposed within the EIAR will be secured if the proposal receives consent through appropriate planning conditions to be attached to the deemed planning consent under s57(2) of the Town and Country Planning Act 1997.

Question 4: Do consultees agree with the approach to the EIA and the associated mitigation and monitoring?

5. Consultation

Community Consultation

Natural Power and the Applicant consider consultation with the community to be a crucial part of the development process and will engage with the local community throughout the application process. As this is a Section 36 application there is no formal requirement to follow the procedures for major developments under the Planning etc. (Scotland) Act 2006, however this application will follow the processes and standards set by the legislation and best practice guidelines (PAN 3/2010 - Community Engagement)[1]. A Pre-Application Consultation Report (PAC Report) will be submitted with the application.

As part of the iterative planning process and best practice, the Applicant is keen to engage with local communities close to the Proposed Development to gather their views, so these can, where possible, inform the planning information required for any forthcoming application.

The views of local communities will be continually sought throughout the planning process and there will be other opportunities for key stakeholders and community members to share their views on the project as it progresses throughout the planning process.

[1] Scottish Government (2010) *Planning Advice Note (PAN) 3/2010 on community engagement* [Online] Available at: Planning Advice Note 3/2010: community engagement - gov.scot (www.gov.scot). [Accessed 20/05/2022]

Other Stakeholder Consultation

Natural Power and the Applicant consider consultation with statutory and non-statutory consultees (e.g. NatureScot, Historic Environment Scotland (HES), Scottish Environment Protection Agency (SEPA), SBC, Community Councils, etc as an integral part of the iterative EIA process and recognises the benefits in carrying out early consultation with all relevant parties. The consultation will progress with the circulation of this Scoping Report and will continue for the duration of EIA process.

Question 5: Do consultees agree with the proposed approach set out for community consultation?

6. Policy and Climate Change Context

Introduction

This section presents a summary of relevant policies that will be taken into consideration to help inform the design of the Proposed Development.

The EIAR will set out the relevant policies that have been considered as part of the assessments undertaken throughout the EIA. A separate Planning Statement will provide a detailed appraisal of the Proposed Development against the relevant Development Plan policies, national planning policy and other material considerations. The EIAR will also concisely reference climate change policy and the contribution of Proposed Development to the UK and Scottish Government's climate change goals and policy targets.

National Planning Policy

National Planning Framework 3 (2014)

The National Planning Framework (NPF) 3[2] is a long-term strategy for Scotland and is the spatial expression of the Government Economic Strategy and plans for development and investment in infrastructure. The NPF identifies national developments and other strategically important development opportunities in Scotland and is accompanied by an Action Programme.

It is important to note that the latest version of NPF, i.e. NPF4, is currently being prepared by the Scottish Government. It provides a clear 'direction of travel' for the new national level planning policy.. The draft NPF4 is referenced below.

Scottish Planning Policy (2014)

Scottish Planning Policy (SPP)[3] sets out national planning policies which reflect the Scottish Ministers' priorities for operation of the planning system and for land use and development. It aims to promote a sustainable place, supporting economic growth, regeneration and appropriately designed development.

The SPP principal policies include a presumption in favour of development that contributes to sustainable development, consideration of renewable energy, sustainable economic development, rural development, historic environment, landscape and natural heritage, transport, flooding and drainage and waste management.

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[2] Scottish Government (2014) *National Planning Framework 3* [Online] Available at: National Planning Framework 3 - gov.scot (www.gov.scot) [Accessed 31/05/2022]

[3] Scottish Government (2020) *Scottish Planning Policy* [Online] Available at: Scottish Planning Policy - gov.scot (www.gov.scot) [Accessed 25/05/2022]

Draft National Planning Framework 4 (2021)

The draft NPF4[4] was published in November 2021. The draft is subject to revisal and a revised NPF4 will be laid before Parlianment in the Autumn 2022. Once approved, it will become part of the statutory Development Plan. There has been strong support for the general direction of travel with NPF4 and the focus for the next draft is on ensuring the wording provides the clarity the Committee of Local Government, Housing and Planning and others have sought. It is a material consideration.

The draft NPF4 (Part 2, Page 44) continues the planning policy approach from the current NPF3 of identifying 'national development' which refers to specific land use allocations and also applies national development status to certain classes of development. The draft NPF4 states that "national developments are significant developments of national importance that will help to deliver our spatial strategy".

In the draft NPF4 18 national developments are proposed to support the delivery of the Spatial Strategy and it has set out that "this designation means that the principle of the development does not need to be agreed in later consenting processes, providing more certainty for communities, business and investors".

There are three categories of national development proposed namely 'liveable places, productive places and distinctive places'. Within the 'productive places' category is proposed national development 12 entitled 'strategic renewable electricity generation and transmission infrastructure'.

A statement for this national development is provided as follows (Page 59):

"This national development supports renewable electricity generation, repowering, and expansion of the electricity grid.

A large increase in electricity generation from renewable sources will be essential for Scotland to meet its net zero emissions targets. Certain types of renewable electricity generation will also be required, alongside developments and increases in storage technology and capacity, to provide the vital services, including flexible response, that a zero-carbon network will require. Generation is for consumption domestically as well as for export to the UK and beyond, with new capacity helping to decarbonise heat, transport and industrial energy demand. This has the potential to support jobs and business investment, with wider economic benefits."

A statement of 'need' is also provided as follows:

"Additional electricity generation from renewables and electricity transmission capacity of scale is fundamental to achieving a net zero economy and supports improved network resilience in rural and island areas".

In terms of designation and classes of development, it is set out that a development within one or more of the classes of development set out in the draft NPF4 and that is of a scale or type that would otherwise have been classified as 'major' by the Town and Country Planning (Hierarchy of Development) (Scotland) Regulations 2009 is designated as a national development - these include (Page 59):

"Electricity generation, including electricity storage, from renewables of or exceeding 50 megawatts capacity".

The Proposed Development would make a valuable contribution in supporting the transition to a net zero economy.

There is a clear recognition in the draft NPF4 that the planning system must be "rebalanced" so that climate change is a primary guiding principle for all plans and decisions. This is an express statement that significant change in the status quo is needed and must be reflected in consenting decisions.

[4] Scottish Government (2021) *Scotland 2045 – fourth National Planning Framework – draft: consultation* [Online] Available at: Scotland 2045 - fourth National Planning Framework - draft: consultation - gov.scot (www.gov.scot) [Accessed 31/05/2022]

The draft NPF4 contains various policies of relevance however given it is in draft form, these may be subject to change. It is expected however that the NPF4 will come into force later in 2022 and will therefore be a key policy consideration for the determination of the Proposed Development.

The Development Plan & Relevant Policies

The statutory Development Plans covering the application site comprise the following:

- The Strategic Development Planning Authority for Edinburgh and South East Scotland Strategic Development Plan (SDP) (adopted 27 June 2013) (SESplan)[5];
- The Scottish Borders Local Development Plan (LDP) (adopted 12 May 2016) (the LDP)[6]; and
- Supplementary Guidance 'Renewable Energy' (July 2018) (the SG)[7].

The policies from SESplan will be of limited relevance for the consideration of the Proposed Development.

The existing LDP is under review and a Proposed LDP was presented to the Council in September 2020. The Proposed Plan was the subject of public consultation which ended on 25 January 2021. The Plan is expected to progress to Examination (to address outstanding objections) in Summer 2022 and is not likely to be adopted until late 2023.

The policies from the LDP relevant to the consideration of the Proposed Development are set out in Table 6.1.

Table 6.1: Relevant LDP Policies

Policy	Policy Summary
PMD1 Sustainability	The preamble to the policy sets outs that the Council will encourage sustainable development. The policy states that the Council will have regard to various sustainability principles in determining planning applications. They relate to matters including sustainable use of land, water quality, protection of natural resources including landscape, habitats and species, built and cultural heritage, efficient use of energy, minimisation of waste, encouragement of walking and cycling, minimising light pollution, protection of public health and safety and the provision of new jobs and support to the local economy.
PMD2 Quality Standards	The policy aims to ensure all new development is of a high quality. It states all development should fit with Scottish Border's townscapes and integrate with its landscape surroundings. It references matters such as layout, orientation, digital connectivity, water usage, hard and soft landscaping works. The policy also covers

[5] City Region Deal (2013) *The Strategic Development Planning Authority for Edinburgh and South East Scotland Strategic Development Plan (SDP)* [Online] Available at: SES Regional Planning — The Edinburgh and South East Scotland City Region Deal (esescityregiondeal.org.uk) [Accessed 24/05/2022]

[6] Scottish Borders Council (2016) *The Scottish Borders Local Development Plan (LDP)* [Online] Available at: Local development plan - adopted | Local development plan | Scottish Borders Council (scotborders.gov.uk) [Accessed 24/05/2022]

[7] Scottish Borders Council (2018) *Renewable Energy Supplementary Guidance* [Online] Available at: Renewable Energy Supplementary Guidance | Scottish Borders Council (scotborders.gov.uk) [Accessed 24/05/2022]

Policy	Policy Summary
	placemaking and design considerations with reference to matters such as scale, massing and height, materials and various other site planning and urban design considerations.
ED9 Renewable Energy Development	The policy sets out SBC's overall approach to proposals for renewable energy development, including wind energy proposals and sets out a list of considerations which will be taken into account in the assessment of wind energy proposals.
ED10 Protection of Prime Quality Agricultural land & Carbon Rich Soil	The policy states that it applies to all development except proposals for renewable energy development. With regard to renewable energy development, it sets out that such proposals will be permitted if they accord with the objectives and requirements of Policy ED9.
HD3 Protection of Residential Amenity	The policy states that development judged to have an adverse impact on the amenity of existing or proposed residential areas will not be permitted. Assessment criteria include matters such as open space considerations, scale, form and type of development as well as matters such as overlooking, loss of privacy and daylight standards.
EP1 International Nature Conservation Sites and Protected Species	The aim of the policy is to give designated or proposed Natura sites, Ramsar sites and sites where there is likely to be the presence of European Protected Species, protection from potentially adverse development. The policy sets out development management tests in relation to proposals which are likely to have a significant effect on such designations.
EP2 National Nature Conservation and Protected Species	The aim of the policy is to protect nationally important nature conservation sites and protected species. These include designation such as Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR). As with policy EP1, this policy sets out development management tests in relation to development proposals that are likely to have a significant adverse effect, either directly or indirectly on such designations.
EP3 Local Biodiversity	The purpose of the policy is to safeguard and enhance local biodiversity. The policy sets out development management tests in relation to development that would have an unacceptable adverse effect on Border's Notable Species and Habitat of Conservation Concern. The policy states that any development that could have such impact should avoid fragmentation of habitats and be sited and designed to minimise adverse impact.
EP4 National Scenic Areas	The aim of the policy is to protect and enhance the scenic qualities of the two National Scenic Areas (NSA) at Eildon and Leaderfoot and Upper Tweeddale. The policy sets out that development that may affect NSAs will only be permitted where (a) the objectives of designation on the overall landscape value of the site and its surrounds will not be compromised or (b) any significant adverse effects on the qualities for the site or its surrounds have been designated are clearly outweighed by social or economic benefits of national importance.
EP5 Special Landscape Areas	The aim of the policy is to ensure that local areas of identified landscape quality - Special Landscape Areas (SLA) are afforded protection against inappropriate development. The policy sets out that the Council, in assessing proposals for development that may affect SLAs, will seek to safeguard landscape quality, and have particular regard to landscape impact of development including visual impact. It adds that proposals that have a significant adverse impact will only be permitted

Policy	Policy Summary
	where the landscape impact is clearly outweighed by social or economic benefits of national or local importance.
EP7 Listed Buildings	The aim of the policy is to protect Listed Buildings from development that would spoil their historic and architectural interest. The policy sets out that SBC will support development that conserves, protects and enhances the character, integrity and setting of Listed Buildings. Other aspects of policy relate to internal or external alterations and extensions to Listed Buildings or new developments within the curtilage of such buildings.
EP8 Archaeology	The aim of the policy is to give Scheduled Monuments and other archaeological or historic assets, including Battlefields or landscapes, strong protection from potentially damaging development. In terms of Scheduled Monuments, the policy states that proposals which would destroy or adversely affect the appearance, fabric or setting of such assets will not be permitted unless (a) the development offers substantial benefits, including those of a social or economic nature, that clearly outweigh the national value of the site and (b) there are no reasonable alternative means of meeting the development need. In terms of regional or local archaeological assets, the policy states that proposals that would adversely affect such assets would only be permitted if it can be demonstrated that the benefits of the proposal would clearly outweigh the heritage value of the asset.
EP9 Conservation Areas	The aim of the policy is to preserve or enhance the character or appearance of Conservation Areas. The focus of the policy is in relation to development proposals within or adjacent to a Conservation Area.
EP10 Gardens and Designed Landscapes	The aim of the policy is to protect the character of Gardens and Designed Landscapes (GDL) from development that would adversely affect their special character. The policy states that the Council will support development that safeguards or enhances the landscape features, character or setting of sites listed in the Inventory of GDL or sites included in historic GDL records. It adds that all development should be carefully sited and be of the highest standards of design, using appropriate finishing and materials.
EP13 Trees, Woodlands & Hedgerows	The aim of the policy is to give protection to the woodland resource of the Scottish Borders. The policy sets out that SBC will refuse development that would cause the loss or serious damage to the woodland resource unless the public benefits of development clearly outweigh the loss of landscape, ecological, recreational, historical or shelter value. The policy adds that where there is unavoidable loss of woodland then there should be replacement planting where possible.
EP15 Development Affecting the Water Environment	The policy is aimed at ensuring development does not adversely affect the water environment. It states that decision making will be guided by assessment of various considerations including potential pollution of surface or underground water, flood risk and compliance with current best practice on Sustainable Urban Drainage.
IS5 Protection of Access Routes	The policy states that development that would have an adverse impact upon an access route available to the public will not be permitted unless a suitable diversion or appropriate alternative route can be provided.

Source: The Scottish Borders LDP

As noted, NPF4 when it comes into force, will also form part of the Development Plan.

The 'Renewable Energy' SG gives further advice and guidance relating to policy ED9 - Renewable Energy Developments as contained within the LDP. It covers a wide range of renewable energy types and references SPP and Scottish Government advice setting out the need to accommodate renewable energy proposals where appropriate, whilst also taking cognisance of economic and other benefits a proposal may offer. It sets out a Spatial Framework for wind energy. It also includes reference to the 2016 Ironside Farrar Landscape Capacity Study as Appendix C (The Scottish Borders Council Wind Energy Consultancy – Update of Wind Energy Landscape Capacity and Cumulative Impact Study) ("the Landscape Capacity Study" [8]).

The Landscape Capacity Study aims to identify landscape and visual sensitivities relative to the consideration and determination of proposals for wind farm developments across the region.

Climate Change and Energy Policy

The burning of fossil fuels to produce electricity is a major contributor to climate change through the release of atmospheric carbon dioxide (CO2) and other harmful gases known collectively as greenhouse gases.

The Proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning and energy policy objectives. The clear objectives of the UK and Scottish Governments will be summarised, in relation to encouraging increased deployment and application of renewable energy technologies, consistent with sustainable development policy principles and national and international obligations on climate change.

The Scottish Government's Energy Strategy (2017)[9] set a target for the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources. As heat and transport become decarbonised, demand for electricity from renewable sources is expected to increase substantially.

Further deployment of renewable energy generating technology will be required throughout the 2020s in order to meet targets. As a mature technology onshore wind development has a continuing and important role to play, as confirmed by national planning and energy policy and most recently in the draft NPF4.

The Scottish Government's Energy Strategy and Onshore Wind Policy Statement (OWPS)[10] (2017) set out inter alia that onshore wind is to play a vital role in Scotland's future – helping to substantively decarbonise electricity supplies and the technology is expected to play material role in growing the economy.

Scotland's overarching statutory target is to achieve a 100% reduction in greenhouse gas emissions to net-zero by 2045, with interim targets of 75% by 2030 and 90% by 2040, now provided for in the Climate Change (Scotland) Act 2009[11] as amended by the Climate Change (Emissions Reductions Targets) (Scotland) Act 2019[12] which came into force in March 2020.

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[8] Ironside Farrar (2016) *Scottish Borders Council Winder Energy Consultancy – Update of Winder Energy Landscape Capacity and Cumulative Impact Study* [Online] Available at: Item No. 18 - Part 1 of IF REPORT Pages 1-42.pdf (moderngov.co.uk) [Accessed 31/05/2022]

[9] Scottish Government (2017) *The future of energy in Scotland: Scottish energy strategy* [Online] Available at: The future of energy in Scotland: Scottish energy strategy - gov.scot (www.gov.scot) [Accessed 31/05/2022]

[10] Scottish Government (2017) *Onshore wind: policy statement* [Online] Available at: Onshore wind: policy statement - gov.scot (www.gov.scot) [Accessed 31/05/2022]

[11] UK Government (2009) *Climate Change (Scotland) Act (2009)* [Online] Available at: Climate Change (Scotland) Act 2009 (legislation.gov.uk) [Accessed 31/05/2022]

[12] UK Government (2019) *Climate Change (Emissions, Reduction Targets) (Scotland) Act (2019)* [Online] Available at: Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (legislation.gov.uk) [Accessed 31/05/2022]

The Scottish Government declared a climate emergency on 14 May 2019. The declaration of an "emergency" is a reflection of both the seriousness of climate change and its potential effects and the need for urgent action to cut carbon dioxide emissions. The declaration is a material consideration which will be referenced.

The draft OWPS Refresh was published in 2021 and key points which can be drawn from it include:

- The central requirement for a rapid transition to net zero and the crucial role of further onshore wind development in achieving legally-binding targets, especially through the 2020s.
- Unequivocal Scottish Government policy support for the future role of onshore wind. An onshore wind target of an additional 8-12 GW of additional onshore wind capacity to be delivered by 2030 is proposed.
- The urgency of the Climate Emergency and the scale of the necessary ambition – there is express recognition in the draft OWPS of the need for “further and faster” delivery and that a “consistently higher rate of onshore wind, and other renewables capacity, will be required year-on-year”.
- The scale of deployment required to be operational before 2030 is very considerable and way beyond what has happened in the past.

A large increase in the deployment of this renewable energy technology is supported through a number of UK level policy documents including the latest UK Energy White Paper (2020)[13] and Net Zero Strategy (2021)[14] and the British Energy Security Strategy (2022)[15]. Scottish Government policy commitments are also clear – most recently expressed in the draft OWPS and in the draft NPF4 which will be material to the energy and national planning policy positions to be considered for the determination of the application.

The Proposed Development will clearly make a contribution to the attainment of renewable energy and electricity targets and emissions reduction at both the Scottish and UK levels and the quantification of this contribution would be described.

Conclusion

The EIAR will summarise the renewable energy policy framework, but a detailed policy appraisal will be provided in a supporting Planning Statement which will make reference to key policy documents such as the forthcoming NPF4 and the new OWPS.

7. Environmental Impact Assessment Report (EIAR)

The EIA process will result in the production of an EIAR. The EIAR will identify the features/receptors that have been agreed with the competent authority and their advisers as features that are likely to be affected by a significant effect from the Proposed Development.

It will focus on each of the broad topics identified within this Scoping Report, the Scoping Opinion, plus any others that develop throughout the remainder of the EIA process, until submission.

Where features are considered, the assessment methodology, results, effects, impacts and mitigation proposed (if any) will be included.

The EIAR will be accompanied by a Non-Technical Summary (NTS) a PAC Report and a Planning, Design and Access Statement (PDAS).

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[13] UK Government (2020) *Energy white paper: Powering our net zero future* [Online] Available at: Energy white paper: Powering our net zero future – GOV.UK (www.gov.uk) [Accessed 01/06/2022]

[14] UK Government (2021) *Net Zero Strategy: Build Back Greener* [Online] Available at: Net Zero Strategy: Build Back Greener – GOV.UK (www.gov.uk) [Accessed 01/06/2022]

[15] UK Government (2022) *British energy security strategy* [Online] Available at: British energy security strategy – GOV.UK (www.gov.uk) [Accessed 01/06/2022]

The EIAR is likely to follow the structure below:

Chapter 1: Introduction

Chapter 2: Legal and Policy Context

Chapter 3: Approach to EIA

Chapter 4: Site Selection and Design Evolution

Chapter 5: Project Description

Chapter 6: Landscape and Visual

Chapter 7: Ecology

Chapter 8: Ornithology

Chapter 9: Hydrology, Geology and Hydrogeology

Chapter 10: Cultural Heritage

Chapter 11: Traffic and Transport

Chapter 12: Aviation and Existing Infrastructure

Chapter 13: Noise

Chapter 14: Socioeconomics, Recreation and Tourism

Chapter 15: Climate Change

Chapter 16: Residual, Synergist Effects & Mitigation and conclusions

The EIAR will be produced both in a hard copy print and electronically. For the majority of consultees, unless otherwise requested, the EIAR will be provided electronically. Upon submission of the application, these documents will be made available for public inspection at appropriate locations to be agreed with SBC and the ECU, and will be distributed to the relevant consultees. An NTS will be submitted alongside the EIAR, which will provide a summary of the main findings and will be written in a non-technical language to help enable a better understanding and overview of the assessments.

Question 6: Do consultees agree with the proposed chapters to be included in the EIAR?

8. Embedded Mitigation and Further Layout Iterations

The design of the Proposed Development to date has been an iterative process, and the layout of which has avoided environmental and physical constraints as far as possible (embedded mitigation). These will be refined as the EIA progresses.

The layout and design of the development will continue to evolve, until the design will be 'frozen' to allow final assessment. As stated previously the layout and design provided at scoping are considered to be the optimum from an energy generation perspective.

Should any changes to the design occur that are likely to have a significant effect on the receptor these will be included within the EIA. If subsequent changes to the design remove the likelihood of significant effects

sufficient to scope out receptors from assessment, this will be discussed with relevant consultees before excluding them from the EIAR.

In the following sections the subject areas to be covered in the Scoping Report and EIAR are provided. Where it is considered that certain subjects or particular aspects within subjects can be scoped out of the EIAR, evidence and a rationale is provided.

9. Landscape and Visual

Introduction

The Landscape and Visual Impact Assessment (LVIA) will consider potential effects of the Proposed Development upon landscape character and quality, and visual amenity (including visual amenity of residents) and cumulative effects. It will describe the existing baseline landscape and visual receptors likely to be affected by the Proposed Development and will consider direct and indirect effects on landscape resources and landscape character, and the implications of identified effects for designated landscapes. The susceptibility of landscape and visual receptors to change from the Proposed Development and the magnitude of such change will be assessed. The significance of effects will be described and assessed, and photomontages of the Proposed Development will be produced for agreed viewpoints.

The LVIA will be undertaken in accordance with guidance set out in Guidelines for Landscape and Visual Impact Assessment (3rd edition, 2013, referred to as GLVIA3)[16], by a suitably qualified and experienced Chartered Landscape Architect.

Existing Conditions

The Proposed Development Area

The Proposed Development Area is located to the west of Duns, in the Scottish Borders. It lies to the south of the part of the Southern Uplands hill range known as the Lammermuir Hills. The site includes the south facing slopes of Hardens Hill (351 m AOD) and Blackamill Hill (303 m AOD), Lees Hill (265 m AOD) and part of Camp Moor north of the B6456 (descending to approximately 220 m AOD). The site includes the Foul Burn and parts of the Blackrig Burn and Wellcleugh Burn valleys. The site is of open moorland or rough grazing with several coniferous plantations as shelterbelts.

The southern edge of the site is bound by the B6456 and to the north by an unnamed road between Longformacus and Duns. Within 10 km there is one existing wind farm, to the north of the Proposed Development on Black Hill (22 turbines of 78 m to tip height).

Visual Amenity

Zone of Theoretical Visibility

The ZTV on Figure 9.1 indicates the maximum visibility of the turbines of the Proposed Development to blade tip height. It is calculated using a bare-ground model that does not take into account local screening by vegetation, buildings or forest. In addition, the ZTV does not indicate how much of any turbine may be seen, i.e. whether visibility at any given point is of blade tips only or full turbines, nor does it indicate the effects of distance. Given these caveats relating to ZTVs, actual visibility will be assessed through field work.

[16] Landscape Institute and Institute of Environmental Management and Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment* 3rd Edition, Oxon: Routledge

The ZTV indicates that the turbines of the Proposed Development will be visible across lower landscapes to the east, south and south-west. However, actual visibility will be reduced by local screening in these more settled and wooded areas. Visibility to the north-east is reduced by topographic screening afforded by Hardens Hill and Knock Hill (356 m AOD), although turbines will be visible from higher ground beyond approximately 6 km away. To the west the Dirrington Laws will cast visibility shadows (areas without visibility in the lee of the hills), and visibility will be much reduced beyond Twin Law Cairns. To the north visibility will extend to Longformacus; further away across the Lammermuir Hills visibility will be limited to higher ground that faces towards the site.

The ZTV in Figure 9.2 represents the theoretical visibility of the search areas for solar PV panels. The figure indicates that, should all areas have panels (modelled at 2.75 m off the ground), there will be theoretical visibility of panels from much of the area within 1-2 km of the site, including from the south-west, south-east, east and to the north-west. Actual visibility will be reduced by localised screening. From over 2 km away, the panels will be seen as distant features on the site at ground level, with greater likelihood of local screening. It is noted that visibility to the north, relates to areas of search extending to the site boundary on the Hardens Hill ridgeline. Mitigation by removal of panels off the ridgeline will remove visibility to the north.

Visual Receptors

Visual effects occur when the introduction of the Proposed Development changes or influences the visual amenity and views experienced by people in the area. Visual receptors include:

- Residents in individual dwellings and settlements;
- Road and railway users; and
- Recreational receptors including walkers, cyclists and horse riders on long distance recreational routes and core paths, as well as visitors to outdoor tourist destinations where the visitor experience incorporates a focus on the surrounding landscape.

Residents

The ZTVs shown in Figures 9.1 and 9.2 illustrate some theoretical visibility of turbines and solar panels at a number of settlements to the surrounding the site. These include Gavinton, Polwarth, Duns, Longformacus, and Westruther within approximately 10 km. Other areas including Greenlaw and more distant settlements will not have views of the Proposed Development.

Residential properties within 2-2.5 km of the site include those around Langtonlees, Raecleugh Head, Choicelee, Kettleshiel, and Hen Law Cottage, each of which have theoretical visibility of turbines and solar panels

Road and Rail Users

Lengthy sections of the road and rail network within the study area are within the ZTV. Roads from where theoretical visibility is identified include:

- B6456 south of the Site from Choicelee to Westruther;
- Minor north of the Site from Duns to Longformacus;
- A6105 from Duns to Greenlaw;
- A697 from Thirlstane to Greenlaw and Coldstream;
- B6460 from Greenlaw to Paxton;
- A6112 from Duns to Grantshouse; and
- Other shorter minor roads.

The East Coast Mainline railway runs along the coast at 15 km from the site at its closest point, and has little ZTV coverage (see Figure 9.1).

Recreational Routes

Recreational routes through the study area include the Southern Upland Way which passes within 4 km to the north of the site, to the north of Black Hill Wind Farm and with some ZTV coverage; and core paths, promoted paths and Rights of Way within 5 km, some of which have ZTV coverage.

Designated Landscapes

The Proposed Development Area is not subject to any statutorily or nationally protected landscape-based designations. However, the site lies just outside the Lammermuir Hills SLA. There are other locally and nationally designated landscapes in the surrounding area, as set out in Table 9.1, and shown in Figure 9.3.

Table 9.1: Designated Landscapes within 20 km

Designated landscape	Approximate distance at nearest point
Lammermuir Hills SLA	Adjacent (within 1 km)
Tweed Lowlands SLA	17 km
Berwickshire Coast SLA	18 km
Eildon and Leaderfoot NSA	20 km

Source: MVGLA, 2022

It is noted that Northumberland National Park is approximately 23 km from the site to the south, and the Northumberland Coast Area of Outstanding Natural Beauty is approximately 25 km away to the south-east.

Landscape Character

The landscape character of the Proposed Development Area and the study area are described in the 2019 NatureScot[17] (formally known as Scottish National Heritage) review of the landscape character of Scotland. The Proposed Development Area lies on the transition between the Upland Fringe Moorland with Hills and the Upland Fringe with Prominent Hills landscape character types (LCTs) . LCTs within approximately 15 km of the Site are shown in Figure 9.3 and include:

- Upland Fringe Moorland with Hills;
- Upland Fringe with Prominent Hills;
- Rolling Lowland Margin;
- Lowland with Drumlins;
- Lowland Margin;
- Lowland Margin with Hills;
- Rolling Farmland – Borders;
- Upland Valley with Mixed Farmland;
- Wooded Upland Fringe Valley;
- Plateau Farmland – Borders;
- Dissected Moorland Plateau; and

[17] Scottish Natural Heritage (2019) D*igital map-based national Landscape Character Assessment* [Online] Available at: Scottish Landscape Character Types Map and Descriptions | NatureScot [Accessed: 25/05/2022]

- Plateau Moorland – Lothians

Other lowland or valley LCTs within approximately 15 km (Pastoral Upland Fringe Valley, Lowland Valley with Farmland, and Lowland River Valleys – Lothians) will have limited visibility of the Proposed Development due to intervening topography.

Existing Developments

Within 10 km of the site, there is one operational wind farm, namely Black Hill (22 turbines of 78 m to blade tip) approximately 1 km to the north. Beyond 10 km (and between 10-15 km away) there are several operational wind farms including:

- Fallago Rig (48 turbines of 110-125 m to tip);
- The Crystal Rig group (made up of Crystal Rig I, II and III, Aikengall I, II and IIa, and Hoprigshiels, with turbines of 110-125 m to tip); and
- Quixwood (13 turbines of 115 m to tip).

The distribution of larger operational wind farm development across the study area is focussed on the uplands and hills of the Lammermuir Hills to the north of the Site, and on coastal hills towards the north-east.

There are no known commercial scale ground-mounted solar panel arrays in the vicinity of the site.

Proposed Surveys and Assessment Methodologies

Guidance

The LVIA will be carried out in accordance with current guidance, i.e. GLVIA3. Maps and visualisations will be produced in accordance with NatureScot guidance[18].

Proposed Study Area

The most widely visible elements of the Proposed Development will be the wind turbines. Much of the LVIA will therefore, necessarily, consider primarily the visibility and effects of the turbines. However, the assessment of effects will consider other elements of the Proposed Development throughout.

The initial study area for the LVIA of the proposed wind turbines will be up to 45 km from the outermost turbines of the Proposed Development, as advised by the NatureScot guidance, but the detailed assessment will focus on potential and likely significant effects which may occur within a much more contained area. It is judged that a study area of approximately 15 km radius will be sufficient for the detailed assessment of likely significant effects on landscape character, a study area of approximately 20 km radius will be used for landscape designations, and a study area of approximately 25 km will allow assessment of all likely significant visual effects. These study areas are also proposed for the cumulative assessment.

The assessment of ground level elements of the Proposed Development (solar PV, infrastructure, battery units) will be focussed on an area within approximately 5 km of the Proposed Development, with nearby viewpoints selected to have views across the site for this purpose.

[18] NatureScot (2017) *Visual Representation of Wind Farms Guidance Version 2.2* [Online] Available at: https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf. [Accessed: 24/05/2022]

Desk Study and Field Surveys

Desk studies will be carried out to identify key landscape and visual receptors, and to identify the likely visibility of the Proposed Development based on ZTV mapping. Computer generated 3D models will be used to prepare draft wireline images to illustrate theoretical visibility, and to enable the selection and analysis of viewpoints for fieldwork and for detailed visualisation modelling though the production of photomontages.

Fieldwork will be carried out including a visit to the site, all viewpoints, and the wider area more generally to assess potential effects on landscape character areas and designated landscapes. Photography will be undertaken for viewpoint locations to be agreed with statutory consultees, including photography at dusk for locations for which night-time photomontages are required to illustrate the effects of aviation lighting.

Assessment Method

Landscape Effects

Effects on landscape character will be considered for LCTs up to approximately 15 km from the site, with ZTV mapping used as a means of identifying which LCTs require assessment. Predicted changes in both the physical landscape and landscape character will be identified. The assessment will identify the magnitude and type of change to the landscape, with reference to its key characteristics as set out in the NatureScot LCT descriptions. The sensitivity of the landscape will also be taken into account, acknowledging value placed on the landscape through designation as well as the presence of other consented and operational wind farms or solar PV installations. The magnitude of the effect will be assessed in terms of the size and scale, geographical extent, duration and reversibility of the effect. These aspects will all be considered, to form a judgement regarding the overall effect and whether this is judged to be significant.

Significance of landscape effects, considering receptor sensitivity and the magnitude of change as set out above, will identify the level of effect using four categories: major, moderate, minor, and negligible. Major and moderate effects will be considered to be significant in the context of the EIA Regulations.

Visual Effects

Visual effects are experienced by people at different locations around the study area, at static locations (for example from settlements or from selected viewpoints) and sequentially when travelling along routes. It is usually considered that grouping people related to ‘status’ (e.g. residents, visitors/tourists/motorist) or the ‘activity’ they are engaged in (sport, informal recreation, commuting) will help the assessment and lead to findings which can be considered representative. Assessment of the visual effects of the Proposed Development on receptors up to approximately 25 km from the site will be based on analysis of the ZTVs, field studies and assessment of representative viewpoints.

A list of potential viewpoints is included in Table 9.2, and shown on Figures 9.1 and 9.2. The viewpoints used for the Black Hill Wind Farm and the withdrawn Inch Moor Wind Farm LVIA were used as a starting point for viewpoint selection, with additional viewpoints selected to represent other parts of the ZTV for the Proposed Development.

Table 9.2: Proposed Viewpoint Locations

Viewpoint	Name	Grid Reference		Distance	Reason for selection
1	Hardens Hill Road	372659	654305	0.4	Viewpoint on minor road within the site to the north. Representative of local road users’ views, to consider nearby views including

Viewpoint Name		Grid Reference		Distance	Reason for selection
					ground level elements, sequential views, and cumulative effects.
2	B6456 Camp Moor	372350	651730	0.3	Viewpoint on B6456 adjacent to the site to the south. Representative of local road users' views, to consider nearby views including ground level elements, sequential views, and cumulative effects.
3	Langton Edge	374050	654100	1.6	Viewpoint on minor road adjacent to the site to the north-east. Representative of local road users' and residents' views, to consider nearby views including ground level elements, sequential views, and cumulative effects.
4	Raecleugh Head Fort	374338	653520	1.7	Viewpoint on Raecleugh Head at the Scheduled Monument. Representative of views seen when walking in this area, to consider nearby views including ground level elements, and cumulative effects. Also to be used for the Cultural Heritage assessment.
5	A6105 Choicelee	374960	651500	2.4	Viewpoint on A6105 to the east of Choicelee. Representative of local road users' and residents' views, to consider nearby views including ground level elements, sequential views, and cumulative effects.
6	B6456 West of Kettlesheil	369261	651778	2.8	Viewpoint on B6456 to the west of the site. Representative of local road users' views, to consider nearby views including ground level elements, sequential views, and cumulative effects.
7	Dirrington Great Law	369853	654926	2.5	Viewpoint on the top of Dirrington Great Law to the north-west of the site. Representative of walkers' views on this hill and Dirrington Little Law. To consider nearby elevated views including ground level elements, and cumulative effects. Also to be used for the Cultural Heritage assessment.
8	Duns Law	378484	654719	6	Viewpoint on the top of Duns Law to the north-east of the site. Representative of walkers' views on this hill. To consider local elevated views including cumulative effects. Also to be used for the cultural heritage assessment.
9	A6105 Duns east	379340	653950	6.7	Viewpoint on A6105 on the approach to Duns from the east. Representative of road users'

Viewpoint	Name	Grid Reference		Distance	Reason for selection
					views and more open views from the settlement. Also to consider sequential views and cumulative effects.
10	Marchmont House avenue	375450	649500	3.8	Viewpoint on the minor road that crosses the avenue of Marchmont House. Representative of road users' views in that local area, and open views from the estate policies. Also to be used for the cultural heritage assessment.
11	A6105 Greenlaw Moor	371867	648263	3.7	Viewpoint on B6105 north of Greenlaw. Representative of road users' views, to consider sequential views and cumulative effects.
12	Westruther	363840	650090	8.5	Viewpoint on B6456 east of Westruther. Representative of road users' views and more open views from the settlement, to consider sequential views and cumulative effects.
13	Twin Law Cairns	362450	654830	9.6	Viewpoint on the top of Twin Law Cairns to the west of the site. Representative of walkers' views on this hill and on nearby sections of the Southern Upland Way. To consider elevated walkers' views of the wind turbines, and cumulative effects.
14	Watch Water Reservoir	366741	655984	5.7	Viewpoint near the Watch Water reservoir to the north-west of the site. Representative of walkers' views on the Southern Upland Way. To consider walkers' views of the wind turbines, and cumulative effects.
15	Wrunk Law	368210	658910	6.6	Viewpoint on minor road north of Longformacus. Representative of road users' views of the wind turbines, to consider sequential views and cumulative effects.
16	Cockburn Law	376560	659760	7.1	Viewpoint on the Cockburn Law to the north-east of the site. Representative of walkers' views on this hill, to consider elevated views of the wind turbines, and cumulative effects. Also to be used for the cultural heritage assessment.
17	Hume Castle	370470	641410	10.7	Viewpoint on the ramparts of Hume Castle to the south of the site. Representative of visitors' views on this hill, and views seen from open areas to the south of the site. To consider more distant views of the wind turbines, and cumulative effects.

Viewpoint	Name	Grid Reference		Distance	Reason for selection
18	A697 north of Coldstream	381140	641180	13.7	Viewpoint on the A697 to the north of Coldstream, to the south-east of the site. Representative of road users' views on this trunk road, and other views seen from open areas to the south-east of the site. To consider more distant views of the wind turbines, sequential views, and cumulative effects.

Source: MVGLA, 2022

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 will be assessed in terms of the size and scale, geographical extent, duration and reversibility of the effect. These aspects will all be considered in forming a judgement regarding the overall effect and whether this is judged to be significant.

Significance of visual effects, considering receptor sensitivity and the magnitude of change as set out above, will identify the level of effect using four categories: major, moderate, minor, and negligible. Major and moderate effects will be considered to be significant in the context of the EIA Regulations.

Night-Time Visual Assessment

In the interests of aviation safety, Civil Aviation Authority (CAA) policy[19] states that turbines over 150 m to tip height are required to incorporate visible lighting. Consequently, an assessment of the effects of visible aviation lighting on the proposed wind turbines will be carried out as part of the LVIA and included within the assessment.

Night-time photomontages, using photographs taken shortly after dusk (with due consideration of safety of photographers), will be produced for 2-3 viewpoints (to be agreed) to illustrate the potential appearance of aviation lights on turbines relative to the existing night-time baseline. The baseline night-time context 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 visual amenity at these viewpoints will be drawn on to provide general comment on the likely effects across the wider study area.

Residential Visual Amenity Assessment

It is considered that a Residential Visual Amenity Assessment (RVAA) will be required as there are a number of residential properties within approximately 2 km of the Proposed Development. The RVAA will be carried out in accordance with the Landscape Institute guidance on RVAAs[20].

Visualisations

Visualisations used to support the assessment will include:

- ZTV maps analysing visibility of the proposed wind turbines to tip and hub heights as well as combined ZTV maps with other wind farms;

[19] Civil Aviation Authority (2017) *DAP Policy: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150 m Above Ground Level* [Online] Available at: DAP Policy: 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 (caa.co.uk) [Accessed: 01/06/2022]

[20] Landscape Institute (2019) *Residential Visual Amenity Assessment (RVAA). Technical Guidance Note 2/19* [Online] Available at: tgn-02-2019-rvaa.pdf (windows.net) [Accessed: 01/06/2022]

- ZTV maps analysing visibility of the proposed solar PV panels;
- Photographs of existing views;
- Wireline images to illustrate theoretical visibility of the Proposed Development from viewpoints;
- Photomontages to illustrate the predicted changes to views from viewpoints; and
- Night-time photomontages for 2-3 viewpoints to illustrate the appearance of aviation lighting after dark.

Visualisations will include cumulative schemes, and will be produced in accordance with NatureScot guidance.

Cumulative Effects

The LVIA will consider operational wind farms and solar PV installations, and those under construction as part of the existing baseline.

Cumulative Assessment Scope

The cumulative assessment will consider the current pattern of wind farms and proposed solar PV schemes across the landscape, and the relationship that the Proposed Development will have with them.

The LVIA will assess the combined visual effects of the Proposed Development with other existing or reasonably foreseeable wind energy and solar PV developments within the study area. The cumulative LVIA will consider operational and consented schemes, and those which have undetermined applications or appeals, within a 45 km radius search area, and solar PV installations within 10 km.

Within these 45 km and 10 km search areas, the cumulative LVIA will seek to focus detailed assessment on the cumulative effects of the Proposed Development with developments most likely to have cumulative relationships with the Proposed Development, primarily those within 15-20 km of the Proposed Development in the case of wind farms, and 5 km in the case of solar PV developments.

Cumulative research will be undertaken using the local authority planning portals (for Scottish Borders, Midlothian, East Lothian and Northumberland) and the scope of assessment and 'cumulative cut-off date' will be agreed with SBC and NatureScot prior to submission to ensure the most up to date information available is included. Schemes at scoping stage within 5 km will only be included at the reasonable request of SBC and NatureScot, and if sufficient information is available to make an informed assessment. Turbines below 50 m to blade tip height will not be included in the assessment.

Cumulative Assessment Methodology

The cumulative landscape and visual assessment (CLVIA) will be carried out in accordance with the principles contained in NatureScot guidance on cumulative assessment[21]. This methodology assesses different development scenarios with increasing levels of 'uncertainty'. Cumulative scenarios will include:

- Existing Scenario: this assesses the effects with all operational developments and those under construction present in the baseline and thus represents the LVIA;
- Consented Scenario: this scenario is somewhat speculative because it assumes that consented developments are also present in the landscape; and
- In-planning Scenario: this is the most speculative scenario because it assumes all undetermined applications, as well as all developments included in the earlier scenarios, are present in the landscape and therefore considers the effect of adding the Proposed Development into this landscape.

[21] NatureScot (2020) *Guidance – Assessing the Cumulative Landscape and Visual Impact of onshore Wind Energy Developments* [Online] Available at: Guidance – Assessing the cumulative landscape and visual impact of onshore wind energy developments | NatureScot [Accessed: 24/05/2022]

The intervisibility of the Proposed Development with other developments in the surrounding area will be illustrated by overlaying the ZTVs of other developments with that of the Proposed Development. Paired ZTVs will be prepared to illustrate the key relationships between the Development and other developments close to the site. Cumulative visual effects will be assessed through analysis of combined ZTVs, views from individual viewpoints and sequential views from routes.

The magnitude of additional cumulative change to views or landscape character is the additional influence the Development has on the views or character of the landscape, assuming the other developments are already present.

The cumulative assessment will consider the in-combination effects of emerging wind energy development patterns, and how the Proposed Development relates to these patterns and trends.

Designated Landscapes

The LVIA will review the baseline description and citations of relevant landscape designations within the ZTV and within approximately 20 km of the Proposed Development. Following the assessment of landscape and visual effects, the LVIA will review the identified effects for landscape and visual receptors within the designated areas, and how these will affect the key qualities and reasons for designation. No separate assessment of effects on designated areas will be made, to avoid double counting.

Potential Significant Effects of the Development

Potential Significant Effects during Construction

The landscape and visual effects that could arise as a result of the Proposed Development during construction are identified as follows:

- Temporary effects on landscape character, primarily as a result of wind turbine installation during construction, with direct effects on the fabric on the landscape and on the character of the site landscape relating to ground level structures, and indirect effects on the perceived effects on the character of the surrounding character areas; and
- Temporary visual effects on views, primarily as a result of visibility of ground level activity and structures as well as wind turbine installation during construction, experienced by people (visual receptors).

Potential Significant Effects during Operation

The landscape and visual effects that could arise as a result of the Proposed Development during operation are identified as follows:

- Long-term effects on landscape character, as a result of ground level structures and wind turbine operation, either affecting the pattern of elements that define the character or affecting the visual/perceptual characteristics of landscape character areas;
- Long-term visual effects as a result of the Proposed Development on nearby views, with effects as a result of wind turbine operation on wider views, experienced by people at places with visibility of different elements of the Proposed Development. This includes effects on the visual aspects of residential amenity for residential properties close to the site; and
- Implications of significant effects identified in or affecting designated landscapes, which may affect their special qualities and reasons for designation.

Potential Significant Effects during Decommissioning

The effects of the Proposed Development during decommissioning will be similar to those identified during construction.

Effects Scoped Out

To allow a focussed assessment, where receptors are unlikely to be affected by the Proposed Development, either through having little or no theoretical visibility, or being distant from the Proposed Development, those receptors will be scoped out of the LVIA. The exception to this may be a few long-distance viewpoints specifically requested by consultees to provide evidence of likely visibility of the wind turbines from these locations, even though effects are unlikely to be significant.

At this stage, it is proposed that the following will not be included in the assessment, on the basis of the initial desk-based work undertaken:

- LCTs beyond 15 km radius;
- Designated landscapes beyond 20 km radius;
- Settlements beyond 10 km;
- Local paths beyond 5 km;
- Scoping schemes as part of the CLVIA; and
- Turbines below 50 m to blade tip height in the CLVIA.

Approach to Mitigation

The primary form of mitigation for landscape and visual effects, including cumulative effects, is through iterative design of the layout of the turbines and other elements of the Proposed Development, as seen from key viewpoints and routes. The process and justification for design development will be set out in detail in the Design Strategy that will form part of the EIAR.

Questions

Question 7: Are consultees content with the proposed methodology for the LVIA?

Question 8: Are consultees content with the proposed approach to undertaking viewpoint photography and preparing visualisations?

Question 9: Are consultees in agreement with the proposed study areas, focus, and source data for the assessment of landscape effects?

Question 10: Are consultees in agreement with respect to the effects that are proposed to be scoped out?

Question 11: Are consultees content that the LVIA scope has identified the most important receptors to be assessed?

Question 12: Are consultees content with the proposed viewpoints identified in Table 9.2, and could they advise of any additional viewpoints they consider necessary to assess the effects of the Proposed Development?

Question 13: Can consultees advise on which three viewpoints should be represented with night-time photomontages to illustrate turbine lighting?

Question 14: Are consultees content with the proposed approach to the cumulative assessment and could they advise of any specific cumulative sites they consider should be included in the assessment?

10. Ecology

The intention of this section of the Scoping Report is to provide the competent authority and its advisors with sufficient information (where it currently exists) on the likely impacts of the Proposed Development on important ecological features. This will allow for an EIAR that focusses on features which could be significantly affected, or for which the predicted effects are currently unknown.

Baseline survey work to inform scoping and therefore the Ecological Impact Assessment (EcIA) commenced in March 2020; the results of these surveys are summarised in the following sections. These results are used to identify important ecological features that could sustain positive or negative impacts as a result of the Proposed Development. Where likely non-significant impacts are identified in this section, Natural Power proposes that these are not carried forward for inclusion in the relevant EIA and are 'scoped out'.

This section also provides information on statutory sites of international importance, upon which the Proposed Development may have a 'Likely Significant Effect' (LSE). A screening process will be undertaken alongside the EIA to determine whether the predicted impacts of the Proposed Development will result in a LSE. The screening process will allow the competent authority to determine whether an Appropriate Assessment (AA) will be required.

The original turbine layout proposed in 2020 was for eight turbines; however the turbine layout was updated in 2021 to a seven-turbine layout. Some surveys reported in this section covered the original, larger turbine layout, which encompasses the entirety of the new turbine layout. Hereafter the survey area covering the eight-turbine layout proposed in 2020 will be referred to as the 'original survey area' and the up-to-date seven-turbine layout will be referred to as the 'updated survey area'.

Legislation and Guidance

The ecological baseline surveys and preliminary assessment presented in this report have been carried out with reference to a number of national policy documents. Legislative and guidance documents with relevance to ecology are listed below:

Legislation

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive)[22];
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive)[23];
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law[24];
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012[25];
- The Conservation of Habitats and Species (Amendment) Regulations 2017, relating to reserved matters in Scotland[26];
- Wildlife and Countryside Act (WCA) 1981 (as amended)[27];
- The Nature Conservation (Scotland) Act 2004[28];
- The Wildlife and Natural Environment (Scotland) Act 2011[29];
- Protection of Badgers Act 1992 (as amended)[30]; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[31].

National Policy Guidance

- PAN 51: Planning, Environmental Protection and Regulation (revised 2006)[32];
- PAN 60: Planning for Natural Heritage (Scottish Government 2000)[33];

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[22] European Commission (1992) *Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive)* [Online] Available at: The Habitats Directive – Environment – European Commission (europa.eu) [Accessed 25/05/2022]

[23] European Commission (1985) *Environmental Impact Assessment Directive 85/337/EEC* [Online] Available at: Environmental Impact Assessment – EIA – Environment – European Commission (europa.eu) [Accessed 25/05/2022]

[24] UK Government (1994) *The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law* [Online] Available at: The Conservation (Natural Habitats, &c.) Regulations 1994 (legislation.gov.uk) [Accessed 25/05/2022]

[25] Scottish Government (2012) *The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012* [Online] Available at: The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012 (legislation.gov.uk) [Accessed 25/05/2022]

[26] Scottish Government (2017) *The Conservation of Habitats and Species (Amendment) Regulations 2017* [Online] Available at: The Conservation of Habitats and Species Regulations 2017 No. 1012 (legislation.gov.uk) [Accessed 25/05/2022]

[27] UK Government (1981) *Wildlife and Countryside Act 1981* [Online] Available at: Wildlife and Countryside Act 1981 (legislation.gov.uk) [Accessed 25/05/2022]

[28] Scottish Government (2004) *The Nature Conservation (Scotland) Act 2004* [Online] Available at: Nature Conservation (Scotland) Act 2004 (legislation.gov.uk) [Accessed 25/05/2022]

[29] Scottish Government (2011) *Wildlife and Natural Environment (Scotland) Act 2011* [Online] Available at: Wildlife and Natural Environment (Scotland) Act 2011 (legislation.gov.uk) [Accessed 25/05/2022]

[30] UK Government (1992) Protection of Badgers Act 1992 [Online] Available at: Protection of Badgers Act 1992 (legislation.gov.uk) [Accessed 25/05/2022]

[31] Scottish Government (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* [Online] Available at: The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 25/05/2022]

[32] Scottish Government (2006) *Planning Advice Note 51: planning, environmental protection and regulation* [Online] Available at: Planning Advice Note 51: planning, environmental protection and regulation – gov.scot (www.gov.scot) [Accessed 25/05/2022]

[33] Scottish Government (2000) *Planning Advice Note 60: natural heritage* [Online] Available at: Planning Advice Note 60: natural

- Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment (Scottish Government 2013)[34];
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000)[35]; and
- SPP (2014)[36].

Other Guidance

Particular attention has also been given to the guidance documents listed below that are applicable to assessing the effects of wind farm developments on ecology. Reference has also been made to guidance documents through the report where relevant:

- European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements[37];
- Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2018)[38];
- Land Use Planning System SEPA Guidance Note 4: Planning Guidance on Windfarm Developments[39];
- Good Practice during Wind Farm Construction[40];
- Bats and Onshore Wind Turbines (January 2021)[41];
- Natural England's interim guidance on 'Bats and Onshore Wind Turbines' (Technical Information Note (TIN) 051)[42];
- Scottish Biodiversity List (SBL)[43]; and
- Scottish Border Council Local Biodiversity Action Plan (LBAP)[44].

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heritage – gov.scot (www.gov.scot) [Accessed 25/05/2022]

34 Scottish Government (2013) *Planning Advice Note 1/2013: Environmental Impact Assessment* [Online] Available at: Planning Advice Note 1/2013: Environmental Impact Assessment – gov.scot (www.gov.scot) [Accessed 25/05/2022]

35 Scottish Executive Rural Affairs Department (2000) *Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended* [Online] Available at: FOI+-+201900008726+-+Information+released+-+Circular+6-1995+Nature+Conservation+-+%27The+Habitats+and+Birds+Directives%27+%28Updated+June+2000%29..PDF (www.gov.scot) [Accessed 25/05/2022]

36 Scottish Government (2020) *Scottish Planning Policy* [Online] Available at: Scottish Planning Policy – gov.scot (www.gov.scot) [Accessed 25/05/2022]

37 Scottish Executive, 2001 (updated 2006). *European protected species, development sites and the planning system: Interim guidance for local authorities on licensing arrangements*. [Online] Available at: European Protected Species – terms of guidance: Chief Planner letter – gov.scot (www.gov.scot) [Accessed 25/05/2022]

38 Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland* [Online] Available at: Combined-EclA-guidelines-2018-compressed.pdf (cieem.net) [Accessed: 25/05/2022]

39 SEPA, (2012). *Land Use Planning System Guidance Note 4: Planning guidance on windfarm developments. Appendix 2. Version 7: 14 May 2014* [Online] Available at: planning-guidance-on-on-shore-windfarms-developments.pdf (sepa.org.uk) [Accessed 25/05/2022]

40 Scottish Renewables, SNH, SEPA, Forestry Commission Scotland, (2015). *Good practice during windfarm construction. Version 3* [Online] Available at: Good Practice during Wind Farm Construction (nature.scot) [Accessed 25/05/2022]

41 NatureScot (2019). *Bats and onshore wind turbines: survey, assessment and mitigation. Version August 2021* [Online] Available at: Bats and onshore wind turbines – survey, assessment and mitigation | NatureScot [Accessed 25/05/2022]

42 Natural England (2014). *Technical Information Note TIN051 Bats and onshore wind turbines interim guidance, 3rd Edition* [Online] Available at: Bats and onshore wind turbines – survey, assessment and mitigation | NatureScot [Accessed 25/05/2022]

43 The SBL forms a list of species and habitats of importance for biodiversity conservation in Scotland, produced by the Scottish Government.

44 Scottish Borders (2018*) Scottish Borders Local Biodiversity Action Plan* [Online] Available at: Local_Biodiversity_Action_Plan_2018_28_lowres_feb2020.pdf [Accessed 25/05/2022]

Methods

Desk Based Review

Designated Sites

A web-based search was undertaken to identify and provide information on statutory sites with an international or national designation for ecological interests, located within 10 km of the Proposed Development. The SNH online tool Sitelink[45] and the online Geographical Information Systems (GIS) tool MAGIC (Multi-Agency Geographic Information for the Countryside)[46] were used.

Data were sought for the following:

- Special Areas of Conservation (SACs) – within 5 km, extended to 10 km for bats, of the Proposed Development Area;
- SSSIs – within 5 km of the Proposed Development Area;
- Locally Nature Conservation Sites (LNCS) such as Sites of Important Nature Conservation (SINCs) and Local Wildlife Sites (LWS) – within 5 km of the Proposed Development Area; and
- Local and National Nature Reserves (including Royal Society for the Protection of Birds (RSPB) and Wildlife Trust Reserves) – within 5 km of the Proposed Development Area.

Species of Note (Existing Data)

To provide additional background information on the Proposed Development Area, historic survey data from 2012 was provided by the Applicant in November 2020 for an area within the footprint of the Proposed Development[47]. This included a Phase 1 Habitat Survey extended to include protected species.

Before the EIAR is submitted, further records of relevant protected or notable species data shall be requested from The Wildlife Information Centre (TWIC).

Habitat Survey

An extended Phase 1 Habitat Survey and National Vegetation Classification (NVC) survey was undertaken within the site boundary (shown in Figure 10.1) in accordance with JNCC's Handbook for Phase 1 Habitat Survey[48]. Due to the changing site boundary and restricted access not all of the Proposed Development has been subject to a Habitat Survey at this time, this relates to the southernmost portion of the red line boundary (shown on Figure 10.1 as outside of the blue survey boundary). This survey characterised the habitats present on site and identified any habitats of significant conservation value and/or protected plant species. The surveyor also assessed habitat suitability to support protected species, avian and non-avian, to inform the requirement for further species-specific survey work. Target notes were taken on protected species signs, habitat and sightings as appropriate. Any non-native invasive species such as Japanese knotweed or giant hogweed were also recorded as target notes.

NVC surveys define the vegetation of selected areas more precisely and identify key sensitive areas such as potential Ground Water Dependant Terrestrial Ecosystems (GWDTE). NVC surveys classify plant communities

45 Nature Scot (2022) *Site link* [Online] Available at: https://sitelink.nature.scot/home [Accessed 09/05/2022]

46 Ordnance Survey (2022) *Magic* [Online] Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 25/05/2022]

47 WSP (2012) *Preliminary Ecological Surveys*: Langton Lees, Dumfries and Galloway. RES UK & Ireland

48 JNCC (2010*) Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit* [Online] Available at: Handbook for Phase 1 habitat survey – a technique for environmental audit (2010) | JNCC Resource Hub [Accessed 01/06/2022]

and sub-communities present on site according to a system developed by Rodwell (1991a; 1991b; 1992; 1995 and 2000)[49],[50],[51],[52],[53].

As defined (Rodwell, 2006[54]; and B. Averis pers. com., 2012[55]), a standard NVC field survey typically consists of vegetation mapping, with representative quadrats taken in communities of particular interest or where classification is challenging.

All habitat patches >10 x 10 m were visited, and the vegetation communities classified according to the NVC community and sub-community system. These were then mapped digitally onto a tablet using NVC codes[56].

In addition to surveys of the site, all but two pinch points along the proposed access route were subject to Phase 1 and NVC surveys in April 2022. The remaining two pinch points were not safe to access, so were assessed using aerial imagery only. Given the access route is unconfirmed at this time and the low potential for impacts, these survey results have not been included at this stage.

Bat Surveys

Roost Surveys

Occupied and unoccupied buildings or ruins, structures such as bridges, quarries and forested areas with mature or dead trees all have the potential to provide suitable locations for roosting or hibernating bats. Within the original development area, any such features were surveyed, and their suitability to support roosting bats determined, along with any evidence of occupation. Surveyors also searched for any other potential roost structures, e.g. mine shafts or bridges, which may have been present.

Features were classified into potential roost categories of negligible, low, moderate or high potential.

Acoustic Surveys

Bat surveys were undertaken in 2020 with seven full spectrum Wildlife Acoustic SM4 static detectors. Where possible, detectors were placed within 200 m of each proposed turbine. The chosen 2020 deployment locations represented the original eight-turbine layout. As the original turbine layout was subsequently altered, an additional detector was deployed in 2021, as shown in Figure 10.2; this was the only detector deployed in 2021.

- Static detectors were deployed for a minimum of ten consecutive nights per deployment, during spring (April-May), summer (June - August) and autumn (September – October). To aid interpretation of all bat activity data, robust site-specific weather data were recorded for each period through the deployment of a weather station.

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49 Rodwell, J.S. (ed.) (1991). *British Plant Communities. Volume 1. Woodlands and scrub*. Cambridge University Press

50 Rodwell, J.S. (ed.) (1991*). British Plant Communities. Volume 2. Mires and heath.* Cambridge University Press

51 Rodwell, J. S. (ed.) (1992). *British Plant Communities. Volume 3. Grassland and montane communities.* Cambridge University Press.

52 Rodwell, J.S. (ed.) (1995). *British Plant Communities. Volume 4. Aquatic communities, swamps and tall-herb fens*. Cambridge University Press.

53 Rodwell, J.S. (ed.) (2000). *British plant communities. Volume 5. Maritime communities and vegetation of open habitats.* Cambridge University Press.

54 Rodwell. J.S. (ed.) (2006). *National Vegetation Classification: Users' handbook* (JNCC National Vegetation Classification Field Guide Series). Peterborough

55 Averis, A. et al. (2004). An Illustrated Guide to British Upland Vegetation. Joint Nature Conservation Committee. Peterborough.

56 Some vegetation types are not apparent under the NVC classification: this is highlighted in a review of coverage of the NVC (Rodwell *et al*., 2000). If a non-NVC habitat type is mapped, for instance soft-rush dominated species-poor rush-pasture, any codes used should be defined in the key.

There were some limitations and constraints to the static detector surveys. During the autumn survey period detectors near turbines 2 and 3 malfunctioned, likely due to battery failure. Of the affected detectors, no bats were recorded over the autumn period for the minimum ten consecutive nights before failure. All the detectors that experienced failure recorded for the entirety of the other survey seasons. As such, this is unlikely to have any overall impact on the assessment of bat species within the Proposed Development Area.

Analysis was undertaken at species level (excepting Myotis sp.) using Kaleidoscope automatic identification software. Myotis sp. and in some cases Pipistrelle sp. were not identified further than genus due to the overlap in call-frequency between species. Signal parameters used to identify potential bat calls and filter out noise calls within the Kaleidoscope software were set to all recordings between 16-120 kHz, 2-500 ms, 500 ms maximum inter-syllable gap and with a minimum of two pulses.

The Kaleidoscope software provides automatic identification to species which were assumed to be correct for common pipistrelles, soprano pipistrelles and noise, these were not investigated further. Automatic identification of other bat species records is considered less reliable and manual quality assurance checks were therefore performed on all other acoustic records. The assessment of the bat survey data was undertaken following standard NatureScot guidance[57].

The Bat Activity Index (BAI) is calculated by Natural Power as the median of bat passes per night, based on the number of calls per night of a given species and on the number of hours between sunset and sunrise[58].

Other Protected Mammal Surveys

Protected mammal surveys were undertaken in April - August 2020 to determine the presence of mammal species for which there is legal protection, this was supplemented with information from surveys in July 2021. The methods comprised a walkover of the site plus a species-specific buffer (where access allowed). Not all areas within the Proposed Development have been surveyed to date (as shown in Figure 10.1) due to access restrictions. Where access was granted, all watercourses within the Proposed Development Area plus a 200 m buffer were surveyed for otter, while a 50 m buffer was searched for water vole. Surveys followed standard methods as described by Chanin (2003)[59], Sargent & Morris (2003)[60] for otter and Strachan et al. (2011)[61] for water vole.

Surveys for badgers were undertaken in suitable habitat within the Proposed Development Area. Surveys were carried out between April - August 2020 as well as July 2021 and consisted of searches for field signs and setts as described by Bang & Dahlstrøm (2001)[62] and Sargent et al. (2003)[63] amongst other sources.

Fish Habitat Surveys

A fish habitat assessment (walkover survey) of the watercourses was undertaken in conjunction with otter and water vole surveys. Surveyors walked targeted watercourses within the site to record the location and extent of different fish habitat features, including water depth, substrate and bankside structure. This enabled an

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57 NatureScot. (2021). *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.*[Online] Available at: Bats and onshore wind turbines - survey, assessment and mitigation | NatureScot [Accessed: May 2022]

58 Lintott, P.R., Mathews, F. (2018). Basic mathematical errors may make ecological assessments unreliable. *Biodivers Conserv* **27,** 265–267 [Online] Available at: https://doi.org/10.1007/s10531-017-1418-5 [Accessed 01/06/2022]

59 Chanin, P. (2003) *Monitoring the Otter Lutra. Conserving Natura 2000 Rivers: Monitoring Series No. 10*. English Nature, Peterborough.

60 Sargent, G. & Morris, P. (2003) *How to Find & Identify Mammals* The Mammal Society, London

61 Strachan, R., Moorhouse, T. & Gelling, M., (2011) *The Water Vole Conservation Handbook* Third Edition, Wildlife Conservation Research Unit, University of Oxford, Abingdon

62 Bang, P. & Dahlstrøm, P. (2001) *Animal Tracks and Signs*. Oxford University Press, Oxford.

63 Sargent, G., Morris, P. and Troughton, G. (2003) *How to Find and Identify Mammals*, 3rd Edition. The Mammal Society, Southampton.

assessment of habitat suitability for freshwater fish following the Scottish Fisheries Coordination Centre (SFCC) methodology[64].

This methodology approximates in-stream habitat availability for fish as a percentage within a known length of the watercourse (50 m lengths). Parameters are recorded for each section, including the percentage of each substrate type (bedrock, boulder, cobble, pebble, gravel, clay, sand and silt) and the flow characteristics (pool, riffle, glide, slack). Locations of the surveyed areas are shown in Figure 10.3. Although these surveys do not identify the presence of fish, they do highlight key habitat where certain species may be present based on known habitat preferences. The results can then inform the requirement for further survey, such as electrofishing to identify which fish species are present.

Results

Designated Sites

As shown within Figure 10.4 the following SAC's are within 10 km of the Proposed Development:

- Three portions of the River Tweed SAC – 3.6 km north-west, 3.8 km south-east and 5 km south-west. The River Tweed SAC includes sections of the river with floating vegetation often dominated by water-crowfoot, used by river lamprey, brook lamprey, sea lamprey, Atlantic salmon and otters. Watercourses on the Proposed Development Area flow into the River Tweed and may therefore sustain species that are designated within the River Tweed SAC. Surveys to assess the presence of suitable habitat for fish species have been carried out on site in response to this.
- Dogden Moss – 3.2 km south-west, upland raised bog which supports the scarce bog-moss Sphagnum imbricatum.

Table 10.1 below includes details of the remaining nationally designated sites, designated for ecological interest, within 5 km of the Proposed Development.

Table 10.1: Nationally Designated Sites Within 5 km of the Proposed Development Area.

Site Name	Designation	Reason for Designation	Approx. distance (km) and direction
Langtonlees Cleugh	SSSI	Mixed deciduous woodland in a steep, relatively undisturbed sandstone gorge. The northern arm of the SSSI has the greater structural and species diversity, with areas of indicative ancient woodland. There are also small areas of neutral grassland, flushed marshy grassland and swamps.	0 - within the eastern edge of the red line boundary
Greenlaw Moor	SSSI	Raised bog with heather moor to the east and a variety of woodland habitats immediately south across the B5646 from the Proposed Development.	0 km south
River Tweed	SSSI	A clean river system, which in turn supports other notified features including Atlantic salmon, otter, rare plants, rare fish and assemblages of invertebrates.	3.6 km north-west, 3.8 km south-east and 5 km south-west

64 Scottish Fisheries Co-ordination Centre (2007). *Habitat Surveys Training Course Manual*. [Online] Available at: http://www.sfcc.co.uk/resources/habitat-surveying.htm [Accessed: May 2022]

Site Name	Designation	Reason for Designation	Approx. distance (km) and direction
Crook Burn, Dyeshaugh	SSSI	Fen meadow, with a variety of wetter and meadow habitats which holds several nationally declining species.	4.8 km north

Source: SiteLink

There are no Local or National Nature Reserves (including RSPB and Wildlife Trust Reserves) within 5 km of the Proposed Development Area.

Impacts to designated sites in close proximity to the Proposed Development may result from pollution through hydrological connectivity and impact on designated features, including upland habitat, protected fish species and otters. Should impact assessment identify the likelihood of significant impacts to designated sites close to the Proposed Development Area, then suitable mitigation measures will be proposed in the EIAR.

Summary of Historic Survey Data

Ecological surveys of the Proposed Development and surrounding area in 2012-2013 categorises the bulk of the habitats as “dry modified bog” with areas of “wet heath/acid grassland” while arable and improved grasslands were present along the eastern and southern portions of the site. Patches of broadleaved woodland and coniferous plantation were also present as were the quarry, motorcross track and watercourses.

The survey identified two badger setts, evidence of water voles, suitability for otters and suitability for use by foraging and commuting bats. The 2013 report also draws attention to a record of red squirrel from within 1 km of the Proposed Development, however information on the location or age of this record is not provided.

Habitat Survey

Habitats found during Phase 1/NVC surveys are described below. The results of the Phase 1 survey are shown in Figure 10.5 and further refined within the NVC survey map shown in Figure 10.6.

Woodland and scrub

Woodland and scrub on site comprised commercial plantation forestry, a small area of semi-natural broadleaved woodland and mixed gorse-bramble scrub. The commercial plantation forestry was generally not diverse enough to form an NVC habitat or was formed of non-native trees. This was predominantly coniferous trees but there were also some areas of broadleaved plantation. Areas of semi-natural broadleaved woodland were present along the burn to the far east of the site within and adjacent the Langtonlees Cleugh SSSI. Some areas of the Langtonlees Cleugh SSSI were classified as a mix of: W11 Quercus petraea-Betula pubescens-Oxalis acetosella woodland; U20 Pteridium aquilinum-Galium saxatile community and W9 Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis woodland. NVC W11 community is listed as a priority habitat on the Scottish Biodiversity List (SBL) (as upland oakwood).

Grassland and marsh

Grassland and marsh on site comprised unimproved and semi-improved acid and neutral areas, improved and marshy grassland communities. Areas classified as acid grassland were mainly to the north of the site, adjacent areas of heath. While the improved grassland fields were largely in the south/centre of the site, additional fields of improved grassland were present to the north of the site adjacent the road. The improved grassland areas were dominated by either NVC MG6a Lolium perenne-Cynosurus cristatus grassland, typical sub-community or MG7 Lolium perenne leys and related grasslands.

Areas of acid grassland were present to the north of the site, including a small amount of NVC U5 Nardus stricta-Galium saxatile grassland, which is an EU Habitats Directive Annex 1 habitat and U2a Deschampsia flexuosa grassland Festuca ovina-Agrostis capillaris sub-community, which is typical of SBL priority habitat Lowland dry acid grassland. Areas of purple moor grass and rush pasture, an SBL habitat, were present across the site. Additional areas considered to be within the following SBL Broad Habitat Categories: Fen, marsh and swamp and Neutral grassland were also present across the site. Of the NVC communities recorded M6d Carex echinata-Sphagnum recurvum/auriculatum mire, Juncus acutiflorus sub-community and M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture (various sub-communities) were considered to have high potential for being ground water dependant. Additional communities with moderate potential to represent ground water dependant habitats were also present mostly in the form of marsh/marshy grassland NVC MG10 *Holcus lanatus-Juncus effusus* rush-pasture communities.

Tall herb and fern

A small area of continuous bracken (U20a *Pteridium aquilinum-Galium saxatile Anthoxanthum odoratum* NVC sub-community) was to the south of the site. Species typical of tall ruderal were present, predominantly adjacent the hedgerows, roads or waterways with species such as *Chamaenerion angustifolium, Rumex obtusifolius, Lathyrus pratense, Cerastium fontanum, Urtica dioica* and *Galium aparine*. The variety of tall herbs were found within different areas, none of which represented tall herb communities in of themselves; however they supplemented other habitats.

Heathland; Dry dwarf shrub heath – acid and wet dwarf shrub heath

Dwarf shrub heath covered much of the upland area of the site, as well as some small patches in the lowland area to the west of the site. Wet heath was present adjacent some of the waterways on site while the dry acid heath was present in the upper regions of the site. The main dry heath community encountered was H9 *Calluna vulgaris-Deschampsia flexuosa* with *U2a Deschampsia flexuosa grassland, Festuca ovina-Agrostis capillaris* sub-community, there were also patches of M15b *Scirpus cespitosus-Erica tetralix* wet heath sub-community within depressions. Additionally, areas of dry heath/acid grassland (U6 *Juncus squarrosus-Festuca ovina* grassland) were present adding to the mosaic of dry heath habitats within the site. All types of dry dwarf shrub heath on site are on the SBL.

Of the wet dwarf shrub heath, NVC M15 *Scirpus cespitosus-Erica tetralix* wet heath community and sub-community were the most common, including M15b *Scirpus cespitosus-Erica tetralix wet heath,* typical sub-community and M15d *Scirpus cespitosus-Erica tetralix wet heath, Vaccinium myrtillus* sub-community. Other NVC communities included M25 *Molinia caerulea-Potentilla erecta* mire communities, H12 *Calluna vulgaris-Vaccinium myrtillus* heath and U2 *Deschampsia flexuosa* grassland communities. Of the above, M15, M25 and U6 communities have moderate potential to be GWDTE.

Swamp and bog/inundation communities

There was a single area of swamp present to the far east of the site (NVC community S10 *Equisetum fluviatile* swamp) and two small areas of wet modified bog (NVC M20a *Eriophorum vaginatum* blanket and raised mire, species-poor sub-community) were present in the centre of the site. These are not GWDTE communities but were partially inundated and therefore require careful mitigation, to be defined in the EcIA. However, the two areas of flush and spring - acid/neutral flush (NVC M6 *Carex echinata-Sphagnum recurvum/auriculatum* mire of various different communities) along the western edge of the site represented high potential GWDTE.

No infrastructure is planned to be on or adjacent to these areas. These habitats are also on the SBL.

Other habitats

Other areas comprised of cultivated arable land, a small quarry and a motocross track with associated infrastructure were also present. A section of 'unnamed road' divided the northern part of the site from the majority of the site. These habitat types are not defined under the NVC.

Summary of Potential Impacts

Table 10.2 lists a summary of the protected habitats with potential to be impacted by the Proposed Development. Further investigation of habitats listed on Annex 1 of EU Habitats Directive and those with potential to be GWDTE will be presented in the EIAR. Should impact assessment identify the likelihood of significant impacts to protected habitats, mitigation measures, such as a Habitat Management Plan and/or Peat Management Plan, will be proposed in the EIAR.

Table 10.2: Summary of Protected Habitats with Potential for Impact During Development

Phase 1 Habitat	NVC community	Conservation Status
Semi-natural broadleaved woodland	W11	Annex 1; SBL
Acid grassland	H9/H12c/M15d/U2a/U2b/U4/U4a/ U4b/U5/U5a/U20	SBL
Acid grassland	M23/M23a/M23b	Potential GWDTE (High); SBL
Acid grassland	MG10/MG10a/M15d/U6/U6d	Potential GWDTE (Moderate); SBL
Marshy grassland	MG5/ /OV28/OV32/U2a/U2b/U4a/U20	SBL
Marshy grassland	M6d/M23a/M23b/	Potential GWDTE (High); SBL
Marshy grassland	M25a/M25b/MG9/MG10/MG10a	Potential GWDTE (Moderate); SBL
Neutral grassland	MG5/MG6b/U4b	SBL
Neutral grassland	M23a/M23b	Potential GWDTE (High)
Neutral grassland	MG9/MG10	Potential GWDTE (Moderate)
Dry dwarf shrub heath	H9/U2a	Annex 1; SBL
Dry dwarf shrub heath	M15b/U6	Potential GWDTE (Moderate); Annex 1; SBL
Wet dwarf shrub heath	M15/M15b/M15d/M25a/M25b	Potential GWDTE (Moderate); Annex 1; SBL
Wet dwarf shrub heath	U2a/U2b	SBL
Wet dwarf shrub heath	H12	Annex 1; SBL
Swamp	S10	Annex 1; SBL;
Wet modified bog	M20a	Annex 1; SBL
Flush and spring - acid/neutral flush	M6	Potential GWDTE (High); Annex 1; SBL

GWDTE – Ground water dependent terrestrial ecosystem; Annex 1 – Listed on Annex 1 of EU Habitats Directive; SBL – Listed on Scottish Biodiversity List and UK Biodiversity Action Plan.

Source: Natural Power, 2022

Bat Surveys

Roost Survey

The roost assessment survey identified two trees as having the potential to support roosting bats within the development area, including a veteran birch tree with a sizable internal cavity accessed via a large east facing hole 3 m high and a dead veteran oak with several areas of lifted bark. The birch tree was considered to have moderate bat roost potential due to the size and orientation of the cavity while the oak tree was considered to offer low bat roost potential. Both trees were on the edge of Langtonlees Cleugh SSSI. If works are to be undertaken within 50 m of these areas further surveys should be completed on these features, once the access track location is confirmed. After further surveys have been completed, a robust assessment of the risks associated with the Proposed Development can be made.

No other potential roost features were identified within 200 m of the original turbine survey area (see Figure 10.7).

Bat Acoustic Surveys

In 2020, a total of c. 1,329 bat passes were recorded, across Locations 1 – 7, consisting of the following species/species groups: soprano pipistrelle (PIPPYG), common pipistrelle (PIPPIP), *Pipistrelle* sp. (PIPsp), *Myotis* sp. (MYOsp), noctule (NYCNOC), and brown long-eared (PLEAUR). The highest number of calls was associated with soprano pipistrelle followed by common pipistrelle and noctule. In 2021 a single detector was deployed at Location 8, to account for the amended turbine location, and recorded a total of c. 3,410 bat passes, consisting of the above species and *Nyctalus* sp, (NYCsp). In 2020 common pipistrelle was the most frequently recorded species followed by soprano pipistrelle and then noctule. Location 8 was the southern-most detector, deployed within the Sitka spruce plantation north of proposed Turbine 1.

Bat Activity Per Location

Table 10.3 details the BAI through the night by species and location, across all the survey periods. The location with the highest levels of activity was Location 8; none of the other locations recorded a median bat activity rate of more than 1 bat pass a night. Location 8 was also deployed for the longest, recording for 64 nights, first deployed 14 May 2020 until 3 June, then 2 July until 23 July, and finally 17 September until 14 October 2020 compared to the 2020 detectors which were deployed for 14 nights in spring (13 - 29 April) , 17 nights in summer (12 June- 3 July) and between 10 nights in autumn (1 - 16 October) however some detector malfunctions meant not all detectors worked for the full 10 nights in autumn. This reduces comparability between locations and partially accounts for the differences in total number of passes per species by location, however the use of averages reduces the impacts of this difference in deployment duration. Location 5 had the second highest maximum BAI with 145 common pipistrelle passes in a single night; Location 5 was along Foul Burn, and the detector recorded for the full 10 nights in Autumn.

The NaureScot Bats and Onshore Wind Turbines Guidance categorised levels of bat activity as low medium or high according to the BAI (Table 10.3). At maximum range, the majority of locations were classified as having low levels of activity, with only Locations 3, 5 and 8 having a high maximum BAI score for any species; at most this was for common pipistrelle, soprano pipistrelle and noctule bats.

Table 10.3: The BAI (Bat Passes per Night) and Risk Category per Species and Location Across the Year

Location	Species	Median BAI	Maximum BAI	Total passes	Median BAI Category	Maximum BAI Category
1	MYOsp	0	15	32	Low	Low
	NYCNOC	0	7	12	Low	Low

Location	Species	Median BAI	Maximum BAI	Total passes	Median BAI Category	Maximum BAI Category
	PIPPIP	0	12	39	Low	Low
	PIPPYG	0	29	65	Low	Low to Moderate
	PIPsp	0	2	3	Low	Low
	PLEAUR	0	0	0	Low	Low
	NYCsp	0	0	0	Low	Low
2	MYOsp	0	3	13	Low	Low
	NYCNOC	0	3	6	Low	Low
	PIPPIP	0	23	31	Low	Low to Moderate
	PIPPYG	0	35	74	Low	Low to Moderate
	PIPsp	0	1	3	Low	Low
	PLEAUR	0	0	0	Low	Low
	NYCsp	0	0	0	Low	Low
3	MYOsp	0	7	32	Low	Low
	NYCNOC	0	5	15	Low	Low
	PIPPIP	0	63	122	Low	Moderate to High
	PIPPYG	0	107	149	Low	High
	PIPsp	0	5	5	Low	Low
	PLEAUR	0	0	0	Low	Low
	NYCsp	0	0	0	Low	Low
4	MYOsp	0	5	23	Low	Low
	NYCNOC	0	7	27	Low	Low
	PIPPIP	0	18	46	Low	Low
	PIPPYG	0	22	56	Low	Low to Moderate
	PIPsp	0	0	0	Low	Low
	PLEAUR	0	0	0	Low	Low
	NYCsp	0	0	0	Low	Low
5	MYOsp	0	5	25	Low	Low
	NYCNOC	0	5	21	Low	Low
	PIPPIP	0	145	200	Low	High
	PIPPYG	0	88	143	Low	High
	PIPsp	0	4	5	Low	Low
	PLEAUR	0	1	2	Low	Low
	NYCsp	0	0	0	Low	Low
6	MYOsp	0	3	18	Low	Low
	NYCNOC	0	3	12	Low	Low
	PIPPIP	0	30	41	Low	Low to Moderate
	PIPPYG	0	41	66	Low	Moderate
	PIPsp	0	4	4	Low	Low

Location	Species	Median BAI	Maximum BAI	Total passes	Median BAI Category	Maximum BAI Category
	PLEAUR	0	2	4	Low	Low
	NYCsp	0	0	0	Low	Low
7	MYOsp	0	1	4	Low	Low
	NYCNOC	0	3	7	Low	Low
	PIPPIP	0	4	9	Low	Low
	PIPPYG	0	11	13	Low	Low
	PIPsp	0	1	1	Low	Low
	PLEAUR	0	1	1	Low	Low
	NYCsp	0	0	0	Low	Low
8	MYOsp	1	11	118	Low	Low
	NYCNOC	1	67	350	Low	Moderate to High
	PIPPIP	6	196	1632	Low	High
	PIPPYG	9	128	1269	Low	High
	PIPsp	0	4	20	Low	Low
	PLEAUR	0	3	14	Low	Low
	NYCsp	0	3	7	Low	Low

Source: Natural Power, 2022

Activity Levels by Species

Using information provided within Tables 3a and 3b of the NatureScot guidance, an overall risk assessment can be made in relation to the site, using a medium sized site (less than 10 turbines but over 100 m at tip height) at a site with moderate habitat suitability. The overall risk assessment for each species or species group is provided in Table 10.4 below. Risk has been classified according to guidance, with low assessed as between 0-4 (green), medium as 5-12 (amber) and high as 15-25 (red).

Across the three survey periods and based on the maximum BAI, common pipistrelle, soprano pipistrelle, *Pipistrelle* sp. and noctule had high levels of activity and these species have been identified as high risk of turbine impact using the maximum range activity assessment. Common and soprano pipistrelle are also classified as high risk at the median BAI. Nathusius' pipistrelle and *Myotis* sp. are considered of moderate risk at their maximum assessment.

Table 10.4: Overall Risk Assessment for Median and Maximum Species Values

Species	Assessment (Median)	Assessment (Maximum)
Common pipistrelle	Low	High
Soprano pipistrelle	Low	High
Pipistrelle sp.	Low	Low
Myotis sp.	Low	Low
Noctule	Low	Medium
Nyctalus sp.	Low	Low
Brown long-eared	Low	Low

Source: SNH, 2019

Summary of Potential Impacts

Based on NatureScot guidance, a seven-turbine development is considered a small sized project; however due to the size of the turbines and presence of other nearby developments, a medium risk was applied. The Proposed Development was considered to offer moderate quality habitat to support bats in that the habitat may be used by foraging bats; the site connected to the wider landscape by linear features; trees or structures were present with moderate to high potential as roost sites. Combined with the medium sized development and medium habitat quality gives the site a medium risk. Species most at risk are soprano and noctule.

Bat species may suffer disturbance or displacement impacts or damage to their roost sites during the wind farm development if no mitigation measures are applied. Bat species are further vulnerable to collisions during the wind farm operational period. Should impact assessment identify the likelihood of significant impacts to bat species, mitigation measures will be proposed in the EIAR.

Other Protected Mammal Surveys

Otter

All suitable habitat within the Proposed Development Area was surveyed for signs of otter in August 2020. Otter spraints were recorded at three locations within the Proposed Development Area – one along Foul Burn in the centre of the site adjacent suitable habitat, and two along Wellcleugh Burn in the far eastern edge of the site. Two probable couches were also recorded along this watercourse. A probable otter feeding sign was recorded further south along Foul Burn at the site's western boundary. Despite the variety of evidence and suitability of the two watercourses where evidence had been recorded, no holts were recorded.

Water Vole

All suitable habitat within the Proposed Development Area was surveyed for signs of water vole in August 2020. No definitive signs of water vole were detected within the Proposed Development Area; however suitable habitat for water vole was recorded along Foul Burn and Wellcleugh Burn. In addition, possible feeding signs and burrows were noted within the site, along Foul Burn. These possible signs are within 10 m of the current proposed layout.

Badger

All suitable habitat within the Proposed Development Area was surveyed for signs of badger throughout 2020 and in July 2021, survey findings are presented within Confidential Appendix A.

Pine Marten

All suitable habitat within the site was surveyed for signs of pine marten in May 2020. No signs of pine marten were recorded within the survey area.

Despite efforts to increase the population of pine martens (Back from the Brink) the site remains within an area that is not known to support pine martens[65].

Red Squirrel

All suitable habitat within the site was surveyed for signs of red squirrel in May 2020. Squirrel feeding signs were recorded in the Sitka spruce plantation in the centre of the Proposed Development Area (Figure 10.8). The Scottish Squirrels project[66] was consulted for sightings of red squirrels nearby – the most recent reported

65 More information on the Back from the Brink project is available [Online] Available at: Back from the Brink: the pine marten (northern England) species recovery project – The Vincent Wildlife Trust (vwt.org.uk) [Accessed 17/05/2022]

sighting within 5 km of Lees Hill was 17 April 2020 from approximately 2.8 km south-east. The only other sighting of a red squirrel within 5 km of the Proposed Development Area was approximately 4.3 km south-east in June 2012. No other sightings of red squirrels were reported to the Scottish Squirrels project from within 5 km of the Proposed Development Area since 2010. However, the Scottish Squirrels project holds records of grey squirrels within woodlands up to 1 km southeast in October 2021 and 2.4 km northeast in May 2020.

The squirrel signs that were encountered near the turbine locations (and likely felling areas) at the centre of the Proposed Development Area were old signs suggesting low activity. Subsequent to the 2020 surveys the majority of the trees within this small plantation bock were blown down, in the winter storms of early 2022. This combined with the lack of submitted records suggest red squirrels are no longer present in that area.

Summary of Potential Impacts

Protected mammals could suffer displacement or disturbance impacts if their habitat is disturbed during the wind farm construction if no mitigation measures are applied. Should the impact assessment identify the likelihood of significant impacts on protected mammal species, mitigation measures will be proposed in the EIAR. Protected mammals with the potential to suffer negative impacts from the Proposed Development are summarised in Table 10.5 below.

Table 10.5: Summary of Protected Mammal Species with Potential for Impact During Development

Protected Mammal Species	Status on Site	Conservation Status
Otter	Species Present	European Protected Species38 WCA 1981 (as amended): Schedule 5 SBL
Water Vole	Habitat Present	Habitat - WCA 1981 (as amended): Schedule 5 SBL
Badger	Species Present	Protection of Badgers Act 1992 (as amended)
Red Squirrel	Habitat Present	WCA 1981 (as amended): Schedule 5 SBL

WCA: Listed on the Wildlife and Countryside Act 1981 (as amended). SBL: Listed on Scottish Biodiversity List and UK Biodiversity Action Plan. Source: Natural Power, 2022

Fish Habitat Surveys

The surveyed section of the waterways on the Proposed Development included portions of Wellcleugh Burn, Raecleugh Head Burn and Foul Burn. Young fish were identified within three of the four surveyed sections of Foul Burn suggesting highly suitable habitat for fish along its entire length, although it was not practical to speciate these individuals during a walkover survey.

Wellcleugh Burn was dry at the first survey location and then had low flow throughout the surveyed areas, Raecleugh Burn was similar in that it had a low flow while Foul Burn was a more medium to high flowing watercourse. Further details on the differences between the watercourses is provided within Table 10.6 below.

Suitable spawning habitat for both salmon and lamprey species incorporating riffle with gravel and pebble was evident within all three surveyed watercourses (Table 10.6). In addition, areas of silt sufficient for lamprey larvae were also available. Boulder and cobble areas providing good juvenile salmon habitat can be found within Raecleugh Burn and Foul Burn.

66 Saving Scotland's Red Squirrels (2020) *Sightings of Red and Grey Squirrels across Scotland* [Online] Available at: Squirrel Sightings – Saving Scotland's Red Squirrels (scottishsquirrels.org.uk) [Accessed 17/05/2022]

Additional cover for fish was provided by low branches and fallen trees. Instream vegetation was present in 65% of the surveyed Wellcleugh Burn, and 73% of Foul Burn; however no instream vegetation was recorded within Raecleugh Burn. Bankside vegetation covered 85 - 100% of the banks at Wellcleugh Burn, 70-80% of the banks at Raecleugh Burn and 10-95% of the banks at Foul Burn, providing stabilisation, preventing bank erosion and giving additional cover for fish species.

Table 10.6: Fish Habitat Survey Results Summary at Proposed Development

Category	Feature	Average % Cover Wellcleugh Burn	Raecleugh Burn	Foul Burn
Habitat	% Riffle	22.00	35.00	28.64
	% Glides	45.75	37.50	31.82
	% Slack	25.50	5.00	1.82
	% Pools	4.75	20.00	37.73
Sediment	% Sand	2.00	2.50	0.00
	% Gravel	0.00	0.00	1.48
	% Pebble	18.63	5.00	13.30
	% Cobble	27.11	10.00	28.18
	% Boulder	4.00	32.50	15.68
	% Bedrock	0.26	7.50	4.00
	% Silt	6.84	40.00	13.86
	% Clay	43.42	5.00	23.50
Flow	% High	0.00	0.00	13.63
	% Medium	0.00	0.00	86.37
	% Low	100.00	100.00	0
Visibility	% Clear	100.00	100.00	100.00
Vegetation	% Bank Vegetation	100.00	100.00	100.00
	% Samples with no Instream Vegetation	38.09	100.00	27.27
	% Instream Vegetation	67.25	0.00	88.19
Average Depth (cm)		32.75	9.66	11.77
Average Width (m)		6.49	120	65.68

Source: Natural Power

Summary of Potential Impacts

The waterways throughout the Proposed Development, particularly Foul Burn, are considered to represent good habitat for salmon and lamprey species at all life stages, throughout the surveyed area. Fish species may suffer displacement or disturbance impacts or habitat damage due to pollution events during the construction process if no mitigation measures are applied. Should the impact assessment identify the likelihood of significant impacts to protected fish species, mitigation measures will be proposed in the EIAR.

Proposed Assessment Methodologies

All ecological surveys at the Proposed Development have been completed and no further surveys are proposed to support the planning application, however pre-construction surveys will be required to ensure appropriate mitigation.

Before the EIAR is submitted, further records from third party organisations shall be requested to ensure the most contemporary records are included within the assessment, including records from the wider area outside the Proposed Development Area.

The approach to the EcIA adopted within this assessment follows the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines. It should be noted that these criteria are intended as a guide and are not definitive; professional judgement will also be applied in determining the value level for Important Ecological Features (IEFs). IEFs have been scoped in or out of further assessment based on these guidelines and with consideration of effects that are potentially significant as set out under the EIA Directive.

The guidelines set out the EcIA process, through the following stages:

- Identification of IEFs through field survey and/or research;
- Determination of the importance of each identified IEF;
- Assessment of impacts affecting those IEFs and or resources, using a defined importance threshold with reference to ecological processes and functions as deemed appropriate;
- Determining the extent, magnitude, duration, timing and frequency of the impacts;
- Assessing the potential for impact reversibility;
- Determining the level of confidence in the above impact predictions;
- Identification of likely significant impacts in the absence of mitigation; and
- The identification of residual impacts following implementation of mitigation.

Proposed Mitigation

To ensure compliance with legislation, and to follow good practice guidance and consultation recommendations, a number of mitigation measures will be implemented should the application be consented. The Applicant would suggest that in order to ensure these practices are adopted that they be included as planning conditions. The proposed wording of these conditions (which is of course open to discussion), which can easily be transposed into the planning consent, is as follows:

- Extended phase 1 surveys of the previously inaccessible area should be conducted prior to submission of the EIAR;
- Prior to commencement of works at the Proposed Development Area, pre-construction ecology walkover surveys will be carried out, including surveys for potential bat roosts, badger, pine marten, and a check of all riparian habitat for signs of otter and water vole. This will enable any refinements to be made if necessary, to mitigation, micrositing and/or the construction programme to take into account any updated distribution or presence of protected species, with a suitable mitigation plan adopted on a case by case basis;
- Consultation should be carried out with NatureScot and the Tweed Foundation regarding requirements for further pre-construction fish surveys. Should further survey work be required, this should take place prior to commencement of works; and
- No development shall take place (including demolition, ground works, vegetation clearance) until a CEMP, incorporating a CMS, has been submitted to and approved in writing by the SBC. The CEMP shall include the following:

- Risk assessment of potentially damaging construction activities;
- Identification of "biodiversity protection zones" (buffers around protected species or key habitat areas which will be protected throughout the works);
- Practical measures (both physical measures and sensitive working practices) to avoid or reduce impacts during construction (may be provided as a set of method statements);
- The location and timing of sensitive works to avoid harm to biodiversity features;
- The times during construction when specialist ecologists need to be present on site to oversee works;
- Responsible persons and lines of communication;
- The role and responsibilities on site of an ECoW or similarly competent person; and
- Use of protective fences, exclusion barriers and warning signs.

The approved CEMP shall be adhered to and implemented throughout the construction period strictly in accordance with the approved details, unless otherwise agreed in writing by SBC.

No development shall commence until the role and responsibilities and operations to be overseen by an appropriately competent ECoW have been submitted to and approved in writing by SBC. The appointed person shall undertake all activities, and works shall be carried out, in accordance with the approved details. The ECoW will ensure that during construction impacts to ecological features are minimised through best practice, including ensuring water quality is maintained and the potential for disturbance or risk of injury/death is minimised for protected species which may be using the site on an occasional basis.

Discussion

Designated Sites

Designated sites will be scoped in to the EIAR.

Under Habitats Regulations any development that may have a LSE on an SAC, either alone or in combination with other projects, requires an AA to be carried out by the relevant competent authority, to determine whether or not the development would have an adverse effect on the integrity of the SAC.

Before an AA is initiated, a screening process is undertaken to determine whether any of the predicted impacts of the Proposed Development will result in an LSE. This screening assessment provides information to the competent authority to allow them to reach a decision on whether or not the development will have an LSE on any SAC and therefore whether an AA is required.

There are two statutory sites (SAC's) with an international designation and potential connectivity located within 10 km of the Proposed Development (Table 10.1). Waterways within the Proposed Development Area connect to the River Tweed SAC and there is evidence of use of the site by otters and suitability for protected fish species. As such, the above SAC will be carried forward for AA screening alongside the EcIA, due to potential connectivity with the Proposed Development. Bog habitat, as designated in the Dogden Moss SAC, is present on site within the proposed turbine layout, however Dogden Moss SAC is approximately 3.2 km at its closest point and not considered connected to the habitats within the Proposed Development. **For this reason, impacts on Dognden Moss SAC are not anticipated and the SAC has been scoped out of the EIAR**.

Langtonlees Cleugh SSSI is within the site and Greenlaw Moor SSSI is adjacent the site (immediately south of the access road) and are therefore likely to be affected by the proposed works. These designated sites will therefore be carried forward for AA screening alongside the EcIA. The remaining three SSSI's are not connected with the Proposed Development by significant habitat corridors such as hedgerow networks or waterways and are sufficiently far that they are not anticipated to be impacted by the Proposed Development.

Habitats

Habitats shall be scoped in to the EIAR.

The results of the Phase 1 and NVC survey have provided an overview of the habitats likely to be encountered during development of Lees Hill Energy Park. Full results from this survey will be presented in the EIAR.

There is a requirement under the Water Framework Directive to carry out assessment of the likely impacts of development on habitats which are dependent on groundwater (GWDTEs), in line with SEPA LUPS[40] guidance. Guidance states that survey of all habitats within 250 m of excavations greater than 1 m deep is undertaken, and within 100 m of all other excavations. The habitat survey work undertaken to date has identified several habitat types that are likely to have a high or moderate potential to support GWDTEs, as well as several Annex I and SBL habitats and habitats indicative of areas of deep peat. If SBL habitats are impacted a Habitat Management Plan will be proposed in the EIAR, and if deep peat habitats are impacted a Peatland Restoration Plan will be proposed in the EIAR.

Bats

Bats shall be scoped in to the EIAR.

Given the two potential roost features located within the Proposed Development Area and the assessment of risk associated with the activity levels for each species recorded on site, it is anticipated that an assessment of the mitigation is required to inform a robust assessment of impacts. The further mitigation will depend upon the final layout of the turbines.

Any potential roost features within 200 m plus blade length of the final turbine layout should also be subject to further survey.

Other Protected Mammals

Otter

Otter shall be scoped in to the EIAR.

Otter are a European protected species and are included on the SBL and are a qualifying feature of the nearby River Tweed SAC. Otter may be negatively impacted if there is disturbance to holts or rest sites during construction, though no such sites have been identified to date. Therefore, otter shall be subject to full EcIA.

The baseline surveys have confirmed the presence of otter within the Proposed Development Area, including within the Foul Burn which bisects the proposed turbine area and will therefore feature an access track. It is recommended that pre-felling and/or pre-construction checks for otter signs and holts/resting areas are undertaken within the construction corridor and 250 m buffer.

Water Vole

Provided a minimum 10 m construction buffer can be retained around all potential water vole habitat they will be scoped out of the EIAR.

In Scotland, water vole habitat (rather than water voles themselves) is protected under the WCA 1981 (as amended). Water vole is also included on the SBL. Water vole may be negatively impacted if there is disturbance to banks and waterways they are using during construction.

As there were potential water vole burrows along Foul Burn within vicinity of the proposed track, micro-siting and other mitigation may be required for this species, a minimum of 10 m construction buffer will be required around any confirmed water vole burrows. It is also recommended that pre-felling and/or pre-construction

checks for water vole signs are undertaken within the construction corridor and 250 m buffer, alongside otter surveys.

Badger

Provided a 30 m buffer (minimum) can be retained around all badger setts, badgers will be scoped out of the EIAR.

In Scotland badger is protected under the WCA 1981 (as amended) and the Protection of Badgers Act 1992 (as amended). Badgers may be negatively impacted if there is disturbance to setts during construction.

As badger setts and badger activity were found during baseline surveys within the Proposed Development Area, including within the proposed turbine area, potential impacts and mitigation measures shall be outlined in the EcIA. It is recommended that a 30 m buffer (as minimum) be maintained from all badger setts. It is therefore recommended that pre-felling and/or pre-construction checks for further badger setts are undertaken within the construction corridor and 250 m buffer.

Pine Marten

We propose that pine marten shall be scoped out of the EIAR.

Pine marten is included on the SBL and is protected under Schedule 5 of the WCA 1981 (as amended). Pine marten may be negatively impacted if there is disturbance to dens and habitat during construction.

As there were no signs of pine marten found on site, it is proposed that pine marten is scoped-out of the EcIA. However, habitat suitable for pine marten exists on site; it is therefore recommended that pre-felling and/or pre-construction checks for pine marten dens are undertaken within the construction corridor and 250 m buffer, along with red squirrel surveys.

Red Squirrel

Red squirrel shall be scoped out of the EIAR.

Red squirrels are included on the SBL, and are protected under the WCA, Schedule 5, which includes protection against having their access to any structure or place which they use for shelter or protection being obstructed. Squirrel may be negatively impacted if there is disturbance to dreys and habitat during construction.

However no evidence of use by red squirrels was recorded within the site and though evidence of old feeding remains were found in 2020, this area of woodland suffered high levels of wind throw during the 2022 storms and is no longer present, further reducing suitability of the site for this species.

Fish

We propose that fish are scoped in to the EIAR.

Suitable habitat and accessibility for protected fish was recorded throughout the waterways on the Proposed Development. Fish may be negatively impacted if there are pollution events that enter the waterways or disturbance to waterways, appropriate mitigation procedures will be required within the EIAR. Consultation with NatureScot will be required to assess the requirements for pre-felling/pre-construction fish surveys.

Conclusions

Features Proposed for Assessment within the EcIA

In order to ensure that the EIAR is compliant with the EIA Directive, and to ensure that the EcIA is focussed on potentially significant effects only, it is proposed that only those important ecological features and impacts shown in Table 10.7 are carried forward for EcIA within the relevant EIAR chapter.

Table 10.7: Features and Impacts to be assessed within the EIAR

Receptor	Scoped in/out	Development Phase	Impact	Assessment
Designated sites	In	Construction	Pollution (hydrological connectivity), impact on designated features: upland bird communities, upland habitat, protected fish species and otter	EcIA
Habitats	In	Construction and operation	Habitat loss	EcIA
Bats	In	Construction and operation	Disturbance/displacement Collision Roost damage/disturbance	EcIA
Otter	In	Construction	Disturbance/displacement impacts	EcIA
Water vole (if a sufficient buffer cannot be retained)	In	Construction	Disturbance/displacement impacts	EcIA
Badger (if a sufficient buffer cannot be retained)	In	Construction	Disturbance/displacement impacts	EcIA
Pine marten	Out			
Red squirrel	Out			
Fish	In	Construction	Disturbance/displacement impacts Damage to habitat	EcIA

Source: Natural Power

Questions to Consultees

Question 15: Do consultees have any comments regarding the EcIA only concentrating on those receptors which may be subject to significant effects from the Proposed Development (either directly or indirectly)?

Question 16: Table 10.7 above notes the receptors and potential impact proposed to be included within the EcIA. Do consultees have any comment regarding this sufficiently covering the potential impacts on features from the Proposed Development and what is proposed to be scoped out?

11. Ornithology

Introduction

The intention of this section within the Scoping Report is to provide the competent authority and its advisors with sufficient information (where it currently exists) as to the likely impacts of the Proposed Development on important ornithological features (IOFs). IOFs are species that are protected by legislation, are of high conservation importance and/or are particularly sensitive to the effects of onshore wind and solar farms. IEFs are discussed in Section 10.

This section describes the baseline ornithology surveys carried out between March 2020 and February 2022 for the Proposed Development and presents the results in order to identify IOFs that could be affected by the Proposed Development. Where likely non-significant effects are identified for an ornithological feature, it is proposed that these features are not carried forward for inclusion in the relevant EIAR and are 'scoped out'. This will allow for an EIAR that focusses on features which could be significantly affected, or for which the predicted effects are currently unknown.

In addition, this section also provides information on statutory sites of international importance, upon which the Proposed Development may have an LSE. A screening process will be undertaken alongside the EIA to determine whether the predicted impacts of the Proposed Development will result in an LSE. The screening process will allow the competent authority to determine whether an AA will be required.

Guidance and Legislation

The ornithological baseline surveys and preliminary assessment presented in this Scoping Report have been carried out with reference to a number of national policy documents. Legislative and guidance documents with relevance to ornithology are listed below:

Legislation

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into UK law[67];
- Wildlife and Countryside Act 1981 (as amended)[68];
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012[69];
- The Conservation of Habitats and Species (Amendment) Regulations 2017, relating to reserved matters in Scotland[70];
- The Nature Conservation (Scotland) Act 2004[71];
- The Wildlife and Natural Environment (Scotland) Act 2011[72];
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, which transpose the EIA Directive into the Scottish planning system[73]; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[74].

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[67] UK Government (1984) *The Conservation (Natural Habitats, &c.) Regulations (1984)* [Online] Available at: The Conservation (Natural Habitats, &c.) Regulations 1994 (legislation.gov.uk) [Accessed 01/06/2022]

[68] UKI Government (1981) *Wildlife and Countryside Act (1981)* [Online] Available at: Wildlife and Countryside Act 1981 (legislation.gov.uk) [Accessed 01/06/2022]

[69] UK Government (2012) *The Conservation (Natural Habitats, &c) Amendment (Scotland) Regulations (2012)* [Online] Available at: The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2012 (legislation.gov.uk) [Accessed 01/06/2022]

[70] UK Government (2017) *The Conservation of Habitats and Species Regulations (2017)* [Online] Available at: The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk) [Accessed 01/06/2022]

[71] UK Government (2004) *Nature Conservation (Scotland) Act (2004)* [Online] Available at: Nature Conservation (Scotland) Act 2004 (legislation.gov.uk) [Accessed 01/06/2022]

[72] UK Government (2011) *Wildlife and Natural Environment (Scotland) Act (2011)* [Online] Available at: Wildlife and Natural Environment (Scotland) Act 2011 (legislation.gov.uk) [Accessed 01/06/2022]

[73] UK Government (2017) *The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations (2017)* [Online] Available at: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 01/06/2022]

[74] UK Government (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations (2017)* [Online] Available at: The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 01/06/2022]

National Policy Guidance

- Planning Advice Note (PAN) 51: Planning, Environmental Protection and Regulation[75];
- Planning Advice Note (PAN) 60: Planning for Natural Heritage (Scottish Government 2000)[76];
- PAN 1/2013 – Environmental Impact Assessment[77]; and
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended[78].

Other Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland[79];
- Recommended bird survey methods to inform impact assessment of onshore wind farms[80];
- Birds and Wind Farms: Risk Assessment and Mitigation[81];
- Developing field and analytical methods to assess avian collision risk at wind farms[82];
- Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action[83];
- Assessing significance of impacts from onshore windfarms on birds outwith designated areas[84];
- Monitoring the impacts of onshore wind farms on birds[85];
- Guidance on methods for monitoring bird populations at onshore wind farms[86];
- Avoidance rates for the onshore SNH wind farm collision risk model[87];
- Assessing the cumulative impact of onshore wind energy developments[88];

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[75] Scottish Government. (2006) *PAN 51. Planning, Environmental Protection and Regulation*. Scottish Government, Edinburgh.

[76] Scottish Government (2000) PAN 60: *Planning for Natural Heritage*. Scottish Government, Edinburgh.

[77] Scottish Government. (2013 (updated 2017)) *PAN 1/2013 – Environmental Impact Assessment*. Scottish Government, Edinburgh.

[78] Scottish Executive (1995 (updated 2000)) *Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives*. Scottish Executive, Rural Affairs Department, Edinburgh.

[79] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester.

[80] SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Scottish Natural Heritage, Battleby.

[81] de Lucas, M., Janss, G. & Ferrer, M. (eds.) (2007) *Birds and Wind Power*. Quercus, Madrid.

[82] Band, W., Madders, M. & Whitfield, D.P. (2007) *Developing field and analytical methods to assess avian collision risk at wind farms*. In de Lucas, M., Janss, G. & Ferrer, M. (eds.) Birds and Wind Power. Quercus, Madrid.

[83] SNH (2000) *Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action*. Scottish Natural Heritage, Edinburgh.

[84] SNH (2018) *Assessing significance of impacts from onshore windfarms on birds outside designated areas*. Scottish Natural Heritage, Inverness.

[85] SNH (2009) *Monitoring the impact of onshore wind farms on birds* (Guidance note). Scottish Natural Heritage, Edinburgh.

[86] SNH (2009) *Guidance on methods for monitoring bird populations at onshore wind farms*. Scottish Natural Heritage, Edinburgh.

[87] SNH (2017) *Avoidance rates for the onshore SNH wind farm collision risk model.* Scottish Natural Heritage, Battleby.

[88] SNH (2018) *Assessing the cumulative impacts of onshore wind farms on birds: guidance*. Scottish Natural Heritage, Inverness.

[89] Scottish Renewables, SNH, SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science, AEECoW (2019) *Good Practice during windfarm construction*. Version 4.

[90] SNH (2016) *Assessing connectivity with Special Protection Areas (SPAs)* (Guidance note: Version 3). Scottish Natural Heritage, Edinburgh.

[91] Ruddock, M. & Whitfield, D.P., (2007) *A Review of Disturbance Distances in Selected Bird Species*. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

[92] BSI Group. (2013) *Smart guide to biodiversity in planning and development.* [Online] Available at: https://www.bsigroup.com/LocalFiles/en-GB/biodiversity/BS-42020-Smart-Guide.pdf [Accessed 20/05/2022]

- Good Practice during Wind Farm Construction[89];
- Assessing connectivity with Special Protection Areas (SPAs)[90];
- A Review of Disturbance Distances in Selected Bird Species[91];
- British Standard 42020:2013 Biodiversity – code of practice for planning and development [92];
- Natural Heritage Zone (NHZ) bird population estimates. Scottish Windfarm Bird Steering Group (SWBSG). Commissioned report number 1504[93];
- Bird Monitoring Methods[94];
- A method for censusing upland breeding waders[95];
- Raptors: A Field Guide to Survey and Monitoring[96];
- Birds of Conservation Concern 5: The population status of birds in the United Kingdom, Channel Islands and the Isle of Man[97]; and
- Scottish Biodiversity List (SBL)[98].

Study Area

The study areas for all ornithological surveys are shown in Figure 11.1.

Access out with the Proposed Development was not granted therefore the survey buffer areas were surveyed by scanning across the area from the edge of the boundary, and from public highways (as appropriate). The surrounding area is readily visible from within the Proposed Development. It is considered very unlikely that key ornithological features were not detected in the buffer as a result of these restrictions.

Methods

This section outlines the ornithological baseline of the Proposed Development.

Desk Based Review

Designated Sites

To assess any connectivity between ornithological features recorded within the Proposed Development with populations protected on designated sites, a desk study was undertaken involving an online search using the NatureScot Sitelink website[99] and Online GIS tool MAGIC (Multi-Agency Geographic Information for the Countryside)[100]. Data were sought for the following:

- SPAs – within 10 km of the Proposed Development (25 km for sites designated for geese and gulls);

[93] Wilson, M.W., Austin, G.E., Gillings, S. & Wernham, C.V. (2015) *Natural Heritage Zone bird population estimates*. SWBSG commissioned report number 1504. Pp72. Available from www.swbsg.org

[94] Gilbert, G., Gibbons, D.W. & Evans, J. (1998). *Bird Monitoring Methods*. RSPB, Sandy.

[95] Brown, A. F. & Shepherd, K. B. (1993). *A method for censusing upland breeding waders*. Bird Study, 40: 189-195.

[96] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring*. 3rd Edition. The Stationery Office, Edinburgh.

[97] A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). *Birds of Conservation Concern 5: the population status of birds in the United Kingdom, Channel Islands and Isle of Man.* British Birds 114, 723–747.

[98] NatureScot (2020) *Scottish Biodiversity List (SBL)* [Online] Available at*:* https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list [Accessed 01/06/2022]

[99] Nature Scot (2022) *Site link* [Online] Available at: https://sitelink.nature.scot/home [Accessed 09/05/2022]

[100] Ordnance Survey (2022) *Magic* [Online] Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 25/05/2022]

- Ramsar sites (Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat) – within 10 km of the Proposed Development;
- SSSIs – within 5 km of the Proposed Development;
- Important Bird Areas (IBAs) – within 5 km of the Proposed Development;
- Local Nature Conservation Sites (LNCS) such as Sites of Important Nature Conservation (SINCs) and Local Wildlife Sites (LWS) – within 5 km of the Proposed Development; and
- Local and National Nature Reserves (including RSPB and Wildlife Trust Reserves) – within 5 km of the Proposed Development.

Species of Note (Existing Data)

Historical data was provided by the Applicant in November 2020. This data includes the following surveys undertaken between 2012 and 2013;

- Extended Phase 1 surveys;
- Breeding bird surveys;
- Vantage point surveys;
- Raptor walkovers; and
- Winter bird walkovers.

To provide background information pertaining to the baseline status of protected species in the local environment, a web-based search for historical records of protected and relevant species recorded within the last 10 full years (2012 - 2022) within 10 km of the Proposed Development will be carried out.

Before the EIAR is submitted, further records of relevant ornithological data shall be requested from the following organisations, to obtain any records they hold for Proposed Development and the surrounding area:

- Lothian & Borders Raptor Study Group (LBRSG);
- RSPB; and
- The Lothian and Borders TWIC.

Field Surveys

The baseline ornithology surveys undertaken are described below. A suite of complementary surveys was carried out, comprising:

- Vantage point (VP) surveys (also known as flight activity surveys);
- Moorland breeding bird surveys;
- Dedicated breeding raptor surveys; and
- Dedicated black grouse surveys.

NatureScot survey guidance[101] recommends a baseline survey period of two years unless it can be shown that a shorter time period is sufficient. Therefore, two full years of VP surveys were completed in addition to two seasons of moorland breeding bird surveys and black grouse surveys. However, due to the low level of ornithological activity recorded during the raptor surveys undertaken in 2020 it was agreed with NatureScot in an email dated 22 March 2021 that a second year of breeding raptor surveys was not required.

[101] NatureScot (2017) *Guidance Note – Recommended bird survey methods to inform impact assessment of onshore windfarms* [Online] Available at: Recommended bird survey methods to inform impact assessment of onshore windfarms | NatureScot [Accessed 01/06/2022]

Survey methodologies followed standard NatureScot guidance. Surveys were all carried out by appropriately qualified and experienced personnel, in possession of a Schedule 1 licence where appropriate, and were undertaken in suitable weather conditions. These surveys are summarised in the following sections.

Full information on the dates, times and weather conditions for all ornithology surveys undertaken at the Proposed Development can be provided upon request in Excel format; but is not included here due to the large size of this dataset.

Target Species

NatureScot guidance states that work to establish the ornithological baseline should focus on those species which are afforded a higher level of legislative protection, or those which, as a result of their behaviour, may be more likely to be subject to impact from wind farms. There are three important species lists from which target species may be drawn:

- Annex I of the EC Birds Directive[102];
- Schedule 1 of the Wildlife & Countryside Act 1981[10369]; and
- Red-listed Birds of Conservation Concern (BoCC)[104].

Consideration should also be given to species of regional conservation concern, as listed within Local Biodiversity Action Plans (LBAPs).

Target species should be restricted to those likely to be affected by wind farms. It is generally considered that passerine species are not significantly impacted by wind farms.

As such, and in accordance with the NatureScot guidance, surveys focused on the following target species:

- All species of raptors and owls listed in Annex I of the EC Birds Directive and/or Schedule 1 and 1A of the WCA 1981 (as amended);
- All species of wildfowl (with the exception of Canada goose and mallard);
- Black grouse; and
- All wader species.

Raptor species that do not appear on the Annex I/Schedule 1 lists (such as kestrel), and which are considered to be of lower conservation concern than target species, are termed secondary species. Recording of secondary species is subsidiary to recording of target species. The following species were considered secondary species for the purposes of flight activity surveys:

- All other raptor species (buzzard, sparrowhawk, kestrel);
- All gull species;
- Grey heron;
- Red grouse;
- Raven;
- Schedule 1[69] passerines (e.g. crossbill); and
- Any large aggregations of red-listed passerines.

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[102] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

[103] UNITED KINGDOM. Wildlife and Countryside Act. *Schedule 1: Birds which are protected by special penalties* (1981) UK: The Stationary Office London [Online] Available at: Wildlife and Countryside Act 1981 (legislation.gov.uk) [Accessed 01/06/2022]

[104] British Trust of Ornithology (2021) *Birds of Conservation Concern* [Online] Available at: Birds of Conservation Concern | BTO - British Trust for Ornithology [Accessed 01/06/2022]

Vantage Point Surveys

VP surveys were undertaken during:

- Breeding season 2020 (March – August 2020);
- Migration season 2020 (March – May 2020 and September – November 2020);
- Non-breeding season 2020/21 (September 2020 – February 2021);
- Breeding season 2021 (March – August 2021);
- Migration season 2021 (September – November 2021); and
- Non-breeding season 2021/22 (September 2021 – February 2022)

This completed full two years of baseline monitoring. These surveys were used to record the flight activity of target species within the vicinity of the Proposed Development. The flight activity of secondary species was also recorded.

Additional migration VP surveys (dawn/ dusk) were conducted to record migration of wildfowl during the spring (March to May 2020) and autumn periods (September to November 2020 and 2021). This involved an additional six hours to be completed per VP per month. It was agreed with NatureScot (email dated 22 March 2021) that migration VPs for the second spring period (2021) were not required.

Two vantage points were used to carry out the VP surveys. The VP locations were carefully selected to obtain maximum visibility based on viewshed analysis and a ground-truthing visit prior to surveys commencing:

- VP1 was located on Hardens Hill, looking south, at National Grid reference (NGR) NT 373077 654592;
- VP2 was located on the north-west of Camp Moor, looking north-east, at NGR NT 372087 652117.

The viewsheds of the two VPs covered all proposed turbine locations (including the current layout) and the majority of the surrounding 500 m buffer (Figure 11.2). Furthermore, most areas not covered by viewsheds were located as such that birds flying over the area would have been seen entering and leaving the area. Viewsheds and coverage of the Proposed Development Area were agreed with NatureScot.

Following NatureScot guidance a minimum of 36 hours of survey effort was undertaken at each VP during both breeding and non-breeding seasons (Table 11.1).

Table 11.1: VP Survey Effort

Month	VP1 hours	VP2 hours	Migration VP1 hours	Migration VP2 hours
March 2020	5	6	6	6
April 2020	6	6	6	6
May 2020	12	6	0	6
June 2020	11	6	-	-
July 2020	6	6	-	-
August 2020	6	6	-	-
Total breeding season 2020	**46**	**36**	**12**	**18**
September 2020	6	6	6	6
October 2020	6	6	6	6
November 2020	5	6	6	6
December 2020	6	6	0	0
January 2021	6	6	0	0

Month	VP1 hours	VP2 hours	Migration VP1 hours	Migration VP2 hours
February 2021	7	6	0	0
Total non-breeding season 2020/21	**36**	**36**	**18**	**18**
March 2021	6	6	-	-
April 2021	6	0	-	-
May 2021	6	12	-	-
June 2021	6	6	-	-
July 2021	6	6	-	-
August 2021	6	6	-	-
Total breeding season 2021	**36**	**36**	**-**	**-**
September 2021	6	6	6	6
October 2021	3	3	3	3
November 2021	9	6	9	9
December 2021	6	9	-	
January 2022	0	6	-	
February 2022	12	6	-	
Total non-breeding season 2021/22	**36**	**36**	**18**	**18**

Source: Natural Power, 2020 - 2022

Breeding Bird Surveys

Breeding bird surveys undertaken in 2020 and 2021, were based upon standard NatureScot guidance. These surveys covered areas of open ground within the Proposed Development, plus open areas within a 500 m buffer. Breeding bird surveys within the 500 m buffer area were undertaken from the edge of the Proposed Development Area with regular scanning to record birds detected by sight and sound. Forested areas do not require breeding bird surveys to be undertaken.

The surveys followed the widely used Brown & Shepherd (1993)[105] methodology, but utilising four survey visits, as is currently recommended (Calladine et al., 2009)[106].

The NatureScot recommendation is that only waders, gulls, red grouse and some wildfowl species are targeted during breeding bird surveys. These species were mapped however, for completeness, passerine species were also recorded. Passerines and near-passerines were recorded and mapped, with the exception of meadow pipit, which was tallied to give a total within each km^2 on the Ordnance Survey (OS) map grid (or part thereof). Woodland breeding passerine species were also recorded for completeness.

Upon completion of the fourth survey visit, records from all visits were combined and analysed to estimate the location of breeding wader territories; based upon the territory analysis method outlined in Bibby et al.,

[105] Brown, A. F., & Shepherd, K. B. (1993). A method for censusing upland breeding waders. *Bird Study*, [Online] *40*(3), 189-195. Available at: https://doi.org/10.1080/00063659309477182 [Accessed 01/06/2022]

[106] Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study* [Online] 56 (3) p381-388. Available at: https://doi.org/10.1080/00063650902984604 [Accessed 01/06/2022]

(2000)[107]. Full details as to how the data were analysed to produce the territory maps can be provided on request.

The results of the breeding bird surveys undertaken in 2020 were provided to NatureScot and through this consultation (email dated 22 March 2021) it was agreed that a second year of breeding bird surveys would be required to determine baseline conditions within the Proposed Development, and so the survey was repeated in 2021.

The dates of the 2020 and 2021 survey visits are summarised in Table 11.2.

Table 11.2: Breeding Bird Survey Effort

Year	Visit	Date
2020	1	28th, 29th April
	2	21st, 26th May
	3	18th, 19th June
	4	2nd, 9th July
2021	1	6th May
	2	27th May
	3	18th, 19th June
	4	1st, 2nd July

Source: Natural Power, 2020 - 2021

Breeding Raptor and Barn Owl Surveys

Dedicated breeding raptor surveys, covering the Proposed Development Area and a 2 km buffer, were carried out during 2020. Due to access limitations the 2 km buffer was covered by scanning from within the Proposed Development and using public roads. Good coverage of the buffer area was possible and it is considered that this approach was sufficient to detect any target species using these areas.

The nature of these surveys was determined by the target species recorded during the VP surveys and breeding bird surveys and by those species considered to have the potential to breed within the survey area, based upon the available habitat. Surveys involved walkovers and short VP watches to identify breeding sites and, where possible, productivity. Surveys were undertaken by experienced surveyors holding a Schedule 1 Licence. Species-specific survey methods were informed by the methods outlined in Gilbert et al. (1998)[108] and Hardey et al. (2013)[109]. As agreed with NatureScot (email dated 22 March 2021) a second year of raptor surveys were not repeated based on the results of the 2020 surveys.

Signs of barn owl presence were assessed out with the breeding season (November to January), following the methods outlined in Gilbert et al. (1998). Systematic searches were undertaken for all suitable potential nest sites within the Proposed Development Area to check for occupancy. A single survey was undertaken in January 2021. No breeding survey was conducted in 2020 and 2021.

The dates of the survey visits are summarised in Table 11.3.

[107] Bibby, C. J., Burgess, N. D., Hill, D. A. & Mustoe, S. (2000). *Bird Census Techniques*. Second Edition. Academic Press, London.

[108] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.

[109] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) Raptors: a field guide to survey and monitoring. 3rd Edition. The Stationery Office, Edinburgh.

Table 11.3: Raptor and barn owl survey effort

Visit	Dates 2020
1	20th March
2	14th April
3	17th April
4	12th May
5	13th May
6	4th June
7	23rd June
8	24th July
9	4th August
1 (barn owl)	27th January

Source: Natural Power, 2020

Black Grouse Surveys

Dedicated black grouse surveys were carried out in spring 2020 and 2021 following methods outlined in The National Black Grouse Survey Instructions (Etheridge and Baines, 1995)[110]; summarised in Gilbert et al. 1998).

The surveys covered the Proposed Development plus a 1.5 km buffer. Access was restricted out with the Proposed Development, therefore the buffer area was surveyed from public roads or from within the Proposed Development. It is considered feasible to detect lekking black grouse audibly at a distance of 1.5 km in calm weather conditions. Three survey visits were undertaken in 2020 but only two were undertaken in 2021 as the first preparatory visit to locate suitable lekking habitat was not required in the second year. Survey dates are found in Table 11.4.

Table 11.4: Black Grouse Survey Effort

Visit	2020	2021
1	5th March	-
2	2nd April	7th May
3	27th May	13th and 14th May

Source: Natural Power, 2020 - 2021

Collision Risk Modelling

Collision Risk Modelling (CRM) uses data collected during flight activity (VP) surveys to predict the number of individuals per species that have the potential to collide with turbine rotors. The modelling methods proposed for the Proposed Development are based on the Band et al. (2007)[111] collision risk model recommended by NatureScot. When using the Band model, height bands are typically chosen such that all flights recorded within certain height bands can be considered to be at potential collision height (PCH); i.e. the height at which rotor blades sweep.

[110] Etheridge, B. & Baines, D. (1995). *Instructions for the Black Grouse Survey 1995/6: a Joint RSPB/GCT/JNCC/SNH Project.* Unpublished.

[111] Band, W., Madders, M. & Whitfield, D.P. (2007) *Developing field and analytical methods to assess avian collision risk at wind farms.* [Online] Available at: Band_et_al_2007.pdf (natural-research.org) [Accessed: May 2022]

For the Proposed Development, flight activity data were recorded into the following height bands, based on the expected turbine specifications that were current at the time survey work commenced:

- Height band 1: 0 – 23 m
- Height band 2: 24 – 30 m
- Height band 3: 31 – 149 m
- Height band 4: 150 – 179 m
- Height band 5: >180 m

The current layout for the Proposed Development comprises seven turbines. However, the blade length and hub height are not defined at the point of writing this document and, therefore, the minimum rotor swept height is not yet known. A precautionary approach using a PCH between 38-200 m has been used for this Scoping Report, based on an indicative hub height of 119 m and a blade length of 81 m (rotor diameter of 162 m) with all flights in height bands 3, 4 and 5 considered to be within PCH. As noted, this will be a precautionary approach as some flights at the lower end of height band 3 (those below 38 m) and the higher end of height band 5 (those above 200 m) will lie outside PCH. Flights recorded in height band 1 and 2 are below PCH.

In the VP survey results presented below, those ornithological features recorded at PCH are highlighted. Three or more flights and/or ten or more individuals at PCH within the collision risk zone (CRZ) (blade length plus 200 m buffer) are considered as qualifying a species for CRM. For the purposes of identifying species at potential collision risk within this Scoping Report, all species that recorded three or more flights and/or ten or more individuals at PCH within the surveyed viewsheds have been highlighted as requiring CRM; which can be considered precautionary.

CRM has not been undertaken at this stage but is described here in order to confirm that this shall be an important part of the assessment. Full CRM will be undertaken for the EIAR, using the finalised dimensions of the proposed turbines and full determination of those flights that occurred at PCH within the CRZ.

Results

Desk-based Review

Designated Sites

Table 11.5 lists the protected areas within the vicinity of the Proposed Development, based upon the search criteria described above.

Table 11.5: Summary of protected sites designated for their ornithological interest, within 10 km of the Proposed Development (within 25 km for geese and gulls)

Site name	Designation	Designated feature	Distance and direction from proposed site
Greenlaw Moor	SSSI	Breeding bird assemblage	c. 10 m south of Proposed Development
Greenlaw Moor	SPA/ Ramsar	Pink-footed goose (non-breeding)	1.7 km south of Proposed Development
Outer Firth of Forth and St Andrews Bay	SPA	Internationally important for non-breeding waterfowl and breeding and	18 km north-east of Proposed

Site name	Designation	Designated feature	Distance and direction from proposed site
Complex		non-breeding seabirds.	Development
Din Moss – Hoselaw Loch	**SPA/ Ramsar**	Pink-footed goose (non-breeding) and greylag goose (non-breeding)	20 km south-east of the Proposed Development

Source: magic.defra.gov.uk

Species of Note

For the purpose of the EIA a desk study will be required to collect ornithological data within 10 km (25 km for geese) of the Proposed Development from the RSPB, TWIC and LBRSG.

Summary of historic survey data

The desk study identified seven Schedule 1 species within 10 km of the Proposed Development and 11 BoCC listed species. All species except goshawk, are included on the SBL. Results are shown in Table 11.6.

Table 11.6: Summary of historic survey data

Species	Designation
Black Grouse	BoCC red-listed, SBL
Cuckoo	BoCC red-listed, SBL
Lapwing	BoCC red-listed, SBL
Golden Plover	SBL
Dotterel	Schedule 1.1, BoCC red-listed, SBL
Red-throated Diver	Schedule 1.1, SBL
Goshawk	Schedule 1.1
Marsh Harrier	Schedule 1.1, BoCC amber-listed, SBL
Barn Owl	Schedule 1.1, SBL
Kingfisher	Schedule 1.1, SBL
Merlin	Schedule 1.1, BoCC red-listed, SBL
Marsh Tit	BoCC red-listed, SBL
Skylark	BoCC red-listed, SBL
Song Thrush	BoCC amber-listed, SBL
Spotted Flycatcher	BoCC red-listed, SBL
Tree Pipit	BoCC red-listed, SBL
Lesser Redpoll	BoCC red-listed, SBL
Yellowhammer	BoCC red-listed, SBL

Source: Renewable Energy Systems (RES)

VP Surveys

Target Species: Breeding Seasons 2020 and 2021

The breeding season surveys during both years recorded flight lines from a total of 18 target species, consisting of geese, wader and raptor species. Table 11.7 summarises levels of flight activity for each species and the

amount of that flight activity which was in PCH. This shows that lapwing and curlew were the most frequently recorded species, with the former recorded in the greatest numbers overall. The associated flight lines are shown in Figures 11.4 – 11.6 and 11.9 – 11.11. In bold are species for which flight activity at PCH meets the required criteria for conducting CRM.

Table 11.7: Results of the breeding season vantage point surveys in 2020 and 2021

Species	No. of flights (individuals) - 2020	No. of flights (individuals) at CRZ - 2020	No. of flights (individuals) - 2021	No. of flights (individuals) at CRZ - 2021
Black grouse	-	-	1 (1)	-
Barnacle goose	**2 (900)**	**1 (450)**	**-**	**-**
Greylag goose	**18 (36)**	**3 (5)**	**34 (122)**	**10 (37)**
Oystercatcher	**29 (41)**	**7 (8)**	**25 (33)**	**1 (1)**
Lapwing	**205 (699)**	**23 (168)**	**124 (546)**	**13 (13)**
Golden plover	**9 (438)**	**5 (240)**	**1 (150)**	**-**
Curlew	**183 (248)**	**46 (72)**	**75 (122)**	**14 (15)**
Woodcock	1 (1)	1 (1)	-	-
Snipe	**15 (19)**	**6 (10)**	**8 (18)**	**1 (1)**
Redshank	2 (2)	-	1 (1)	-
Marsh harrier	1 (1)	1 (1)	-	-
Hen harrier	1 (1)	1 (1)	-	-
Red kite	2 (2)	2 (2)	-	-
White-tailed eagle	-	-	2 (2)	1 (1)
Short-eared owl	1 (1)	-	5 (5)	-
Merlin	-	-	1 (1)	-
Peregrine	7 (7)	2 (2)	-	-

Source: Natural Power, 2020 - 2021

Target Species: non-breeding seasons 2020/21 and 2021/22

A total of 13 target species were recorded during non-breeding season VP surveys between September 2020 and February 2021, and September 2021 and February 2022 (inclusive). Ten of those species were also recorded during the breeding season, the target species not recorded during the breeding seasons were pink-footed goose, whooper swan and goldeneye. Table 11.8 summarises levels of flight activity for each species and the amount of that flight activity which was in PCH. Pink-footed goose was the most frequently recorded species in terms of numbers of flights and individuals. The flight lines for the non-breeding season target species are shown in Figures 11.7 – 11.8 and 11.12 – 11.13 . Five species (greylag goose, pink-footed goose, lapwing, golden plover and peregrine) were recorded at PCH and meet the required criteria for conducting CRM. These species are in bold in Table 11.8.

Table 11.8: Results of the non-breeding seasons VP surveys in 2020/21 and 2021/22

Species	No. of flights (individuals) - 2020/21	No. of flights (individuals) at CRZ - 2020/21	No. of flights (individuals) - 2021/22	No. of flights (individuals) at CRZ– 2021/22
Greylag goose	**5 (13)**	**3 (5)**	**12 (73)**	**8 (53)**

Species	No. of flights (individuals) - 2020/21	No. of flights (individuals) at CRZ - 2020/21	No. of flights (individuals) - 2021/22	No. of flights (individuals) at CRZ– 2021/22
Pink-footed goose	**12 (700)**	**9 (592)**	**26 (1343)**	**23 (1118)**
Unidentified grey goose	**4 (84)**	**1 (7)**	**1 (3)**	**1 (3)**
Whooper swan	1 (6)	1 (6)	-	-
Goldeneye	-	-	1 (1)	1 (1)
Oystercatcher	1 (3)	-	-	-
Lapwing	**6 (46)**	**1 (1)**	**11 (251)**	**10 (250)**
Golden plover	**16 (393)**	**6 (167)**	**16 (116)**	**8 (68)**
Curlew	3 (5)	-	4 (4)	-
Snipe	2 (5)	-	1 (1)	1 (1)
Unidentified wader	2 (18)	1 (5)	-	-
Hen harrier	2 (2)	-	4 (4)	1 (1)
Red kite	1 (1)	-	-	-
Merlin	-	-	1 (1)	-
Peregrine	**7 (7)**	**2 (2)**	**4 (4)**	**2 (2)**
Unidentified raptor	-	-	1 (1)	-

Source: Natural Power 2020 - 2021

Incidental Records

A number of incidental records of target species were made during VP surveys. Records in this category include birds not in flight; birds heard only; birds seen simultaneously where only one could be tracked; birds recorded before/after formal survey effort; and, most commonly, birds beyond the viewshed. These records are summarised in Table 11.9 for completeness.

Table 11.9: Incidental Records of Target Species Recorded During VP Surveys

Species	Number of records/flights	Number of individuals
Barnacle goose	1	1
Greylag goose	16	75
Pink-footed goose	28	5429
Unidentified goose	11	641
Whooper swan	2	22
Unidentified duck	1	2
Oystercatcher	11	24
Lapwing	16	156
Golden plover	18	667
Curlew	14	91
Snipe	17	23
Redshank	1	2

Species	Number of records/flights	Number of individuals
Goshawk	1	1
White-tailed eagle	2	2
Peregrine	8	8

Source: Natural Power

Secondary Records

Table 11.10 summarises the secondary species recorded during the VP surveys. Buzzard was seen the most frequently during VP surveys, but common gull was seen in the largest numbers of individuals. A large proportion of the common gull records is supplemented by counts taken of foraging birds within the Proposed Development on multiple occasions during VPs and therefore misrepresentative of actual flights over the Proposed Development. Common gull were recorded foraging in groups ranging from 35 to 600 individuals.

Table 11.10: Summary of Secondary Species Recorded During VP Surveys

Species	No. of flights recorded	No. of individuals recorded
Red grouse	10	13
Canada goose	5	11
Mallard	24	55
Black-headed gull	3	5
Common gull	143	10275*
Great black-backed gull	15	19
Herring gull	4	40
Lesser black-backed gull	79	130
Large gull sp.	41	326
Unidentified gull	21	345
Cormorant	2	81
Grey heron	6	6
Sparrowhawk	20	20
Buzzard	250	347
Tawny owl	1	1
Kestrel	133	143
Raven	73	158

** This figure is misrepresentative of actual flights across the Proposed Development.*
Source: Natural Power

Breeding Bird Surveys

Upland waders were the focus of the breeding bird surveys. A total of six wader species were considered to have held territories (breeding) within the survey area (Table 11.11) in 2020 and five in 2021. The locations of these territories (mapped by estimated central point) are shown in Figures 11.14 and 11.15.

Table 11.11: Estimated Number of Territories of Wader Species Found During Breeding Bird Surveys in 2020 and 2021

Species	Estimated no. territories	
	2020	2021
Oystercatcher	4	4
Lapwing	28	27
Golden plover	1	-
Curlew	8	6
Snipe	11	8
Redshank	1	1

Source: Natural Power. 2020 - 2021

Other breeding species that were recorded and mapped during breeding bird surveys were as follows (woodland passerines and near passerines (e.g. woodpigeon) were recorded but are not included here):

- Red grouse;
- Mallard;
- Skylark;
- Stonechat;
- Pied wagtail;
- Meadow pipit;
- Yellow hammer; and
- Reed bunting.

Species recorded during breeding bird surveys but for which evidence of breeding could not be confirmed within the survey area, based on the data recorded during the dedicated surveys, were as follows:

- Red-legged partridge;
- Canada goose;
- Greylag goose;
- Teal;
- Common gull; and
- Cuckoo;

Breeding Raptor and Barn Owl Surveys

The results of the dedicated breeding raptor surveys carried out during 2020 are shown in Confidential Figure 11.16.

Target species

Red kite

During the 2020 surveys a single red kite flight was recorded circling over Hang Man's Hill to the south of the Proposed Development within the 2 km survey buffer. Suitable habitat for nesting is present within the Proposed Development and buffer consisting of varied sizes of mature trees and narrow shelter belts, however there was no evidence found to suggest that red kite bred within the Proposed Development or survey buffer

in 2020 and 2021. This is consistent with the VP surveys, which only recorded two red kite flights during the breeding season in 2020 and recorded no flights in 2021.

Barn owl

A survey in January 2021 confirmed the presence of barn owl using the farm buildings around Langtonlees Farm, with an adult seen within one of the buildings. Various other buildings in the same location had the potential for roosting and breeding barn owl.

In addition, the landowner confirmed breeding attempts by a pair within one of the buildings around the farm in both 2020 and 2021, but the outcome was unknown.

Short-eared owl

A single flight was recorded on 13 May during the 2020 surveys, involving a bird flying north towards Hardens Hill. Suitable habitat is present within the Proposed Development and buffer, however there was no evidence found to suggest that short-eared owl bred within the Proposed Development or survey buffer in 2020 and 2021.

Peregrine

The dedicated surveys in 2020 returned two records of peregrine, one flight on 13 May within the south-western survey buffer and another bird heard calling from the met mast on Hardens Hill on 4 June. Suitable nesting locations within the Proposed Development are not present, however they may be present within the wider area.

Secondary species

Sparrowhawk

Sparrowhawk were not recorded during the 2020 surveys, however suitable habitat is present within the Proposed Development and buffer consisting of mature woodland and coniferous shelterbelts. Evidence of potential breeding was found within coniferous plantation to the south of Langtonlees Farm which consisted of plucking posts, feeding remains and a used nest (unoccupied).

Buzzard

Three active buzzard nests were recorded within coniferous plantation on the Proposed Development. Surveys during June and August confirmed the presence of young in the nest.

Kestrel

Kestrel was recorded on three occasions hunting within the Proposed Development including one record being a pair of birds. Evidence of breeding was not confirmed, however a pair was frequently recorded during the flight activity surveys in both 2020 and 2021 including juveniles present with adults which would suggest breeding occurred within or nearby the Proposed Development.

Black Grouse Surveys

The results of the dedicated black grouse surveys are shown in Confidential Figure 11.17. The dedicated surveys in 2020 recorded no black grouse within the survey area. In 2021 a single lek was located just outside the 1.5 km survey buffer with a maximum of three lekking males observed, no females were recorded. No leks or sightings of black grouse were recorded within the Proposed Development .

Single male black grouse were recorded within the site during a dedicated raptor survey in April 2020 and during a VP survey in March 2021. The numbers of lekking male black grouse recorded during each visit in 2021 is shown in 11.12.

Table 11.12: Maximum Number of Lekking Male Black Grouse Recorded in 2021

Date	Number of lekking males
7 May 2021	1
14 May 2021	3

Source: Natural Power, 2021

Proposed Assessment Methodologies

All ornithological surveys at the Proposed Development have been completed and no further surveys are proposed.

Before the EIAR is submitted, further records from third party organisations shall be requested in order that the most contemporary records are included within the assessment, including records from the wider area outside the Proposed Development Area.

The approach to the EcIA adopted within this assessment follows the CIEEM guidelines [112]. It should be noted that these criteria are intended as a guide and are not definitive; professional judgement will also be applied in determining the value level for IOFs. IOFs have been scoped in or out of further assessment based on these guidelines and with consideration of effects that are potentially significant as set out under the EIA Directive[113].

The guidelines set out the EcIA process, through the following stages:

- Identification of IOFs through ornithological field survey and/or research;
- Determination of the importance of each identified IOF;
- Assessment of impacts affecting those IOFs and or resources, using a defined importance threshold with reference to ecological processes and functions as deemed appropriate;
- Determining the extent, magnitude, duration, timing and frequency of the impacts;
- Assessing the potential for impact reversibility;
- Determining the level of confidence in the above impact predictions;
- Identification of likely significant impacts in the absence of mitigation;
- The identification of residual impacts following implementation of mitigation; and
- All existing, consented and submitted developments (of three or more turbines) within 10 km of the Proposed Development, will be considered as part of the assessment of cumulative impacts.

Approach to Mitigation

To ensure compliance with legislation, and to follow good practice guidance and consultation recommendations, a number of embedded mitigation measures will be implemented should the application be consented. The Applicant would suggest that in order to ensure these practices are adopted that they be

[112] Chartered Institute of Ecology and Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland* [Online] Available at: Combined-EclA-guidelines-2018-compressed.pdf (cieem.net) [Accessed: May 2022]

[113] DIRECTIVE 2011/92/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment.

included as planning conditions. The proposed wording of these conditions, which can easily be transposed into the planning consent, is as follows:

- If the removal of trees or shrubs is due to take place during the breeding season then a competent ECoW shall undertake a careful, detailed check of vegetation for active birds' nests in advance of vegetation being cleared and provided written confirmation that no birds will be harmed and/or that there are appropriate measures in place to protect nesting bird interest onsite. Any such written confirmation should be submitted to the SBC;
- No development shall take place (including demolition, ground works, vegetation clearance) until a CEMP, incorporating a CMS, has been submitted to and approved in writing by SBC. The CEMP shall include the following:
  - Risk assessment of potentially damaging construction activities;
  - Identification of "biodiversity protection zones";
  - Practical measures (both physical measures and sensitive working practices) to avoid or reduce impacts during the construction phase (may be provided as a set of method statements);
  - The location and timing of sensitive works to avoid harm to ornithological features;
  - The times during construction when specialist ecologists need to be present onsite to oversee works.
  - Responsible persons and lines of communication;
  - The role and responsibilities onsite of an ECoW or similarly competent person; and
  - Use of protective fences, exclusion barriers and warning signs.
- No development shall commence until the role and responsibilities and operations to be overseen by an appropriately competent ECoW have been submitted to, and approved in writing by, SBC. The appointed person shall undertake all activities, and works shall be carried out, in accordance with the approved details. The ECoW will monitor and advise on potential effects on ornithological features during construction in order that impacts are minimised through good practice. This includes maintaining water quality and minimising the potential for disturbance or risk of injury/death for protected species which may be using the Proposed Development; and
- Should there be any other specific impacts as a result of the EcIA, there may also be further planning conditions specific to the particular impact that the Applicant will discuss with consultees on a case by case basis.
- The approved CEMP shall be adhered to and implemented throughout the construction phase strictly in accordance with the approved details, unless otherwise agreed in writing by the local planning authority.

Potential Impacts Scoped Into the Assessment

Designated Sites

Under the Conservation (Natural Habitats, & c.) Regulations 1994, as amended (the Habitats Regulations) any development that may have an LSE on an SPA or SAC, either alone or in combination with other projects, requires an AA to be carried out by the relevant competent authority, to determine whether or not the development would have an adverse effect on the integrity of the SPA or SAC.

Before an AA is initiated, a screening process will be undertaken to determine whether any of the predicted impacts of the development will result in an LSE. This screening assessment will provide information to the competent authority to allow them to reach a decision on whether or not the development will have a LSE on any SPA or SAC and therefore whether an AA will be required.

Greenlaw Moor SPA

The Proposed Development is located c.1.7 km from Greenlaw Moor SPA, which is designated for wintering pink-footed goose. A total of 39 flights (2043 individuals) were recorded during the non-breeding VP surveys between September and February at the Proposed Development with most flights recorded above PCH. Therefore, there is a potential route to impact on the wintering population of pink-footed goose at the SPA through collision with turbines during the operational phase of the Proposed Development. On this basis, Greenlaw Moor SPA will be scoped in to the EIAR, for inclusion for screening for Habitats Regulations Appraisal (HRA).

Greenlaw Moor SSSI

The Proposed Development is located c.10 m from Greenlaw Moor SSSI, which is designated for wintering pink-footed goose and breeding bird assemblage including black grouse, wader species and short-eared owl. Six wader species were recorded breeding within the Proposed Development during the baseline surveys with short-eared owl occasionally recorded during the breeding seasons. A single black grouse lek was also recorded outwith the Proposed Development. Therefore, there is a potential route to impact on the breeding bird assemblage at the SSSI through disturbance/displacement from the Proposed Development during the operational phase. A total of 39 flights (2043 individuals) were recorded during the non-breeding VP surveys between September and February at the Proposed Development with most flights recorded above PCH. Therefore, there is a potential route to impact on the wintering population of pink-footed goose at the SSSI through collision with turbines during the operational phase of the Proposed Development. On this basis, Greenlaw Moor SSSI will be scoped in to the EIAR, for inclusion for screening for Habitats Regulations Appraisal (HRA).

Outer Firth of Forth and St Andrews Bay Complex

The Proposed Development is located c.18 km from Outer Firth of Forth and St Andrews Bay Complex SPA, which is designated for international importance of non-breeding waterfowl and breeding and non-breeding seabirds. A total of 143 flights (10275 individuals) of common gull were recorded during the VP surveys, particularly during the non-breeding seasons. The high number of individuals represents numbers of foraging birds within the Proposed Development. Large gull species were also recorded during the VP surveys but in lower numbers; great black-backed gull (15 flights, herring gull (4 flights) and lesser black-backed gull (79 flights). Therefore, there is a potential route to impact on the non-breeding seabird population at the SPA through collision and disturbance/displacement from the Proposed Development during the operational phase. On this basis, Outer Firth of Forth and St Andrews Bay Complex SPA will be scoped in to the EIAR, for inclusion for screening for HRA.

Din Moss – Hoselaw Loch SPA/Ramsar

The Proposed Development is located c.20 km north-west of the Din Moss – Hoselaw Loch SPA/RAMSAR, which is designated for both wintering pink-footed goose and greylag goose. During the non-breeding VP surveys between September and February pink-footed goose were recorded at the Proposed Development, totalling 39 flights (2043 individuals) with most flights recorded above PCH. Greylag goose were also recorded during the non-breeding VP surveys between September and February totalling 17 flights (86 individuals) with most flights recorded above PCH. Therefore, there is a potential route to impact on the wintering population of pink-footed goose and greylag goose at the SSSI through collision with turbines during the operational phase of the Proposed Development. On this basis, Din Moss – Hoselaw Loch SPA/RAMSAR will be scoped in to the EIAR, for inclusion for screening for Habitats Regulations Appraisal (HRA).

Ornithology

Barnacle goose

Barnacle goose is a BoCC amber-list species due to the international importance of the UK non-breeding population.

Barnacle goose was recorded once during VP surveys, with flight activity recorded in April 2020. This species meets the required criteria for conducting CRM in the breeding seasons. These geese are likely to be of the Svalbard breeding population and therefore the flight activity recorded is considered to be migratory. There is therefore a potential for collision risk posed by the Proposed Development on this species during operation.

Favourable foraging habitat is not considered to be present within the Proposed Development, as the Svalbard barnacle geese predominately winter at the Solway Firth, where they utilise coastal fields and saltmarsh habitats. Therefore, there is no potential for disturbance/displacement effects during construction, operation or decommissioning.

As there is a potential for collision risk posed by the Proposed Development on this species during operation barnacle goose (collision impacts) will be scoped in to the EIAR.

Greylag goose

Greylag goose is a resident breeder and winter migrant. It is a BoCC amber-list species due to its localised non-breeding population. In the south of Scotland, the breeding population is considered to be a naturalised feral population; with only the wintering population being of conservation importance.

Greylag goose was recorded during VP surveys, with flight activity recorded during breeding season surveys in both 2020 and 2021 and the 2021/22 non-breeding season surveys. This species meets the required criteria for conducting CRM in both the breeding and non-breeding seasons. These flights are considered communal flights from resident breeding population in the area as well as records of migratory flights undertaken during spring and autumn migration periods. There is therefore a potential for collision risk posed by the Proposed Development on this species during operation.

VP records also confirm that greylag goose use the Proposed Development for foraging, primarily the cultivated land within the eastern half of the Proposed Development. Therefore, there is potential for disturbance/displacement effects during construction, operation or decommissioning. There is also the potential for collision risk posed by the Proposed Development on this species during operation greylag goose will be scoped in to the EIAR.

Pink-footed goose

Pink-footed goose is a BoCC amber-list species due to the international importance of the UK non-breeding population.

Pink-footed goose was recorded during VP surveys, with nine flights (592 individuals) and 23 flights (1118 individuals) recorded in CRZ during non-breeding season VP surveys in both 2020/21 and 2021/22 respectively, meeting the required criteria for conducting CRM in the non-breeding seasons. These flights are considered to be of both migratory and communal flights of birds potentially using the Greenlaw Moor SPA. There is therefore a potential for collision risk posed by the Development on this species during operation.

The cultivated area within the Proposed Development provides suitable foraging habitat for this species, however there was no evidence of pink-footed goose using the Proposed Development for winter roosting or foraging. Therefore, there is no potential for disturbance/displacement effects during construction, operation or decommissioning.

As there is a potential for collision risk posed by the Proposed Development on this species during operation pink-footed goose will be scoped in to the EIAR.

Oystercatcher

Oystercatcher is a resident breeder, winter migrant and a BoCC amber-list species due to the international importance of the UK breeding and non-breeding populations and the localised nature of the non-breeding population.

A total of 29 and 25 flights (74 individuals) were recorded during the 2020 and 2021 breeding season VP surveys respectively. Seven flights (eight individuals) and one flight (one individual) were recorded in CRZ during the 2020 and 2021 breeding seasons respectively. Four oystercatcher territories were recorded within the Proposed Development during breeding bird surveys in 2020 and 2021.

Due to the number of flight activity records during VP surveys there is potential collision risk for this species. Also, given that suitable breeding and foraging habitat is present within the Proposed Development there is the potential for disturbance/displacement effects posed by the Proposed Development to this species. Therefore, oystercatcher will be scoped in to the EIAR.

Lapwing

Lapwing is a resident breeder, winter migrant and a BoCC red-list species due to a severe decline in the UK breeding population size over a recent 25-year period and longer-term.

Fight activity was recorded within the Proposed Development during the 2020 and 2021 breeding season VP surveys with totals of 205 and 124 respectively, of which 36 flights (181 individuals) were recorded at CRZ. Flight activity recorded during the 2020/21 and 2021/22 non-breeding seasons VP surveys totalled 6 and 11 respectively (combined total of 297 individuals), of which 11 flights (251 individuals) were recorded in CRZ. Flight activity meets the required criteria for conducting CRM in the breeding and non-breeding seasons. During the breeding bird surveys in 2020 and 2021 a total of 28 and 27 lapwing territories were recorded within the Proposed Development respectively. Territories were mainly found within the cultivated fields and open areas of heath and grassland habitats.

Due to the number of records during VP surveys there is potential collision risk for this species. Also, given that suitable breeding and foraging habitat is present within the Proposed Development there is the potential for disturbance/displacement effects posed by the Proposed Development to this species. Therefore, lapwing will be scoped in to the EIAR.

Golden plover

Golden plover is a resident breeder, winter migrant and an Annex I species.

During the 2020 and 2021 breeding season a combined total of ten flights were recorded during baseline VP surveys. 16 flights were recorded during both the 2020/21 and 2021/22 non-breeding seasons (393 and 116 individuals respectively). A total of 19 flights (475 individuals) were recorded in CRZ, therefore this species does qualify for CRM. During the non-breeding season surveys VP flight activity surveys recorded this species using Hardens Hill and the cultivated areas within the Proposed Development for foraging and potentially roosting. The Proposed Development provides suitable habitat for breeding with a single territory recorded during the 2020 breeding bird surveys, no breeding was recorded 2021.

Due to the number of records during VP surveys there is potential collision risk for this species. Also, given the presence of birds during the non-breeding season within the Proposed Development there is the potential for disturbance/displacement effects posed by the Proposed Development to this species. Therefore, golden plover will be scoped in to the EIAR.

Curlew

Curlew is a resident breeder and winter migrant in Scotland. It is a BoCC red-list species due to a severe long-term breeding population decline.

During the 2020 and 2021 breeding season a combined total of 258 flights were recorded during baseline VP surveys, (248 and 122 individuals respectively). Three and four flights were recorded during the 2020/21 and 2021/22 non-breeding seasons. A total of 60 flights (87 individuals) were recorded in CRZ, therefore this species does qualify for CRM. During the breeding bird surveys in 2020 and 2021 a total of eight and six curlew territories were recorded within the Proposed Development respectively. Territories were recorded throughout the Proposed Development excluding the cultivated areas around with the Proposed Development.

Due to breeding territories within the Proposed Development and the distance of recorded territories from proposed infrastructure there is the potential for disturbance/displacement effects on this species during construction, operation and decommissioning of the Proposed Development. There is also the potential for collision risk during operation of the wind farm. Therefore, curlew will be scoped in to the EIAR.

Snipe

Snipe is a resident breeder and winter migrant and is a BoCC amber-list species due to moderate long-term declines in breeding range.

During the 2020 and 2021 breeding season a combined total of 23 flights were recorded during baseline VP surveys, (19 and 18 individuals respectively). A total of three flights were recorded during the 2020/21 and 2021/22 non-breeding seasons. A total of eight flights (12 individuals) were recorded in CRZ, therefore this species does qualify for CRM for the breeding season. During the breeding bird surveys in 2020 and 2021 a total of 11 and 8 snipe territories were recorded within the Proposed Development respectively. Territories were recorded throughout the Proposed Development excluding the cultivated areas around Proposed Development

Due to breeding territories within the Proposed Development and the distance of recorded territories from proposed infrastructure there is the potential for disturbance/displacement effects on this species during construction, operation and decommissioning of the Proposed Development. There is also the potential for collision risk during operation of the wind farm. Therefore, snipe will be scoped in to the EIAR**.**

Peregrine

Peregrine is a resident breeder. It is a Schedule 1 and Annex I species.

During the 2020 breeding season a total of seven flights were recorded during baseline VP surveys. Seven and four flights were recorded during the 2020/21 and 2021/22 non-breeding seasons with a total of six flights (six individuals) were recorded in CRZ.

The level of recorded flight activity in the non-breeding seasons qualifies this species for CRM. As no breeding activity of this species was observed within the survey area during baseline surveys, potential disturbance/displacement effects during construction and operation are considered to be negligible. For these reasons, we would scope in peregrine to the EIAR.

Potential Impacts Scoped Out of the Assessment

Ornithology

Black grouse

Black grouse is a resident breeder and is a BoCC red-list species due to both historical and recent population declines.

No black grouse were recorded during baseline surveys within the survey area (Proposed Development plus a 1.5 km buffer), however lekking birds were recorded outwith the proposed development (>1.5 km). The lek also lies close of the proposed abnormal access road (B 6456).

The amount of suitable black grouse breeding habitat to be lost directly to the proposed development is likely to be relatively small, given the distance to the lek. The general type of construction activity associated with wind and solar farms has the potential for disturbance/displacement during construction, however given the distance of the lek being >1.5 km from the Proposed Development the effects posed by the Proposed Development is negligible. Therefore, given the black grouse presence in the wider area, we would **scope out black grouse to the EIAR.**

Whooper swan

Whooper swan is a BoCC amber-list species due to the international importance of the UK non-breeding population.

Whooper swan was recorded once during VP surveys, with flight activity recorded during non-breeding season VP surveys in 2020/21. As only one flight was recorded this species does not qualify for CRM.

The cultivated area, particularly arable fields within the Proposed Development provides limited suitable foraging habitat for this species, however there was no evidence of whooper swan using the Proposed Development for foraging.

Due to the low numbers of records during VP surveys there is negligible collision risk for this species. Given there are no records of birds foraging within the Proposed Development there is no potential for disturbance/displacement effects posed by the Proposed Development to this species. As such we would **scope out whooper swan from the EIAR.**

Goldeneye

Goldeneye is a rare breeder and is a BoCC red-list species [98]due to a severe decline in the UK non-breeding population size over a recent 25-year period and longer-term.

Goldeneye was recorded once during VP surveys in September 2021. There is no suitable habitat for goldeneye within the vicinity of the Development.

The level of recorded flight activity does not qualify this species for CRM therefore collision risk for this species is negligible. Given there is no suitable habitat for goldeneye within the Proposed Development there is no potential for disturbance/displacement effects posed by the Development to this species. As such we would **scope out goldeneye from the EIAR.**

Woodcock

Woodcock is a resident breeder and a winter migrant. It is a BoCC red-list species due to a severe decline in the UK breeding population size over a recent 25-year period and longer-term.

A single flight was recorded in April 2020.

The level of recorded flight activity does not qualify this species for CRM and therefore the collision risk is considered negligible. Suitable woodcock breeding habitat present within the Proposed Development to be lost directly to components of the wind development is likely to be relatively small therefore the potential for disturbance/displacement effects during construction and operation is considered to be negligible. As such we would **scope out woodcock from the EIAR.**

Redshank

Redshank is a resident breeder and winter migrant in Scotland. It is a BoCC amber-list species due to a severe long-term breeding population decline.

Two and one flight were recorded during the 2020 and 2021 breeding seasons respectively. A single breeding territory was recorded in 2020 and 2021. Both territories were recorded within the northern half of the Proposed Development.

The level of recorded flight activity does not qualify this species for CRM and therefore the collision risk is considered negligible. As a single territory was recorded within the Proposed Development, potential disturbance/displacement effects during construction and operation are considered to be negligible. As such we would **scope out redshank from the EIAR.**

Marsh Harrier

Marsh harrier is a rare resident breeder. It is a Schedule 1, Annex I and a BoCC amber-list species due to its localised breeding distribution.

An individual was recorded once during breeding VP surveys in August 2020 heading west across the Proposed Development.

The level of recorded activity does not qualify this species for CRM and therefore the collision risk is considered negligible. Given there is no suitable habitat for marsh harrier within the Proposed Development there is no potential for disturbance/displacement effects posed by the Proposed Development to this species. As such we would **scope out marsh harrier from the EIAR.**

Hen harrier

Hen harrier is a rare resident breeder. It is a Schedule 1, Annex I[69] and a BoCC red-list species due to both historical and recent population declines.

During the VP surveys a single flight of hen harrier was recorded in the breeding season, with six flights during the non-breeding season. Only two flights were recorded in CRZ therefore does not qualify this species for CRM.

Due to the low level of flight activity recorded during the baseline surveys the potential collision risk posed by the Proposed Development on this species during operation is considered negligible. No evidence of breeding or winter roost activity was recorded during the baseline surveys therefore the potential for disturbance/displacement effects during construction and operation are considered to be negligible. **Therefore, harrier will be scoped out of the EIAR.**

Red kite

Red kite is a Schedule 1 and Annex I species, a resident breeder and wintering species.

Red kite was recorded three times during VP surveys, once in the breeding and two in the non-breeding seasons in 2020 (two record in CRZ). One flight was recorded during the dedicated raptor surveys in 2020 but there was no evidence found to suggest that red kite use the Proposed Development for breeding, and no evidence of use for roosting in winter from VP surveys. Given the infrequency of red kite records it is likely that this species only visits the Proposed Development occasionally.

The level of recorded flight activity does not qualify this species for CRM and therefore potential collision risks are considered to be negligible. As no breeding activity of this species was observed within the survey area during baseline surveys, potential disturbance/displacement effects during construction and operation are considered to be negligible. On this basis, we would **scope out red kite from the EIAR.**

White-tailed eagle

White-tailed eagle is a rare, but increasing, resident breeder. It is a Schedule 1, Annex I and a BoCC amber-list species due to a historical decline that is now recovering.

White-tailed eagle was recorded twice during breeding VP surveys in August 2021 at PCH and relate to the same individual.

The level of recorded activity does not qualify this species for CRM therefore the potential collision risk posed by the Proposed Development on this species during operation is considered negligible. No breeding activity of this species was observed during baseline surveys therefore, potential disturbance/displacement effects during construction and operation are considered to be negligible. As such we would **scope out white-tailed eagle from the EIAR.**

Barn owl

Barn owl is a Schedule 1 resident breeding species.

Barn owl was not recorded during the VP surveys despite anecdotal evidence of breeding within the farm buildings at Langtonlees Farm during both breeding seasons, although nocturnal species are not well detected by such surveys. The winter survey confirmed occupancy of an individual using one of the farm buildings.

Barn owls hunt/forage typically less than 3 m above the ground and there is no evidence to suggest that wind turbines have a significant impact on barn owls in the UK[114]. Therefore, potential collision risks are considered to be negligible. This species has habituated to conditions within an active working farm and any potential disturbance/displacement effects during construction and operation are considered to be negligible. On this basis, we would **scope out barn owl out from the EIAR.**

Short-eared owl

Short-eared owl is a resident breeder and winter migrant. It is an Annex I and a BoCC amber-list species due to moderate long-term declines in breeding range, and also moderate declines in breeding range within a recent 25-year period.

One flight of short-eared owl was recorded in April 2020 during the breeding VP surveys. An individual was also recorded during the dedicated raptor surveys in May 2020. Five flights on a single day in July 2021 (presumed to be the same individual) were recorded during the breeding VP surveys with a single bird recorded during the BBS. However, there was no evidence to suggest that occupancy of short-eared owl or breeding had occurred within the Proposed Development during 2020 and 2021 breeding seasons.

Potential collision risk posed by the Proposed Development on this species during operation is considered negligible. No breeding was confirmed during the baseline surveys therefore the potential for disturbance/displacement effects during construction and operation is considered negligible. As such we would **scope out short-eared owl from the EIAR.**

Merlin

Merlin is a resident breeder and winter migrant. It is a Schedule 1, Annex I and a BoCC red-list species due to historic declines in its breeding population.

Merlin was recorded twice during the VP surveys with single birds recorded during one breeding and one non-breeding season. However, this species was not recorded during the dedicated raptor surveys or the breeding bird surveys and there was no evidence of breeding.

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114 The Barn Owl Trust (2015) *Wind turbines and Barn Owls* [Online] Available at: Wind turbines and Barn Owls - The Barn Owl Trust [Accessed 01/06/2022]

The level of recorded flight activity does not qualify this species for CRM and therefore potential collision risks are considered to be negligible. As no breeding activity of this species was observed within the survey area during baseline surveys, potential disturbance/displacement effects during construction and operation are considered to be negligible. On this basis, we would **scope out merlin from the EIAR.**

Secondary raptor species

Sparrowhawk, buzzard (no species-specific conservation designations) and kestrel (BoCC amber-list[98]) were regularly recorded during the VP surveys with nine flights (nine individuals), 75 flights (103 individuals), and 41 flights (41 individuals) recorded respectively. A single record of tawny owl was also recorded. It is considered that embedded mitigation will be sufficient to reduce any potential disturbance effects on these widespread species to a negligible level. Mitigation includes dedicated nest checks prior to any felling or construction taking place in an area of forestry. If an active nest is found then a suitable buffer will be implemented around the nest in which felling and construction will not be undertaken until the nesting attempt has reached its conclusion.

Displacement and turbine collision during operation is a potential risk for these species, particularly buzzard and kestrel which spend a considerable amount of time hunting over open ground. However, any such effects are considered unlikely to have any more than a local impact on these populations.

Given the limited potential for significant effects to this species **secondary raptor species will be scoped out from the EIAR.**

Other secondary species

Red grouse (BoCC amber-list) were noted as being present throughout most VP surveys although 10 flights (13 individuals) were recorded. Red-legged partridge (no species-specific conservation designations) were present within the Proposed Development and recorded mostly during the breeding bird surveys.

Canada goose (no species-specific conservation designations) was recorded during VP surveys (five flights, 11 individuals) and mostly during the breeding seasons. Mallard (BoCC amber-list) were frequently recorded within the Proposed Development with 24 flights (55 individuals). A pair of teal (BoCC amber-list) were recorded during the breeding bird surveys in May and June 2021, no evidence of breeding was recorded.

Cuckoo (BoCC red-list) was recorded once during the breeding birds surveys in 2020 along the northern boundary of the Proposed Development. During the VP surveys cormorant and grey heron (no species-specific conservation designations for both species) were recorded infrequently with two flights (81 individuals) and six flights (six individuals) respectively.

Common gull (BoCC amber-list) were regularly recorded during VP surveys with 144 flights (10,275) individuals), of which 46 flights (5,801 individuals) and 74 flights (3,322) were recorded during the non-breeding seasons between October and February in 2020 and 2021 respectively. During the non-breeding months regular counts of foraging birds were conducted during the VPs. This species used the cultivated areas on the Proposed Development for foraging, particularly around the Langtonlees Farm and Lees Hill area. Flight activity from the VP surveys recorded birds using the main flight corridor between Hardens Hill and Hen Law, flying SE or NW, to and from the Langtonlees area. The Outer Firth of Forth and St Andrews Bay Complex lies approximately 18 km from the Proposed Development that may suggest potential connectivity.

Great black-backed gull (BoCC amber-list) and lesser-black-backed gull (BoCC amber-list) were recorded frequently with 15 flights (19 individuals) and 79 flights (130 individuals) recorded respectively. Fewer flights of black-headed gull (BoCC amber-list) and herring gull (BoCC red-list) were recorded with three flights (five individuals) and four flights (40 individuals) respectively.

Raven (no species-specific conservation designations) was recorded frequently within the Proposed Development with 73 flights (158 individuals). Flights of red grouse were recorded throughout the VP surveys

and although more numerous outwith the Proposed Development (to the west), results from the breeding bird surveys would suggest this species bred within the Proposed Development.

There are no protected areas designated for these species that have connectivity to the Proposed Development. Should the Proposed Development receive consent, good practice mitigation measures (e.g. pre-construction nest checks, use of exclusion zones etc.) will be followed during the pre-construction and construction phases, to ensure compliance with the Wildlife and Countryside Act (1981).

Turbine collision is a potential risk for these species, particularly for large gulls and ravens which spend more time flying at PCH than other non-raptor secondary species (i.e. scavenging over open ground). However, any such effects are considered unlikely to have any more than a local impact on these populations.

With the mitigation measures described in the embedded mitigation in place and given the relatively low predicted potential impact of collisions, **other secondary species will be scoped out from the EIAR.**

Passerines

No passerines of high conservation concern were recorded in large numbers during baseline surveys. Those species that were recorded are all common and/or widespread species. Passerines are not considered to be significantly affected by collision with turbines. As such, it is expected that there will be no significant population level impact of disturbance/displacement and/or collisions on these species as a result of construction, operation and decommissioning of the Proposed Development.

We will therefore scope **out passerine species from the EIAR.**

Conclusions

Features Proposed for Assessment within the EcIA

In order to ensure compliance with the EIA Directive, and to ensure that the EcIA is focussed on potentially significant effects only, we propose that only those important ornithological features and impacts identified in Table 11.13 be assessed within the relevant EIAR.

Table 11.13: Features and Impacts to be Assessed within the EIAR

Receptor	Scoped In/ out	Development Phase	Impact	Assessment
Designated Site				
Greenlaw Moor SPA	In	Operation	Adverse effects on site integrity (migratory pink-footed goose)	Screening for AA
Greenlaw Moor SSSI	In	Operation	Adverse effects on site integrity (breeding bird assemblage)	Screening for AA
Outer Firth of Forth and St Andrews Bay Complex	In	Operation	Adverse effects on site integrity (non-breeding waterfowl and breeding and non-breeding seabirds)	Screening for AA
Din Moss – Hoselaw Loch SPA/ Ramsar	In	Operation	Adverse effects on site integrity (migratory pink-footed goose and greylag goose)	Screening for AA
Ornithological Feature				

Receptor	Scoped In/ out	Development Phase	Impact	Assessment
Black grouse	**Out**			
Barnacle goose	In	Operation	Collision	EcIA, including CRM
Greylag goose	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Pink-footed goose	In	Operation	Collision	EcIA, including CRM
Whooper swan	**Out**			
Goldeneye	**Out**			
Oystercatcher	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Lapwing	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Golden plover	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Curlew	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Woodcock	**Out**			
Snipe	In	Construction and Decommissioning, Operation	Collision & Disturbance/displacement	EcIA, including CRM
Redshank	**Out**			
Marsh harrier	**Out**			
Hen Harrier	**Out**			
Red kite	**Out**			
White-tailed eagle	**Out**			
Barn owl	**Out**			
Short-eared owl	**Out**			
Merlin	**Out**			
Secondary Raptor Species	**Out**			
Other	**Out**			

Receptor	Scoped In/ out	Development Phase	Impact	Assessment
Secondary Species				
Passerine Species	**Out**			

Source: Natural Power

Questions

Question 17: Are consultees satisfied that ornithological survey effort completed provides a robust assessment of effects?

Question 18: Do consultees have any comments regarding the EIA only concentrating on those receptors which may be subject to significant effects from the Proposed Development (either directly or indirectly)?

Question 19: Table 11.13 notes the receptors and potential impacts proposed to be included within the EIA. Do consultees agree with the list of receptors and impacts to be included within the EIAR?

12. Hydrology, Geology and Hydrogeology

Introduction

This section of the Scoping Report outlines the information currently available and presents the baseline conditions applicable to the hydrological, hydrogeological and geological environment in the surrounding region of the Proposed Development.

The intention of this section of the Scoping Report is to introduce the project and provide the competent authority and its advisors with sufficient information (where it currently exists) on the likely impacts of the Proposed Development on individual receptors and important features at this stage. The intended approach will allow for an EIAR that focusses on only those aspects of the Proposed Development that are likely to have a significant effect on known hydrological, hydrogeological and groundwater receptors, as well as those receptors that are currently unknown.

Where the impacts on important hydrological, hydrogeological and geological features (whether it be direct or indirect) from the Proposed Development are not likely to cause a significant effect these have been detailed below. For each of these features, it is proposed that these receptors are ‘scoped out’ and thus not included within the EIAR.

The structure of this section notes the guidance and legislation, methodologies to be used and identifies the results from the desktop review and survey work undertaken to date.

Embedded Mitigation and Layout Iterations

The design of the Proposed Development will avoid known impacts on hydrological receptors, as far as possible, through embedded mitigation including watercourses and peat. Throughout the EIAR process and following further survey work and feedback from the consultation process, the layout will be optimised with hydrology constraints as a key consideration. Should the layout change from now to the application, it should be noted that the layout presented within this Scoping Report represents a ‘greatest extent scenario’ and generally any amendments to the design will not increase the likelihood of a significant impact. Should there

be any subsequent changes to the layout that are likely to have a significant impact on identified receptors then these will be included within the EIAR. If the changes are not likely to have a significant impact, these will first be discussed with the relevant consultees to ensure that they too are in agreement with the Applicant's understanding and before excluding them from the EIAR.

Mitigation by Design

A series of set-back or "buffer" distances will be adopted to help reduce effects of the Proposed Development on the hydrological environment. As the design process evolves, a 50 m buffer will be ensured for all natural hydrological features identified using OS 1:25,000 and 1:10,000 scale mapping and site surveys. Infrastructure will be located out with this buffer except where access necessitates. Any watercourse crossings associated with the new access tracks required as part of the Proposed Development will be minimised as far as practicable.

Table 12.1 confirms that all proposed turbines within the scoping layout are located outside of the 50 m buffer limits. Distances were calculated using functionalities provided within the QGIS package.

Table 12.1: Distance of Turbines from Identified Hydrological Features

Turbine ID	Turbine Distance from Watercourse/Waterbody (m)
T1	476
T2	70
T3	154
T4	562
T5	398
T6	85
T7	305

Source: Natural Power, 2022

In addition to watercourses, the design of the Proposed Development would also seek to avoid areas of peaty/carbon rich soil as well as Private Water Supplies (PWS) and other water resources. The results of detailed surveys completed as part of the EIAR would be used to inform the design in this regard.

Good Practice Mitigation

Mitigation will follow the well-established principles of industry good practice so as to prevent or minimise effects on the surface and groundwater environment. The following principles will be included as part of the good practice mitigation:

- Drainage – no runoff derived from works associated with the Proposed Development will be allowed to directly enter the natural drainage network. All runoff will be adequately treated via a suitably designed drainage scheme with appropriate sediment and pollution management measures. The Proposed Development is situated in an upland hydrological area and it is imperative that the drainage infrastructure is designed to accommodate storm flows based on a 1-in-200 year event plus climate change to help maintain the existing hydrological regime;
- Storage – all soil/peat stockpiles as well as equipment, materials and chemicals will be stored well away from any watercourses. Chemical, fuel, and oil stores will be sited on impervious bases with a secured bund;

- Vehicles and refuelling – standing machinery will have drip trays placed underneath to prevent oil and fuel leaks causing pollution. Where practicable, refuelling of vehicles and machinery will be carried out in designated areas, on an impermeable surface, and well away from any watercourse;
- Maintenance – only emergency maintenance to construction plant will be carried out within the Proposed Development Area, in designated areas, on an impermeable surface well away from any watercourse or drainage, unless vehicles have broken down necessitating maintenance at the point of breakdown, where special precautions will be taken;
- Welfare facilities – on-site welfare facilities will be adequately designed and maintained to ensure all sewage is disposed of appropriately. This may take the form of a soakaway or tankering and off-site disposal depending on the suitability of the site for a soakaway and only with prior agreement with SEPA;
- Cement and concrete – fresh concrete and cement are alkaline and corrosive and can be lethal to aquatic life. The use of wet concrete in and around watercourses will be avoided and elsewhere carefully controlled;
- Monitoring Plan – all activities undertaken as part of the Proposed Development will be monitored throughout the construction phase. Such monitoring will be to ensure environmental compliance;
- Contingency plans – plans will ensure that emergency equipment is available on site i.e., spill kits and absorbent materials, advice on action to be taken and who should be informed in the event of a pollution incident; and
- Training – All relevant staff personnel will be trained in both normal operating and emergency procedures and will be made aware of highly sensitive areas on site.

Further details on specific mitigation requirements will be provided as part of the EIAR, either embedded within the chapter or as a standalone outline CEMP as well as associated appendices. Under the Water Environment (Miscellaneous) (Scotland) Regulations 2017[115], amendments were made to the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) or CAR[116] and the Proposed Development will require a construction runoff permit for water management across the entirety of the Proposed Development Area prior to any construction works taking place, including enabling works. No work will be able to commence on site until a permit has been obtained. Details on other requirements for CAR, including watercourse crossings, would be provided in the EIAR.

Legislation and guidance

International Legislation and Guidance

The assessment takes account of the requirements of the Water Framework Directive (2000/60/EC)[117] (WFD). The WFD aims to protect and enhance the quality of surface freshwater (including lakes, rivers and streams), groundwater, groundwater dependent terrestrial ecosystems, estuaries and coastal waters. The key objectives of the WFD relevant to this assessment are:

- To prevent deterioration and enhance aquatic ecosystems; and
- To establish a framework of protection of surface freshwater and groundwater.

[115] UK Government (2017) *The Water Environment (Miscellaneous) (Scotland) Regulations 2017* [Online] Available at: The Water Environment (Miscellaneous) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 25/05/2022]

[116] UK Government (2021) *The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)* [Online] Available at: car_a_practical_guide.pdf (sepa.org.uk) [Accessed 25/05/2022]

[117] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

The WFD resulted in The Water Environment and Water Services (Scotland) Act 2003[118], which gave Scottish Ministers powers to introduce regulatory controls over water activities in order to protect, improve and promote sustainable use of Scotland's water environment. These regulatory controls in the form of the CAR, made it an offence to undertake the following activities without a CAR authorisation:

- Discharges to all wetlands, surface waters and groundwaters (replacing the Control of Pollution Act 1974)[119];
- Disposal to land (replacing the Groundwater Regulations 1998)[120];
- Abstractions from all wetlands, surface waters and groundwaters;
- Impoundments (dams and weirs) of rivers, lochs, wetlands and transitional waters; and
- Engineering works in inland waters and wetlands.

National and Regional Legislation and Policy

The assessment takes account of the following legislation and policy:

- The Water Environment and Water Services (Scotland) Act 2003;
- The Water Environment (Miscellaneous) (Scotland) Regulations 2017;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- Flood Risk Management (Scotland) Act 2009[121];
- The Water Supply (Water Quality) (Scotland) Regulations 2010[122];
- The Private Water Supplies (Scotland) Regulations 2006[123];
- Water Intended for Human Consumption (Private Water Supplies) (Scotland) Regulations 2017[124];
- Part IIA of the Environment Protection Act 1990[125];
- Waste Management Licensing (Scotland) Amendment Regulations 2016[126];
- Pollution Prevention and Control (Scotland) Regulations 2012[127];
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017[128];

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[118] UK Government (2003) *Water Environment and Water Services (Scotland) Act 2003* [Online] Available at: Water Environment and Water Services (Scotland) Act 2003 (legislation.gov.uk) [Accessed 25/05/22]

[119] UK Government (2016) *Discharges to surface water and groundwater: environmental permits* [Online] Available at: Discharges to surface water and groundwater: environmental permits - GOV.UK (www.gov.uk) [Accessed 25/05/2022]

[120] UK Government (1998) *Disposal to land (replacing the Groundwater Regulations 1998* [Online] Available at: The Groundwater Regulations 1998 (legislation.gov.uk) [Accessed 25/05/2022]

[121] UK Government (2009) *Flood Risk Management (Scotland) Act 2009* [Online] Available at: Flood Risk Management (Scotland) Act 2009 (legislation.gov.uk) [Accessed 25/05/2022]

[122] UK Government (2010) *The Water Quality (Scotland) Regulations 2010* [Online] Available at: The Water Quality (Scotland) Regulations 2010 (legislation.gov.uk) [Accessed 25/05/2022]

[123] UK Government (2006) *The Private Water Supplies (Scotland) Regulations 2006* [Online] Available at: The Private Water Supplies (Scotland) Regulations 2006 (legislation.gov.uk) [Accessed 25/05/2022]

[124] UK Government (2017) *The Water Intended for Human Consumption* (Private Supplies) (Scotland) Regulations 2017 [Online] Available at: The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 25/05/2022]

[125] UK Government (1990) *Environmental Protection Act 1990* [Online] Available at: Environmental Protection Act 1990 (legislation.gov.uk) [Accessed 25/05/2022]

[126] UK Government (2016) *The Waste Management Licensing (Scotland) Amendment Regulations 2016* [Online] Available at: The Waste Management Licensing (Scotland) Amendment Regulations 2016 (legislation.gov.uk) [Accessed 25/05/2022]

[127] UK Government (2012) *The Pollution Prevention and Control (Scotland) Regulations 2012* [Online] Available at: The Pollution Prevention and Control (Scotland) Regulations 2012 (legislation.gov.uk) [Accessed 25/02/2022]

[128] UK Government (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* [Online] Available at:

- Scottish Planning Policy (2014)[129];
- The Scottish Borders Local Development Plan (LDP) (adopted 12 May 2016) (the LDP)[130];
- Land Use Planning System (LUPS) Guidance Note 4: Planning Guidance on Onshore Windfarm Developments[131];
- LUPS Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[132]; and
- SEPA Policies:
  - No. 19 Groundwater Protection Policy for Scotland[133];
  - No. 41 Development at Risk of Flooding: Advice and Consultation[134];
  - No. 54 Land Protection Policy[135]; and
  - No. 61 Control of Priority & Dangerous Substances & Specific Pollutants in the Water Environment[136].

Other Guidance and Good Practice

Table 12.2 lists other key guidance and good practice documentation which has been considered as part of this assessment.

Table 12.2: Good Practice and Statutory Guidance

Topic	Source of information
Scottish Government Planning Advice Notes (PAN's)	PAN 50 Controlling the Environmental Effects of Surface Mineral Workings PAN 51 Planning (revised 2006), Environmental Protection and Regulation PAN 1/2013 Environmental Impact Assessment PAN 61 Planning and Sustainable Urban Drainage Systems PAN 79 Water and Drainage Flood Risk (2015); Planning Advice

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (legislation.gov.uk) [Accessed 25/02/2022]

[129] Scottish Government (2020) *Scottish Planning Policy* [Online] Available at: Scottish Planning Policy - gov.scot (www.gov.scot) [Accessed 25/05/2022]

[130] Scottish Borders Council (2016) *The Scottish Borders Local Development Plan (LDP)* [Online] Available at: Local development plan - adopted | Local development plan | Scottish Borders Council (scotborders.gov.uk) [Accessed 24/05/2022]

[131] SEPA (2017) *Land Use Planning System (LUPS) Guidance Note 4: Planning Guidance on Onshore Windfarm Developments* [Online] Available at: planning-guidance-on-on-shore-windfarms-developments.pdf (sepa.org.uk) [Accessed 25/05/2022]

[132] SEPA (2017) *Land Use Planning System SEPA Guidance Note 31 - Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems* [Online] Available at: lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf (sepa.org.uk) [Accessed 25/05/2022]

[133] SEPA (2009) Groundwater Protection Policy for Scotland v3 – Environmental Policy Number 19 [Online] Available at: Groundwater Protection Policy for Scotland V3, November 2009 (sepa.org.uk) [Accessed 25/05/2022]

[134] SEPA (2016) SEPA – *Planning Authority Protocol (Policy 41) Development at Risk of Flooding: Advice and Consultations* [Online] Available at: sepa-planning-authority-protocol-41.pdf [Accessed 25/05/2022]

[135] SEPA (2003) *SEPA position statement on land protection* (reference EP 54) [Online] Available at: EP-054 (sepa.org.uk) [Accessed 25/05/2022]

[136] SEPA (2008) *Control of Priority & Dangerous Substances & Specific Pollutants in the Water Environment* [Online] Available at: Policy 61 Control of priority and dangerous substances and specific pollutants in the water environment (sepa.org.uk) [Accessed 25/05/2022]

Topic	Source of information
SEPA Guidance for Pollution Prevention (GPPs) and Pollution Prevention Guidelines (PPGs)	GPP 1: Understanding your Environmental Responsibilities – Good Environmental Practice GPP 2: Above Ground Oil Storage Tanks GPP 4: Treatment and Disposal of Wastewater Where there is no Connection to the Public Foul Sewer GPP 5: Works and Maintenance in or Near Water PPG 6: Working at Construction and Demolition Sites PPG 7: Safe Storage – The Safe Operation of Refuelling Facilities GPP 8: Safe Storage and Disposal of Used Oils GPP 13: Vehicle Washing and Cleaning GPP 21: Pollution Incident Response Planning GPP 22: Dealing with Spills GPP 26: Safe Storage – Drums and Intermediate Bulk Containers
SEPA Position Statements (Published)	WAT-PS-06-02: SEPA (2015), Culverting of Watercourses, Version 2 WAT-PS-07-02: SEPA (2012), Bank Protection, Version 2 WAT-SG-23: SEPA (2008), Engineering in the Water Environment, Good Practice Guide – Bank Protection Rivers and Lochs, Version 1 WAT-SG-25: SEPA (2010), Engineering in the Water Environment, Good Practice Guide, Construction of River Crossings, Version 2 WAT-SG-26: SEPA (2010), Engineering in the Water Environment, Good Practice Guide, Sediment Management, Version 1 WAT-SG-31: SEPA, (2006) Special Requirements for Civil Engineering Contracts for the Prevention of Pollution, Version 2 WAT-SG- 78: SEPA (2012), Sediment Management Authorisation, Version 1
Construction Industry Research and Information Association (CIRIA)	CIRIA C692 Environmental Good Practice on Site (third edition) CIRIA C753 SuDS Manual (2015) CIRIA C532 Control of Water Pollution from Construction Sites CIRIA C648 Control of Water Pollution from Linear Construction Projects CIRIA C689 Culvert Design and Operation Guide

Topic	Source of information
Other Guidelines	SNH and Scottish Renewables Joint Publication, (2019) Good Practice During Wind Farm Construction Version 4 Scottish Water. Precautions for Onshore Wind Developments. FCE, SNH, (2010), Floating Roads on Peat Scottish Renewables, Joint Publication (2012), Development of Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste Scottish Government. 2017. Peat Landslide Hazard and Risk Assessment – Best Practice Guide for Proposed Electricity Generation Developments (2nd Edition) SEPA, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended), A Practical Guide, Version 8.4, October 2019 River Crossings and Migratory Fish: Design Guidance, A Consultation Paper, The Scottish Executive SEPA Land Use Planning Guidance Note 4 (2017): Planning Guidance on On-Shore Windfarm Developments, Version 9 SEPA Land Use Planning Guidance Note 31 (2017): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3

Source: Natural Power

Survey Work Undertaken

This sub-section summarises the desk-based and site survey work that has been undertaken to inform the details presented in this Scoping Report.

Desk-based Study

A desk-based study has been undertaken in order to establish the surface and groundwater hydrology underlying the Proposed Development Area. A detailed review of documentation and data sources has been undertaken, as detailed in Table 12.3.

Table 12.3: Baseline Information Sources

Topic	Sources of Information
Topography	10 m contour data derived from Digital Terrain Model (DTM) data
Designated Nature and Conservation	In-house Designated Site Database NatureScot, SiteLink website: http://gateway.snh.gov.uk/sitelink/searchmap.jsp

Topic	Sources of Information
Sites	
Solid and Superficial Geology	BGS Geology of Britain Viewer, http://mapapps.bgs.ac.uk/geologyofbritain3d/index.html
Soils and Peat	James Hutton Institute (JHI), Soil Information For Scottish Soils (SIFSS): http://sifss.hutton.ac.uk/ Scotland's Soils Interactive Map, Carbon and Peatland 2016 and National Soil Map of Scotland: http://soils.environment.gov.scot/
Climate	Met Office: https://www.metoffice.gov.uk/public/weather/climate/gcv3mcrf9 Flood Estimation Handbook (FEH): FEH Web Service: https://fehweb.ceh.ac.uk/ Flood Modeller Suite: https://www.floodmodeller.com/
Surface Water Hydrology	1:10,000 OS Raster Data 1:50,000 OS Raster Data Flood Estimation Handbook (FEH): FEH Web Service: https://fehweb.ceh.ac.uk/ Flood Modeller Suite: https://www.floodmodeller.com/
Flooding	Flood Risk Management Map (SEPA): http://map.sepa.org.uk/floodmap/map.htm
Water Quality	SEPA, WFD Classification, Web Mapping Application, SEPA, Water Classification Hub: https://www.sepa.org.uk/data-visualisation/water-classification-hub SAC, State of the Environment Report 2018 – 2020: https://www.south-ayrshire.gov.uk/sustainable-development/publications.aspx
Hydrogeology	Scotland's Environment Web Interactive Map: https://map.environment.gov.scot/sewebmap/ BGS Geology of Britain Viewer: http://mapapps.bgs.ac.uk/geologyofbritain3d/index.html BGS Geoindex Onshore: https://mapapps2.bgs.ac.uk/geoindex/home.html SEPA, River Basin Management Plans, Web Mapping Application: http://gis.sepa.org.uk/rbmp/

Source: Natural Power

Site Investigations

Site investigations were carried out on the 11th and 12th August 2020 to assess the hydrological characteristics of the site and to complete a 100 m grid peat depth survey. The purpose of the field surveys was to gain an understanding of the topography, soils and geography of the site.

Assessment Scope

The desk-based study and fieldwork has been undertaken to:

- Identify designated areas of relevance to hydrology;
- Confirm surface water catchment areas and watersheds;
- Describe the hydromorphological conditions of watercourses;
- Identify all flooding risks;
- Collate water quality and flooding data for the immediate area and main downstream watercourses;

- Carry out first phase (100 m gird) peat probing;
- Collect soil, geological and hydrogeological information; and
- Collect information relating to recreational and fisheries resources.

Baseline results

Designated Areas

There is one designated area within the Proposed Development Area, one within a 3 km buffer and one outside the 3 km buffer but with hydrological connectivity to the site.

Towards the eastern boundary of the Proposed Development, the Langtonlees Cleugh is designated as a SSSI due to the presence of upland mixed ash woodland.

The designated area within the 3 km buffer is located to the south-west of the Proposed Development. The Greenlaw Moor SSSI and SPA is protected due to the presence of raised bog wetlands that provide habitat for various breeding birds and pink-footed geese.

Both Langtonlees Cleugh SSSI and Greenlaw Moor SSSI and SPA have potential hydrological connection to the Proposed Development and this will be explored within the EIAR.

The Proposed Development is hydrologically connected to the River Tweed, although beyond the 3 km buffer, and is classed as both a SAC and a SSSI. This is because of the high conservation ecological value, and is designated for Atlantic salmon, sea lamprey, river lamprey, brook lamprey, otters and freshwater habitats[137]. Further assessment will be required as part of the EIAR to assess if there is any impact of to the River Tweed SAC and SSSI.

Surface Hydrology

A walkover and morphological assessment of the watercourses identified as part of the desk assessment was undertaken from the 11 and 12 August 2020. The land use within the Proposed Development is dominated by open moorland and agricultural farmland.

The site lies within the catchments of tributaries of the Langton Burn and Fangrist Burn both of which discharge to the Blackadder Water which forms part of the River Tweed SAC and SSSI. The lower reach of the Langton Burn downstream of the Proposed Development before its confluence with the Blackadder Water also forms part of the River Tweed SAC designation. The Blackadder Water flows into the Whiteadder Water before discharging into the River Tweed reaching the North Sea at Berwick-upon-Tweed.

Within the site boundary mapped watercourses include Stonypark Burn that flows into the Fangrist Burn, and Foul Burn, Blackrig Burn, and Wellcleugh Burn all of which flow into the Langton Burn. These catchments are described further below.

The Langton Burn is classed by SEPA under the River Basin Management Plan (RBMP) as currently having a Good status[138], with Fangrist Burn being classed by SEPA as currently having a Poor status[139] due to the overall ecology being affected by modifications to bed, banks and shores by farming activities.

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137 Scottish Natural Heritage, River Tweed Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). Advice for developers and competent authorities when considering projects which could affect the River Tweed SAC and SSSI.

138 SEPA (2020) *Water classification hub: Langton Burn* [Online] Available at: Water Classification Hub (sepa.org.uk) [Accessed 01/06/2022]

139 SEPA (2020) *Water classification hub: Fangrist Burn* [Online] Available at: Water Classification Hub (sepa.org.uk) [Accessed 01/06/2022]

Stonypark Burn

The Stonypark Burn flows to the south into Kettelshiel Burn at NT 70238 52666, then into Fangrist Burn which flows into the Blackadder Water. The Stonypark Burn is located toward the western boundary of the Proposed Development with only a small area of the catchment located within the site boundary in the north-west. The current iteration of the layout shows no infrastructure situated within the catchment.

Foul Burn

Foul Burn features the majority of the Proposed Development infrastructure and flows south into the Langton Burn at NT 71964 51766. The Foul Burn is included within the Langton Burn classification of Good under SEPAs RBMP.

Blackrig Burn

Blackrig Burn is situated in the eastern area of the Proposed Development Area, with the watercourse flowing south-east towards the Langton Burn beyond the boundary. The watercourse confluences with the Raecleugh Head Burn at NT 74120 52820 and continues south where it confluences with Wellcleugh Burn at NT 73980 52264. At this point, the watercourse, now named Leescleugh Burn, flows eastwards where it connects to the Langton Burn at NT 74932 52337. The catchment of the Blackrig Burn does not feature any infrastructure associated with the Proposed Development in the current iteration of the design layout.

Wellcleugh Burn

The Wellcleugh Burn is located in the south-eastern area of the Proposed Development. The watercourse flows eastwards where it confluences with the Blackrig Burn at NT 73980 52264 and becomes known as the Leecleugh Burn. As stated previously, the Leecleugh Burn flows eastward where it connects to the Langton Burn at NT 74932 52337. The catchment of the Wellcleugh Burn features track infrastructure associated with the Proposed Development in the current iteration of the design layout.

Flood Risk

The Flood Risk Management (Scotland) Act 2009 sets in place a statutory framework for delivering a sustainable and risk-based approach to managing flooding.

Flood information available on the SEPA flood map indicates that the Proposed Development is not at risk of flooding. The Langton Burn, downstream of the Proposed Development is at a high likelihood of fluvial flooding 10% (1 in 10 years) contained within the riparian zones of the channel.

There are localised areas of surface water flooding, however these areas are confined to the watercourses channel extent.

No areas of the Proposed Development are indicated as being at risk of groundwater flooding on the SEPA flood risk map.

There is no risk of coastal flooding due to the Proposed Developments topographical position and being located approximately 25 km from the nearest coast.

A flood risk assessment will be undertaken as part of the planning application and would consider all types of flooding. Currently the assessment will be carried out in accordance with SPP but taking into account draft policy NPF4. The document states that “Planning authorities must take the probability of flooding from all sources – (coastal, fluvial (watercourse), pluvial (surface water), groundwater, sewers and blocked culverts) and the risks involved into account when preparing development plans and determining planning applications.”

Soils and Peat

The distribution of soils across the Proposed Development is dependent upon land use, geology, topography, and hydrological regime of the area. The types of soil present in the Proposed Development area as indicated on the National Soil Map of Scotland are presented in Table 12.4.

Table 12.4: Summary of Proposed Development Soil Types

Major soil group	Major soil subgroup	Component soils
Podzols	Peaty podzols	Peaty gleyed podzols
Podzols	Peaty gleyed podzols	Noncalcareous gleys with peaty podzols with brown forest soils
Podzols	Humus-iron podzols	Humus-iron podzols with peaty gleyed podzols
Brown soils	Brown earth soils	Brown forest soils, some noncalcareous and humic gleys
Brown soils	Brown earth soils	Brown forest soils, some brown forest soils with gleying

Source: National Soil Map of Scotland

The Proposed Development Area is dominated by peaty podzols in the northern area, with brown forest soils making up the southern section.

Peat is defined as partially decomposed organic material, exceeding 0.5 m in thickness, that is formed in-situ and under waterlogged conditions[140]. The accumulation of peat is a slow process with a growth rate of around 1 mm a year requiring the rate of organic input to exceed the rate of decomposition. In Scotland, for a soil to be classified as peat it must contains more than 60% of organic matter[141].

In August 2020, an initial Phase 1 investigation was undertaken, in accordance with Scottish Government guidance[142] whereby peat depths were recorded on a 100 m grid spacing across the Proposed Development Area. The survey area covered 475 points.

Table 12.5 provides a summary of the 475 points surveyed, while a visual representation of the peat depth can be found in Figure 12.1.

Table 12.5: Recorded peat depths

Soil Depth Range (m)	Results	% of Points
≤0.5	436	92
>0.5 - ≤1.0	34	7
>1.0	5	1

Source: Natural Power

The Phase 1 peat depth survey indicates that 92% of the peat probed area recorded a depth of ≤ 0.5 m and are therefore classified as peat soils. The maximum peat depth measured was 1.4 m and was found at the

140 The Scottish Parliament (2012*) SPICe Briefing, Peatlands and Climate Change* [Online] Available at: SB 12-28 Peatlands and Climate Change - Parliamentary Business : Scottish Parliament [Accessed 01/06/2022]

141 Scotland's Soils (2019) *Peatland restoration* [Online] Available at: https://soils.environment.gov.scot/resources/peatland-restoration [Accessed 05/05/2022]

142 Scottish Government, Scottish Natural Heritage, SEPA (2017) *Peatland Survey. Guidance on Developments on Peatland* [Online] Available at: Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf (www.gov.scot) [Accessed 01/06/2022]

north-eastern slopes of Lees Hill in the Blackrig Burn catchment. All proposed turbines are indicated to lie on peat of < 0.5 m with areas in the Marchmont land pocket likely to be similar.

Given the lack of peat on site, particularly underlying infrastructure **it is proposed that further detailed peat surveys are scoped out of the EIAR**. Instead, a random sample of soil cores would undertaken to verify the findings of the Phase 1 peat surveys.

The NatureScot Carbon and Peatland 2016 map[143] shows that the Proposed Development Area is underlain by pockets of Class 0 and Class 4 soils. No Class 1 or Class 2 soils are present on site. The majority of infrastructure currently lie on Class 4 which is predominantly mineral soil with some peat soil. However the site is predominately underlain by Class 0, mineral soils verifying the findings of the 100 m grid soil survey.

Bedrock Geology

According to the 1:50,000 scale British Geological Society (BGS) data set, the majority of the Proposed Development is underlain by bedrock of the Stratheden Group and Inverclyde Group (undifferentiated) – interbedded sandstone and argillaceous rocks. These sedimentary units are fluvial in origin. This rock can be associated with alluvial fans which are detrital, coarse-grained and have a depositional environment of rivers flowing from upland valleys to lowland plains[144]. Blacksmill Hill and the northern area of the Proposed Development are underlain by Dirrington Great Law Sill which has a felsite composition. These igneous rocks are intrusive bodies which can be associated with batholiths, plutons, dykes and sills[145].

Superficial Geology

No superficial deposits lie on the topographic high of Blacksmill Hill and the associated infrastructure. However, the remainder of the Proposed Development area is underlain by Glacial till that comprise of variably sorted boulders, gravel, sand, silt and clay that were deposited in the Devensian-Diamicton period[146].

Hydrogeology

The presence of water within both the bedrock and the superficial deposits underlying the Proposed Development is closely controlled by the hydrogeological characteristics of the hosting lithology. The Blacksmill Hill bedrock is classified as a low productivity aquifer with flow virtually all through fractures and other discontinuities. The British Geological Survey[147] summarise the aquifer as an unnamed igneous intrusion with limited groundwater in near surface weathered zone and secondary fractures, rare springs. The rest of the Proposed Development Area is underlain with two moderate productivity aquifers that are situated to the north and to the south. The southern aquifer, including of Lees Hill, is described as having significant intergranular flow due to the presence of sandstone, siltstone and mudstone. In addition, the northern aquifer, including of Hardens Hill, features sandstones, siltstones, mudstones and conglomerates that are interbedded with lavas (likely relating to the nearby igneous intrusion) that can produce groundwater yields up to 1 litre per second (L/s).

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143 Scotland's Soils (2016*) Scotland's Environment, Carbon and Peatland 2016 Map*: http://map.environment.gov.scot/Soil_maps/?layer=10 [Accessed 02/06/2020]

144 British Geological Survey (2017) *Geology of Britain 3D* [Online] Available at: http://mapapps.bgs.ac.uk/geologyofbritain3d/ [Accessed 05/05/2022]

145 British Geological Survey (2017) *Geology of Britain 3D* [Online] Available at: http://mapapps.bgs.ac.uk/geologyofbritain3d/ [Accessed 05/05/2022]

146 British Geological Survey (2017) *BGS Geology 50k (DigMapGB-50) - 1:50k Superficial deposits* [Online] Available at: https://www.bgs.ac.uk/datasets/bgs-geology-50k-digmapgb/ [Accessed 05/05/2022]

147 British Geological Survey (2022) *Aquifer Classification* [Online] Available at: https://map.environment.gov.scot/sewebmap/, [Accessed 05/05/2022]

Areas of discrete or diffusely emerging groundwater may also support plant communities and be considered as GWDTE, which will require further assessment during the completion of the EIAR.

Fisheries

All water draining the Proposed Development Area ultimately flows into the River Tweed. Specific fisheries mitigation will be included within the Ecology section of the EIAR, however it is important that water quality is maintained so that the rivers can continue to support these species at current levels. Alongside good practice mitigation measures, water quality monitoring and maintaining a buffer distance of a minimum of 50 m from mapped watercourses, water quality should be adequately protected. **It is suggested that fisheries and is scoped out of the hydrology section of the EIAR being covered by ecology and water quality**.

Water Resources

Consultation with OS mapping has confirmed there are properties within a 3 km buffer of the Proposed Development which would require investigation to determine if they are served by a PWS. Further consideration and consultation with SBC will take place to support the production of the EIAR. This investigation will confirm and assess which properties may utilise PWS within 3 km of the Proposed Development.

Drinking Water Protected Area

Scottish Water will also be consulted in relation to any Scottish Water assets that may be in the vicinity of the Proposed Development. The area is classified as a groundwater drinking water protected area, groundwater body - Greenlaw –which is a total of 85.4 ha^2 and underlies the majority of the Proposed Development. Greenlaw is designated by SEPA as Good overall currently[148], with future objectives remaining in Good status.

Summary of Likely Impacts on Baseline Receptors

The potential impacts of construction and operation of the Proposed Development on the identified baseline receptors have been outlined in Table 12.6.

[148] SEPA (2020) *Water classification hub: Greenlaw* [Online] Available at: Water Classification Hub (sepa.org.uk) [Accessed 01/06/2022]

Table 12.6: Summary of Impacts on Baseline Receptors

Baseline	Potential Impact during Construction and Operation	Suggested Mitigation (in addition to Embedded Mitigation)	Significance of Impact taking into account Embedded and Additional Mitigation	Scoped In or Scoped Out	Reason
Designated Areas	Degradation of quality of site watercourses through increased mobilisation of silt, as well as presence of pollutants such as fuels and oils.	Specific mitigation to be outlined in CEMP.	Likely to be low or not significant.	Scoped In	Designated areas within 3 km have potential hydrological connectivity with the Proposed Development. River Tweed, of which streams on site drain into, is classified as a SAC and SSSI. Areas of the site are within a drinking water protected area.
Site Hydrology	Disruption of flow regime or degradation of water quality or quantity.	Mitigation outlined as part of the EIAR. Implementation of site specific hydrological monitoring plan.	Likely to be not significant. This will be confirmed as part of the works undertaken as part of EIAR.	Scoped In	The site hydrology will need assessed and mapped to ensure sensitivity and appropriate mitigation and monitoring can be put in place to demonstrate low to negligible impact.
Flood Risk	Increase in impermeable area, which includes associated PV infrastructure, within the site catchments causing increased runoff rates and reducing filtration.	Flood risk will be managed through embedded mitigation.	Likely to be not significant. This will be confirmed as part of the works undertaken as part of the EIAR.	Scoped In	The embedded mitigation will manage drainage and runoff associated with the Proposed Development.
Soils	Loss of soil and peat through inappropriate site design.	Site design has avoided areas of identified peat.	Likely to be low. This will be confirmed as part of the works undertaken as part of the EIAR.	Scoped In	Where peat is indicated, infrastructure has avoided placement on these areas.

Peat				**Scoped Out**	Further confirmation required that all proposed infrastructure has avoided areas of deeper peat as far as possible. Proposed survey would include coring to verify Phase 1 results. It is proposed that detailed peat surveys are scoped out.
Geology	Loss of geology through disturbance and excavation.	Specific mitigation not required as geological features are not considered to be a valued receptor.	Negligible	**Scoped Out**	Construction will have no significant impact on solid geology due to the uniformity underlying the site. No specific geological features have been identified.
Hydrogeology	Temporary or permanent disruption of subsurface flows as a result of construction.	GWDTE Assessment to establish if site habitats are dependent on groundwater. PWS may be dependent on site hydrogeology and will require additional assessment.	Likely to be low. This will be confirmed as part of the works undertaken as part of the EIAR.	Scoped In	Assessment will be required to confirm presence of GWDTE on site. PWS may require assessment.
Fisheries	Decrease in water quality affecting fisheries interests or amenities.	Mitigation outlined as part of the site specific CEMP will support the protection of fisheries and recreational interests.	Likely to be low.	**Scoped Out**	River Tweed will be considered and addressed within the assessment of water quality and ecology as part of the EIAR.

Water Resources .	Degradation in water quality or quantity serving PWS, public water assets as well as other licensed abstraction and discharges. Degradation in water quality to public water supply assets.	Dependent upon completion of further investigations, there is the potential for the completion of a PWS Risk Assessment and Monitoring Plan. Drainage mitigation to be outlined in CEMP will support the protection of water resource receptors.	Likely to be low to not significant. This will be confirmed as part of the works undertaken as part of the EIAR.	Scoped In	PWS properties, abstractions and discharges are yet to be confirmed and will be assessed in the EIAR.
Water Quality	Degradation of quality of site watercourses through increased mobilisation of silt, as well as presence of pollutants such as fuels and oils.	Mitigation outlined as part of the EIAR will support the protection of designated areas.	Likely to be low to not significant. This will be confirmed as part of the works undertaken as part of the EIAR.	Scoped In	Water quality to be assessed as part of the EIAR.

Source: Natural Power

Method of Assessment and Reporting

The Geology, Hydrology, and Hydrogeology Chapter of the EIAR would be produced alongside accompanying figures and technical appendices. Following further establishment and updating of baseline conditions, an assessment of the effects associated with construction, operation and decommissioning of the Proposed Development will be carried out in line with Scottish planning policy and guidance.

Data Collection

A desk-based assessment will be carried out to establish the catchment characteristics and baseline hydrological and hydrogeological conditions that prevail within the site boundary. The desk-based review will build upon the information presented in this Scoping Report and will include:

- Further determination and description of the hydrology, and hydrogeology, contained within the Proposed Development, from published maps and other available literature;
- Review of existing sources of data relating to water regimes, including SEPA water quality and flood risk data, discharge consents, abstraction licenses and identification of other water users;
- Identification of any hydrologically important sites;
- Additional and more detailed consideration on the extent of peat soils; and
- In collaboration with project ecologists, identification of eco-hydrology such as GWDTE.

Additional site surveys may also be undertaken across the Proposed Development. This would include a hydrological survey of watercourses and waterbodies to record key features and characteristics, including (if applicable) potential watercourse crossing locations, potential flood risk from unmapped watercourses or

drainage features as well as potential flood risk mitigation opportunities that could be integrated within permanent drainage configurations.

Phase 1 (100 m grid) peat survey has already been completed in accordance with the current good practice guidance described above. Additionally, it is proposed that coring take place to verify the results of the initial Phase 1 survey which would be used to refine the final layout to be presented in the EIAR demonstrating how areas of carbon rich soil have been avoided through site investigation and design evolution. Where these cannot be avoided, the EIAR would also outline how potential impacts on carbon rich soils would be minimised.

Consultation

In order to provide additional and more detailed information to support the EIAR, consultation would be undertaken with third party stakeholders and is likely to include SBC, SEPA, NatureScot and Scottish Water.

Assessment of Effects

An assessment of the effects associated with construction, operation and decommissioning of the project will be carried out in line with planning and CIEEM guidance[149]. The assessment will follow the mitigation hierarchy by adopting the principles of avoidance, mitigation, compensation, and enhancement. The assessment will follow the established source-pathway-receptor approach, and effects will be assessed as being either not significant or of minor, moderate, or major significance. Effects of moderate or major significance are considered to be significant. Following the determination of impacts, mitigation measures will be identified, and residual impacts identified.

Potential cumulative environmental impacts to soils, geology and water resources will be assessed where concurrent proposed wind farm sites or construction activity may be in hydrological connection with the Proposed Development, or water resource receptors. Where potential cumulative impacts are identified, the same criteria as used for assessment of the Proposed Development will be employed.

It is anticipated that as the assessment of potential impacts would inform the design of the Proposed Development and good practice measures would be implemented during the construction, operation, and decommissioning of the Proposed Development, that significant residual effects to the geological and water environment would be avoided. However, if potential significant residual effects to the geological and water environment are identified through the assessment process described above, suitable mitigation measures will be set out in the EIAR.

13. Cultural Heritage

Introduction

The cultural heritage section of the EIAR will characterise the historic environment within the Proposed Development Area and in the wider study area. Consultation, desk-based research including LIDAR assessment and walkover surveys, a ZTV and setting visits will be used to define proportionate study areas for the assessment. A baseline of designated and non-designated heritage assets will be assembled to assess the potential direct, indirect, and setting effects of the Proposed Development. Where likely significant effects are identified, mitigation measures will be identified.

149 CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2.* Chartered Institute of Ecology and Environmental Management, Winchester

The cultural heritage of an area comprises archaeological sites, historic buildings, GDLs, historic battlefields and other sites, features or places in the landscape that have the capacity to provide information about past human activity, or which have cultural relevance due to associations with folklore or historic events. Sites of cultural heritage interest may also derive some, or all, of that interest from their setting within the wider landscape. The cultural heritage section of this Scoping Report is therefore intended to identify likely significant effects of the Proposed Development upon the physical fabric and settings of heritage assets within the Proposed Development Area and likely significant effects on the setting of cultural assets within the wider study area.

Direct physical impacts involve physical alteration or destruction of heritage assets and could result from groundworks for the construction of proposed infrastructure (including turbine and crane bases, foundations for solar PV panels and batteries, new or upgraded access tracks, substations, transformers, cables etc).

Effects on the setting of heritage assets can arise due to the relative scale of the Proposed Development, and the potential for elements of it to detract from the understanding, appreciating and experiencing of an asset from key views from/towards the asset.

Cultural significance is a quality that applies to all heritage assets and as defined by HES (NatureScot & HES 2018, Appendix 1 Page 175)[150], relates to the ways in which a heritage asset is valued both by specialists and the general public; it may derive from factors including the asset's fabric, setting, context and associations. The approach which will be taken to the analysis of a heritage asset's cultural significance will aims identify its 'special characteristics' which should be protected, conserved or enhanced. Such characteristics may include elements of the asset's setting, which is defined in HES's guidance as "the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated" (HES 2016, updated 2020, Section 1)[151].

This use of the word cultural 'significance', referring to the range of cultural values or interest attached to an asset, should not be confused with the unrelated usage in EIA where the 'significance of an effect' reflects the weight that should be attached to it in a planning decision.

Historic landscape is not treated as a heritage asset for the purposes of this assessment except where a defined area of landscape has been designated for its cultural heritage interest (commonly including Conservation Areas, and areas included in the Inventory of GDLs, and sometimes Scheduled Monuments). It is recognised that all landscapes have a historic dimension, and this will be considered as part of the assessment of Landscape Character (covered in the LVIA chapter of the EIAR). Further, although any effects on the cultural significance and importance of heritage assets due to change in their setting are likely to be visual in nature, the assessment of these visual effects is distinct from the assessment of visual change in the LVIA. The assessment of effects on setting may be informed by visualisations prepared as part of the LVIA but the conclusions reached regarding visual change in the setting of a heritage asset are distinct.

Legislation, Policy and Guidance

The Outer Study Area (OSA) for the EIA will include heritage assets located in both Scotland and England. As the Proposed Development Area is located wholly within Scotland, it proposed that the EIA will be carried out with reference to the following Scottish legislation, policy and guidance (and it is acknowledged that the

[150] NatureScot and HES (2018). *Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment Process in Scotland* [Online] Available at: Publication 2018 - Environmental Impact Assessment Handbook V5.pdf (nature.scot) [Accessed 25/05/2022]

[151] Historic Environment Scotland (2016) Managing Change in the Historic Environment: Setting [Online] Available at: Managing Change in the Historic Environment: Setting | HES | History [Accessed 25/05/2022]

methodology for good practice settings assessment is comparable with that laid out in the Historic England's GPA3: The Setting of Heritage Assets (2017)[152].

Legislation

- The Ancient Monuments and Archaeological Areas Act 1979[153];
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[154]; and
- The Historic Environment Scotland Act 2014[155].

Policy

- Scottish Planning Policy, 2014;
- Historic Environment Policy Scotland (HEPS) (HES, 2019)[156]; and
- Policies in the Scottish Borders Local Development Plan (SBLDP) (adopted 2016): Policies EP7-10[157].

Technical Guidance

- Historic Environment Scotland Circular (HES, 2019)[158];
- Planning Advice Note (PAN) 2/2011: Planning and Archaeology[159];
- IEMA/CIfA/IHBC Principles of Cultural Heritage Impact Assessment in the UK (2021)[160];
- Designation Policy and Selection Guidance (DPSG), (HES, 2019)[161]
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists (CIfA), 2020)[162];
- Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (CIfA, 2020)[163];

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[152] Historic England. (2017) *The Setting of Heritage Assets.* [Online] Available at: The Setting of Heritage Assets (historicengland.org.uk) [Accessed: May 2022]

[153] UK Government (1979) *Ancient Monuments and Archaeological Areas Act 1979* [Online] Available at: Ancient Monuments and Archaeological Areas Act 1979 (legislation.gov.uk) [Accessed 25/05/2022]

[154] UK Government (1997) *Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997* [Online] Available at: Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (legislation.gov.uk) [Accessed 25/05/2022]

[155] UK Government (2014) *The Historic Environment Scotland Act 2014* [Online] Available at: Historic Environment Scotland Act 2014 (legislation.gov.uk) [Accessed 25/05/2022]

[156] Historic Environment Scotland (2019) Historic Environment Policy Scotland (HEPS) [Online] Available at: Historic Environment Policy for Scotland | Historic Environment Scotland [Accessed 25/05/2022]

[157] Scottish Borders Council (2016) Local Development Plan [Online] Available at: Local development plan - adopted | Local development plan | Scottish Borders Council (scotborders.gov.uk) [Accessed 25/05/2022]

[158] Historic Environment Scotland Historic (2019) *Environment Scotland Circular* [Online] Available at: Historic Environment Scotland Circular | Historic Environment Scotland [Accessed 25/05/2022]

[159] Scottish Government (2011) *Planning Advice Note 2/2011: Planning and archaeology* [Online] Available at: Planning Advice Note 2/2011: Planning and archaeology - gov.scot (www.gov.scot) [Accessed 25/02/2022]

[160] IEMA (2021) *Principles of Cultural Heritage Impact Assessment in the UK* [Online] Available at: j30361_iema_principlesofchia_v8.pdf (archaeologists.net) [Accessed 25/05/2022]

[161] Historic Environment Scotland (2020) *Designation Policy and Selection Guidance* [Online] Available at Designation Policy and Selection Guidance | Hist Env Scotland (historicenvironment.scot) [Accessed 25/05/2022]

[162] Chartered Institute for Archaeologists (CIfA) (2020) *Standard and Guidance for Historic Environment Desk-Based Assessment* [Online] Available at: CIfAS&GDBA_4.pdf (archaeologists.net) [Accessed 25/05/2022]

[163] Chartered Institute for Archaeologists (CIfA) (2014) *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment* [Online] Available at: CIfAS&GCommissioning_1.pdf (archaeologists.net) [Accessed 25/05/2022]

- Managing Change in the Historic Environment: Setting (HES, 2016, updated 2020); and
- Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment Process in Scotland (NatureScot and HES, 2018).

Baseline

Study Areas

Overlapping study areas are proposed for the identification of heritage assets that may be affected by the Proposed Development:

- The Proposed Development Area boundary, to identify potential direct (physical) impacts; and
- The OSA based on a bare earth ZTV to identify assets beyond the Proposed Development Area that may be affected through development within their setting.

Within the Proposed Development Area boundary, all known and potential heritage assets will be assessed for potential direct, setting and indirect effects.

Within the OSA, assets will be included in the assessment based on the level of importance assigned to the asset so as to ensure that all likely significant effects are identified:

- Up to 2 km from Proposed Development: Category C Listed Buildings, and all non-designated heritage assets;
- Up to 5 km from Proposed Development: Conservation Areas, and Category B Listed Buildings;
- Up to 10 km from Proposed Development: Scheduled Monuments, and Inventory Historic Battlefields; and
- Beyond 10 km from Proposed Development: World Heritage Sites, Category A Listed Buildings (and Grade I Listed Buildings in England), Inventory GDLs (and Registered parks and Gardens in England), and any asset which is considered exceptionally important, and where long-distance views from or towards the asset are thought to be particularly sensitive, in the opinion of the assessor or relevant consultees.

The baseline will be screened (and agreed with relevant consultees) to identify any assets of particular sensitivity or importance. Criteria for the identification of assets of particular sensitivity or importance will be based on the approach set out in Managing Change in the Historic Environment: Setting (HES, 2016, updated 2020) that sets out a range of factors which might form part of the setting of a heritage asset as follows:

- “Current landscape or townscape context;
- Views to, from and across or beyond the historic asset or place;
- Key vistas: for instance, a ‘frame’ of trees, buildings or natural features that give the historic asset or place a context, whether intentional or not;
- The prominence of the historic asset or place in views throughout the surrounding area, bearing in mind that sites need not be visually prominent to have a setting;
- Aesthetic qualities;
- Character of the surrounding landscape;
- General and specific views including foregrounds and backdrops;
- Views from within an asset outwards over key elements in the surrounding landscape, such as the view from the principal room of a house, or from a roof terrace;
- Relationships with other features, both built and natural;

- Non-visual factors such as historical, artistic, literary, place name, or scenic associations, intellectual relationships (e.g. to a theory, plan, or design), or sensory factors; and
- A 'sense of place': the overall experience of an asset which may combine some of the above factors."

Preliminary Baseline

The baseline information used for this Scoping Report has been compiled using existing data on the historic environment:

- HES designations data available as GIS datasets;
- Historic England data available as GIS datasets;
- SBC Historic Environment Record (HER) data provided in November 2021; and
- National Record of the Historic Environment (NRHE) comprising the Canmore database.

Known heritage assets are shown to 10 km on Figure 13.1.

Proposed Development Area

There is one designated heritage assets within the Proposed Development Area: Scheduled Monument SM4548 Hen Law, cairn 1550m WNW of Langtonlees. The listing describes it as follows: *(Prehistoric ritual and funerary: cairn (type uncertain)). The monument is a small turf-covered burial cairn of the earlier Bronze Age situated on the south western summit of Hen Law. Although it measures only 3m in diameter and 0.25m high it will cover a burial of that period. Around it, traces of other burials and of the rites associated with burials may survive below the level of the modern turf. The monument is well preserved; it is of a type rarely preserved because of their small size; it is of national importance because of the rarity of the type and its vulnerability. It is of national importance to the theme of earlier Bronze Age burial and ceremonial practices. It is of particular interest because of the proximity of the much larger and more prominent cairns on the Dirrington Laws; comparison between the burials, which are in cairns of such different scale, would be of great value to the study of earlier Bronze Age society.*

There are 22 further known non-designated heritage assets recorded within the Proposed Development Area on the SBC HER. These are mostly later historic period assets relating to agricultural exploitation, along with two roads, a milestone, a findspot of a jet ring, and a modern radio station.

Outer Study Area

There are three Scheduled hill forts (SM377, SM4580 & SM378), two Category B Listed Buildings, one Category C Listed Building, two Non-Inventory Designed Landscapes (Duns and Marchmont), and 69 further non-designated heritage assets within 2 km of proposed turbines.

There are two Inventory GDLs (GDL274 Marchmont & GDL161 Duns Castle) within 5 km of the Proposed Development, both of which are partially located within the ZTV for the scoping layout. There is one Conservation Area at Gavinton, as well as 10 Scheduled Monuments (including SM4626 Dirrington Great Law cairns and SM4638 Dirrington Little Law cairn), six Category A Listed Buildings (including LB15384 Polworth Church), 44 Category B Listed Buildings, and three Non-Inventory Designed Landscapes (Langton, Whitchester & Longformacus).

Within 10 km of the Proposed Development Area there are three further GDLs, 28 Scheduled Monuments, (including one Property in Care SM90134 Edin's Hall, broch) and 46 Category A Listed Buildings.

Beyond 10 km there are nine further GDLs (including one Property in Care GDL154 Dunglass) in Scotland as well as one Grade II* Registered Park and Garden located across the border in England.

There are no Inventory Battlefields or World Heritage Sites within the defined OSA.

Proposed Surveys and Assessment Methodologies

Desk-based Assessment

A baseline desk-based assessment will be conducted to establish the baseline condition of the Proposed Development Area. The principal sources of information will be the SBC HER, supplemented by relevant published documentary and cartographic material as appropriate. Various sources will be consulted for the collation of data, including but not limited to:

- Designation data downloaded from HES;
- Designation data downloaded from Historic England;
- HER data, digital extract from SBC;
- The NRHE, including the Canmore database and associated photographs, prints/drawings and manuscripts held by HES;
- Conservation Area Character Appraisals;
- Historic Landscape Assessment data;
- The National Collection of Aerial Photography (NCAP);
- Geological data available online from the British Geological Survey;
- Historic maps held by the National Library of Scotland;
- Unpublished maps and plans held by the National Records of Scotland;
- Relevant internet resources, including Google Maps, Google Earth, Bing satellite imagery and PastMap;
- Readily available published sources and unpublished archaeological reports;
- LIDAR data;
- ZTV/cumulative ZTV; and
- Findings of other environmental topics (LVIA, peat depth, ground conditions, noise and vibration).

LIDAR DTM data is available from the Scottish Remote Sensing Portal which will be utilised for the survey of potential hitherto unknown heritage assets within the Proposed Development Area.

A site visit will be undertaken to 'ground-truth' the results of the LIDAR survey, as well as to record site characteristics, any visible archaeology and geographical/geological features which may have a bearing on previous land use and archaeological survival, as well as those which may constrain subsequent archaeological investigation.

Stage 1 Setting Assessment

Likely significant effects on the settings of heritage assets will be identified from an initial desk-based appraisal of data from HES, the HER and consideration of current maps and aerial images available via online sources. The methodology adopted for the identification and assessment of potential effects on setting follows the approach set out in Managing Change in the Historic Environment: Setting (HES, 2016, updated 2020) and the Environmental Impact Assessment Handbook (Version 5, NatureScot & HES, 2018, Appendix 1). The guidance sets out three stages in assessing the impact of development on the setting of a heritage asset or place as follows:

- "Stage 1: identify the historic assets that might be affected by a development;

- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and
- Stage 3: evaluate the likely significant effect of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated."

The Stage 1 Setting Assessment methodology considers each heritage asset in the OSA in turn to identify heritage assets in the ZTV that have a wider landscape setting that contributes to their cultural significance and whether it is likely that cultural significance would be harmed by the Proposed Development. Where heritage assets are located outwith the ZTV, third-party viewpoints within the ZTV which may provide a key view towards the heritage asset and the Proposed Development Area are considered.

Visualisations

Where the Stage 1 Setting Assessment identifies the potential for a significant effect, the asset will be visited to define baseline conditions and identify key viewpoints.

Wireframe visualisations will be used in tandem with the ZTV to understand the likely nature of change in the setting of heritage assets.

Consultation with national and regional curators (HES and SBC) will be undertaken to agree the viewpoints for the EIAR setting assessment.

Assessment of Significant Effects

To assess the effect of the Proposed Development upon cultural heritage, the significance of any effect is calculated through comparison of the importance of each heritage asset against the potential magnitude of change upon it. Impacts from cumulative developments will also be considered.

Effects on cultural heritage can arise through direct physical effects, indirect effects, or effects on setting.

- Direct physical effects describe those development activities that directly cause damage to the fabric of a heritage asset. Typically, these activities are related to construction works and will only occur within the Proposed Development Area.
- Indirect effects describe secondary processes, triggered by the Proposed Development, that lead to the degradation or preservation of heritage assets. For example, changes to hydrology may affect archaeological preservation; or changes to the setting of a building may affect the viability of its current use and thus lead to dereliction.
- An effect on the setting of a heritage asset occurs when the presence of a development changes the surroundings of a heritage asset in such a way that it affects (positively or negatively) the cultural significance of that asset. Visual effects are most commonly encountered but other environmental factors such as noise, light or air quality can be relevant in some cases. Impacts may be encountered at all stages in the life cycle of a development from construction to decommissioning, but they are only likely to lead to significant effects during the prolonged operational phase of the Proposed Development.

Likely significant effects on unknown heritage assets will be discussed in terms of the risk that a significant effect could occur. The level of risk depends on the level of archaeological potential combined with the nature and scale of disturbance associated with construction activities and may vary between high and negligible for different elements or activities associated with a development, or for the Proposed Development as a whole.

Assessment Methodology

To assess the significance of the effect of the Proposed Development upon cultural heritage, the importance of each heritage asset is assessed against the potential magnitude of change upon it using a reasoned matrix-style approach.

Importance of Receptor

The importance of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of non-designated assets, the professional judgement of the assessor. Heritage assets of national importance and international importance are assigned a high and very high level respectively. Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas are, by definition, of national importance.

The criterion for Listing is that a building is of 'special architectural or historic interest'; following DPSG Annex 2.19, Category A refers to 'outstanding examples of a particular period, style or building type', Category B to 'major examples of a particular period, style or building type', and Category C to 'representative examples of a particular period, style or building type'.

Any feature which does not merit consideration in planning decisions due to its cultural significance may be said to have negligible heritage importance; in general, such features are not considered as heritage assets and are excluded from the assessment.

Magnitude of Impact

The magnitude of an impact is a measure of the degree to which the cultural significance of a heritage asset will potentially change as a result of the Proposed Development (NatureScot & HES 2018, Environmental Impact Assessment Handbook, v5 Appendix 1, para 42). This definition of magnitude applies to likely effects on the setting as well as likely physical effects on the fabric of an asset.

Significance of Effect

The significance of an effect ('EIA significance') on the cultural significance of a heritage asset, resulting from a direct or indirect physical effect or an effect on its setting is assessed by combining the magnitude of the impact and the importance of the heritage asset. It is common practice to identify EIA effects as significant or not significant, and in this proposed EIAR, Major and Moderate effects will be regarded as 'significant' in EIA terms, while Minor and Negligible effects are 'not significant'.

Impact assessment conclusions upon scheduled monuments will also be presented in the terms of SPP paragraph 145 i.e. "Where there is potential for a proposed development to have an adverse effect on a scheduled monument or on the integrity of its setting". SPP does not define 'integrity' in the context of paragraph 145, therefore for the purposes of the assessment, the integrity of a setting is considered to be maintained if the principal characteristics of the setting that contribute to the cultural significance of the asset are retained, and it would continue to be possible to appreciate and understand the scheduled monument in its setting.

Potential Effects

Construction

Any infrastructure or access tracks associated with the Proposed Development will be designed to avoid the identified heritage assets within the Proposed Development Area.

Should any previously unknown heritage assets be noted during the desk-based assessment or LIDAR/walkover survey, any infrastructure associated with the Proposed Development such as access tracks will take into account the presence of these heritage assets and take steps to avoid them through design.

Operation

Appraisal of heritage assets against the scoping ZTV has identified the following where visualisations will be beneficial in understanding change in their setting.

- SM4548 Hen Law, cairn 1550m WNW of Langtonlees;
- SM4626 Dirrington Great Law, three cairns;
- SM4638 Dirrington Little Law, cairn on summit of;
- SM377 Raecleugh Head, fort 275m NW of;
- SM4580 Raecleugh Head, fort 150m W of;
- SM378 Raecleugh Head Hill, fort 690m NNW of Raecleugh Head;
- SM366 Cockburn Law, fort;
- SM3939 Duns Law, fort and Covenanters' Camp;
- GDL274/LB15386 Marchmont House; and
- GDL161/LB4108 Duns Castle.

Cumulative effects will be considered in cases where an effect of more than negligible significance would occur upon a heritage asset, as identified through EIA, as a result of the Proposed Development. Wind energy developments (under construction, consented or at application stage) are included in the cumulative assessment where they also feature prominently within views of or towards heritage assets identified as affected by the Proposed Development, therefore also have a potential to impact upon their cultural significance.

Approach to Mitigation

National planning policies and planning guidance as well as the local planning policies require that account is taken of potential effects upon heritage assets by proposed developments and that where possible such effects are avoided. Where avoidance is not possible these policies require that any significant effects are minimised or offset.

The Proposed Development will be designed to avoid direct impacts on known heritage assets.

Given the presence of known heritage assets and the potential for presently unknown archaeological remains to be buried beneath the site, a programme of archaeological works will be undertaken prior to the commencement of construction of the Proposed Development. Details of the proposed programme of archaeological works will be presented in the EIA Report.

The Proposed Development layout will be designed where possible, to minimise impacts on the settings of designated heritage assets. Where avoidance of impacts is not possible appropriate additional compensatory mitigation will be proposed.

Effects Scoped Out

The extent of ground disturbance associated with decommissioning will not extend beyond the construction footprint and so decommissioning effects on heritage assets within the Proposed Development Area will not occur. Any residual operational phase setting effects will be reversed. **Decommissioning effects are therefore proposed to be scoped out of the assessment**.

Construction phase setting effects will be temporary and are not considered to be significant i due to their very short duration. **Construction phase setting effects are therefore proposed to be scoped out of the assessment**.

Questions for Consultees

Q20: Do consultees agree with the proposals for 'Effects Scoped Out' in this Scoping Report?

Q21: Are consultees content with the proposed study areas presented in this Scoping Report?

Q22: Are there any other relevant consultees other than HES and SBC who should be contacted with respect to the Cultural Heritage and Archaeology assessment?

Q23: Do consultees wish to request any specific heritage assets to be assessed in the EIAR?

Q24: Do consultees accept the 400m buffer applied surrounding the Scheduled Monument located within the Proposed Development Area, SM4548 Hen Law, cairn 1550m WNW of Langtonlees, for the solar and battery storage search area in order to preserve its setting? At 0.25m high, the monument is not a prominent cairn that may be appreciated beyond this distance, and intervisibility with the Dirrington Laws is preserved?

14. Traffic and Transport

Introduction

The objective of the traffic and transport study is to assess the impact of the Proposed Development on the public road network, by means of a Traffic Impact Assessment (TIA). This will be supplemented by an Access Route Assessment for delivery of the wind turbine Abnormal Indivisible Loads (AILs) and a preliminary Traffic Management Plan (TMP).

Due to the nature of this type of project where operational traffic is limited weekly to only a very small number of Light Goods Vehicles (LGVs) undertaking maintenance, and because future decommissioning activities are likely to generate smaller volumes of traffic compared to the construction phase, the assessment will focus on impacts during the construction phase of the Proposed Development only, excluding the operational and decommissioning phases from the assessment. It is currently proposed that the assessment will provide an expected 'worst case' example of impacts on the local road network, however if required, the assessment can present the most likely scenario for traffic impacts as an alternative.

Legislation, Policy and Guidance

The traffic and transport study will be carried out in accordance with the following guidance documents;

- Transport Assessment Guidance (Transport Scotland)[164]; and
- IEMA Guidelines for the Environmental Assessment of Road Traffic (the IEMA Guidelines) to assess impact upon environmental receptors[165].

[164]Transport Scotland (2012) *Transport Assessment Guidance* [Online] Available at: TRANSPORT ASSESSMENT GUIDANCE [Accessed 25/05/2022]

[165] IEMA (1990) *IEMA Guidelines for the Environmental Assessment of Road Traffic (the IEMA Guidelines) to assess impact upon environmental receptors* [Online] Available at: CD13H_GEART (1).pdf [Accessed 25/05/2022]

EIA - Traffic and Transport Chapter

Following completion of the traffic and transport study, a Traffic and Transport EIA Chapter will be produced as part of the EIA and will include the following information:

- Description of the proposed construction and Abnormal Invisible Load (AIL) traffic routes;
- Description of the baseline traffic movements on identified delivery routes;
- Description of the predicted construction and AIL traffic movements, along with their predicted durations;
- Assessment of the resulting temporary increase to traffic movements on the road network (magnitude);
- Assessment of the sensitivity of receptors identified along the proposed traffic route(s);
- Assessment of the temporary environmental impacts on receptors due to the temporary increase in traffic (significance);
- Identification of required mitigation measures for any resultant significant effects;
- AIL Route Survey Report (appended); and
- Preliminary Traffic Management Plan (TMP) (appended).

Consultation

In order to agree the scope of the traffic and transport study it is intended to consult with the following stakeholders:

- SBC;
- Transport Scotland; and
- Police Scotland.

The discussions will identify the extent of the study area, the methodology and the data sources proposed for use in the assessment.

Study Area

The Proposed Development is situated in the Scottish Borders, west of Duns. The location of the access is still being developed but will likely be from the B6456 via the A68 and A697 respectively.

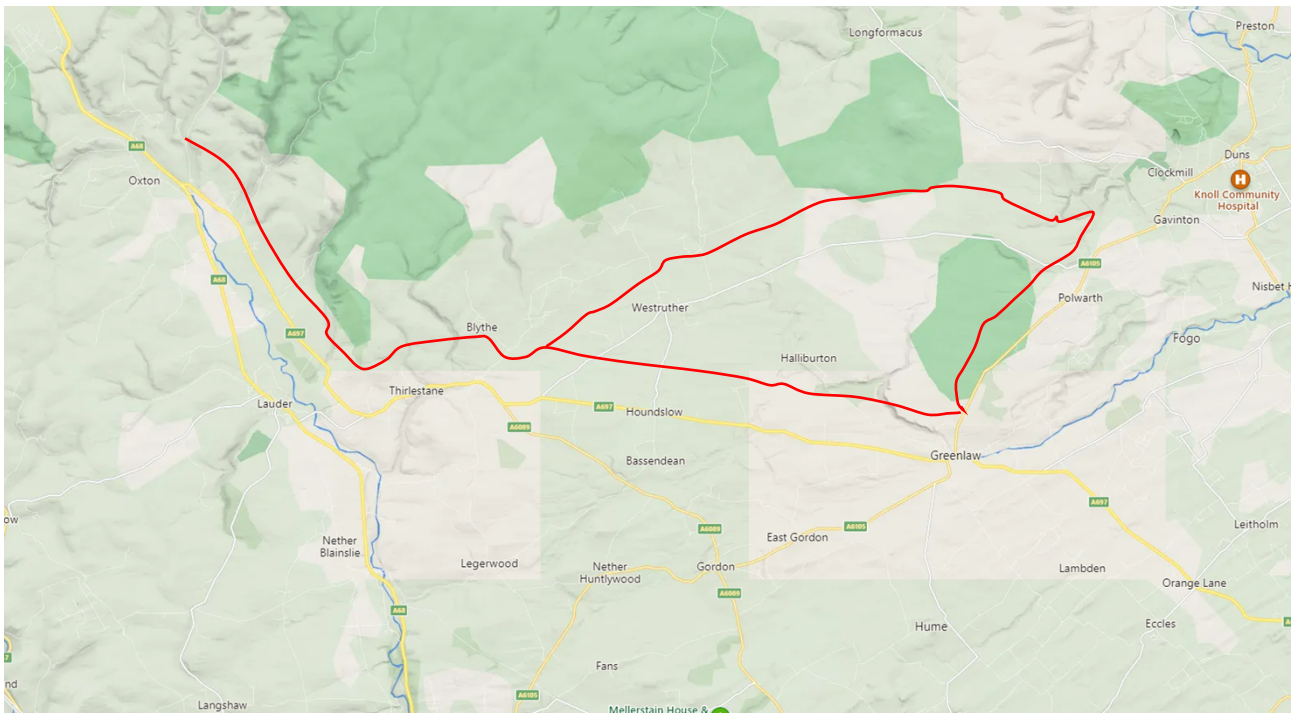
Given the road network arrangement and location of the Proposed Development Area, it is considered that there are several route options from identified material supply centres (e.g., quarries) which would eventually converge onto the B6456. From an initial review, the majority of supply centres likely to service the project are located west of the site, dispersed across a wide area via multiple routes, resulting in the overall increases in traffic volumes on each route being minimised.

It is therefore proposed that the geographical extent of the assessment include the currently assumed transport route (albeit with the aim of minimising traffic through Greenlaw):

- A697 between A68/A697 roundabout and Greenlaw;
- B6456 between A697 and A6105; and
- A6105 between Greenlaw and A6105/B6456 junction.

The plate below shows the proposed study area (identified routes highlighted in red).

Plate 14.1: Route for Proposed Development



Based on the initial assessment undertaken by Systra, it is currently anticipated that turbine component deliveries will come from the Rosyth Dockyard to site via the B981, M90, M8, A720, A68, A697 and B6456, however a number of options are currently being investigated for final site access and will be assessed as part of the EIA. From the outcome of this initial assessment, it is currently anticipated that the upgrades required for AIL traffic will be from the A68/A720 junction to the Proposed Development, with no upgrade works expected prior to this point.

Traffic Impact Assessment

The TIA will focus on impacts during the construction phase as any impact to the road network will cease once the relevant construction activities are completed. The following outlines the anticipated impacts associated with the Proposed Development:

- Temporary increase in movements of Heavy Goods Vehicles (HGVs) and LGVs associated with the construction of the Proposed Development;
- Transport impacts (due to the delivery of AILs) associated with the wind turbine generator components, during the construction phase;
- Effects on sensitive receptors, principally residents and communities in the surrounding area;
- Road widening/improvements to accommodate AILs.

During the operational phase these impacts will no longer occur and therefore longer-term mitigation is not required.

Effects Scoped Out

The volume of traffic generated during the operational phase of the wind farm is considered to be negligible as this would be limited to operational staff in light goods or 4x4 vehicles inspecting the site and undertaking ad-hoc maintenance and servicing. It is assumed that traffic movement associated with inspection and maintenance will be occasional and limited in number. As such **it is proposed to scope out operational and maintenance impacts from this assessment.**

Decommissioning will include the removal of the wind turbines, solar panels, battery storage containers and associated infrastructure. Typically, buried infrastructure such as cabling, and turbine foundations (less the top 1 m) would remain in-situ following decommissioning. Similarly, access tracks may be left in-situ in whole or in part depending on planning conditions and any landowner arrangements. Hence, the vehicle movements associated with the decommissioning phase is considered to be significantly less than that during the construction phase.

Furthermore, decommissioning of the Proposed Development is unlikely to take place before the end of its life and as such a minimum period of 35 years is assumed before decommissioning takes place. Due to the changes in the baseline situation which may have occurred by the time that the Proposed Development is decommissioned it is considered impractical to assess the likely environmental effects. Given the uncertainty of baseline conditions around 35 years in the future and the expected reduction in traffic volumes associated with decommissioning, **it is proposed to scope out decommissioning impacts from this assessment**. However decommissioning impacts will be considered within the decommissioning plan which would be submitted prior to decommissioning.

Assessment Methodology

The traffic and transport study developed for the Proposed Development will provide the forecasts of vehicle movements. The study will seek to provide a robust (expected worst case or most likely case) assessment of impacts and effects associated with the Proposed Development. It will identify the potential traffic increase and associated environmental effects on sensitive receptors and mitigation will be proposed where necessary.

With regards to Transport Scotland's Transport Assessment Guidance, the guidance is aimed at appraising the operational implications of a development and as such has limited relevance to the development of a wind or solar farm project given the temporary nature of traffic increase during construction and the low numbers of additional permanent traffic generated by its operation. However, Paragraph 5.54 states that 'Transport Assessment must cover traffic and road issues, parking and any particular impacts caused by abnormal loads'. These elements will be assessed through a TIA and TMP respectively, focussed on the construction phase of the Proposed Development. The adopted AIL assessment methodology is set out in further detail below.

Transport Scotland's Transport Assessment Form has been included as Appendix B to aid with establishing the assessment requirements, in line with Transport Scotland's scoping process.

In terms of the environmental impact on receptors, the IEMA Guidelines suggests that two rules can be used as a screening process to delimit the scale and extent of the assessment:

- Rule 1 – Include highway links where traffic flows would increase by more than 30% (or the number of HGVs would increase by more than 30%); and
- Rule 2 – Include any other specifically sensitive areas where traffic flows would increase by 10% or more. (IEMA Guidelines Paragraph 3.20 defines sensitive area as including 'accident blackspots, conservation areas, hospitals, links with pedestrian flows etc.').

Where the predicted increase in traffic flow is lower than these thresholds, the significance of the effects will be stated to be low or insignificant, and further detailed assessments will not be warranted. Where the predicted increase in traffic flow exceeds these thresholds, the effects of the additional traffic generated will be assessed. The sensitivity of receptors will be assessed and synthesised with the magnitude of effect to determine its significance. Further mitigation may be required to minimise the potential effect.

The criteria used for the identification and assessment of potentially significant impacts will be clearly presented in the EIA Chapter. The magnitude of each impact and its significance will be assessed by a variety of mechanisms, including published guidance and professional judgement.

Baseline Traffic

Published traffic data will be reviewed, or traffic surveys undertaken, to inform the assessment within a defined study area, set out above and to be agreed with consultees. The traffic data will be used to determine the baseline traffic volumes for use within the traffic and transport study. The assessment will consider the most up to date traffic data readily available, and/or utilise traffic survey data gathered, which will be used as a baseline.

Acquisition of traffic count data will be obtained either by use of the Department for Transport Traffic Count Database, consultation with the local roads authority or commissioning of traffic counts, depending on the level of existing information available.

Assessment of baseline sensitivity of receptors will include for 'embedded mitigation'. With respect to this assessment, this includes best practice processes which are implemented during construction, regardless of the outcome of the TIA. These measures will be defined within the assessment and delivered through the TMP.

Cumulative assessment

Consideration will be given to possible cumulative effects of the Proposed Development with regards to other Proposed Developments (both in planning and consented), occurring as result of concurrent construction programmes within the same study area. It is important to note that a cumulative assessment in respect of traffic and transport effects is dependent on the likelihood of more than one similar project being under construction at the same time as the Proposed Development. This is especially pertinent to the peak construction periods associated with the importation of stone which would be dependent on the outputs of local quarries.

AIL Route Survey Report

An assessment of potential delivery routes for AILs, associated with the wind turbine component deliveries, will be undertaken to identify the preferred route to the Proposed Development, from the nearest suitable port, and to assess what mitigating measures may be required on the public road network.

Swept path drawings for key points of interest, undertaken on OS base mapping will be prepared as deemed appropriate. These will be carried out on the expected wind turbine component dimensions. The swept path assessments will identify areas of over-sail and over-run, street furniture modifications and indicative mitigation works.

A full Electronic Service Delivery for Abnormal Loads (ESDAL) consultation with the trunk and local roads officers relating to structure issues with the proposed access routes would also be undertaken to identify any structural issues that may arise.

Preliminary Traffic Management Plan

As part of the transport study, and in line with any pre-application requirements, a preliminary construction TMP will be produced for transport associated with site traffic (HGV's, LGV's etc). The TMP will generally outline the detail of the works and the associated traffic. It will include aspects such as the standard industry mitigation measures considered for impacts associated with the works and typical traffic management measures employed for control of traffic on the public road to ensure there are no safety issues or impediments on the public highway.

Consultee Questions

Question 25: Do consultees agree with the proposed study area of the assessment?

Question 26: Do consultees agree that operational and decommissioning phases can be scoped out and the assessment will consider the effects during the construction phase only?

Question 27: Can consultees provide traffic count data?

Question 28: Do consultees agree that 'embedded mitigation' i.e. any mitigation considered standard good practice can be assumed in baseline assessment of receptors?

Question 29: Do the consultees agree with the approach to consider the environmental impacts in line with IEMA thresholds of 30% and 10%?

Question 30: Do the consultees agree with the traffic assessment approach set out in Section 14?

Question 31: Do consultees agree that the 'worst case scenario' be modelled or would a realistic 'most likely scenario' approach be more appropriate?

Question 32: Do Transport Scotland agree that in relation to their Transport Assessment Guidance, no 'Transport Statement' or 'Transport Assessment' is required?

15. Aviation and Existing Infrastructure

Aviation

Wind turbines have the potential to affect the performance of radars used for air traffic control, air defence and meteorological forecasting, and of aeronautical radio navigation aids. They can also present an obstacle hazard to aircraft flying at low altitude. They may affect the specified minimum altitudes for aircraft flying instrument approach procedures at airports. Aviation obstruction lighting on wind turbines may generate adverse night time visual impacts.

Solar PV panels have the potential to cause glint and glare which may affect pilots of aircrafts flying in the vicinity. In 2010, the CAA published interim guidance[166] which advised developers of solar PV installations to be cognisant of Articles 137, 221 and 222 of the Air Navigation Order[167] and to consult with the operators of nearby aerodromes before construction is initiated. The interim guidance also advised that, following review of research and guidance by the US Federal Aviation Administration and other national aviation authorities, the CAA would develop policy and guidance material on the installation of solar PV, principally on or in the vicinity of licensed aerodromes but also on installations away from aerodromes.

The CAA's formal policy and guidance on solar PV was published in a new edition of CAP 738 – Safeguarding of Aerodromes – in 2020[168]. The policy states:

'In the United Kingdom there has been a further increase in solar PV cells, including some located close to aerodrome boundaries; to date the CAA has not received any detrimental comments or issues of glare at these established sites. Whilst this early indication is encouraging, those responsible for safeguarding should remain vigilant to the possibility.'

[166] Civil Aviation Authority. (2010) *Interim CAA Guidance - Solar Photovoltaic Systems.*

[167] UK Government. (2016) *The Air NavigationOrder 2016* [Online] Available at: The Air Navigation Order 2016 (legislation.gov.uk) [Accessed: May 2022]

[168] Civil Aviation Authority. (2020) *Safeguarding of Aerodromes, Cap 738* [Online] Available at: Safeguarding of Aerodromes (caa.co.uk) [Accessed: May 2022]

There are no licensed, certificated or Government aerodromes within 30 km of the Proposed Development Area (PDA). The nearest unlicensed airfield is Charterhall, a 600m light aircraft airstrip located 7 km south south-east of the PDA. The PDA is more than 5 km clear of any possible circuit pattern for Charterhall airfield.

In view of the absence of airfields in the vicinity of the PDA and the stated CAA policy on solar PV, **it is concluded that there are no potential adverse glint and glare effects on aviation from the solar PV element of the proposed development and it is proposed to scope these effects out of the EIA assessment**. See also Section 18 below where glint and glare generally from the solar PV panels is discussed.

For the wind energy element of the proposed development, a study area of 130 km radius will be used to identify potentially affected air traffic control and air defence primary surveillance radars. Study areas for other aviation and defence facilities will be as follows:

- 60 km radius for instrument flight procedures at licensed or certificated aerodromes;
- 30 km radius for licensed and certificated aerodromes and Meteorological Office radars;
- 20 km radius for aeronautical radio navigation aids and secondary surveillance radars;
- 15 km radius for unlicensed aerodromes and launching sites; and
- 50 km radius for the Eskdalemuir seismic monitoring array.

The airspace over the Proposed Development Area is Class G (uncontrolled) from ground level up to Flight Level (FL) 195 (approximately 19,500 ft above sea level). Above FL195 is Class C controlled airspace under the control of the NATS Prestwick Centre.

Primary surveillance radars with the potential to detect turbines in the Proposed Development Area are as follows:

- National Air Traffic Services (NATS) En Route Great Dun Fell (120 km south of Lees Hill);
- NATS En Route Lowther Hill (93 km south-west of Lees Hill);
- NATS En Route/Scottish Power Kincardine (87 km north-west of Lees Hill);
- Leuchars Diversion Aerodrome (72 km north, north-west of Lees Hill);
- Edinburgh Airport (61 km north-west of Lees Hill);
- Royal Air Force (RAF) Brizlee Wood air defence radar (56 km south-east of Lees Hill); and
- RAF Spadeadam Deadwater Fell (56 km south, southwest of Lees Hill).

Initial radar line of sight assessment has established that the radars at Kincardine, Leuchars, Edinburgh and Deadwater Fell are not capable of detecting turbines up to 200 m at the Proposed Development Area due to intervening terrain. It is therefore proposed to scope those radars out of assessment.

The radar line of sight to the proposed turbines from the radars at Great Dun Fell, Lowther Hill and Brizlee Wood will be modelled using specialist software. The operators of those three radars will be consulted.

For any radars found to have line of sight to the turbines, an operational impact assessment will be carried out, taking into account the airspace classification and structure; the volume and types of air traffic; and the types of air traffic service provided. For any affected radars, potential operational and technical mitigation measures will be assessed.

The nearest Meteorological Office rainfall radar (Munduff Hill) is 76 km from the Proposed Development Area - well beyond the requested 20 km radius consultation zone. It is therefore proposed to scope Meteorological Office radars out of assessment.

The Proposed Development Area is in a zone classified by the Ministry of Defence (MoD) as a “regular military low flying area where mitigation may be necessary to resolve concerns”. These designations are more than 10 years old and do not relate to current military low flying patterns. However, in view of the fact that the

turbines will be in excess of 150 m tall and will require lighting, effects on night low flying by military aircraft will be assessed.

There are no licensed, certificated or Government aerodromes within 30 km of the Proposed Development Area. The nearest unlicensed airfield is Charterhall, a 600 m light aircraft airstrip located 7 km south, south-east of the Proposed Development Area. The CAA (CAP 764) recommended consultation zone for wind farms around airfields of Charterhall's size is a 3 km radius. It is therefore proposed to scope effects on all civil and military airfields out of assessment.

There are no instrument flight procedures (IFPs) associated with civil or military airfields within 60 km of the Proposed Development Area. It is therefore proposed to scope effects on IFPs out of assessment.

The closest turbine in the Proposed Development Area will be 65.7 km from the centre of the Eskdalemuir seismic array. Since this is beyond the 50 km consultation zone specified in the MoD (Eskdalemuir Seismic Recording Station) Technical Site Direction 2005 it is proposed to scope out effects on the Eskdalemuir seismic array.

The turbines will be more than 150 m tall and will therefore be subject to the mandatory lighting requirements of the Air Navigation Order. An assessment will be made of the potential for a reduced lighting scheme which seeks to minimise the number, intensity and periods of illumination of any lights on the turbines, while maintaining aviation safety.

Telecommunications and Radiocommunications

Fixed microwave and scanning telemetry link radio facilities with the potential to be affected by the Proposed Development will be identified through consultation.

Determination of the impact of the proposed wind turbines on any potentially affected telecommunications and radiocommunications facilities will be conducted principally through consultation with the operators of the services.

Utilities

Potential utilities including gas and electricity will be investigated and assessed during the EIA, with the final layout designed to avoid potential direct effects.

Public Access

The locations of any footpaths will be considered during the iterative design process. Scoping responses from the local planning authority and ScotWays will be considered during the final design work to ensure balance between wind optimisation and potential effects on access are addressed.

Consultee Questions

Question 33: Do consultees agree with the proposed approach for the aviation and existing infrastructure assessments?

16. Noise

Introduction

Noise will be emitted as a result of the Proposed Development during the construction, operation and decommissioning phases. This section provides a summary of the noise effects anticipated at each stage of the development and, where appropriate, details of the proposed assessment work.

Study area

The Proposed Development Area is located within a rural location. There are a number of scattered residential properties around the Proposed Development Area with the closest occupied property being approximately 775 m from the proposed turbines (based on the current layout, Figure 3.2: Site Layout Plan).

The operational Blackhill Wind Farm is located to the north of the Proposed Development.

Assessment methodology

Construction Noise

A construction noise assessment will be undertaken to determine the potential noise impacts during the construction of the wind turbines and ancillary infrastructure for the Proposed Development only. The construction noise assessment will be undertaken in accordance with BS5228-1: 2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Noise'[169]. The assessment will consider the temporary noise effects of construction on the nearest identified Noise Sensitive Receptors (NSRs). Specifically, the assessment will consider noise arising from the use of borrow pits, concrete batching, construction compounds and laydown areas, vehicle movements within and accessing the site, and activities occurring at the base of the turbines.

Operational Noise

The Scottish Government's Planning Advice Note PAN1/2011 'Planning and Noise'[170] refers to the 'Onshore Wind Turbines' web-based document which in turn states that ETSU-R-97 'The Assessment of Rating of Noise from Windfarms'[171] should be used by Planning Authorities 'to assess and rate noise from wind energy developments until such time that an update is available.' The web-based document also refers to the Institute of Acoustics (IOA) 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'[172] (IOA GPG) as a source, which provides:

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169 BSI. (2014) *BS 5228-1:2009 (amended 2014) 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'*

170 Scottish Government. (2011) *Planning Advice Note 1/2011: Planning and Noise* [Online] Available at: Planning Advice Note 1/2011: planning and noise - gov.scot (www.gov.scot) (Accessed: May 2022]

171 The Working Group on Noise from Wind Turbines (1996*). ETSU-R-97, the Assessment and Rating of Noise from Windfarms*. Final Report for the Department of Trade & Industry.

172 Institute of Acoustics (2013). *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*.

173 A logarithmic scale is used in noise level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level. The correction factor is called 'A Weighting' and the resulting measurements are written as dB(A). The dB(A) is internationally accepted and has been found to correspond well with people's subjective reaction to noise.

'significant support on technical issues to all users of the ETSU-R-97 method for rating and assessing wind turbine noise, and should be used by all IOA members and those undertaking assessments to ETSU-R-97. The Scottish Government accepts that the guide represents current industry good practice.'

ETSU-R-97 details a methodology for establishing noise limits for proposed wind farm developments and these limits should not be exceeded. ETSU-R-97 states 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 both turbine source noise and background noise with wind speed. Separate noise limits apply for quiet daytime and for night-time periods. Quiet daytime limits are chosen to protect a property's external amenity, and night-time limits are chosen to prevent sleep disturbance indoors, with windows open.

ETSU-R-97 recommends that wind farm noise for the quiet daytime periods should be limited to 5 dB(A)[173] above the prevailing background or a fixed minimum level within the range 35 - 40 dB $L_{A90,10min}$, whichever is the higher. The precise choice of criterion level within the range 35 – 40 dB(A) depends on a number of factors, including the number of dwellings in the neighbourhood of the wind farm (relatively few dwellings suggest a figure towards the upper end), the effect of noise limits on the number of kWh generated (larger sites tend to suggest a higher figure) and the duration and level of exposure to any noise. These factors will be taken into account with justification for deriving suitable noise limits included in the noise assessment.

An exception to the setting of both the quiet daytime and night-time fixed minimum limit occurs where a property occupier has a financial involvement with the Proposed Development. In that case the fixed minimum limit can be increased to 45 dB $L_{A90,10min}$ or the prevailing background noise L_{A90} plus 5 dB, whichever is the greater for both the quiet daytime and night-time periods.

A background noise survey may not be required for situations where predicted wind turbine noise levels at the nearest noise sensitive properties is limited to an $L_{A90,10min}$ of 35dB(A) up to wind speeds of 10 m/s at 10 m, as the protection of the amenity of those properties can be controlled through a simplified noise condition as detailed in ETSU-R-97. ETSU-R-97 states that:

'For single turbines or wind farms with very large separation distances between the turbines and the nearest properties, a simplified noise condition may be suitable. If the noise is limited to an $L_{A90,10min}$ of 35dB(A) up to wind speeds of 10m/s at 10m height, then this condition alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary.'

Where background noise levels are predicted to exceed the simplified noise criteria (or if cumulative noise has the potential to constrain development) then background noise monitoring will be undertaken at key representational noise monitoring locations around the study area for the Proposed Development. Noise limits will be set relative to existing background noise levels at the nearest receptors and these limits will reflect the variation in background noise with wind speed. Consultation will be undertaken with the Councils Environmental Health Department prior to the commencement of the noise assessment in order to agree the assessment methodology and noise monitoring locations.

Equipment for measuring meteorological conditions will be installed at the Site for the duration of the noise assessment in order to collect wind speed and direction data at various heights. Depending on the monitoring equipment used data will be either measured directly at hub height or data collected at two different heights will be used to determine the wind speed at turbine hub height in accordance with the guidance in the IOA GPG. A series of simultaneous ten-minute measurements will be taken by the wind monitoring equipment over a period of at least two weeks.

The noise assessment for the Proposed Development will be undertaken in three stages:

- Determine the 'Total ETSU-R-97 Noise Limits' which are applicable to the operation of all schemes in the area;

- Undertake a cumulative assessment (where required) to determine whether predictions from all cumulative schemes meet the 'Total ETSU-R-97 Noise Limits'; and
- Derive a set of Site Specific Noise Limits (for the Proposed Development) and undertake predictions to determine whether the Proposed Development can operate within the Site Specific Noise Limits.

The guidance contained in the IOA GPG will be used to establish suitable Site Specific Noise Limits which fully take account of the proportion of the Total ETSU-R-97 Noise Limits which has been allocated too, and can realistically be used by, existing operational and consented wind farms in the area.

The noise assessment will include predictions of likely wind turbine noise levels across a range of wind speeds to demonstrate compliance with the Total ETSU-R-97 and Site Specific Noise Limits. A cumulative noise assessment will also be undertaken in order to consider the consented, operational and proposed (in planning) wind farms within the vicinity of the Proposed Development. The assessment will be undertaken in accordance with ETSU-R-97 and the IOA GPG.

Solar and Battery Storage

In respect to operational noise from non-wind developments, such as solar and battery energy storage sites, PAN 1/2011 refers to Assessment of Noise: Technical Advice Note (TAN)[174]. The TAN identifies BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'[175] and BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'[176] as appropriate methodologies for the assessment of environmental noise from proposed new developments or activities.

Noise from the operation of a solar farm is typically low level in nature and is generated from two primary sources; the inverters and the transformers. The number and size of the inverters varies depending on type of solar farm layout. The noise level output from both the transformers and the inverters can often be controlled through the appropriate positioning of the plant and the use of enclosures as required.

Noise from the operation of a battery storage facility is generated from the use of multiple inverter units, transformers and battery cooling requirements. Noise output from battery storage plant is likely to be higher in level than from solar farm plant, however, careful placement and mitigation measures can minimise noise impacts.

Depending on the final location of the solar PV panels and the battery storage facility, an operational noise assessment may be required. Where necessary, an assessment will be undertaken in line with BS 4142:2014+A1:2019 and BS 8233:2014.

Discussion

Matters to be Scoped out

Vibration

Given the nature of construction activities proposed and the relative distances from residential receptors, the risk of ground borne vibration impacting on residential receptors is considered very low, as such it is not proposed that a vibration assessment be undertaken and that **a vibration assessment is scoped out**.

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174 Scottish Government (2011) *Planning Advice Note 1/2011: Planning and Noise - Assessment of noise: technical advice note* [Online] Available at: Planning Advice Note 1/2011: planning and noise - gov.scot (www.gov.scot) [Accessed: May 2022]

175 British Standards Institute. (2014) *Methods for Rating and Assessing Industrial and Commercial Sound. UK : BSI, 2014. BS4142:2014 + A1:2019.*

176 British Standards Institute. (2014) *Guidance on Sound Insulation and Noise Reduction for Buildings. UK : BSI, 2014. BS8233:2014.*

Battery Storage and Solar Construction Noise

Construction noise effects associated with the battery storage and solar element of the Proposed Development are likely to be temporary in nature, with noise levels from construction activities varying over time as activities and plant start, stop and move around the site. Construction activities that would generate noise include site preparation, the laying of hardstanding and the installation of plant. The construction phase will be temporary with noise levels varying continually throughout this period. It is therefore **not considered necessary to carry out specific construction noise assessments for the battery storage solar PV developments and that they should be scoped out.**

Decommissioning Noise

The potential noise impacts from the decommissioning phase will be no greater than those predicted during the construction phase (as decommissioning is effectively a reversal of the construction process). On that basis, it is not proposed to undertake an assessment of **decommissioning noise and that it should be scoped out**.

Low-Frequency Noise

A study, published in 2006[177] by acoustic consultants Hayes McKenzie on the behalf of the Department of Trade and Industry (DTI), investigated low frequency noise from wind farms. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines.

In February 2013, the Environmental Protection Authority of South Australia published the results of a study into in infrasound levels near wind farms[178]. This study measured infrasound levels at urban locations and rural locations with wind turbines close by, and rural locations with no wind turbines in the vicinity. It found that infrasound levels near wind farms are comparable to levels away from wind farms in both urban and rural locations. Infrasound levels were also measured during organised shut downs of the windfarms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

Bowdler et al., (2009)[179] concluded that:

"...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours".

During a Planning Appeal (PPA-310-2028, Clydeport Hunterston Terminal Facility, approximately 2.5 km south-west of Fairlie, 9 Jan 2018), the health impacts related to low frequency noise associated with wind turbines were considered at length by the appointed Reporter (Mr M Croft). The Reporter considered evidence from Health Protection Scotland and the National Health Service. In addition, he also considered low frequency noise surveys undertaken by the Appellant and the Local Authority both of which demonstrated compliance with planning conditions and did not identify any problems attributable to the turbine operations; some periods with highest levels of low frequency noise were recorded when the turbines were not operating.

The Reporter concluded that:

- The literature reviews by bodies with very significant responsibilities for the health of local people found insufficient evidence to confirm a causal relationship between wind turbine noise and the type of health complaints cited by some local residents;

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[177] Hayes McKenzie, The Department for Trade and Industry. (2006) *The measurement of low frequency noise at three UK wind farms.*

[178] Environmental Protection Authority of South Australia. (2013) *Infrasound levels near windfarms and in other environments* [Online] Available at: Infrasound Levels near Wind Farms and in Other Environments (epa.sa.gov.au) [Accessed: May 2022]

[179] Bowdler et al. (2009). Prediction and Assessment of Wind Turbine Noise: Agreement about relevant factors for noise assessment from wind energy projects. Acoustic Bulletin, Vol 34 No2 March/April 2009, Institute of Acoustics.

- The NHS's assessment is that concerns about health impact are not supported by good quality research; and
- Although given the opportunity, the Community Council failed to provide evidence that can properly be set against the general tenor of the scientific evidence.

It is therefore **not considered necessary to carry out specific assessments of low frequency noise and that it should be scoped out.**

Amplitude Modulation

In its simplest form, Amplitude Modulation (AM), by definition, is the regular variation in noise level of a given noise source. This variation (the modulation) occurs at a specific frequency, which, in the case of wind turbines, is defined by the rotational speed of the blades, i.e. it occurs at the rate at which the blades pass a fixed point (e.g. the tower), known as Blade Passing Frequency.

A study was carried out in 2007 on behalf of the Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford[180], which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM. The study defined AM as aerodynamic noise from wind turbines with a greater degree of fluctuation than normal at blade passing frequency. Its aims were to ascertain the prevalence of AM on UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required.

The study concluded that AM had occurred at only a small number (4 of 133) of wind farms in the UK, and only for between 7% and 15% of the time. It also stated that, the causes of AM are not well understood and that prediction of the effect was not currently possible.

This research was updated in 2013 by an in-depth study undertaken by Renewable UK[181], which has identified that many of the previously suggested causes of AM have little or no association to the occurrence of AM in practice. The generation of AM is based upon the interaction of a number of factors, the combination and contributions of which are unique to each site. With the current state of knowledge, it is not possible to predict whether any particular site is more or less likely to give rise to AM, and the incidence of AM occurring at any particular site remains low, as identified in the University of Salford study. The report includes a sample planning condition to address AM, however that has not yet been validated or endorsed by UK Government.

In 2016, the IOA proposed a measurement technique to quantify the level of AM present in any particular sample of windfarm noise. In August 2016 a report written by WSP/Parsons Brinkerhoff[182] was published by the Department of Business, Energy & Industrial Strategy (BEIS, formerly The Department of Energy & Climate Change). The report sought to build on the conclusions of the IOA study in order to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition.

In November 2017, an article entitled 'A planning condition for wind farms' was published in Vol 42 No 6 of the Acoustics Bulletin magazine[183]. The article was written collaboratively by a number of noise consultants and

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180 University of Salford. (2007) *Research into aerodynamic modulation of wind turbine noise: final report.* [Online] Available from - http://usir.salford.ac.uk/id/eprint/1554/ [Accessed: May 2022]

181 Renewable UK. (2013) *Wind Turbine Amplitde Modulation: Research to Improve Understanding as to its Cause and Effect* [Online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/collection/4E7CC744-FEF2-473B-AF2B-135FF2AA3A43/ruk_wind_turbine_amplitude_modulation_dec_2013_v2_(1).pdf. [Accessed: May 2022]

182 WSP/ Parsons Brinkerhoff. (2016) *Wind Turbine AM Review Phase 2 report.* [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/562186/Phase_2_Report_-_Wind_Turbine_AM_Review_Issue_3__FINAL_.pdf. [Accessed: May 2022]

183 Institute of Acoustics. (2017) *Acoustics Bulletin (Vol 42 No 6)* [Online] Available at: Acoustics_Bulletin_AM_Article_Nov-Dec_2017_(Ad_Pages_Removed).pdf [Accessed: May 2022]

suggested a noise planning condition which included consideration of AM. The authors noted in the article that:

'Whilst local authorities and developers have waited for a planning condition that could be applied to newly consented wind farms, or to those already consented but with a suspensive condition, the report Wind Turbine AM Review (WTAMR) by WSP/Parsons Brinckerhoff for DECC arguably did not provide that. In addition there have been a number of comments on WTAMR that we consider should be addressed.'

The article then went on to propose a draft condition but noted that: 'This approach is proposed based on the current state of understanding, but may be subject to modification in light of new research and further robust information.' And 'As various people before us have discovered, the derivation of a penalty is not easy. There is not sufficient reliable research to be confident that a penalty system would always provide a fair indication of the impact of AM.'

At the time of writing there has been no official response to those recommendations from the IOA Noise Working Group and, as yet, no endorsement from any Scottish Government Minister or Department. The recommendation to impose a planning condition and the associated penalty scheme is at odds with the advice from the IOA GPG which currently states (Paragraph 7.2.1):

'The evidence in relation to "Excess" or "Other" Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM.'

At time of writing there is no agreed methodology which can be used to predict the occurrence of AM or an agreed methodology which can be used to determine whether the effects of AM, should it occur, are likely to be significant. **On that basis it is considered therefore that amplitude modulation should be scoped out.**

Questions

Question 34: Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the IOA GPG to assess operational wind turbine noise, BS4142 to assess solar and battery storage noise (if required) and BS5228 to assess construction noise for the wind farm?

Question 35: Can consultees agree that assessment of vibration, construction noise for the battery storage and solar PV, low frequency noise and amplitude modulation be scoped out of the EIA?

17. Socioeconomics

Introduction

This chapter will consider the potential socio-economic, recreation and tourism effects from the Proposed Development.

The socio-economics, recreation and tourism assessment will include consideration of local tourism and recreation activity, employment generation and the wider indirect and induced effects from the development, which, including that associated with the wind turbines, ground-mounted solar PV and battery storage.

Baseline Description

The baseline assessment will include a description of the current socio-economic, recreation and tourism baseline within the local area. This will include a summary of the economic performance data and a description of the relevant tourism assets that will be covered in the assessment.

The baseline will cover:

- Employment and economic activity in the local area within the context of regional and national economies;
- Wage levels within the regional economy compared to the national level; and
- The role of the tourism sector in the local and regional economy, with consideration of assets, including accommodation providers and other tourism assets in the vicinity of the Proposed Development (15 km).

Study Areas

The baseline description will cover and compare the study areas of:

- 15 km radius from the Proposed Development Area (for tourism, consistent with existing research on wind farms and tourism assets);
- The Scottish Borders; and
- Scotland.

The economic impacts associated with the wind turbines, ground-mounted solar PV and battery storage will be quantified for the Scottish Borders and Scotland.

Relevant Guidance and Legislation

There is no specific legislation or guidance on the methods that should be used to assess the socio-economic impacts of a proposed onshore wind farm development. The proposed method has however been based on established best practice, including that used in the UK Government and industry reports on the sector. In particular, this assessment will draw from two studies by BiGGAR Economics on the UK onshore wind energy sector: a report published by RenewableUK and the Department for Energy and Climate Change (DECC) in 2012 on the direct and wider economic benefits of the onshore wind sector to the UK economy (BiGGAR Economics, 2012)[184] and a subsequent update to this report published by RenewableUK in 2015 (BiGGAR Economics, 2015)[185]. Since then, the evidence from those assessments has been updated based on a series of evaluations of the economic benefits delivered by recent onshore wind developments. A similar model will also be used for the ground-mounted solar PV and battery storage, based on the experience of deployment of these technologies elsewhere.

There is also no formal legislation or guidance on the methods that should be used to assess the effects that renewable energy development may have on general tourism and recreation interests. The proposed method will consider individual attractions and tourism facilities to assess if there could be any effects from the Proposed Development.

It is also important that the socio-economic, tourism and recreation chapter takes account of the relevant local and national policy objectives.

The assessment work will also include other relevant strategies such as:

- Scotland's National Performance Framework[186];
- Scotland's National Strategy for Economic Transformation[187];

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184 Department of Energy & Climate Change and RenewableUK. (2012) *Onshore Wind, Direct & Wider Economic Impacts* [Online] Available at: Microsoft Word - SB - Report Onshore Wind Direct & Wider Economic Impacts 26apr12 Amends & comments - SB (publishing.service.gov.uk) [Accessed: May 2022]

185 RenewableUK. (2015) *Onshore Wind: Economic Impacts in 2014* [Online] Available at: onshore_economic_benefits_re.pdf (ymaws.com) [Accessed: May 2022]

186 Scottish Government. (2022) *National Performance Framework* [Online] Available at: National Performance Framework | National Performance Framework {accessed: May 2022]

187 Scottish Government. (2022) *Scotland's National Strategy for Economic Transformation* [Online] Available at: Scotland's National Strategy for Economic Transformation - gov.scot (www.gov.scot) [Accessed: May 2022]

- Scotland Outlook 2030 (the national tourism strategy)[188]; and
- Relevant regional and local strategies, including the South of Scotland Regional Economic Strategy[189].

Proposed Scope of Survey and Assessment

It is anticipated that the contents of the assessment chapter will include:

- Introduction, including scope of assessment and methodology;
- Economic development and tourism strategic context;
- Baseline socio-economic, tourism and recreation context;
- Socio-economic assessment including direct and indirect impacts;
- Tourism and recreation impact assessment
- Proposed measures and actions to maximise local economic impacts;
- Proposed measures and actions to mitigate any harmful effects (if required); and
- Summary of findings and conclusions.

This study will be a desk-based study.

Potential Impacts

Assessing the significance of effects will be based on assessing the sensitivity of an economy/tourism and recreation asset to change and then assessing the potential magnitude of the change associated with the Proposed Development. When sensitivity and magnitude are combined, the significance of effect will be assessed. Major and moderate effects will be considered significant in the context of EIA Regulations.

In order to assess the magnitude of the socio-economic direct and indirect impacts (both temporary and permanent), the level of activity/employment supported during the construction and operation phases will be estimated.

Government and industry reports will be used to determine the expected capital and operational expenditure associated with the Proposed Development, as well as the breakdown of expenditure by different contracts, the wind turbines, solar PV and battery storage, and the associated site infrastructure works. An assumption will then be made based on the share of each type of contract that can be secured regionally and nationally. This increase in turnover in each study area will then be used to estimate the economic impact associated with the Proposed Development.

In order to assess effects on tourism and recreation assets, the features that make them distinctive and attractive will be identified. The potential impact of the Proposed Development on those key features will then be assessed, with consideration of other chapters of the EIAR where relevant, to determine the magnitude of change.

Potential Mitigation

Proposed mitigation measures will depend on the findings of the assessment and potential effects identified.

188 Scottish Tourism Alliance. (2020) *Scotland Outlook 2030* [Online] Available at: Scotland Outlook 2030 - Scotland's tourism strategy (scottishtourismalliance.co.uk) [Accessed: May 2022]

189 Scottish Borders Council. (2021) *South of Scotland Regional Economic Strategy 2021* [Online] Available at: South of Scotland Regional Economic Strategy 2021 - Scottish Borders Council - Citizen Space [Accessed: May 2022]

Potential Effects

The effects that will be considered in the assessment will include the potential socio-economic, tourism and recreation effects associated with the Proposed Development. This will be done using the methodology developed by BiGGAR Economics, which has been used to assess over 140 renewable energy projects across the UK.

The potential direct socio-economic effects will include:

- Temporary effects on the local and national economy due to expenditure during the construction phase; and
- Permanent effects on the local and national economy due to expenditure associated with the operational phase.

The potential indirect socio-economic effects will include:

- Permanent effects as a result of any additional public expenditure that could be supported by the additional tax revenue that would be generated during the operational phase; and
- Permanent effects on the local economy that could be supported by any community funding or shared ownership proposals during the operational phase.

The relationship between wind farm development and tourism has been the subject of several studies. If impacts arising from onshore wind farms, such as landscape character or visual impacts, lead to changes in visitor behaviour or spending, it would be expected that there would be evidence of such changes in other areas where there has been onshore wind farm development.

In 2021, BiGGAR Economics produced a report[190] analysing the relationship between the construction of onshore wind farms and tourism employment, based on case studies of 44 wind farms developed in Scotland. The report concluded that, there was no pattern or evidence suggesting that the development of onshore wind farms in Scotland had any negative effects on the tourism economies of the country as a whole, local authority areas or the immediate areas surrounding wind farms.

Nevertheless, the tourism sector is an important contributor to the Scottish economy, particularly in rural economies, and so there is merit in considering whether the development will have any effect on the tourism sector. This assessment will consider the potential effects that the development could have on tourism assets and local accommodation providers. This will consider the implications of any effects identified for the tourism sector in the local area and wider region.

Questions

Question 36: Do consultees have any suggestions on socio-economic and tourism effects that should be specifically considered in the assessment?

18. Other Issues

Shadow Flicker

Shadow flicker is an effect caused by the rotation of the turbine blades when the sun is shining, which can create a flickering or strobe like effect. Shadow flicker will be calculated using WindFarmer software which will

190 BiGGAR Economics. (2021) *Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms* [Online] Available at: https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf [Accessed: May 2022]

identify the potential areas susceptible to shadow flicker and the extent of shadow flicker impact caused. This software can identify the study area for the assessment based on candidate turbine dimensions and orientations, as well as model periods of predicted shadow flicker.

Shadow flicker will be calculated assuming:

- There are clear skies every day of the year;
- The turbines are always rotating;
- The sun can be represented as a single point; and
- The blades of the turbines are always perpendicular to the direction of the line of sight from the specified location to the sun.

There is no standard for the assessment of shadow flicker in Scotland and there are no guidelines with which to quantify what exposure levels would represent a significant versus not significant effect. In the absence of specific guidelines and if shadow flicker has to be assessed in the EIAR, the assessment will considered the 'Best Practice Guidance for Planning Policy Statement 18 (PPS18) Renewable Energy' (Department of Environment Northern Ireland, 2009)[191] from Northern Ireland, which states: "It is recommended that shadow flicker at neighbouring offices and dwellings…should not exceed 30 hours per year or 30 minutes per day". As such, properties where shadow flicker would potentially exceed these thresholds would be subject to significant effects.

It is proposed that shadow flicker **can be scoped out if the final layout for proposed turbines is further than 10 rotor diameters from potential receptors**.

Glint and Glare

Glint and Glare assessments can often be required for solar PV developments. The key receptors for a glint and glare assessment are:

- Road users on regional or national roads within 1 km of a solar panel; and
- Residential properties within 1 km of a solar panel.

If deemed necessary, impacts on road users will be determined based on whether reflections are predicted and the relative position of the reflection to the observer. Impacts on dwelling occupants will consider glare duration due to the observer in that instance being static. All assessments would be conducted in accordance with industry best practice and applicable guidance.

It is proposed that glint and glare **can be scoped out if the final layout for solar PV is further than 1 km from either residential properties and/or regional or national roads.**

Glint and Glare will also be addressed within the Aviation and Existing Infrastructure chapter of the EIAR, however as noted above, **it is concluded that there are no potential adverse glint and glare effects on aviation from the solar PV element of the proposed development and it is proposed to scope these effects out of the EIA assessment**.

Climate Change

A wind farm has the potential to make savings on greenhouse gas emissions compared to electricity generation which involves the burning of fossil fuels. The EIAR will consider the current electricity generation mix and assess the level of CO_2 savings that could potentially be saved depending on the source of electricity

191 Department of Environment, Northern Ireland (2009) *Best practice Guidance to Planning Policy statement 18 'Renewable Energy* [Online] Available at: Planning Policy Statement 18 'Renewable Energy' Best Practice Guidance (infrastructure-ni.gov.uk). [Accessed 23/05/2022]

generation the wind farm is displacing at any given time. An assessment will be undertaken in accordance with Scottish Government recommended methodology[192].

Where peat or carbon-rich soils are present, SEPA requires planning applications for onshore wind farms to include a systematic assessment of the likely effects to these features. This requirement aligns with the - EIA Directive 2014/52/EU (as amended)[193] which sets out that direct and indirect effects of development projects on climate (Article 3) and climatic factors (Annex IV) are considered.

Accordingly, a Climate Impact Assessment (CIA) will be undertaken in accordance with Schedule 4 of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 which transpose the EIA Directive into Scottish law and states that:

(4) A description of the factors specified in regulation 4(3) likely to be significantly affected by the development:….climate (for example greenhouse gas emissions, impacts relevant to adaptation).

(5) A description of the likely significant effects of the project on the environment resulting from, inter alia …

(f) The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.

The assessment will also consider relevant Scottish policy on climate change and adaption and will also consider the climate change targets of SBC.

The CIA approach will consider the likely magnitude of greenhouse gas (GHG) emissions of the Proposed Development in comparison to the baseline scenario with no development (where no emissions are produced as no construction takes place).

Carbon Balance

Current best practice recommends that the EIAR include undertaking a carbon balance assessment which assesses effects with reference to the magnitude of emissions released by the development and the period of time it takes to payback for those carbon emissions, the context of those emissions (e.g. national, regional and local emissions reduction targets) and professional judgement. This assessment will be based on the proposed information regarding the scale and nature of the Proposed Development. Where data is unavailable, worst-case reasonable assumptions will be used.

A carbon balance assessment employs the Scottish Government's Carbon Calculator Tool[194] and quantifies the CO_2 emissions savings over the life of the Proposed Development against the release of CO_2 from other energy generation methods as a result of implementing the project. It also reports on the time it takes to pay back any carbon debt and the potential effects of the Proposed Development on climate change in terms of carbon savings produced.

A carbon balance assessment will be produced to give an indication of the Proposed Development's impact on the existing peat on site and to assess the potential effects in terms of carbon dioxide (CO_2) emissions against the total potential carbon savings attributed to the Proposed Development. The assessment will quantify the gains over the life of the project against the release of CO_2 during construction, including loss of

192 The Scottish Government (2008) *Calculating carbon savings from wind farms on Scottish peat lands: a new approach* [Online] Available at:https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/pages/13/ [Accessed 20/05/2022]

193 European Union. (2014) *Assessment of the Effects of Certain Public and Private Projects on the Environment* [Online] Available at: DIRECTIVE 2014/•52/•EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL - of 16 April 2014 - amending Directive 2011/•92/•EU on the assessment of the effects of certain public and private projects on the environment - (europa.eu) [Accessed: May 2022]

194 The Scottish Government (2008) *CARBON CALCULATOR TOOL* [Online] Available at Carbon Calculator Tool (sepa.org.uk).[Accessed 20/05/2022]

peat bog and construction of roads/tracks and other infrastructure. The latest version of the Carbon Calculator that is available before the application is submitted will be used. It is not expected for there to be any requirement for the Carbon Balance assessment to be amended post submission following any further update of the Carbon Calculator that may occur.

Population and Human Health

The assessment of potential health effects will be covered under individual aspect chapters where relevant and where scoped into the EIA (e.g. noise, socio-economics, tourism and recreation, and shadow flicker).

Major Accidents and Disasters

The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events, and the construction and operation of the Proposed Development would be managed within the requirements of a number of health and safety related regulations, including the Construction (Design and Management) Regulations 2015[195] and the Health and Safety at Work etc. Act 1974[196]. However, a screening exercise would be undertaken to identify further detail that may been to be provided (in relation to flood risk or peat slide risk for example).

Ice Throw

Ice throw is the process of ice falling or being launched from the blades of a turbine. As embedded mitigation, the turbines will have sensors on them to detect the build-up of ice and automatically prevent the turbines spinning when ice has developed on them, thus preventing the ice being thrown. Scottish Government's Onshore Wind Farm Advice Sheet[197] states that danger to human or animal life from falling parts or ice is rare. **Ice throw will not be assessed in the EIA and is therefore scoped out of the assessment**.

Lightning

As stated in Scottish Government's Onshore Wind Farm Advice Sheet[203], the danger to human or animal life from lightning strike via a turbine is rare since lightning is directed down the turbine to the earth; the turbine itself being earthed. Maintenance of the turbines would not be undertaken during high lightning risk weather conditions. **Lightning will not be assessed in the EIA and is therefore scoped out of the assessment**.

Questions

Question 37: Do consultees agree with the proposed approach of the assessments within Section 18?

19. Residual, Synergist Effects and Mitigation

A concluding chapter will present the key findings from each EIAR chapter and any required mitigation. In line with The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 it will then assess the potential synergistic effects that may occur in combination.

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195 Health and Safety Executive. (2015) *The Construction (design and Management) Regulations 2015* [Online] Available at: Construction - Construction Design and Management Regulations 2015 (hse.gov.uk) [Accessed: May 2022]

196 UK Government. (1974) *Health and Safety at Work etc. Act 1974* [Online] Available at: Health and Safety at Work etc. Act 1974 (legislation.gov.uk) [Accessed: May 2022]

197 Scottish Government (2014) *Onshore wind turbines: planning advice* [Online] Available at: Onshore wind turbines: planning advice - gov.scot (www.gov.scot) [Accessed 20/05/2022]

This chapter will summarise the residual effects regarding all of the proposed work in relation to the construction, operation and decommissioning of the Proposed Development. It will identify all mitigation, including the mitigation by design that will be undertaken to reduce any such effects, should the development be consented.

20. EIAR Accompanying Documents

Non-technical Summary

The NTS details the main components of the Proposed Development and summarizes the main findings of the environmental studies carried out to build and operate the Proposed Development. It is designed to be an easily readable document that will communicate the main elements of the EIA to any interested party without the need for the reader to have specialist background knowledge. It will also contain maps that show the extent and geographical location of the development.

Planning, Design and Access Statement

Although not a statutory requirement for Section 36 applications, a PDAS will be produced and seek to highlight the design principles and concepts behind the Proposed Development. It will detail how the developer has applied these principles to the Proposed Development in tandem with input from consultation activities.

The PDAS will also provide a commentary of the EIA findings and assess the Proposed Development accounting for residual effects (both positive and negative) against national policy and legislation, the Development Plan and other material planning considerations relevant to the Proposed Development.

Pre-application Consultation Report

Although not a statutory requirement for Section 36 applications, the applicant intends to submit a PAC Report to accompany the application.

It is proposed that the legislation and best practice guidance in relation to public consultation for Major Developments will be broadly followed as contained in PAN 3/2010 - Community Engagement - Planning with People[198].

The PAC Report will:

- Outline the scope of the consultation programme including when and who has been consulted;
- Confirm how the consultation programme meets the best practice standards;
- Set out how the applicant has responded to the comments made, including whether and the extent to which the proposals have changed as a result of PAC;
- Provide documentary evidence that the planned consultation programme has taken place e.g. copies of advertisements of the public events and reference to display materials and records of response from such events;
- Demonstrate that steps were taken to explain the nature of PAC i.e. that it does not replace the application process whereby representations can be made to the planning authority; and
- Make an assessment of the success of the Pre-application Consultation activities

[198] Scottish Government. (2010) *Planning Advice Note 3/2010: Community Engagement* [Online] Available at: Planning Advice Note 3/2010: community engagement - gov.scot (www.gov.scot) [Accessed: May 2022]

25 Conclusion

This document has been prepared by Natural Power on behalf of the Applicant in anticipation of an application under Section 36 of the Electricity Act 1989[199] for Lees Hill Energy Park in the Scottish Borders.

For each topic area questions have been provided within this Scoping Report. The questions focus on the methodologies, baseline data and likely impacts caused by the development. Information has been provided on the Proposed Development and the known environmental receptors. Where features or receptors are deemed to have a possible significant effect the methodologies to assess the impact have been provided for comment. Responses on these would help ensure that the detailed methodology, survey and assessment are carried out with consideration to all statutory consultees and key stakeholders. This approach is in line with good practice in the planning system and an emphasis being communicated at a national level to focus the content of the EIA and EIAR on key elements identified at the scoping stage.

26 Summary of all the Questions for Consultees

A summary of consultation questions as proposed throughout this Scoping Report is below. Please see previous chapters where relevant for further context.

Question 1: Do the consultees agree with proposed approach to scoping and the purpose of the Scoping Report?

Question 2: Do the Energy Consents Unit consider that the battery storage element of the proposal should be included in the total installed capacity and if so, how would this impact on the planning application fee?

Question 3: Do consultees accept a micro siting allowance of 90 m to allow flexibility within the project design?

Question 4: Do consultees agree with the approach to the EIA and the associated mitigation and monitoring?

Question 5: Do consultees agree with the proposed approach set out for community consultation?

Question 6: Do consultees agree with the proposed chapters to be included in the EIAR?

Question 7: Are consultees content with the proposed methodology for the LVIA?

Question 8: Are consultees content with the proposed approach to undertaking viewpoint photography and preparing visualisations?

Question 9: Are consultees in agreement with the proposed study areas, focus, and source data for the assessment of landscape effects?

Question 10: Are consultees in agreement with respect to the effects that are proposed to be scoped out?

Question 11: Are consultees content that the LVIA scope has identified the most important receptors to be assessed?

Question 12: Are consultees content with the proposed viewpoints identified in Table 9.2, and could they advise of any additional viewpoints they consider necessary to assess the effects of the Proposed Development?

Question 13: Can consultees advise on which three viewpoints should be represented with night-time photomontages to illustrate turbine lighting?

[199] UK Government. (1989) *Electricity Act 1989* [Online] Available at: Electricity Act 1989 (legislation.gov.uk) [Accessed: May 2022]

Question 14: Are consultees content with the proposed approach to the cumulative assessment and could they advise of any specific cumulative sites they consider should be included in the assessment?

Question 15: Do consultees have any comments regarding the EcIA only concentrating on those receptors which may be subject to significant effects from the proposed development (either directly or indirectly)?

Question 16: Table 10.7 above notes the receptors and potential impact proposed to be included within the EcIA. Do consultees have any comment regarding this sufficiently covering the potential impacts on features from the proposed development and what is proposed to be scoped out?

Question 17: Are consultees satisfied that ornithological survey effort completed provides a robust assessment of effects?

Question 18: Do consultees have any comments regarding the EIA only concentrating on those receptors which may be subject to significant effects from the Proposed Development (either directly or indirectly)?

Question 19: Table 11.10 notes the receptors and potential impacts proposed to be included within the EIA. Do consultees agree with the list of receptors and impacts to be included within the EIA Report?

Question 20: Do consultees agree with the proposals for 'Effects Scoped Out' in this Scoping Report?

Question 21: Are consultees content with the proposed study areas presented in this Scoping Report?

Question 22: Are there any other relevant consultees other than HES and SBC who should be contacted with respect to the Cultural Heritage and Archaeology assessment?

Question 23: Do consultees wish to request any specific heritage assets to be assessed in the EIAR?

Question 24: Do consultees accept the 400m buffer applied surrounding the Scheduled Monument located within the Proposed Development Area, SM4548 Hen Law, cairn 1550m WNW of Langtonlees, for the solar and battery storage search area in order to preserve its setting? At 0.25m high, the monument is not a prominent cairn that may be appreciated beyond this distance, and intervisibility with the Dirrington Laws is preserved?

Question 25: Do consultees agree with the proposed geographical extent of the assessment?

Question 26: Do consultees agree that operational and decommissioning phases can be scoped out and the assessment will consider the effects during the construction phase only?

Question 27: Can consultees provide traffic count data?

Question 28: Do consultees agree that 'embedded mitigation' i.e. any mitigation considered standard good practice can be assumed in baseline assessment of receptors?

Question 29: Do the consultees agree with the approach to consider the environmental impacts in line with IEMA thresholds of 30% and 10%?

Question 30: Do the consultees agree with the traffic assessment approach set out in Section 14?

Question 31: Do consultees agree that the 'worst case scenario' be modelled or would a realistic 'most likely scenario' approach be more appropriate?

Question 32: Do Transport Scotland agree that in relation to their Transport Assessment Guidance, no 'Transport Statement' or 'Transport Assessment' is required?

Question 33: Do consultees agree with the proposed approach for the aviation and existing infrastructure assessments?

Question 34: Can the consultees confirm that they agree with the proposed assessment methodologies, specifically the use of ETSU-R-97 and the IOA GPG to assess operational wind turbine noise, BS4142 to assess solar and battery storage (if required) and BS5228 to assess construction noise for the wind farm?

Question 35: Can consultees agree that assessment of vibration, construction noise for the battery storage and solar PV, low frequency noise and amplitude modulation be scoped out of the EIA?

Question 36: Do consultees have any suggestions on socio-economic and tourism effects that should be specifically considered in the assessment?

Question 37: Do consultees agree with the proposed approach of the assessments within Section 18?

27 Responding to this Scoping Report

Consultee responses to this report should be directed to the ECU which will form a Scoping Opinion. The ECU can be contacted via email:

Econsents_Admin@gov.scot

The Applicant will welcome such responses to inform the scope of EIA to be undertaken for the Proposed Development and further consultation to be undertaken with each consultee as the EIA progresses.

A. List of Figures

Figure 3.1: Location Plan

Figure 3.2: Site Layout Plan

Figure 3.3: Regional Context

Figure 9.1: Zone of Theoretical Visibility of Wind Turbines to 45 km

Figure 9.2: Zone of Theoretical Visibility of Solar PV Search Areas

Figure 9.3: Designated Landscapes

Figure 9.4: Landscape Character Types

Figure 9.5: Combined Zone of Theoretical Visibility with Black Hill Wind Farm

Figure 10.1: Ecological Survey Areas

Figure 10.2: Static Bat Detector Locations 2020 and 2021

Figure 10.3: Fish Habitat Survey Areas 2020

Figure 10.4: Designated Sites within 10 km of the Proposed Development

Figure 10.5: Phase 1 Habitat Results 2021 Overview

Figure 10.6: NVC Survey Results 2021

Figure 10.7: Bat Roost Survey Results 2020

Figure 10.8 (Confidential): Protected Mammal Survey Results 2020

Figure 11.1: Ornithological Survey Areas

Figure 11.2: Site and Vantage Point Viewsheds

Figure 11.3: Designated Sites within 10 km (25 km for geese and gulls) of the Proposed Development

Figure 11.4: Breeding Season VP Survey Results (Mar - Aug 2020) Geese

Figure 11.5: Breeding Season VP Survey Results (Mar - Aug 2020) Waders

Figure 11.6: Breeding Season VP Survey Results (Mar - Aug 2020) Other Species

Figure 11.7: Non-breeding Season VP Results (Sep 2020 - Feb 2021) Geese and Swans

Figure 11.8: Non-breeding Season VP Results (Sep 2020 - Feb 2021) Raptors

Figure 11.9: Breeding Season VP Survey Results (Mar - Aug 2021) Geese

Figure 11.10: Breeding Season VP Survey Results (Mar - Aug 2021) Waders

Figure 11.11: Breeding Season VP Survey Results (Mar - Aug 2021) Raptors

Figure 11.12: Non-breeding season VP results (Sep 2021 - Mar 2022) Geese and Duck

Figure 11.13: Non-breeding Season VP Results (Sep 2021 - Mar 2022) Raptors

Figure 11.14: Lees Hill BBS Results 2020

Figure 11.15: Lees Hill BBS Results 2021

Figure 11.16 (Confidential): Raptor Results 2020 and Barn Owl Survey Results 2021

Figure 11.17 (Confidential): Black Grouse Survey Results 2020 and 2021

Figure 12.1: Interpolated Peat Depth (Phase Survey Results)

Figure 13.1: Cultural Heritage Assets

B. Transport Assessment Form

Contact Details		
	Applicant	Consultant
Contact name	Miles McConville	Craig Galloway
Company	Fred Olsen Renewables Ltd	Natural Power Consultants Ltd
Address	Ochil House, Stirling, FK7 7XE	120 Bath Street, Glasgow, G2 2EN
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Development Details	Lee's Hill Energy Park
Brief description	The following are being considered for the Proposed Development: Up to 7 wind turbines with associated infrastructure; Ground-mounted solar PV panels; Temporary borrow pits; Anemometry mast(s); Temporary construction and storage compounds, laydown areas and ancillary infrastructure; Substation, compound, and control building; and Battery/energy storage.
Existing/ historical site use	Open moorland and agricultural farmland.
Location: Street/Road Town/City/Plan Area (Map to be included)	The Proposed Development is situated approximately 5 km west of Duns, in the Scottish Borders.
Size (e.g. GFA, no. of dwellings, etc.) Indicate if any thresholds in Table 3.1 are exceeded.	The Proposed Development covers an area of approximately 533 hectares and exceeds the thresholds noted in Table 3.1.