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TORRANCE WIND FARM EXTENSION II

TA 2.1 - SCOPING REPORT

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SCOPING REPORT

NOVEMBER 2020



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1 INTRODUCTION

1.1 Purpose of the Scoping Report

This Scoping Report constitutes the request for a Scoping Opinion for a proposed ten turbine extension (the Development) to the operational Torrance Farm Wind Park and Torrance Farm Wind Park Extension, approximately 1.5 kilometres (km) north of Harthill, North Lanarkshire (the Site). The Site location is shown in Figure 1 of this Report. This Scoping Report has been prepared by Arcus Consultancy Services Ltd (Arcus) on behalf of GreenGridPower3 Ltd (the Applicant).

In Scotland, renewable energy developments that do not exceed the generation capacity of 50 Megawatts (MW) require consent from the Local Authority under Section 57 of the Town and Country Planning (Scotland) Act 1997 (as amended by the Planning (Scotland) Act 2019, under section 27).

As under Regulation 2 of the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009, the Development falls under the description of Electricity Generation and this Class of development with a generation capacity of over 20 MW but under 50 MW falls under the category of a major development. As such, major planning application (the Application) for the Development will be submitted to North Lanarkshire Council (the Council).

It is anticipated that the Application will require an Environmental Impact Assessment (EIA) under Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulation 2017 (the EIA Regulations). The findings of the EIA will be presented within an EIA Report.

This Scoping Report has been prepared with a view to providing a structure for consultation on the approach to the EIA and the content of the EIA Report.

1.2 Project History

The original Torrance Farm Wind Park was consented in 2011 (North Lanarkshire Reference: 10/00973/FUL) and consists of three turbines up to 125 metres (m) to tip height with a combined generating capacity of 9 MW. Torrance Farm Wind Park became operational in 2013.

An application for a four-turbine extension (up to 12 MW) was submitted in March 2012 for Torrance Extension (North Lanarkshire Reference: 12/00284/FUL). This consisted of turbines up to 125 m to tip height with a maximum rotor diameter of 101 m and ancillary infrastructure.

In May 2012, the scheme was revised to two turbine and subsequently consented in July 2012. Torrance Extension became operational in 2015.

The original Torrance Farm Wind Park and Torrance Extension are hereafter referred to as the "Existing Wind Farm".

1.3 The Applicant

GreenGridPower3 Ltd is an independent renewable energy developer involved in the creation of onshore wind generation projects across Scotland. Previously the Applicant was involved in the original Torrance Farm Wind Park and its two turbine Extension.

As part of those projects, the Applicant set up community benefit funds for the communities of Harthill, Greenrigg, Eastfield and Blackridge and introduced Foundation Scotland as a support group to help the local communities in achieving their ambitions. Over the past 6 years, over £60,000 per year has been paid in community benefit by the existing wind farm

projects, and the Development proposed herein will continue in a similar fashion to provide further community benefit funds to support communities of North Lanarkshire.

1.4 Structure of Scoping Report

This Report is comprised of the following sections:

- Introduction;
- Environmental Impact Assessment;
- The Development;
- Policy and Legislative Context;
- Technical Assessments:
 - Landscape and Visual;
 - Ecology;
 - Ornithology;
 - Hydrology and Hydrogeology;
 - Geology and Soils;
 - Cultural Heritage and Archaeology;
 - Noise;
 - Traffic and Transport;
 - Climate Change and Carbon Balance; and
 - Other Issues (including Shadow Flicker).
- Summary.

The following Figures accompany the Report:

- Figure 1 – Site Location;
- Figure 2 - Indicative Site Layout;
- Figure 3 - Cultural Heritage;
- Figure 4 - Ecological Designations Plan;
- Figure 5 - Landscape Designations Plan;
- Figure 6 – Zone of Theoretical Visibility (ZTV) and proposed viewpoints; and
- Figure 7 – Vantage Points and Viewsheds.

2 ENVIRONMENTAL IMPACT ASSESSMENT

2.1 EIA Regulations

The EIA will be undertaken in line with the Town and Country Planning (EIA) (Scotland) Regulations 2017 (the EIA Regulations). This Report provides a summary of the details of the assessment areas which will be included within the EIA Report to meet the information requirements as set out in Schedule 4 of the EIA Regulations.

2.2 Approach to EIA

EIA is an iterative process aimed at identifying and assessing the potential effects arising as a result of a proposed development. Any effects identified will be used to inform and refine the design of the Development. Where adverse effects are identified that cannot be avoided through embedded mitigation, suitable mitigation measures to reduce or offset effects will be proposed. In addition, the EIA will be used to identify potential enhancement measures that could be applied to maximise beneficial effects.

The main steps of the EIA process are broadly summarised as follows:

- **Scoping [current stage]:** The Scoping Opinion from the Council will be used to inform and focus the scope of the EIA on likely significant effects that could be anticipated to occur as a result of the Development;
- **Baseline studies:** Desk-based assessment, baseline surveys and site visits will be undertaken, where appropriate, in order to determine the baseline conditions of the environment and area that may be affected by the Development;
- **Predicting and assessing effects:** Potential interactions between the Development and the baseline conditions will be considered. The nature of the effects, e.g. direct or indirect; positive or negative; long, medium or short term; temporary or permanent, will be predicted and assessed. Potential cumulative effects arising from Development in conjunction with other proposed or consented developments will also be considered;
- **Mitigation and assessment of residual effects:** Potential effects will be avoided or reduced wherever possible through embedded mitigation. Where this is not possible, operational mitigation or other measures to reduce and/or offset significant effects will be proposed. The residual effects will then be assessed to determine any effects predicted to remain following implementation of the recommended mitigation measures; and
- **Production of the EIA Report:** The results of the EIA will be set out in the EIA Report.

In order to assess the potential effects arising from the Development, the significance of such effects will be determined, in accordance with the requirements of the EIA Regulations. The determination of significance is based on professional judgement, however fundamentally, the overall effect on a receptor relates to the sensitivity of the resource or receptor being affected and the magnitude of change as a result of the effect.

The assessment of effects will combine professional judgement together with consideration of the following:

- The sensitivity of the resource or receptor under consideration;
- The magnitude of the potential effect in relation to the degree of change which occurs as a result of the Development;
- The type of effect, i.e. adverse, beneficial, neutral or uncertain;
- The probability of the effect occurring, i.e. certain, likely or unlikely; and
- Whether the effect is temporary, permanent and/or reversible.

A generalised methodology for assessing significant effects is detailed below; however, each individual technical area will have a specific assessment methodology which may vary from that detailed in the following Sections.

2.2.1 Assessment Methodology

2.2.1.1 Sensitivity of Receptors

The sensitivity of the baseline conditions, including the importance of environmental features on or near the Site or the sensitivity of potentially affected receptors, will be assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

Table 1 details a general framework for determining the sensitivity of receptors. Each technical assessment will specify their own appropriate sensitivity criteria that will be applied during the EIA and details will be provided in the relevant EIA Report Chapter.

Table 1: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

2.2.1.2 Magnitude of Change

The magnitude of change will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

General criteria for assessing the magnitude of an effect are presented in Table 2. Each technical assessment will apply their own appropriate magnitude of effects criteria during the EIA, with the details provided in the relevant EIA Report Chapter.

Table 2: Framework for Determining Magnitude of Change

Magnitude of Effects	Definition
High	A fundamental change to the baseline condition of the asset, leading to total loss or major alteration of character.
Medium	A material, partial loss or alteration of character.
Low	A slight, detectable, alteration of the baseline condition of the asset.

Magnitude of Effects	Definition
Negligible	A barely distinguishable change from baseline conditions.

If effects of zero magnitude (i.e. none / no change) are identified, this will be made clear in the assessment.

2.2.1.3 Significance of Effect

The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 3 summarises guideline criteria for assessing the significance of effects.

Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in Table 3.

Zero magnitude effects upon a receptor will result in no effect, regardless of sensitivity.

Table 3: Framework for Assessment of the Significance of Effects

Magnitude of Effect	Sensitivity of Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

2.2.2 Mitigation

Where the EIA identifies likely significant adverse environmental effects, mitigation measures will be proposed in order to avoid, reduce, offset or compensate those effects. These mitigation measures may be embedded in the design or compensatory. Such embedded mitigation measures will likely include the movement or loss of turbines, access tracks and other infrastructure; and management and operational measures.

In line with the mitigation hierarchy identified in the Planning Advice Note (PAN) 1/2017¹ and 1/2013², the strategy of avoidance, reduction, offsetting and compensation seeks:

- First to avoid significant adverse effects;
- Then to minimise those which remain; and
- Lastly, where no other remediation measures are possible, to propose appropriate compensation.

In addition, enhancement measures may be incorporated into design of the Development to maximise environmental benefits.

¹ Scottish Government, 2017, The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 [Online] Available at: <https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/> (Accessed 06/11/2020)

² Scottish Government, 2013, The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2013 [Online] Available at: <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/> (Accessed 06/11/2020)

2.2.3 Residual Effects

Taking cognisance of the suggested mitigation (and enhancement) measures, the predicted effects will be assessed to determine whether any residual effects remain.

2.2.4 Cumulative Assessment

The methodology adopted for assessing the cumulative effects of wind energy developments will be in accordance with advice from NatureScot. Cumulative effects, which are the combined effects of two or more similar developments, will be considered for each technical area assessed within the EIA.

The extent of any cumulative assessment relative to each technical assessment will be agreed during the consultation process and can include both existing and proposed windfarm developments as well as other forms of development.

2.2.5 Alternatives

Schedule 4, Part 2 of the EIA Regulations requires an outline of reasonable alternatives (such as technology, location, size and scale) considered and the main reasons why the Development was chosen, taking into account the environmental effects.

As the Development is adjacent to the Existing Wind Farm, the benefits of utilising existing infrastructure and extending in an area which already has wind turbines will be demonstrated. As such, alternative technologies, locations, sizes and scale will be considered within the EIA Report.

3 THE DEVELOPMENT

3.1 Site Description

The Site is adjacent to the Existing Wind Farm and occupies undulating farmland and a commercial forestry area in the south, rising between approximately 175 to 200 m Above Ordnance Datum (AOD). The existing on-site farming and forestry operations will continue throughout the construction and operation of the Development.

The Site is entirely within the North Lanarkshire Council (the Council) administrative area; however, the administrative boundary with West Lothian Council (WLC) is adjacent to the northern boundary of the Site.

The wider context of the Site is in close proximity to the M8 motorway and adjacent to the Harthill services; beyond the immediate area include a series of residential areas including Blackridge, Harthill and Armadale.

3.2 Site Selection

The Site was identified as a suitable site for a wind energy development due to its wind resource, proximity to electrical grid, accessibility and opportunity to minimise environmental effects associated with the Development. These considerations remain relevant for the Development, in particular:

- **Environmental Designations:** there are no statutory ecology, landscape or cultural heritage designations within the Site. Loan Birch Wood Site of Importance for Nature Conservation (SINC) which is a non-statutory local designation lies within the northern part of the Site and Torrance Marsh SINC is situated to the west of the Site, however effects on both receptors can be avoided by design;
- **Clustering:** The Development would form an extension to the Existing Wind Farm;
- **Available Land:** The Site is large enough to accommodate the Development without significantly affecting the agricultural operations; and
- **Access:** The Site is easily accessible to construction traffic and abnormal loads.

The Scoping layout, as shown in Figure 2, has been informed by desk-based assessment of on-site constraints and knowledge of the baseline from the previous work undertaken for the operational Torrance Farm Wind Park and subsequent Extension.

At this stage, the layout shown in Figure 2 is indicative and subject to change.

3.3 The Development

The Applicant is proposing to extend the consented Torrance Farm Wind Park on land to the west. The location of the Development is shown in Figure 1, and the indicative site layout relative to the Existing Wind Farm is shown on Figure 2. The infrastructure associated with the Development is likely to include:

- Up to 10 no. wind turbines and associated infrastructure, with a maximum tip of 140 m;
- A main site entrance and access track, likely from the B718 public road and on-site access tracks between turbines;
- On-site power collection system (transformer and underground cables);
- Battery energy storage and substation compound; and
- Temporary anemometer mast.

The indicative site layout and further design iterations will be influenced by, and in keeping with, the existing wind farm layouts adjacent to the site

3.3.1 Turbines

Proposed turbine details are as follows:

- Number of Turbines up to 10
- Maximum Height to blade tip up to 140 m
- Maximum Diameter to blade tip up to 120 m
- Generating capacity (per turbine) up to 4.6 MW
- Total generation capacity of the Development up to 49.9 MW

Each turbine will have a transformer, which is likely to be external to the turbine tower for health and safety reasons. Underground cabling, laid alongside the access tracks, will link the turbine transformers to a single storey substation and control building.

The connection to the national grid falls under a separate consenting process and is subject to a separate application.

For the purposes of the EIA pertaining to the Development, the precautionary principle will be adhered to and the largest prospective turbine dimensions will be assessed as the selected option. This allows a worst-case scenario to be evaluated, for example, during bird collision risk modelling and landscape and visual assessment.

3.3.2 Access

The turbines would be delivered to the most suitable port and the turbine components would be delivered to the Site via the existing road network. Use of public roads will require consultation with the appropriate bodies and an abnormal load assessment.

The route to site and access point for the Development is anticipated to be largely similar as followed for the existing Torrance Farm Wind Park, however the primary wind farm access points will likely come off the B718. This will be finalised during the EIA and in consultation with the relevant highway authority and Council. Where reasonable and if possible, consented track and existing farm access tracks on site will be adapted and used where suitable to provide access to the locations of the turbines, and other infrastructure. Where required, new tracks will be constructed of a graded stone and will be approximately 5 m in width.

3.3.3 Community Benefit

In accordance with the most recent advice from the Scottish Government³, the Applicant has committed to providing a community benefit fund of £5,000 per MW installed capacity throughout each year of operation.

A community benefit fund was established by the Applicant as part of the community benefit for the Torrance Farm Wind Park and its Extension, through support from Foundation Scotland. This fund receives over £60,000 annually, and has supported local projects for the communities of Harthill, Greenrigg, Eastfield and Blackridge

3.3.4 Decommissioning

The Development will be designed to operate for a period of 40 years. Provision will be made for the installation to be decommissioned and the site restored at the expiry of planning permission. Typically, all above ground equipment will be dismantled and

³ Scottish Government (2019) Scottish Government Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments [Online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2019/05/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments/documents/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments/govscot%3Adocument/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments.pdf> (Accessed 30/10/2020)

removed from the Site, cables and the turbine foundations will be cut off below ground level and covered with topsoil. Access tracks will be left for use by the landowners, or if appropriate, covered with topsoil. Alternatively, the Applicant may apply for planning permission to extend the operational life of the Development and this application would be submitted in accordance with the relevant planning and environmental impact legislation and regulations at the time of any such application.

4 POLICY AND LEGISLATIVE CONTEXT

This Section of the Report identifies the key policy documents of relevance to the Development which will be considered throughout the preparation of the EIA Report, including key planning guidance, renewable energy policy and other material planning considerations.

4.1 UK Planning Policy

There are clear renewable energy, electricity and carbon emission saving targets at a UK level for 2020 and longer term to 2050.

In May 2019, the Committee on Climate Change (CCC) published its landmark report entitled 'Net Zero – UK's Contribution to Stopping Global Warming'. The report responds to requests from the Governments of the UK, Wales and Scotland, asking the CCC to reassess the UK's long-term carbon emissions targets.

The report makes recommendations for the UK economy that a new tougher emissions target of net zero greenhouse gases (CHG) by 2050, ending the UK's contribution to global warming within 30 years. This would replace the previous target of an 80% reduction by 2050 from a 1990 baseline.

In Scotland, a target of net-zero GHG economy by 2045, reflecting Scotland's greater relative capacity to remove emissions than the UK as a whole. A net zero GHG target for 2050 would deliver on the commitment that the UK made by signing the Paris Agreement.

In terms of the UK and Scottish targets, the report makes it clear that, *"this is only possible if clear, stable and well-designed policies to reduce emissions further are introduced across the economy without delay. Current policy is insufficient for even the existing targets"*.

4.2 Scottish Government Planning Policy

There has been a large number of policy documents produced by the Scottish Government detailing topics of renewable energy and climate change, including:

- Statement from the First Minister on the 'Climate Emergency';
- The Climate Change (Emissions Reduction Targets) (Scotland) Bill 2018;
- The Climate Change Plan (2018);
- The Onshore Wind Policy Statement (2017);
- The Scottish Energy Strategy (2017);
- The 2020 Routemap for Renewable Energy in Scotland (Updated 2013 and 2015);
- The Electricity Generation Policy Statement;
- The 2020 Routemap for Renewable Energy in Scotland (2011); and
- The Climate Change (Scotland) Act 2009.

The renewable energy policy framework is a very important consideration and one that should attract significant weight in the balance of factors in the determination of the subsequent application.

4.2.1 Climate Change Plan: Third Report on Proposals and Policies 2018 – 2032

The Climate Change Plan: Third Report on Proposals and Policies (RPP3) was laid in Parliament on 28th February 2018 and sets out how Scotland can deliver its target of a 66% emissions reduction, relative to the 1990 baseline for the period 2018-2032. The RPP3 comprises three parts. Part One sets out the context for the Scottish Government's climate change proposals and policies. The Scottish Government's statutory duties are covered in Part Two, and Part Three of the Plan provides detailed information on the emissions envelopes and emissions reduction trajectories for each sector. Part Three identifies the progress, ambition and policies for the electricity, building, transport, industry, water, land use, forestry, and agricultural sector.

The Executive Summary notes that 'Climate change is one of the greatest global threats we face. Scotland must play its part to achieve the ambitions set out in the Paris Agreement, which mandates concerted, global actions to deal with the threat'.

Achievement of a 66% reduction in emissions by 2032 will require an 'enormous transformational change' (Pg.7) and the Climate Change Plan promotes a vision where the 'energy sector will be flourishing and competitive, delivering secure, affordable, clean energy for Scotland's households, communities and businesses' (Page 7). The pathways to 2032 envisage a scenario whereby Scotland's electricity system will be largely decarbonised and increasingly important as a power source for heat and transport.

The RPP3 notes that a critical role for the planning system will be to try and accommodate the further development of low emissions energy generation facilities noting that *"we will continue to need to find room for large scale infrastructure such as wind and solar farms, as well as more locally based equipment"* (Page 34/35).

4.2.2 Climate Change (Emissions Reduction Targets) (Scotland) Bill

The Climate Change Bill was introduced to Parliament on 23rd May 2018. The Climate Change Bill amends the Climate Change (Scotland) Act 2009 and will immediately increase the 2050 target to 90% by 2050, which the UK Committee on Climate Change (CCC) states this is currently *"at the limit of feasibility."*

The Climate Change Bill demonstrates Scotland's ambition to go further and achieve a 100% reduction in all greenhouse gas emissions as soon as possible. Setting a 90% reduction target for all greenhouse gases means net-zero emissions of carbon dioxide by 2050 (i.e. Scotland to be carbon neutral).

4.2.3 Scottish Government Climate Change Adaption Programme: Fourth Annual Progress Report

In May 2018, the Scottish Government published its fourth annual progress report on Scotland's Climate Change Adaptation Programme. The Report sets out the context for climate adaptation in Scotland, highlighting that climate change is already being experienced globally; that there are a range of future risk and opportunities; and that there is a developing evidence base to informing appropriate action. An Adaption Programme sets out the statutory requirements, its update and annual progress reports.

It provides a summary of the core content of the Adaption Programme, the highlights to date, and the findings of the first Independent Assessment of the Programme in 2016. The Progress Report refers to the development of Scotland's second five-year Adaptation Programme which is to be published in 2019.

4.2.4 Low Carbon Scotland: Climate Change Plan – Third Report on Proposals and Policies 2018 – 2032

The Low Carbon Scotland: Climate Change Plan was published in September 2018 and provides an overview of the Scottish Government's climate change plan 2018-2032. The document contains the most up-to-date renewable electricity generation data available from UK Government.

"In 2015, Scotland had reduced its emission by 41% from the 1990 baseline, and in 2017 Scotland generated 68.1% of its electricity requirements from renewables. Scotland's success in decarbonising electricity paves the way for transformational change across all sectors of the economy and society, particularly as electricity will be increasingly important as a power source for heat and transport."

The Climate Change Plan aims that by 2032 Scotland will have reduced its emissions by 66% relative to the baseline, while growing the economy, increasing the wellbeing of the

people of Scotland and protecting and enhancing the natural environment. Further, the Climate Change Plan proposes that by 2032 Scotland's electricity system will be largely decarbonised and increasingly important as a power source for heat and transport.

The Development, therefore, draws significant support as a contributor to these targets.

4.3 Development Plan

The North Lanarkshire Local Plan (the NLLP)⁴ sets out a strategy for regeneration and sustainable growth of the North Lanarkshire communities by balancing a range of fundamental economic, environmental and social aspirations. The NLLP's strategy states that the environmental impact of development should be reduced through location, accessibility, energy efficiency, renewable energy and the minimisation and management of waste and pollution.

The Council's interactive map identifies the following policy designations within the Site Boundary:

- Policy EDI2 - Promoting Economic Development and Infrastructure, Sub-Policy EDI 2 C2 - Opencast Coal Extraction Search Area;
- Policy BE 3 - Assessing Development in the Green Belt and Rural Investment Area, Sub-Policy NBE 3 B - Rural Investment Area; and
- NBE1 - Protecting the Natural and Built Environment, Sub-Policy NBE 1 A4A - Sites of Importance for Nature Conservation

The following list of individual policies are relevant to the Development and are not quoted in full (for full policy wording please refer to the NLLP)

- Development Strategy Policy (DSP)
 - DSP – 1 Amount of Development;
 - DSP – 2 location of Development;
 - DSP – 3 Impact of Development;
 - DSP – 4 Quality of Development;
- Development Strategy Area Priorities (DSAP)
 - DSAP 4 – Local Regeneration Priorities;
- Economic Development and Infrastructure (EDI)
 - EDI 1 A2 - Alternative Development Potential;
 - EDI 1 C - Protecting Mineral Resources;
- Natural and Built Environment (NBE)
 - NBE1 - Protecting the Natural and Built Environment;
 - NBE 1 A3c - Regional Parks;
 - NBE 1 A5 - Other Sites of Importance;
 - NBE 1 A6 - Protected Species;
 - NBE 1 B2c - Listed Buildings;
 - NBE 1 B3c - Sites of Archaeological Interest;
 - NBE 2 A1 - Central Scotland Forest;
 - NBE 2 A2 - Greening the Urban Fringe;
 - NBE 2 A3 - Woodland Management and Structure Planting;

⁴ North Lanarkshire Council (2012) North Lanarkshire Local Plan Policy Document [Online] Available at: <https://www.northlanarkshire.gov.uk/CHttpHandler.ashx?id=8411&p=0> (Accessed 30/10/20)

- NBE 2 A5 - Countryside Access / Public Rights of Way (including Core Path Network);
- NBE 2 B1 - Lighting Strategy;
- NBE 2 B3 - Listed Buildings;
- NBE 2 C - Vacant and Derelict Land Regeneration.

4.4 Material Considerations

4.4.1 North Lanarkshire Draft Supplementary Planning Guidance

The following list of Supplementary Guidance by the Council are relevant to the Development:

- SPG 01 Landscaping (Sept 2009);
- SPG 01A Landscaping supplement (Sept 2009);
- SPG 08 Development in the RIA (July 2010);
- SPG 09 Flooding and Drainage (July 2010);
- SPG 12 Wind turbine developments (July 2010);
- SPG 20 Biodiversity (December 2011);
- SPG 20 Biodiversity appendix (December 2011);
- SPG 22 Environmental Impact Assessment (EIA) (December 2011); and
- SPG 33 Archaeology (November 2012).

4.4.2 ClydePlan

The ClydePlan is a Strategic Development Plan that was adopted in July 2017⁵, which sets out a Vision and Spatial Development Strategy until 2036 of where new development should be located and a policy framework that helps deliver sustainable economic growth through the creation of high-quality places which reduces inequalities and which enhances the quality of life. The ClydePlan comprises the eight following local authorities: East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Lanarkshire, Renfrewshire, South Lanarkshire and West Dunbartonshire.

The following list of individual policies are relevant to the Development and are not quoted in full (for full policy wording please refer to the ClydePlan):

- Policy 10 – Onshore Wind;
- Policy 13 – Forestry and Woodland;
- Policy 15 – Natural Resource Planning; and
- Policy 16 – Improving the Water Quality Environment and Managing Flood Risk and Drainage.

4.4.3 National Planning Policy 3

The National Planning Framework 3 (NPF3) was published on 23rd June 2014. NPF3 is a long-term strategy for Scotland and is the spatial expression of the Government's Economic Strategy and plans for development and investment in infrastructure. Together, NPF3 and SPP (2014), applied at the strategic and local levels, are intended to help the planning system deliver the Scottish Government's vision and outcomes for Scotland and to contribute to the Government's central purpose. SPP is further considered below.

High level support for renewables is provided through the "vision" which is referred to as *"we have seized the opportunities arising from our ambition to be a world leader in low carbon generation, both onshore and offshore..."*.

⁵ ClydePlan Strategic Development Plan (2017). Available online at <https://www.clydeplan-sdpa.gov.uk/images/ApprovedPlanHighRes.pdf> (Accessed 30/10/2020)

Chapter 3 sets out the role that Planning will play in delivering the commitments set out in 'Low Carbon Scotland: The Scottish Government's Proposals and Policies' which states "*the priorities identified in this spatial strategy set a clear direction of travel which is consistent with our world leading climate legislation*".

Chapter 3 states that it is the Scottish Government's ambition to achieve at least an 70% reduction of greenhouse gas emissions by 2020. Paragraph 3.8 further states that the Government's aim is to meet at least 30% of overall energy demand from renewables by 2020 – this includes generating the equivalent of at least 100% of gross consumption from renewables.

Onshore wind is considered a key technology in the energy mix which will contribute to Scotland's goal of becoming a low carbon place which will be a key part of the 'vision' for Scotland (as set out in Paragraph 1.2 of NPF3).

The Development would contribute to renewable energy targets and meet the objectives of NPF3 and longer-term Government targets. As demonstrated through the 2014 EIA, the Development will minimise the effects on the environment, whilst benefiting the local community and contributing to economic development.

NPF4 is anticipated to be adopted in late 2020 which, based on the drafts consulted upon, will provide further support for renewable energy development including onshore wind in Scotland.

4.4.4 Scottish Planning Policy

Scottish Planning Policy (SPP) sets out national planning policies which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land. The SPP promotes consistency in the application of policy across Scotland whilst allowing sufficient flexibility to reflect local circumstances.

SPP is a non-statutory document which sets out the Scottish Government's policy on land use planning and therefore, should be afforded significant weight in the determination process for planning applications; however, paragraph (iii) of SPP acknowledges that "it is for the decision-maker to determine the appropriate weight in each case".

SPP contains two Principal Policies, namely 'sustainability' and 'placemaking'. SPP states at paragraph 24 that:

"the Scottish Government's central purpose is to focus Government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth".

Paragraph 27 states "*indicates that sustainable economic growth is the key to unlocking Scotland's potential ... and to achieving a low carbon economy ...*". It also makes reference to the need to maintain a high-quality environment and to pass on "a sustainable legacy for future generations".

Paragraphs 152 to 192, under the heading "A Low Carbon Place", detail how the Scottish planning system will contribute towards delivering a low carbon economy, specifically through the development of electricity generation technologies which will help contribute to reducing greenhouse gas emissions. Paragraphs 161 to 166 deal solely with onshore wind development.

The SPP sits alongside other key Scottish Government documents including the NPF3 and Circulars.

4.5 Summary

The above policies and plans reflect the current direction of the Scottish Government's and Council's objectives for accommodating wind turbine development.

Both NPF3 and SPP set out a strong position of support in relation to renewable energy and renewable energy targets and recognise the significant energy resource provided by onshore wind. Nonetheless, development should continue to be guided to appropriate locations and environmental effects need to be judged to be acceptable before consents are forthcoming.

A Planning Statement will accompany the forthcoming application to undertake an in-depth appraisal of the Development to assess its compliance with relevant planning policies.

5 LANDSCAPE AND VISUAL

5.1 Introduction

This Section sets out the approach to the Landscape and Visual Impact Assessment (LVIA) proposed to be undertaken for the Development.

5.2 Assessment Methodology

5.2.1 Guidance

The assessment methodology will follow the 'Guidelines for Landscape and Visual Impact Assessment' Third Edition (GLVIA3). As recommended by GLVIA3, this is not a generic LVA methodology, but has been tailored to be proportionate to the nature and location of the Development. The methodology also considers the following guidance:

- Guidelines for Landscape and Visual Impact Assessment (GLVIA3)⁶;
- The Landscape Institute (2013), GLVIA3 Statement of Clarification 1/13⁷;
- Siting and Designing Windfarms in the Landscape, NatureScot⁸;
- Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments, NatureScot⁹;
- General Pre-Application and Scoping Advice for Onshore Wind Farms (NatureScot, 2020)¹⁰
- Scottish Government, Onshore Wind Turbines: planning advice¹¹
- Visual Representation of Wind Farms, Version 2.2, NatureScot¹²; and
- Visual Representation of Development Proposals, Technical Guidance Note 2019, The Landscape Institute¹³.

5.2.2 Methodology

Landscape effects are defined by the Landscape Institute as "*Effects on the landscape as a resource in its own right*". These effects can be positive or negative. Development may have a direct (physical) effect on the landscape as well as an indirect or effect perceived from outside the landscape character area. The potential landscape effects, occurring during the construction, decommissioning, and operation phases, may therefore include, but are not restricted to, the following:

- Changes to landscape elements: the addition of new elements or the removal of trees, vegetation, and buildings and other characteristic elements of the landscape character type;
- Changes to landscape qualities: degradation, erosion, or reinforcement of landscape elements and patterns, and perceptual characteristics, particularly those that form key characteristic elements of landscape character types;
- Changes to landscape character: landscape character may be affected through the effect on characteristic elements (including perceptual characteristics), landscape

⁶ Landscape Institute and Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment (GLVIA3), 3rd Edition, Routledge, London (Accessed 08/10/20)

⁷ <https://www.landscapeinstitute.org/technical-resource/glvia3-clarifications/> (Accessed 08/10/20)

⁸ NatureScot (2017) Siting and Designing Windfarms in the Landscape, Version 3a, (Accessed 08/10/20)

⁹ NatureScot (2012) Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments (Accessed 08/10/20)

¹⁰ NatureScot General Pre-Application and Scoping Advice for Onshore Wind Farms. Available at:

<https://www.nature.scot/sites/default/files/2020-10/General%20pre-application%20and%20scoping%20advice%20for%20onshore%20wind%20farms.pdf> (Accessed 08/10/20)

¹¹ Scottish Government (2014) Onshore Wind Turbines: Planning Advice [Online] <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/> (Accessed 08/10/20)

¹² NatureScot (2017) *Visual Representation of Wind Farms*, Version 2.2 (Accessed 05/11/20)

¹³ The Landscape Institute (2019) Visual Representation of Development Proposals, Technical Guidance Note 06/19 (Accessed 05/11/20)

patterns and attributes and the cumulative addition of new features, the magnitude and presence of which is sufficient to alter a notable part of the overall landscape character type of a particular area;

- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

Visual effects are concerned wholly with the effect of development on views and general visual amenity. Visual effects are identified for different receptors (people) who would experience the view at their places of residence, during recreational activities, at work, or when travelling through the area. Visual effects may include the following:

- Visual effect: Change in the appearance of the landscape as a result of development. This can be positive (i.e. beneficial or an improvement) or negative (i.e. adverse or a detraction); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

Particular attention is dedicated to the Development's impact on local residents because they would experience the Development from different locations, at different times of the day, usually for longer periods of time, and in different seasons.

Essentially, the level of landscape and visual effect (and whether this is significant) is determined through consideration of the 'sensitivity' of:

- The landscape element, assemblage of elements, key characteristics or character type or area under consideration bearing in mind quality and value; or
- The visual receptor; and the 'magnitude of change' posed by the Development, in this case the construction of a wind farm and associated infrastructure, its operation for a period of 25 years, and subsequent decommissioning.

Landscape or visual sensitivity is ranked from large, medium, small to negligible and the magnitude of change is similarly ranked from high, medium, small to negligible. The type of effect is also considered and may be direct or indirect, temporary or permanent, cumulative, and positive, neutral or negative. The landscape and visual assessment will involve a combination of both quantitative and subjective assessment and wherever possible has sought to gain a consensus of professional opinion through consultation, peer review and the adoption of a systematic, impartial, and professional approach.

In accordance with EIA Regulations, it is essential to determine whether the predicted effects are likely to be 'significant'. Significant landscape and visual effects, in the assessor's opinion, resulting from the Development would be all those effects that normally result in a 'substantial', a 'moderate / substantial', or 'moderate' effect with any exceptions being clearly explain. The landscape and visual assessment will unavoidably involve a combination of both quantitative and qualitative assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

5.2.3 Study Area

5.2.3.1 LVIA

In accordance with guidance, the Study Area for the LVIA of the Development will cover a radius of 40 km from the nearest turbine, as shown in Figure 6. This is considered to be the maximum radius within which a significant landscape and/or visual effect could occur given the height of the turbines that are being considered.

5.2.3.2 Cumulative Landscape and Visual Assessment Study Area

The Cumulative LVIA (CLVIA) assesses the cumulative effects of the development in combination with other developments. In line with NatureScot guidance, and outlined in GLVIA3, cumulative effects for the purpose of this assessment are based on the following definitions:

- Cumulative Effects are defined as the additional changes caused by a proposed development in conjunction with other similar development or as the combined effect of a set of developments, taken together (NatureScot 2012:12);
- Cumulative Landscape Effects are defined as effects that 'can impact on either the physical fabric or character of the landscape or any special values attached to it' (NatureScot 2012:10);
- Cumulative visual effects are defined as effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different Wind turbines' (NatureScot 2012:11);

A search will be undertaken using publicly available online data sources and information on planning authority planning portals of all cumulative sites within a 60 km radius of the Site. The search will include:

- Development under construction;
- Consented but not yet constructed development;
- Development for which a valid planning application has been submitted; and
- Development which has been refused planning permission and which is subject of an appeal.

5.3 Baseline Conditions and Information Gathered to Date

Field surveys were carried out throughout spring and summer 2010, and updated autumn 2011 to support the Torrance Farm Extension application, which has informed the preliminary review of the Site. The landscape surrounding Site was assessed for any particular features that contribute to the landscape character of the Development or are important to the wider landscape setting.

5.3.1 Site Context

The Site is located on the edge of an area of distinctive upland moorland and more settled farmland which lies to the north of the M8 transport corridor, between Edinburgh in the east and Glasgow in the west. Five turbines have already been installed adjacent to the Site as part of the Torrance Farm Wind Park and its Extension. The immediate locality of the Development is rural and commercial forestry, although there are a number of small towns within the local area.

In addition to wind farms, there are a number of tall masts and pylons located within this landscape. The land cover on site consists of improved and semi-improved grassland, with some areas of coniferous plantation. There are stretches of degraded hedgerow, hedgerow trees and post and wire fences demarcating field boundaries.

5.3.2 Cumulative Wind Farms

The following **operational** wind farms are located within 10 km of the Site, and influence the landscape character:

- Drumduff Wind Farm;
- Southrigg Farm;
- Burnhead; and
- Nether Braco.

Beyond 10 km, cumulative operational wind farms include Black Law, Black Law 2 and Tormywheel

The following **consented wind farms** are located within 10 km of the Site:

- Drumelzie;
- West Benhar;
- Stanebert; and
- Brownhill Farm.

There are a number of other sites in planning, consented and operational within 60 km of the Site, and a full cumulative search will be undertaken prior to approaching the Council to agree the cumulative assessment scope.

5.3.3 Landscape Character

The character area of the Site is described as Plateau Moorlands which extends to the west and south, although it falls on the boundary with the West Lothian Plateau which is a modified landscape which gradually merges with the farmland of the River Almond valley.

As the land rises to the north to form the smooth plateau landform, the land becomes less agricultural, wilder and more exposed in character. Predominant land cover changes from improved and semi-improved grassland used for grazing, to heather and grass moorland. The landscape also becomes very sparsely populated, with a handful of single dwellings.

This landscape is notable for its transitional character of contrasting remote, exposed upland and more settled farmland of the lowlands. The local landscape has been significantly modified over time through coal mining, railroads, industrial units and forestry plantation.

This character area also contains the existing wind farms of Torrance Farm Wind Park and its Extension, Black Law and Black Law extension, and consented wind farms including West Benhar, Brownhill Farm and Greengairs wind farm. The existing wind farms are an influencing and defining characteristic within the landscape.

5.3.4 Landscape Designations

The Site is not located within a statutory landscape designation. However, there are designated landscape areas that are located within the study area and from which it may be possible to view the Development, and impacts on these designations will be assessed.

5.3.4.1 International Designations

There are two international designations. These are UNESCO World Heritage Sites:

- New Lanark World Heritage Site; and
- Antonine Wall World Heritage Site.

New Lanark was inscribed by UNESCO as a cultural World Heritage Site in 2001 in recognition of the profound influence on social developments that emerged as a result of Robert Owen and his social philosophy in progressive education, factory reform and humane working practices. The site contains a number of 19th century cotton mill buildings, workers' housing and a school, tucked into the valley of the River Clyde.

The Antonine wall was built by the Roman Army under the Emperor Antoninus Pius after the successful conquest of southern Scotland in 142 AD. It runs from Bo'ness to the mouth of the River Clyde.

Both are considered 'high' sensitivity receptors. However, the Development will not be visible from either World Heritage Site and given the distance and intervening development, can be scoped out of further assessment.

5.3.4.2 National Designations

There are no national landscape designations within the study area.

5.3.4.3 National Non-Statutory Landscape Designations

There are 28 sites listed on the Inventory of Gardens and Designed Landscapes (GDL), which is a national non-statutory landscape designation. Inclusion within the inventory means that it receives recognition and a degree of protection through the planning system. The relative importance (international, national, regional, local) of a site is assessed within the individual citations within the Inventory.

5.3.4.4 Local Landscape Designations

There are a number of local landscape designations within the 40 km study area, including:

- Blackridge Heights Special Landscape Area (SLA) (West Lothian);
- Clyde Valley Area of Great Landscape Value (AGLV) (North Lanarkshire);
- Bathgate Hills SLA (West Lothian);
- Clyde Valley SLA (South Lanarkshire);
- Pentland Hills (West Lothian / South Lanarkshire / City of Edinburgh / Scottish Borders);
- Douglas SLA (South Lanarkshire);
- Leadhills SLA (South Lanarkshire);
- Bo'ness SLA (Falkirk);
- Slamannan Plateau SLA (Falkirk);
- Campsie Fells SLA (East Dunbartonshire);
- Fintry Hills Local Landscape Area (LLA) (Stirling)

Particular consideration will be given to impacts on the Blackridge Heights SLA, located approximately 1.2 km north of the Site at its closest point.

5.3.5 Wild Land

There are no Wild Land Areas (WLA) within the study area and as such, this can be scoped out of further assessment.

5.3.6 Visual Receptors and Visual Amenity

The landscape and visual effects of the Development will be assessed in detail from a range of viewpoints. These are representative of a range of views and viewer types, including settlements, transport routes, recreational routes, main visitor locations, main landscape character types and a variety of distances, aspects, elevations, extents, and sequential routes. Specific locations will also be identified.

Sixteen viewpoints throughout the study area have been identified. These viewpoints represent typical views that people who live in the area, visitors to the area, and people passing through are likely to experience. These viewpoints will be confirmed with the Council and Nature Scot however, are as proposed in Table 4 below. The asterisk denotes different viewpoint to Torrance Farm Extension application.

Table 4: Proposed Viewpoint Locations

	Viewpoint Description	NGR	Distance to the Site
1*	Harthill Road, at junction with Blairmuckhill Road	290069, 666298	Adjacent to northern boundary.
2	Properties at Polkemmet	293372, 664670	1.1 km south-east
3	Harthill	290606, 664502	550 m south

	Viewpoint Description	NGR	Distance to the Site
4	'Knock' viewpoint on Cairnpapple Hill	299058, 671126	9.6 km north-east
5	Forrest Road at quarry adjacent to Dewshill Cottages	285628, 664307	3.5 km west
6	Hillend Reservoir	282754, 667488	7.3 km north-west
7	Black Loch	286129, 670421	5.7 km north
8	Bathgate	298254, 668629	7.8 km east
9	Cockleroy	298944, 674360	11.7 km north-east
10	Harburn	303965, 661412	13.5 km south-east
11	Kilsyth Hills	273441, 681131	22.3 km north-west
12	Dunfermline	307196, 688549	28 km north-east
13	B7057 at J5 of the M8	287046, 663893	2 km west
14	Forrestfield village on A89	285491, 667064	4.3 km north-west
15	B717 from Harthill to Shotts at Brownfield Farm	288058, 662345	2.2 km south-west

These viewpoints are broadly similar to the Torrance Farm Wind Park Extension application however, amendments are proposed based on closest receptors and comments to the Torrance Farm Extension application.

5.3.7 Sequential Assessment

There is potential for sequential effects when travelling around the study area. It is proposed the scope of the sequential assessment will consider sequential visual impacts, including cumulative impacts, on the following routes:

- M8 motorway;
- A89;
- B718;
- B8084; and
- NCR 75.

The location of the Site within the central belt means it has a direct relationship with the surrounding landscape on all sides and a number of settlements in the surrounding area. As such, routes for travel will be assessed in both directions.

5.4 Key Sensitivities

The following sensitivities are considered to be important considerations for the LVIA:

- Effects on landscape character and the landscape designations;
- Blackridge Heights SLA;
- Visual amenity effects from receptors including Harthill and Blackridge;
- Sequential effects on the M8 and A89;
- Cumulative landscape and visual effects;

5.5 Potential Effects and Assessment

The selection of receptors to include in the assessment is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely to be significant do not require assessing under the EIA Regulations.

5.5.1 Scoped Out Effects

Those receptors scoped out the assessment following initial desk-based review and site visit, are listed below.

- Landscape Character Areas outwith a 15 km radius of the Development;
- All WLAs;
- All NSAs;
- All GDLs;
- Night-time assessment (as turbines < 150 m to tip height); and
- Viewpoints representative of the key visual receptors in the Study Area with no or very limited potential for a significant effect to arise.

The LVIA will consider all potentially significant effects during construction, operation and decommissioning, cumulative effects as well as solus effects and the potential for night-time effects relating to aviation lighting should that be made a technical requirement.

5.6 Key Questions for Consultees

Where relevant, consultees are asked to respond to the following questions:

- Are consultees content that the LVIA scope has identified the most important receptors to be assessed?
- Are consultees in agreement with the proposed study area, focus, and source data for the assessment of landscape effects?
- Are consultees content with the proposed revised viewpoints identified in Table 4 above, and could they advise of any additional viewpoints they consider necessary to assess the effects of the Development?
- Can it be confirmed that a 40 km Study Area for the LVIA is considered an appropriate starting point for the LVIA but that 15 km is suitable for the detailed assessment of effects on landscape and visual amenity?
- Can it be confirmed that the 2019 SNH landscape character types are to be used and supersede the 1998 SNH assessment?
- Can the Council please confirm the scope / recent applications for the cumulative assessment baseline?

6 ECOLOGY

Ecological surveys will be undertaken in order to establish the baseline conditions and assess the potential effects of the Development, significance and the potential for mitigation.

6.1 Assessment Methodology

6.1.1 Approach to Assessment

6.1.1.1 Overview of Ecological Impact Assessment (EcIA)

The assessment of ecological impacts will follow the guidance document produced by the Chartered Institute of Ecology and Environmental Management (CIEEM)¹⁴, ensuring a transparent and scientifically rigorous approach to Ecological Impact Assessment (EcIA). These guidelines set out the process for assessment through the following:

- Collation of baseline ecological information through desk study and field surveys;
- Identification and characterisation of ecological impacts from all phases of the Development;
- Incorporation of measures to mitigate identified impacts;
- Assessment of significance of residual impacts following mitigation;
- Identification of appropriate compensation to offset significant residual impacts; and
- Identification of opportunities for ecological enhancement.

The Ecology Chapter of the EIA Report will be supported by Technical Appendices detailing the desk study results, consultation, survey methods and results, and will be further supported by relevant figures, tables and photographs, where necessary. Where sensitive data is recorded, the Ecology Chapter will be supported by confidential appendices which will not be released to the public domain.

6.1.1.2 Desk Study & Consultation

In addition to formal scoping, early and thorough consultation with key stakeholders is a key element in the assessment process. NatureScot will be engaged to discuss preliminary survey results and key constraints where necessary, whilst ensuring that statutory consultees are kept informed about the nature of the proposal.

In order to augment baseline data and, if necessary, refine the survey scope, recent records (within 20 years) of protected and/or notable species and details of sites of ecological interest will be sought. Consultation requests for the provision of data will be obtained from the following organisations:

- NatureScot;
- The Council;
- North Lanarkshire Local Biological Records Centre (NLLBRC);
- Scottish Badgers; and
- Clyde Bat Group.

Consultation requests for the provision of data will aim to collect the following:

- All records of rare, notable or protected flora and fauna within 5 km of the Site; and,
- All records of invasive, non-native species within 2 km of the Site.

¹⁴ CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. 2nd edition [Online] Available at: https://www.cieem.net/data/files/Website_Downloads/Guidelines_for_Ecological_Impact_Assessment_2015.pdf (Accessed 01/10/20)

Information relating to statutory designated sites was obtained from the NatureScot Sitelink¹⁵ website. Sites designated for their ornithological interest (such as Special Protection Areas (SPAs)) or geological interests are considered separately and are not discussed below.

A 5 km buffer of the Site was searched for statutory designated sites of ecological interest, shown in Figure 4, including:

- Local Nature Reserves (LNR);
- National Nature Reserves (NNR);
- Marine Protected Areas (MPA);
- Ramsar sites;
- Sites of Special Scientific Interest (SSSI); and,
- Special Areas of Conservation (SAC).

The following statutory designated sites were found within the relevant Study Areas, and are listed in Table 6.

Table 6: Statutory Sites Designated for Ecological Features

Statutory Site	Designation	Approximate distance from the Site	Qualifying Features
Blawhorn Moss	SAC	1.8 km to the north	<ul style="list-style-type: none"> • Active raised bog • Degraded raised bog
	SSSI		<ul style="list-style-type: none"> • Raised bog
	NNR		<ul style="list-style-type: none"> • N/A
Haddockrigg and North Shotts Mosses	SSSI	2.2 km to the south-west	<ul style="list-style-type: none"> • Raised bog
North Shotts Moss	SAC	2.6 km to the south-west	<ul style="list-style-type: none"> • Active raised bog • Degraded raised bog
Black Loch Moss	SAC	4.6 km to the north-west	<ul style="list-style-type: none"> • Active raised bog • Degraded raised bog
	SSSI		<ul style="list-style-type: none"> • Raised bog

6.1.2 Baseline Surveys

The scope of field surveys is based on our first-hand experience and understanding of key ecological sensitivities in the area, and on industry good practice, including prevailing NatureScot survey guidelines for protected species surveys for development projects¹⁶ and onshore wind farms¹⁷.

NatureScot general advice (2019) guidance for onshore wind farms states that "*non-avian species surveys should be completed no more than 18 months prior to submission of the application, to ensure that they are a contemporary reflection of species activity at and around the site.*" Although habitat and botanical data is not time-limited in such a way within NatureScot guidance, however recent CIEEM guidance recommends that habitats data is likely to require to be updated after 3 years. As the data gathered to support the

¹⁵ NatureScot. *NatureScot Sitelink*. Available at: <https://sitelink.nature.scot/home>. [Accessed on 29/10/2020]

¹⁶ <https://www.nature.scot/professional-advice/planning-and-development> [Accessed 29/10/20]

¹⁷ NatureScot (2020) General Wind Farm Advice [Online] Available at: <https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms> [Accessed 29/10/20]

2011 Torrance Farm Wind Park and its Extension exceed the above timescales, surveys will be appropriately updated.

Survey areas will vary depending on the survey methods; however, they are all broadly based on appropriate buffers of the Site. Should this change ahead of the commencement of surveys, the survey areas will be redefined accordingly.

6.1.2.1 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey will be undertaken in spring 2021 and will be conducted following standard methods (JNCC, 2010) to accurately map and classify semi-natural habitats within the Site and record the higher plants of each habitat. The survey will also seek to determine the presence or absence of controlled botanical species, such as Japanese knotweed. Target Notes will be recorded to provide detail about features of particular interest as well as any evidence of, or potential for, protected species. The survey area will include the Site and a 250 m buffer (where access permits).

Optimum Survey Period: April–September

6.1.2.2 National Vegetation Classification Survey

Where protected or potentially sensitive habitats (e.g. Annex 1 Habitats and UKBAP Priority Habitats) are recorded during the Extended Phase 1 Surveys, a National Vegetation Classification (NVC) Survey will be carried out according to standard methods (Rodwell 1991; 2006) in spring/summer 2021. NVC assesses the vascular plant, bryophyte and macro-lichen species within homogenous vegetation types to classify and map communities. This survey will also provide details of any Ground Water Dependent Terrestrial Ecosystems (GWDTE) present, which will be mapped in accordance with current SEPA/SNIFFER (2017) guidance.

Optimum Survey Period: April–September

6.1.2.3 Bat Surveys

Bat surveys will be carried out between May and October 2021 in accordance with new multi-stakeholder Bat Survey Guidelines published by NatureScot¹⁸. This new sets out a points-based framework to assess the risk a turbine development is likely to pose to bats, and scores and categories sites through consideration of the habitats present and the scale of the development.

Based on this assessment criteria the Site is considered to have a Moderate Habitat Risk (due to the presence of mixed and suitable commuting and foraging features) and a Medium Project Scale (between 10-40 turbines), giving the site three points, and categorising it as a 'medium risk' site.

Remote Monitoring Activity Surveys

Remotely operating full spectrum bat detectors (Anabat Swift) will be used to automatically record bat activity on three seasonal occasions between May and October 2021 inclusive (spring: April-May, summer: June-mid-August and autumn: mid-August-October). In accordance with the 2019 survey guidelines¹⁸, and based on the proposed 10 turbines, 10 AnaBat Swift bat detectors will be deployed for a minimum of ten consecutive nights each survey season. The AnaBats will be located within the potential turbine layout and a range of representative habitats and control sites, where feasible.

All bat data recorded during survey will be analysed using Anabat analysis software, ideally within a month of it being recorded to ensure that issues are identified promptly.

¹⁸ NatureScot (2019) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*.

Transect Surveys

Due to the spatial and temporal limitations of transect survey data generally, it is not believed that transect surveys would be of any notable additional value to the bat survey baseline data collected, and therefore would have a negligible influence in ensuring the robustness of the assessment on the potential impacts on bats. In light of this, and in accordance with the 2019 guidelines, transect surveys have been scoped out.

Roost Surveys

Data searches will be conducted to identify known roost sites in the vicinity of the Site. Potential bat roosts on site will be identified and assessed during initial site visits and, if necessary, emergence/re-entry surveys carried out at potential roost sites considered to be at risk.

6.1.2.4 Protected Species Surveys

Based on available habitats and historical records, the Site boundary has the potential to support several protected species including, but not limited to: otter (*Lutra lutra*), water vole (*Arvicola amphibius*) and badger (*Meles meles*), however a watching brief for other notable species will be maintained. The below species-specific surveys will be conducted.

Otter and Water Vole survey

Some suitable habitats for both otter and water vole are likely to exist within the Site and the wider local area. Otter and Water Vole Surveys will be carried out in summer, avoiding surveying during or after periods of heavy rainfall. In accordance with established NatureScot guidance (2019) all watercourses and waterbodies within the Site boundary and up to 200 m outwith that are potentially at risk of impact will be surveyed in summer by an experienced ecologist in accordance with published guidelines.

Timing: April – September

Badger Surveys

Due to the presence of suitable woodland, grassland and arable habitats throughout the Site and the wider area, targeted surveys will be carried out within suitable habitats up to 150 m of the Site to search for signs of the presence of badger. Surveys will be carried out by an experienced ecologist in accordance with published NatureScot (2016) guidelines.

Timing: February – November

Amphibians and Reptiles

Due to the presence of ponds within the Site and the surrounding local area, the potential impacts of the development on great crested newt (*Triturus cristatus*) will need to be addressed within the EIA.

A Habitat Suitability Index (HSI) assessment will be carried out on all ponds and waterbodies within 500 m as per published guidance^{19,20}. If ponds are considered to be suitable, eDNA sampling and analysis will be undertaken as appropriate to inform the need for further pond surveys.

¹⁹ ARG UK (2010) UK Advice Note 5: Great Crested Newt Habitat Suitability Index <https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file> (Accessed 29/10/2020)

²⁰ NatureScot (undated) Protected Species Advice for Developers – Great Crested Newt <https://www.nature.scot/sites/default/files/2017-10/A2124123%20-%20Species%20Planning%20Advice%20Project%20-%20great%20crested%20newt%20-%20FINAL.pdf> (Accessed 29/10/2020)

The Site has the potential to support other common amphibian species, as well as common reptile species, and although specific surveys are not considered necessary, a watching brief for these species will be maintained.

Scoped Out

Protected Species not included in the above scope as considered to be absent from the Site and local area, due to either the habitats present or the geographical location of the Site as are therefore scoped out. This includes;

- Red squirrel (*Sciurus vulgaris*);
- Pine marten (*Martes martes*); and
- wildcat (*Felis silvestris*).

6.1.2.5 Fisheries Surveys

In accordance with NatureScot advice, all development sites with the potential to directly or indirectly affect watercourse should be subject to a Fisheries Habitat Survey following the Scottish Fisheries Coordination Centre methods, to inform the likelihood of the presence of salmonids, eels, freshwater pearl mussel and other protected/ BAP species and so the need or otherwise for species specific surveys.

There are several minor watercourses within the Site including the How Burn, which connects to the River Almond, a Designated Scottish Salmon River presence of several watercourse in the Site. Although obstacles to migratory fish ruled out the presence of migratory trout and salmon, as well as eel and freshwater pearl mussel, the presence of resident fish species, including brown trout (UK Biodiversity Action Plan priority fish species) cannot be ruled out.

In light of the above, a Fisheries Habitat Survey (FHS) will be carried out by qualified surveyors (Scottish Fisheries Co-ordination Centre (SFCC)), for all representative/suitable survey locations in accordance with SFCC (2007) guidance. The FHS will identify sensitive areas, such as salmonid fish spawning habitat, and will inform the need for further surveys required to inform appropriate mitigation, however at this stage, these are not anticipated to be required.

6.2 Assessment Methodology

The assessment of ecological impacts will follow the guidance document produced by the CIEEM¹⁴ ensuring a transparent and scientifically rigorous approach to EcIA.

The assessment will include proposals for the avoidance and mitigation of potentially adverse effects and will consider enhancement measures to increase biodiversity in the area. Potential cumulative ecological effects with other nearby developments will also be addressed. Mitigation will be identified where the assessment indicates that there is a potential significant impact on important habitats and species as a consequence of the Development.

CIEEM guidelines set out the process for assessment through the following:

- Collation of baseline ecological information through desk study and field surveys;
- Identification and characterisation of Important Ecological Features (IEFs);
- Incorporation of imbedded mitigation measures such as mitigation by design, and mitigation by practise
- Identification and characterisation of ecological impacts from all phases of the Development;
- Assessment of significance of effects ahead of and following application mitigation hierarchy;
- Incorporation of measures to mitigate identified potential effects;

- Assessment of significance of cumulative effects;
- Identification of appropriate compensation to offset significant residual impacts; and
- Identification of opportunities for ecological enhancement.

6.2.1.1 Determining Importance

Upon identification of the likely effects a systematic assessment of IEFs will be carried out. In accordance with CIEEM guidance, the importance of an ecological feature is considered within a defined geographical context.

The determination will be site specific however, habitats and species of nature conservation importance identified through statutory policy and legislation will provide a starting point for the identification of IEFs requiring consideration in EcIA. Expert judgment is also required for the identification of IEFs, particularly where these may not be included in lists, designated sites or features, or highlighted in nature conservation policy. Only ecological features with at least regional importance are considered as IEFs, and will require assessment for potential significant effects. All other features will be are scoped out of the assessment, with justification for exclusion provided.

6.2.1.2 Assessment of Significance

Within this assessment, the significance of the potential effects on each identified IEF is determined by considering both the nature conservation importance of each feature and the degree to which it may be affected (the effect magnitude) by the Development, and will include consideration of embedded mitigation.

6.2.1.3 Mitigation, Residual Effects and Cumulative Effects

The assessment will include proposals to mitigate significant adverse effects, and will include measures to increase biodiversity in the area where possible, such as habitat restoration and management. Mitigation will be identified where the assessment indicates that there is a potential significant impact on IEFs as a consequence of the Development. Following the application of mitigation, an assessment of residual effects will be carried out to determine whether effects remain 'significant'. Potential cumulative ecological effects with other nearby developments will also be addressed.

6.3 Potential IEFs

Baseline ecological surveys have not been undertaken at the time of writing; however, a preliminary appraisal of the Site (which includes an assessment of the baseline data present above, as well as the results of previous surveys), suggests that potential IEFs include, but are not limited to;

- Bats;
- Water vole; and
- Great crested newt

6.3.1 Potential Effects and Assessment

The ecological assessment will focus on the potential effects of indirect and direct impacts during construction, operation and decommissioning of the Development. This will be assessed in terms of, but not limited to, the detrimental effects of the following;

- Indirect impacts on nearby designated sites and their qualifying interests;
- Direct and indirect habitat loss and disturbance - temporary or permanent loss to terrestrial or aquatic habitats, including sensitive or protected habitats;
- Turbine-related bat mortality - death or injury to bats by collision with the turbine blades; and

- Indirect and direct effects on protected fauna including, but not limited to, badger, water vole and great crested newt.

6.3.2 Scoped In

Until the ecological baseline surveys are complete, the potential for significant effects to arise relating to the predicted IEFs remains, as does the potential for effects on IEFs that come to light at a later date. Following completion of the ecological baseline surveys, further consultation will take place with NatureScot to determine if any further IEFs can be scoped out at that stage.

6.3.3 Scoped Out Effects

All ecologically designated areas beyond 5 km of the Site are scoped out further ecological assessment as these are unlikely to receive a significant ecological effect.

6.4 Key Questions for Consultees

Where relevant, consultees are asked to respond to the following questions:

- Are consultees content with the proposed baseline ecology survey effort?
- Are consultees content with the proposed approach to the evaluation and impact assessment methods?
- Can consultees provide details or any current or recent ecological records, works or projects within or in the vicinity of the Site, which may not yet be in the public domain? and

7 ORNITHOLOGY

7.1 Introduction

This Section sets out the approach to the evaluation of the ornithological interest of the Site and surrounding area and to the assessment of potential impacts on birds throughout the construction and operational phases of the Development.

7.2 Assessment Methodology

7.2.1 Approach to Assessment

7.2.1.1 Overview of the EIA

The assessment of ornithological impacts will follow the guidance document produced by the CIEEM²¹, ensuring a transparent and scientifically rigorous approach to EcIA for ornithology. These guidelines set out the process for assessment through the following:

This will include:

- Collation of baseline ornithological information through desk study and field surveys;
- Identification and characterisation of ornithological impacts from all phases of the Development;
- Incorporation of measures to mitigate identified impacts; and
- Assessment of significance of residual impacts following mitigation.

The Ornithology Chapter of the EIA Report will be supported by Technical Appendices detailing the desk study results, consultation, baseline survey methods and results, collision risk modelling and results, and will be further supported by relevant figures where necessary. Where sensitive data is recorded, the Ornithology Chapter will be supported by confidential appendices which will not be released to the public domain.

7.2.1.2 Desk Study & Consultation

In addition to formal scoping, early and thorough consultation with key stakeholders is a key element in the assessment process. NatureScot will be engaged to discuss preliminary survey results and key constraints where necessary, whilst ensuring that statutory consultees are kept informed about the nature of the proposal.

In order to augment baseline data and, if necessary, refine the survey scope, recent records (within 10 years) of protected and/or notable species and details of sites of ornithological interest will be sought. Consultation requests for the provision of data will be obtained from the following organisations:

- NatureScot;
- The Council;
- The Raptor Study Group (RSG);
- The Royal Society for the Protection of Birds (RSPB);
- The British Trust for Ornithology (BTO); and
- North Lanarkshire Biological Records Centre (NLBRC).

The Study Area used for the desk-based study varies depending on the ornithological feature as follows:

- Within 20 km of the Site for statutory sites designated for wintering geese;

²¹ CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1*. Chartered Institute of Ecology and Environmental Management, Winchester.

- Within 10 km of the Site for statutory sites designated for other ornithological features; and
- Within 2 km of the Site for existing records of protected and sensitive bird species²² from relevant organisations listed above.

The following two statutory designated sites were found within the relevant Study Areas, and are listed in **Error! Reference source not found.**6, and presented in Figure 4.

Table 7: Statutory Sites Designated for Ornithological Features

Statutory Site	Designation	Approximate distance from the Site	Qualifying Features
Slamannan Plateau	Special Protection Area (SPA)	9.5 km to the north-west	Taiga bean goose (<i>Anser fabalis fabalis</i>), non-breeding
	Site of Special Scientific Interest (SSSI)		
Firth of Forth	Ramsar	15.5 km to the north	<p>Non-breeding (all designations)</p> <ul style="list-style-type: none"> • Bar-tailed godwit (<i>Limosa lapponica</i>) • Goldeneye (<i>Bucephala clangula</i>) • Knot (<i>Calidris canutus</i>) • Pink-footed goose (<i>Anser brachyrhynchus</i>) • Redshank (<i>Tringa totanus</i>) • Shelduck (<i>Tadorna tadorna</i>) • Slavonian grebe (<i>Podiceps auritus</i>) • Turnstone (<i>Arenaria interpres</i>) • Waterfowl assemblage <p>Passage (all designations)</p> <ul style="list-style-type: none"> • Sandwich tern (<i>Sterna sandvicensis</i>) <p>Non-breeding (SPA & SSSI only)</p> <ul style="list-style-type: none"> • Common scoter (<i>Melanitta nigra</i>) • Cormorant (<i>Phalacrocorax carbo</i>) • Curlew (<i>Nurmenius arquata</i>) • Dunlin (<i>Calidris alpina</i>) • Eider (<i>Somateria mollissima</i>) • Golden Plover (<i>Pluvialis apricaria</i>) • Great crested grebe (<i>Podiceps cristatus</i>) • Grey plover (<i>Pluvialis squatarola</i>) • Lapwing (<i>Vanellus vanellus</i>) • Long-tailed duck (Mallard (<i>Anas platyrhynchos</i>)) • Oystercatcher (<i>Haematopus ostralegus</i>)
	SPA		
	SSSI		

²² Defined as species included on one or more of the following: Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), Annex I of the Birds Directive, the UK Birds of Conservation Concern (BoCC) Red and Amber lists and the Scottish Biodiversity List (SBL)

Statutory Site	Designation	Approximate distance from the Site	Qualifying Features
			<ul style="list-style-type: none"> • Red-breasted merganser (<i>Mergus serrator</i>) • Red-throated diver (<i>Gavia stellata</i>) • Ringed plover (<i>Charadrius hiaticula</i>) • Scaup (<i>Aythya marila</i>) • Velvet scoter (<i>Melanitta fusca</i>) • Wigeon (<i>Anas Penelope</i>) <p>Breeding (SSSI only)</p> <ul style="list-style-type: none"> • Eider • Ringed plover • Shelduck

7.2.2 Baseline Surveys

Ornithology Field Surveys at the Site commenced in September 2020 and will be completed in August 2021. Based on the location and likely sensitivities, it is considered that one year of ornithology surveys will be sufficient to inform the impact assessment. This will be confirmed in consultation when the year of survey nears completion. The ornithology survey programme for the survey year will comprise the following:

- Year-round Flight Activity Surveys (FAS);
- Breeding Bird Surveys; and
- Breeding Raptor Surveys.

A summary of each survey method is presented below.

7.2.2.1 Flight Activity Surveys (September 2020 to August 2021, inclusive)

Year-round FAS will be undertaken to record the flight activity of target species such as wildfowl, waders and protected raptors and owls. In accordance with current NatureScot guidance **Error! Bookmark not defined.**, this will involve a series of watches from two Vantage Points (VPs) overlooking the proposed turbine locations and a surrounding 500 m buffer. VP locations and viewsheds are shown in Figure 7.

The VP locations have been selected through a combination of viewshed analysis and initial visits to the Site to verify the visibility. In line with NatureScot (2017) guidance²³, locations were optimised to allow maximum coverage of the Survey Area from the minimum number of VPs.

It is proposed that a total of 36 hours of survey per VP will be completed annually during each of the following periods:

- Non-breeding season (September to mid-March); and
- Breeding season (mid-March to August).

This meets the minimum survey effort requirement in current NatureScot (2017) guidance **Error! Bookmark not defined.**

7.2.2.2 Breeding Bird Survey (April to July 2021)

A Breeding Bird Survey will be completed to map the territories of breeding wader species, in areas of open ground within 500 m of the Site (access permitting). The survey will follow

²³ NatureScot. (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms, Version 2.

a modified version of the Brown and Shepherd (1993) census method for breeding waders, as recommended in NatureScot (2017) guidance²⁴. Four survey visits will be completed between April and July 2021. Although the survey will focus on breeding waders, observations of other notable species of conservation concern will also be recorded.

7.2.2.3 Breeding Raptor Surveys (March to August 2021)

Breeding Raptor Surveys will be undertaken between March and August 2021 to identify breeding territories of protected raptor species (including owls).

The survey methods will be based on current guidance for surveying raptors (Hardey *et al.*, 2013)²⁴. This will involve a combination of watches from suitable VP locations overlooking areas of potential nesting habitat, and walkovers of suitable habitat to search for evidence of breeding. In accordance with NatureScot (2017) guidance²⁵ survey areas will be as follows:

- Suitable habitat within 1 km of the Site (access permitting) for goshawk (*Accipiter gentilis*) and barn owl (*Tyto alba*); and
- Suitable habitat within 2 km of the Site (access permitting) for all other protected raptor and owl species likely to be present in the area.

7.2.3 Impact Assessment

The assessment method will follow the process set out in the relevant provisions of the EIA Regulations and guidance on implementation of the Birds and Habitats Directive (NatureScot, 2018a)²⁵.

An assessment of cumulative effects will be undertaken following published guidance (NatureScot, 2018)²⁶. Cumulative effects on each Important Ornithological Features (IOF) relevant to the proposed development will be assessed in relation to other projects and activities subject to the EIA process within a relevant search area and their effects on a relevant reference population; for example, an SPA population where there is potential connectivity, or at a Natural Heritage Zone (NHZ) level for breeding species outwith SPAs.

7.3 Potential IOFs

The majority of baseline ornithology surveys have not been undertaken at the time of writing; however, a preliminary appraisal of the Site, suggests that potential IOFs include, but are not limited to;

- Barn owl; and
- Wader species

7.3.1 Potential Significant Effects

Potential significant effects of the Development on ornithological features include:

- Disturbance and/or displacement of birds;
- Collision of birds with wind turbines (standard Collision Risk Modelling will be used for at-risk species if there is sufficient flight activity);
- Barrier effects causing disruption of flight lines due to the addition of turbines to an area already supporting turbines; and

²⁴ 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.

²⁵ NatureScot. (2018a). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

²⁶ NatureScot. (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note

- Indirect effects on bird usage of the Site, e.g. disruption to habitat function; changes in availability of open ground; changes in prey abundance or distribution.

7.3.2 *Scoped In*

Until baseline surveys are complete, the potential for significant effects to arise relating to the predicted IOFs remains unknown, as does the potential for effects on IOFs that come to light at a later date. Following completion of the baseline surveys, further consultation will take place with NatureScot to determine if any further IOFs can be scoped out at that stage.

7.3.3 *Scoped Out*

The following have been scoped out of the assessment:

- Wintering goose and swan surveys – Although the Site is within the core foraging range of pink-footed goose (a designated feature of the Firth of Forth SPA/Ramsar/SSSI), the Site is not within a known foraging area²⁷, and therefore surveys are not required as stated in NatureScot guidance **Error! Bookmark not defined.** Additionally, although Slamannan Plateau SPA/SSSI (designated for taiga bean goose) is within 10 km of the Site, the Site is outwith the mapped distribution of bean geese, which are faithful to Slamannan Plateau and a small surrounding area²⁸. Foraging goose and swan surveys have therefore been scoped out of the assessment;
- Impacts on Slamannan Plateau SPA/SSSI and Firth of Forth Ramsar/SPA/SSSI have been scoped out based on the location of the Site, and the low probability connectivity with designated sites, as stated above;
- Two years of baseline surveys have been scoped out, based on the location of the Site, and the low probability of connectivity with any statutory designated sites; and
- All statutory sites designated for ornithological interests that are located beyond 20 km of the Site will be scoped out of the assessment as it is considered unlikely that there will be any connectivity between bird populations from these statutory sites and the Site.

7.4 **Key Questions for Consultees**

- Are Consultees content with the proposed methods for assessment?
- Are Consultees content with the extent of ornithological datasets obtained as part of the desk-based study?
- Are Consultees content with the scope of the completed surveys?
- Are Consultees in agreement with what has been scoped in/out of the assessment, as described above?

²⁷ Mitchell, C. (2012) *Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland*. Wildfowl and Wetlands Trust / Scottish Natural Heritage Report, Slimbridge https://monitoring.wwt.org.uk/wp-content/uploads/2013/07/FeedingDistribution_PGGJScot_2012.pdf

²⁸ Minshull, B. C., Mitchell, C., Maciver, A., & Griffin, L. (2014) *Report on the collation of field use data relating to wintering bean geese on the Slamannan Plateau*. Scottish Natural Heritage Commissioned Report No. 711.

8 HYDROLOGY AND HYDROGEOLOGY

8.1 Introduction

Hydrology and hydrogeological surveys will be undertaken in order to establish the baseline conditions and assess the potential effects of the Development, significance and the potential for mitigation.

8.2 Assessment Methodology

8.2.1 Study Area

The Hydrology and Hydrogeology Core Study Area comprises the Site. A Wider Study Area comprising a 10 km buffer of the Site is proposed to assess the potential impacts of the Development on the wider hydrological environment.

At distances greater than 10 km, it is considered that schemes such as wind farm developments are unlikely to contribute to a hydrological effect, in terms of chemical or sedimentation impacts, due to dilution over distance of potentially polluting chemicals.

8.2.2 Methodology

A site walkover, consultation, desk studies and data requests will be undertaken to inform the baseline and assessment.

The following activities will be undertaken to inform the hydrological and hydrogeological assessment:

- Review of published data and maps;
- Consultation with SEPA, the Council and the British Geological Survey (BGS);
- Identification of solid and surface geologies;
- Review of Pollution Prevention Guidelines;
- Identification of surface water features, catchments and GWDTEs;
- Preparation of a catchment plan;
- Identification of data on public and private abstractions and supplies, and risk assessment of these;
- Identification of other similar developments within 10 km;
- Collation of flood plain information, water quality data and groundwater vulnerability information;
- Production of a Water and Construction Environmental Management Plan (WCMP); and
- Concise section within the EIA Report to assess Flood Risk to meet the requirements of the SPP Framework.

The EIA Report chapter will describe the potential effects of the Development including:

- Details of consultation undertaken;
- Assessment methodologies for construction and decommissioning phases;
- Hydrological walkover survey details and results;
- Assessment of the operational and decommissioning phases of the project to establish the effect on the hydrological resource;
- Identify mitigation measures, where necessary;
- Identify any residual effects following mitigation; and
- Cumulative assessment with other developments within 10 km of the Development; and
- Statement of significance in accordance with the EIA Regulations.

8.3 Baseline Conditions and Information Gathered to Date

An initial review of the hydrological conditions of the Site has been undertaken. This Section outlines the potential hydrological and hydrogeological receptors which have been identified within the Site and the wider catchment in which the Site is located.

8.3.1 Surface Hydrology

The Development lies within the overall catchment of the River Almond. The Development lies on two defined topographical slopes which act as a watershed for an unnamed watercourse in the east of the Site. The unnamed watercourse drains from west to east before joining How Burn. How Burn flows from northwest to southeast before joining the River Almond. There are several smaller unnamed watercourses within the Site which drain towards How Burn. Considered low sensitivity as previous mining activities have modified the morphology of the receptors.

No watercourses within the Site are designated or have a SEPA water quality classification category. The water quality of How Burn and the River Almond are classed as 'Poor'.

Site surveys will ground truth the presence of watercourses and drainage features.

Appropriate buffers will be applied to watercourses and drains during the design phase.

8.3.2 Hydrogeology

Data on hydrogeology was obtained from the SEPA Aquifer and Vulnerability Maps. The Aquifer Maps represent how groundwater moves horizontally in the aquifer whilst the Vulnerability Map represents the strata overlying the aquifer ('vertical pathway'). These maps provide the following information for the Site:

- Bedrock Aquifer: IF M Intergranular Flow, Moderate Productivity;
- Superficial Aquifer: IL Intergranular Flow, Low Productivity; and
- Vulnerability Class 2.

Vulnerability classes range from 1 to 5, with 5 being most vulnerable. Class 4 is subdivided. It is the hydrogeological characteristics within the pathway rather than the 'importance' of a particular aquifer that results in the final vulnerability classification. Large parts of Scotland show areas of Classes 4 and 5, reflecting the widespread occurrence of fracture flow dominated rocks where the potential for the attenuation of contaminants in the pathway is very limited.

The sedimentary rocks underlying the site are likely to contain volumes of groundwater within the intergranular passages of the rock. The 2 rating at the site represents a relatively low vulnerability to contaminants (unless continuous discharging and leaching of contaminants occurs onsite). This low vulnerability rating on the site is a result of the intergranular dominant flow within the rocks allowing attenuation in the bedrock to occur. The methodology behind the classification assumes that where contaminants move through bedrock which is dominant in intergranular flow, attenuation of contaminants can take place.

The SEPA River Basin Management Plan map classes the groundwater body underlying the Development (Stirling and Falkirk bedrock and localised sand and gravel aquifers) as having a 'Poor' chemistry status. The data sheet for this groundwater body sites mining and quarrying of coal as a diffuse source of pollution.

8.3.3 GWDTes

As detailed within Section 6, a NVC survey will be undertaken to identify GWDTes, which will be mapped in accordance with current SEPA/SNIFFER (2017) guidance.

8.3.4 Designated Hydrological Receptors

There are four statutory designations relating to hydrology within 5 km of the Development:

- Blawhorn Moss SAC and SSSI - located approximately 1.8 km north west of the Site and is designated for raised bog;
- Hassockrigg and North Shotts Mosses SSSI - located approximately 2.2 km south west of the Site and both sections of the designation are designated for raised bog;
- North Shotts Moss SAC - located approximately 2.6 km south west of the Site and is designated for active and degraded raised bog; and
- Black Loch Moss SSSI – located approximately 4.6 km north west and designated for its active raised bog and degraded bog.

The above hydrological designations are considered to be hydrologically disconnected from the Site (in terms of surface and sub-surface water effects, as development is proposed in areas that are hydrologically up-gradient) or are of sufficient distance to remain unaffected by the Development.

8.3.5 Private and Public Water Supplies

Information pertaining to the location, type and source of public and private water supplies will be identified through consultation with relevant statutory consultees.

The Torrance Farm Wind Park hydrological assessment showed that there were no private water supplies within 1.5 km of the Site. However, as the Site boundary has been increased and given the intervening time, it is proposed that a 2 km search radius from the Site is used to request details on public and private water supplies.

8.3.6 Flooding

The Indicative River and Coastal Flood Map (Scotland) produced by SEPA shows the areas of Scotland with a 0.5 % (1:200) or greater chance of flooding. These areas are known as medium to high risk areas for flooding.

The SEPA Flood Map shows that minor isolated areas in the east of the Site are classified as having a 'High' and 'Medium' annual probability of flooding from surface water. The How Burn enters the south west of the Site which is considered 'High' probability of river flooding.

The flood maps show flooding is restricted to the waterbodies and do not indicate widespread flooding across the Site.

An initial 50 m buffer will be placed around watercourses onsite, therefore it is not anticipated that turbines or electrically sensitive equipment or turbines will be located within these areas of potential flood risk. As such, a concise section within the EIA Report will consider how the Development will impact surface water run-off and effects on off-site receptors, in accordance with paragraphs 255 to 268 of the SPP.

8.4 Key Sensitivities

At this stage, the key sensitive receptors are considered to be the Torrance Marsh SINC, How Burn and its tributaries, groundwater, designated receptors, the hydrological function of potential GWDTes and potential Public and Private Water Supplies.

Information pertaining to private and public water supplies is yet to be received but will form part of the baseline data requests.

Potential impacts could occur from:

- Chemical pollution;
- Sedimentation as a result of construction;
- Acidification of watercourses;

- Impediments to watercourse and near-surface water flow;
- Increased run-off and flood risk;
- Migration of pollutants from contaminated land; and
- Compaction of superficial deposits.

The predicted significance of impacts will be determined through a standard method of assessment and based on professional judgement, considering both the sensitivity of receptor and the magnitude of the potential impact.

8.5 Scoped Out Effects

It is proposed that the migration of pollutants from contaminated land is scoped out of the assessment as the Site has not previously been developed and it is unlikely contaminated land will be encountered.

It is proposed that statutory designated receptors not hydrologically connected to the Development, are scoped out as there is no potential for effects on these receptors (as detailed in Section 7.3.5).

There is limited potential for pollution and sedimentation effects on the water environment at distances greater than 10 km and it is proposed that receptors beyond this distance are scoped out.

8.6 Embedded Design Measures

A 50 m buffer zone will be established for all turbine bases and ancillary structures / infrastructure around the watercourses on the site, where possible.

The requirement for access tracks crossing watercourses will be minimised, where possible, during the design stage.

A WCMP will accompany the EIA Report and form part of the embedded development design. The WCMP will comprise methods and works that are established and effective measures to which the Applicant will be committed through the development consent. Accordingly, the assessment of significance of effects of the Development should be considered with the inclusion of the WCMP.

Measures in order to protect the water environment will be outlined in the WCMP and will be based on good construction practice outlined in the following documents:

- Pollution Prevention Guidelines (PPGs) 1 to 21²⁹;
- Nature Scotland (2015), Good Practice During Wind Farm Construction³⁰;
- The Construction Industry Research and Information Association (CIRIA) (2015), Environmental Good Practice on Site (C741)³¹; and
- CIRIA (2001), Control of Water Pollution from Construction Sites (C532)³².

²⁹ Netregs (N.d) Pollution Prevention Guidelines [Online] Available at: <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/> (Accessed 09/10/20)

³⁰ Nature Scotland (2015) Good Practice During Wind Farm Construction [Online] Available at: <https://www.nature.scot/guidance-good-practice-during-wind-farm-construction> (Accessed 09/10/20)

³¹ CIRIA (2018) Environmental Good Practice On Site [Online] Available at: https://www.ciria.org/Training/Training_courses/Environmental_good_practice_on_site.aspx (Accessed 09/10/20)

³² CIRIA (2001) Control of Water Pollution from Construction Sites [Online] Available at: <http://www.orkneywind.co.uk/advice/SEPA%20Pollution%20Advice/ciria%20c532.pdf> (Accessed 09/10/20)

8.7 Key Questions for Consultees

The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:

- Do the Council and the consultees agree with the proposed methodology and scope of the hydrology and hydrogeology assessment? and
- Does the Council, Nature Scotland, SEPA or other consultees have any information that would be useful in the preparation of the hydrology and hydrogeology assessment?

9 GEOLOGY AND PEAT

9.1 Introduction

An assessment of the impact of the Development on geology and peat will be undertaken. This will establish the baseline conditions, inform the assessments and designs whilst determining any suitable mitigation measures required.

9.2 Assessment Methodology

9.2.1 Study Area

The study area includes the area within the Site for the preliminary investigation and a more specific approach will be adopted in assessing the impact on peat from the development footprint.

The purpose of this assessment will be to:

- Identify any areas susceptible to peat slide, using peat thickness and digital terrain model (DTM) data to analyse slopes;
- Advise on the micro siting of turbines and tracks to areas of shallow or no peat;
- Assess potential effects on soils, peat and geology, and sensitive habitats; and
- Develop an acceptable code for construction that will adopt best practice procedures, effective management and control of onsite activities to reduce or offset any detrimental effects on the geology and soils including peat.

9.3 Baseline Conditions and Initial Findings

9.3.1.1 Solid Geology

Information from the BGS mapping indicates the underlying geology comprises undivided cyclic sedimentary rocks of the Lower Coal Measures (Scotland). Several fault lines exist within the Site. The turbines have been sited to avoid these fault lines.

9.3.1.2 Superficial Geology

Information from the British Geological Surveys (BGS) mapping indicates the underlying superficial deposits comprise till of the Devensian period. Isolated areas of peat are displayed on the mapping within the Site. Observations made during previous site walkover suggest that anthropological influences, such as drainage ditches and agricultural practices, have degraded the peat mass to such an extent that it should be classified as acid grass land. This will be confirmed by a further site survey.

During walkover surveys in 2011, no peat or peaty soils were observed. Observations made during the site walkover suggest that anthropological influences, such as drainage ditches and agricultural practices, have degraded the peat mass to such an extent that it should be classified as acid grass land.

This is supported by the Scottish Environment datasets that indicates no peat is present within the Site³³.

9.3.1.3 Mining

The Coal Authority interactive mapping indicates that the site lies in a 'Development High Risk' area from past underground mineworking and the presence of known mine entries. Turbine locations should seek to avoid the mine entry locations and the extent of the

³³ Scotland's Environment (2020) Carbon and Peat Map 2016 [Online]. Available at: <https://www.environment.gov.scot/> (Accessed 30/10/2020)

shallow mineworking ascertained. A detailed Coal Mining Risk Assessment will be undertaken to support the EIA.

9.4 Potential Effects and Assessment

9.4.1 Peat Slide Risk

Development of wind farms on peatlands can lead to potential peat slide risk. As the Site is not considered to be abundant in peat, an assessment of the likely impact on peatlands and the potential for peat slide risk can be scoped out.

9.4.2 Impact on Peatland Habitat

Excavation of peat during construction of site infrastructure, including access tracks, crane hardstandings, turbine foundations and cable trenches may lead to potential impacts on any peat habitat. In addition, natural surface drainage systems may change in this regard which could lead to drying and oxidation of in-situ peat. However, as the Site is not considered to contain peat, an assessment of the likely impact on peatlands and the potential for peat slide risk can be scoped out.

9.4.3 Scoped In Effects

The potential effects that are to be considered during the assessment are:

- Details of embedded mitigation and restoration relative to Geology and Soils;
- Coal Mining Risk Assessment, to be prepared as technical appendix but not assessed in accordance within the EIA Regulations;

9.4.4 Scoped Out Effects

Assessment of the effects of the Development on peat.

9.5 Key Questions for Consultees

The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:

- Do the consultees agree with the proposed methodology and scope of the Geology and Peat Assessment? and
- Do the consultees have any information that would be useful in the preparation of the Geology and Peat assessment, including details of local quarrying activity?

10 CULTURAL HERITAGE AND ARCHAEOLOGY

10.1 Introduction

The assessment will consider direct, indirect, and cumulative effects upon the following receptors:

- Archaeology – above and below ground, designated and un-designated. Consideration will be given to the potential for currently unknown (buried) archaeological remains to exist within the Development; and
- Cultural Heritage – World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventoried Gardens and Designed Landscapes, Inventoried Battlefields and Conservation Areas.

The assessment will be conducted with reference to the relevant statutory and planning frameworks for cultural heritage. In addition to those mentioned in the Planning and Policy Section, cognisance will also be taken of Historic Environment Policy for Scotland May 2019 (HEPS)³⁴. The assessment will be undertaken in accordance with current best practice and guidelines which includes the Chartered Institute for Archaeologists (CIfA) Standards and Guidance³⁵ and Historic Environment Scotland's Managing Change in the Historic Environment Series, specifically 'Managing Change in the Historic Environment: Setting' (2016)³⁶.

10.2 Assessment Methodology

10.2.1 Study Area

The following Study Areas will be used within the heritage assessment:

- Core Study Area (CSA): This study area will cover the Site and be used to inform the assessment of direct effects;
- 1 km Study Area: This study area will cover the area within a 1 km radius of the CSA and will be used for the Desk-Based Assessment (DBA) to inform the archaeological potential of the Site;
- 5 km Study Area: This study area will cover the area within a 5 km radius of the CSA and will be used to inform the assessment of indirect effects on all nationally significant assets;
- 5-15 km Study Area: This study area will cover the area between 5 and 15 km of the CSA. Selected heritage assets within this study area will be included within the assessment of indirect effects. This will likely include assets which have a large landscape presence or elevated positions for long distance views are integral to the setting. The final selection of assets within this study area will be agreed during consultation with HES; and
- Cumulative Study Area: This study area will cover an area within a 15 km radius of the CSA and will be used to assess the cumulative effects of nearby wind farm developments.

³⁴ Historic Environment Scotland (2019) *Scottish Environment Policy for Scotland May 2019* [Online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=1bcfa7b1-28fb-4d4b-b1e6-aa2500f942e7> (Accessed 02/10/20)

³⁵ Chartered Institute for Archaeologists (2017) *Standard and Guidance for Historic Environment Desk-Based Assessment*, Published December 2014, Updated January 2017 [Online] Available at: http://www.archaeologists.net/sites/default/files/CifAS%26GDBA_3.pdf (Accessed 02/10/20)

³⁶ Historic Environment Scotland (2016) *Managing Change in the Historic Environment: Setting*. [Online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549> (Accessed 02/10/20)

10.2.2 Desk Based Assessment

A baseline will be prepared as part of a DBA which will compile cultural heritage records to establish the baseline against which the impact assessment will be carried out. Data will be gathered from the following sources:

- Historic Environment Scotland (HES) Datasets including Canmore;
- The Council's Historic Environment Record (HER);
- Aerial photographs and other cartographic information detailing previous land uses;
- The Statistical Accounts of Scotland; and
- Local studies libraries and other archives, as appropriate.

The 1 km Study Area around the Site will be used to collect data to inform on the archaeological potential of the Site.

The DBA will be augmented by a walkover survey in order to:

- Assess and validate documentary data collected;
- Identify the extent and condition of any visible archaeological remains; and
- Determine whether previously unrecorded historic features are visible.

10.2.3 EIA Report and Chapter

The cultural heritage assessment will evaluate the effects of the Development on the cultural significance of designated and non-designated heritage assets. Cultural significance relates to the ways in which a heritage asset is valued by both specialists and the wider public. It may derive from factors including the asset's fabric, setting, context and associations.

The sensitivity of a heritage asset is initially equated with its designation status or lack thereof, and further informed by its cultural significance and professional judgement. World Heritage Sites are afforded a very high level of sensitivity due to their international importance. Scheduled Monuments, Grade A Listed Buildings, Inventoried Battlefields, and Inventoried Gardens and Designed Landscapes have a high level of sensitivity due to their national importance. Grade B and C Listed Buildings, conservation areas, and some non-designated assets are considered to be of regional value and as such, have a medium level of sensitivity. Locally important sites and archaeological features are considered to be of low sensitivity.

The magnitude of potential change as a result of the Development considers both direct and indirect effects on heritage assets which includes changes to the fabric, setting, and context of an asset to the extent that it affects its cultural significance. The magnitude of change ranges from very high, which constitutes total destruction of an assets or blocking of a key view, to no effect.

The significance of the potential effect is broadly determined by correlating the sensitivity of the asset against the magnitude of the expected change, with the final conclusion of the significance of the effect informed by professional judgement.

The assessment will consider the 'sensitivity' of a cultural heritage feature against the 'magnitude' of any potential change, to arrive at the 'significance' of the effect as summarised in Section 1.3.3.

10.2.3.1 Direct Effects

Known archaeology, as identified during the DBA, will be avoided during site design, where possible. The assessment of physical effects will consider direct effects where sites or potential sites / buried archaeology are in danger of being disturbed or destroyed during the construction phase of the Development.

10.2.3.2 Indirect Effects

The assessment of indirect effects considers changes in setting which have the potential to affect the understanding, appreciation and experience of heritage assets. For the purposes of evaluating indirect effects upon heritage assets, designation status and proximity to the Development will determine whether further assessment is required. For the purposes of this document, designated heritage assets include Listed Buildings, Scheduled Monuments, Inventoried Gardens and Designed Landscapes, Inventoried Battlefields and World Heritage Sites as well as regionally designated Conservation Areas.

All nationally designated heritage assets that are within the 5 km Study Area, and designated assets within the 15 km Study Area that fall within the ZTV will be assessed as part of the EIA. This may include assets which do not themselves lie within the ZTV but for which the views over/ across the asset are from within the ZTV. The final list of assets requiring assessment will be agreed during consultation.

The archaeology and cultural heritage assessment will include proposals for mitigation of any identified impacts where necessary.

The assessment of indirect effects upon the setting of undesignated archaeology and cultural heritage assets is broadly based upon its designation status or lack thereof. Undesignated sites are often of low sensitivity and therefore will not receive a significant indirect effect as defined by the EIA Regulations. As such, they can be scoped out of the EIA at this stage unless specific assets are requested during consultation.

10.2.3.3 Cumulative Effects

For the purposes of the assessment of cumulative effects, only wind farm developments (operational, under construction, consented, or in planning) within approximately 15 km of the Site will be considered. The potential for a significant cumulative effect is considered most likely to occur within the 5 km study area. As such, the Cumulative Study Area allows for the assessment of effects within the 5 km radius of the Development and other wind farms, specifically where the ZTVs for the Development and cumulative wind farms overlap, i.e. where each is theoretically simultaneously visible.

10.3 Baseline Conditions and Information Gathered to Date

Initial information relating to archaeology and cultural heritage has been gathered through a preliminary desk top search using available online resources to indicate potential features of interest, as listed below.

10.3.1 Scheduled Monuments

There are two scheduled monuments within 5 km of the Site. These have the potential to receive any effect upon their settings. Due to their proximity to the Development, these are the assets considered most likely to receive changes to their setting resulting in potential significant indirect effects from the Development. Additional consultation will be undertaken with the Council Archaeologist and Historic Environment Scotland to ensure any potential effects are appropriately considered, together with the scope and extent of any supporting assessment and illustration to be provided in the EIA Report chapter. These are listed below (identified by their Scheduled Monument number) and their locations are indicated on Figure 3.

- 11222 Farmstead, 1400 m WSW of Woodend Farm; and
- 11223 Farmstead, 720 m WNW of Craigmarry.

10.3.2 Listed Buildings

There are several listed buildings within 5 km of the Site, as shown on Figure 3. The nearest is a category B Listed Building (14553), the Westcraigs Inn in Blackridge, located

approximately 1 km north of the Site boundary in Blackridge. Category A listed buildings within 5 km of the Site consist of:

- 14557: Gowan Bank, Farmhouse, steading and Cottages, approximately 4.9 km north of the Site;
- 51254: Brucefield Church, with courtyard and church halls, approximately 3.8 km east, located within the centre of Whitburn; and
- 50013: Shotts, Calderhead Road, Centrelink 5 (Former Cummins Engine Company Ltd), Including Boiler House to NW And Entrance Gates, approximately 4.2 km southwest of the site within Shotts.

10.3.3 Inventoried Historic Gardens and Designed Landscapes

There are no Historic Gardens or Designed Landscapes within 10 km of the Development, and only three within 15 km. The nearest is Allanton (Inventory number 12) which lies approximately 10.2 km to the southwest with negligible intervisibility with the Development.

Callendar Park (Inventory number 77) lies approximately 15 km north of the Development and will have not intervisibility with it. Harburn House (Inventory number 206) lies approximately 13 km to the south-east, and is predicted to have very limited intervisibility with the Development; extensive plantation around the perimeter of the designed landscape and its distance from the turbines will effectively prevent their being any intervisibility. This class of feature is not considered further as due to distance, none are considered to have potential to receive any significant effect on their settings.

10.3.4 Other

No World Heritage Sites, Inventoried Battlefield, or Conservation Areas are within the 5 km Site.

10.4 Key Sensitives

It is anticipated that the potential direct effects on surviving non-designated archaeological remains will be reduced by avoidance through design, resulting in no direct effects to heritage assets.

The Listed Buildings, Scheduled Monuments and Inventoried Battlefield within the 5 km Study Area all have the potential to receive significant indirect effects as a result to changes in their setting caused by the Development. As such, a detailed assessment of these heritage assets will be undertaken in the EIA Report.

Heritage assets between 5 and 15 km may be included in assessment whereby the assets lie in elevated positions and their setting incorporates long distance views towards the Development (i.e. Forts and duns). The final selection of heritage assets for inclusion in the assessment of indirect effects will be agreed through further consultation.

10.5 Potential Effects Assessment

Potential effects on heritage assets may include the following:

- Permanent loss of archaeological features directly affected by the Development footprint;
- Changes to the setting of heritage assets resulting in indirect effects that affect the ability to understand, appreciate or experience the asset; and
- Cumulative effects upon heritage assets as a result of cumulative changes to their setting.

10.5.1 Scoped in Effects

Based on the baseline condition, it is proposed that the following effects will be scoped into the assessment and included within the EIA Report:

- Direct effects on known undesignated archaeological features within the Site;
- Direct effects on the potential for unknown archaeological remains to survive within the Development footprint;
- Indirect effects on all designated assets within the 5 km Study Area;
- Indirect effects on designated heritage assets within the 15 km Study Area where the assets, or key views towards to asset, lie within the ZTV; and
- The cumulative effect of the Development in conjunction with other wind farm developments within a 15 km.

10.5.2 Scoped out Effects

The EIA Regulations state that only likely significant effects need to be considered within the EIA Report; therefore, if an effect will not be significant, it can be scoped out of assessment. Based on this and the baseline conditions, it is proposed that the following effects will be scoped out of assessment:

- Direct effects on undesignated archaeological features outwith the CSA;
- Direct effects on designated heritage assets outwith the CSA;
- Indirect effects on undesignated heritage assets of local importance;
- Indirect effects on designated heritage assets beyond the 15 km Study Area;
- Indirect effects on designated heritage assets within the 15 km Study Area where the assets, or key views towards the asset, do not lie within the ZTV; and
- Cumulative effects from wind farm developments outwith the 15 km Study Area

10.6 Key Questions for Consultees

The above scope is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely significant do not require assessing under the EIA Regulations.

Key questions for consultees are:

- Do the Council and Consultees agree with the proposed methodology and scope of assessment?
- Are the Council and Consultees content to scope out indirect effects upon non-designated heritage assets?
- Are the Council and Consultees content to scope out assets out with the 5 km Study Area where the assets, or key views towards the asset, do not lie within the ZTV?
- Are the Council and Consultees content that the selection of landscape viewpoints will support and aid the heritage assessment?
- Do the Council and Consultees have any information regarding current or recent archaeological work or projects being undertaken within or in the vicinity of the Site, particularly those whose results may not be yet recorded in the Historic Environment Record? and
- Do the Council and Consultees have details of any cultural heritage sites in the vicinity of the Site which it considers may raise significant issues within the EIA process for this Development.

11 NOISE

11.1 Introduction

Sources of noise during operation of a wind turbine are both mechanical (from machinery housed within the turbine nacelle) and aerodynamic (from the movement of the blades through the air). Modern turbines are designed to minimise mechanical noise emissions from the nacelle through isolation of mechanical components and acoustic insulation of the nacelle. Aerodynamic noise is controlled through the design of the blade tips and edges. In most modern wind turbines, aerodynamic noise is also restricted by control systems which actively regulate the pitch of the blades.

Whilst noise from the wind turbines increases with wind speed, at the same time ambient background noise (for example wind in trees) usually increases at a greater rate. Planning conditions are used to enforce compliance with specified noise level limits.

The effects of noise from the Development will be assessed in consultation with the Environmental Health Officer (EHO) of the Council.

11.2 Assessment Methodology

11.2.1 Guidance

The following guidance and information sources are pertinent to the assessment of wind turbine noise:

- The Scottish Government's planning information on onshore wind turbines³⁷;
- Planning Advice Note 1/2011 (PAN1/2011): Planning and Noise³⁸;
- ETSU-R-97: The Assessment and Rating of Noise from Wind Farms³⁹; and
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise⁴⁰.

11.2.1.1 *Scottish Government Planning Information on Onshore Wind*

The Scottish Government's Online Renewables Planning Advice states that ETSU-R-97 should be used to assess and rate noise from wind energy developments, together with the Institute of Acoustics' Good Practice Guide.

11.2.1.2 *PAN 1/2011: Planning and Noise*

PAN 1/2011 provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It promotes the principles of good acoustic design and the appropriate location of new potentially noisy development. An associated Technical Advice Note offers advice on the assessment of noise impact and includes details of the legislation, technical standards and codes of practice appropriate to specific noise issues.

Appendix 1 of the Technical Advice Note: Assessment of Noise describes the use of ETSU-R-97 in the assessment of wind turbine noise.

³⁷ Scottish Government (2014) Onshore Wind Turbines [Online] Available at: <http://scotland.gov.uk/Resource/0045/00451413.pdf> (Accessed 03/10/20)

³⁸ The Scottish Government (2011) PAN 1/2011: Planning and Noise

³⁹ ETSU (1996) ETSU-R-97 The Assessment and Rating of Noise from Wind Farms

⁴⁰ Institute of Acoustics (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise

11.2.1.3 ETSU-R-97

ETSU-R-97 provides a framework for the assessment and rating of noise from wind turbine installations. It is the accepted standard for wind farm developments in the UK as supported by national guidance.

The aim of ETSU R 97 is to provide *"indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities"*.

The report makes it clear from the outset that any noise restrictions placed on a development must balance the environmental impacts of the development against the national and global benefits which would arise through the development of renewable energy sources.

Both background noise and noise from wind turbines typically vary with wind speed. According to ETSU-R-97, wind farm noise assessments should therefore consider the site-specific relationship between wind speed and background noise, along with the particular noise emission characteristics of the proposed wind turbines.

ETSU-R-97 specifies the use of the $LA_{90,10min}$ descriptor for both background and wind turbine noise. Therefore, unless otherwise specified, all references to noise levels within this Section relate to this descriptor. Similarly, all wind speeds referred to relate to a height of 10 m above ground level (AGL) at the location of the Development, standardised in accordance with current good practice guidance or BS: EN (IEC) 61400 11:2003 as appropriate, unless otherwise stated.

The document recommends the application of external noise limits at the nearest noise sensitive properties, to protect outside amenity and prevent sleep disturbance inside dwellings. These limits take the form of a 5 dB margin above the prevailing background noise level, except where background noise levels are lower than certain thresholds, where fixed lower limits apply. Separate limits apply for quiet daytime and night-time periods, as outlined below.

During daytime, the guidance specifies limits designed to protect the amenity of residents whilst enjoying the external garden areas of their properties. The limits are based on the prevailing background noise level for 'quiet daytime' periods, defined in ETSU-R-97 as:

- 18:00 – 23:00 every day;
- 13:00 – 18:00 on Saturday; and
- 07:00 – 18:00 on Sundays.

ETSU-R-97 recommends that the fixed lower noise limit for quiet daytime should be set within the range 35 to 40 dB, $LA_{90,10min}$, with choice of value dependent on the following factors:

- The number of dwellings in the neighbourhood of the Development;
- The effect of the noise limits on the number of kWh (kilowatt hours) generated; and
- The duration and level of exposure.

Different limits apply at night, where potential sleep disturbance is the primary concern rather than the requirement to protect outdoor amenity. Night-time is considered to be all periods between 23:00 and 07:00. A limit of 43 $LA_{90,10min}$ is recommended for night time at wind speeds or locations where the prevailing wind speed-related night-time background noise level is lower than 38 $LA_{90,10min}$. At other times, the limit of 5 dB above the prevailing wind speed-related background noise level applies. The value of night time fixed lower limit was selected in order to ensure that internal noise levels remain below those considered to have the potential to cause sleep disturbance, taking account of the

attenuation of noise when passing from outdoors to indoors, and making allowance for the presence of open windows.

Where the occupier of the property has a financial interest in a development, ETSU R 97 states that the fixed lower noise limit for both daytime and night-time can be increased to 45 dB(A) and that "*consideration should be given to increasing the permissible margin above background*".

11.2.1.4 *The Good Practice Guide*

The Good Practice Guide (GPG) was published by the Institute of Acoustics (IOA) in May 2013 and has been endorsed by the Scottish Government as current industry good practice (IOA, 2013). The guide presents current good practice in the application of ETSU-R-97 assessment methodology for wind turbine developments at the various stages of the assessment, and will be followed throughout the assessment.

11.2.2 Methodology

The specific methodologies involved in applying ETSU-R-97 will be detailed in full in the EIA Report but, in summary, these provide recommendations for noise limits relating to the existing levels of background noise for quiet day-time and night-time periods.

To carry out a noise assessment in accordance with ETSU-R-97, the following steps are required:

- Specify the number and locations of the wind turbines;
- Identify the locations of the nearest, or most noise sensitive, neighbours;
- If necessary, determine the background noise levels as a function of site wind speed at the nearest neighbours, or a representative sample of the nearest neighbours, and derive noise limits;
- Specify the type and noise emission characteristics of the wind turbines proposed for the Site;
- Calculate the noise emission levels due to the operation of the wind turbines as a function of site wind speed at the closest and/or most noise sensitive properties; and
- Compare the calculated noise emission levels with the noise limits and assess accordingly.

11.2.2.1 *Cumulative Noise Assessment*

ETSU-R-97 and the GPG state that the noise limits that ETSU-R-97 recommends apply to the cumulative effect of noise from all wind turbines that may affect a particular location.

It is acknowledged that the existing Torrance Farm Wind Park and its Extension wind energy developments will require inclusion in the cumulative assessment. A search will be undertaken in consultation with the Council to identify any other wind energy developments either operational, consented or in planning which may also require consideration in the assessment process.

Cumulative noise levels will be established in line with the requirements of the GPG, and assessed against the ETSU-R-97 noise limits to determine the level of headroom present (i.e. the level of noise which may be generated by the Development, after taking all relevant cumulative developments into account).

Noise due to the Development will then be assessed against the remaining headroom to determine compliance with ETSU-R-97.

11.3 Baseline Conditions and Information Gathered to Date

The assessment is limited to the effects on human receptors at noise-sensitive locations, namely residential properties, schools, hospitals and places of worship. Each of these receptor types are considered to be of equal value.

Noise effects are assessed on the basis of the level of noise produced by the Development relative to established criteria or limits. In particular, the use of the ETSU-R-97 methodology does not result in a magnitude of effect in the manner employed for other types of assessment within the EIA, but rather a test of acceptability.

The nearest residential properties to the Development are identified on the Ordnance Survey background mapping in Figure 2.

The GPG provides advice on how appropriate background noise measurements can be made in the presence of existing wind turbines by the following methods:

- Switching off the existing wind turbines during the background noise survey;
- Accounting for the contribution of the existing wind turbines in the measurement data by directional filtering or subtracting a prediction of noise from the existing wind farms;
- Utilising an agreed proxy location removed from the area acoustically affected by the existing wind turbines; or
- Utilising background noise data presented with the Environmental Statements / Reports for the existing wind turbines (the suitability of the background noise level data should be established).

If necessary, these issues will be considered in consultation with the EHO to agree the most appropriate approach to the assessment.

Baseline noise levels will then be analysed in accordance with the ETSU-R-97 and the GPG. The appropriate daytime fixed lower noise limit will be determined taking into account the three factors discussed in ETSU-R-97 and the GPG (the number of affected properties, the effects on the amount of energy generated and the magnitude and duration of exposure), and appropriate noise limits defined.

11.4 Potential Effects and Assessment

11.4.1 Construction Noise

Noise during the Development's construction phase will consist of that generated by on site activities and noise due to construction traffic on public roads. Whilst the precise location of construction works has yet to be established, the closest potential noise-sensitive receptor is situated approximately 0.4 km to the closest turbine location, based upon the current scoping layout.

An assessment of construction noise impacts will be carried out in line with the requirements of BS5228:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open sites*.

The effects of construction traffic noise will be assessed using the methodologies described in CRTN⁴¹ and DMRB⁴².

11.4.2 Operational Noise

Operational noise impacts are associated primarily with the aerodynamic noise generated by the movement of the turbine blades through the air, and to a lesser extent by the operation of mechanical components housed within the turbine itself. Operational noise

⁴¹ Calculation of Road Traffic Noise, Department of Transport, 1988

⁴² Design Manual for Roads and Bridges, LA 111 Noise and Vibration, Revision 2, Transport Scotland &c., 2020

impacts are assessed on the basis of the level of noise produced by the Development relative to ETSU-R-97 noise limits (or an apportionment thereof).

11.4.3 Scoped Out Effects

11.4.3.1 Low Frequency Noise and Infrasound

A study⁴³, published in 2006 by acoustic consultants Hayes McKenzie on the behalf of the 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, but that complaints attributed to low frequency noise were in fact, most likely due to a phenomenon known as Amplitude Modulation (AM).

In February 2013, the Environmental Protection Authority of South Australia published the results of a study into infrasound levels near wind farms⁴⁴. This study measured infrasound levels at urban locations, 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 wind farms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

Bowdler et al. (2009)⁴⁵ concludes 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".

11.4.3.2 Amplitude Modulation

In its simplest form, 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.

There is a distinction between 'normal' AM of wind turbine noise, characterised as blade swish and Enhanced AM (EAM) or Other AM (OAM), sometimes characterised onomatopoeically as 'thump'. It should be noted that ETSU-R-97 describes and makes allowance for normal AM or blade swish.

A study⁴⁶ was carried out in 2007 on behalf of the Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford, which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM. This report 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 increased AM (OAM) 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 OAM 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 OAM were not well understood and that prediction of the effect was not then currently possible.

⁴³ The measurement of low frequency noise at three UK wind farms, Hayes Mckenzie, The Department for Trade and Industry, URN 06/1412, 2006

⁴⁴ Environment Protection authority (2013) Infrasound levels near wind farms and in other environments [Online] Available at: http://www.epa.sa.gov.au/xstd_files/Noise/Report/infrasound.pdf (Accessed 03/10/20)

⁴⁵ 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

⁴⁶ Research into aerodynamic modulation of wind turbine noise'. Report by University of Salford, The Department for Business, Enterprise and Regulatory Reform, URN 07/1235, July 2007.

This research was followed by an in-depth study undertaken by RenewableUK⁴⁷, which identified that many of the previously suggested causes of OAM have little or no association to the occurrence of OAM in practice. The generation of OAM 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, the research concludes that it is not possible to predict whether any particular site is more or less likely to give rise to OAM, and the incidence of OAM 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 or the IOA.

In 2016, the IOA published a measurement technique⁴⁸ to quantify the level of AM present in any particular sample of wind farm noise. This technique is supported by the Department of Business, Energy & Industrial Strategy (BEIS, formerly The Department of Energy & Climate Change) who have published guidance⁴⁹, which follows on from 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. Notwithstanding this, the suggested outline planning condition is as yet unvalidated, remains in a draft form and would require site-specific legal advice on its appropriateness to a specific development.

Section 7.2.1 of the GPG therefore remains current, stating: *"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"*.

11.4.3.3 Ground-Borne Vibrations

Research undertaken by Snow⁵⁰ in 1996 found that levels of ground-borne vibration 100 m from the nearest wind turbine were significantly below criteria for 'critical working areas' given by British Standard BS6472:1992 Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz), and were lower than limits specified for residential premises by an even greater margin.

Ground-borne vibration from wind turbines can be detected using sophisticated instruments several kilometres from a wind farm site as reported by Keele University⁵¹. This report clearly shows that, although detectable using highly sensitive instruments, the magnitude of the vibration is orders of magnitude below the human level of perception and does not pose any risk to human health.

11.5 Key Questions for Consultees

The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities. Key questions for consultees are:

- Do the Council and consultees agree with the proposed methodology and scope of assessment?
- Does the Council have any policies or guidance relating specifically to wind farm noise which should be taken into account in the EIA?
- Do the Council and Consultees have details of any further cumulative developments in the locality which it considers may raise significant issues within the EIA process for the Development?

⁴⁷ Wind Turbine Amplitude Modulation: Research to improve understanding as to its Cause and effects, Renewable UK, 2013

⁴⁸ Institute of Acoustics, (2016) A Method for Rating Amplitude Modulation in Wind Turbine Noise

⁴⁹ BEIS, (2016), Review of the evidence on the response to amplitude modulation from wind turbines

⁵⁰ ETSU (1997), Low Frequency Noise and Vibrations Measurement at a Modern Wind Farm, prepared by D J Snow

⁵¹ Microseismic and infrasound monitoring of low frequency noise and vibrations from wind farms: recommendations on the siting of wind farms in the vicinity of Eskdalemuir, Scotland". Keele University, 2005

12 TRAFFIC AND TRANSPORT

12.1 Introduction

The Traffic and Transport chapter of the EIA will assess the impact of the Development on the local and regional road network. Vehicle movements to the Site of the Development will consist of Abnormal Load Vehicles (ALVs), Heavy Goods Vehicles (HGVs), LGVs and cars.

The EIA will identify potential effects from increased road traffic arising from the construction, operation and decommissioning of the Development. The significance of these effects will be assessed against recognised guidelines. Where required, appropriate mitigation measures will be proposed to reduce these effects. The access and traffic aspects of the EIA will consider the effects of the Development on the road network and traffic volumes.

The Development is located adjacent to the M8 motorway, between Glasgow and Edinburgh. The port of delivery for wind turbine components is anticipated to be King George V docks in Glasgow. An abnormal load route assessment (ALRA) will be undertaken on the proposed delivery route.

Structural investigation is being undertaken to establish the loading capacity of any structures identified on the proposed delivery route, and the ALRA will consider the suitability of its alignment. Additionally, consideration is being given to the possibility of constructing a temporary bridge to be used during construction of the Development.

12.2 Assessment Methodology

12.2.1 Geographic Scope

The majority of turbine components will be delivered by ALVs and will travel via the Abnormal Load Route from the port of delivery. General construction traffic will consist of HGVs, LGVs and cars, and will originate from a variety of locations. The majority of general construction traffic is anticipated to approach from the south, although where possible materials may be supplied from within the local area particularly concrete and aggregates.

The assessment will consider all routes which are likely to be used by construction traffic. A worst-case scenario approach to assessment will generally be used. Principally this means that during the assessment all construction traffic is assumed to use each route under consideration, in reality as traffic will be distributed between a variety of routes the impact will be less than assessed.

12.2.2 Potential Impacts

The principle effects that could occur as a result of increased traffic during construction of the Development are as follows:

- Traffic generation;
- Hazardous loads;
- Accidents and Safety;
- Driver delay;
- Pedestrian Amenity;
- Severance; and
- Noise and Vibration.

Once the Development is operational, it is envisaged that the volume of traffic associated with the scheme would be minimal. Occasional visits may be made to the Site for maintenance checks. The vehicles used for these visits are likely to be a four wheel drive off road type or similar and there may on occasion be a need for an HGV to access the Site

for maintenance and repairs. It is considered that the significance of the environmental effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the Development is proposed in the EIA.

12.2.3 Guidance

The assessment will follow guidance contained in the following planning policy documents:

- The Institute of Environmental Management and Assessment ("IEMA", 1993), 'Guidelines for the Environmental Assessment of Road Traffic'; and
- The 'Transport Assessment Guidance' (Transport Scotland, 2012).

12.2.4 Screening

In accordance with the above guidance a screening exercise will be undertaken for the proposed routes. The screening process uses two thresholds as follows:

- Include roads where traffic will increase by more than 30% (or where the number of HGVs will increase more than 30%); and
- Include any other specifically sensitive areas where traffic flows will increase by 10% or more.

Where the predicted increase in traffic flows is lower than the thresholds, the guidelines suggest the significance of effects can be stated to be low or not significant and further detailed assessments are not warranted. Peak traffic flows will be identified to assess a worst-case scenario.

12.2.5 Consideration of Further Assessment

On routes where traffic is predicted to increase above the thresholds identified in the screening process further assessment may be warranted. This further assessment will consider the potential for receptors to receive impacts relating to the effects.

In assessing traffic effects, we would make use of the findings of the ALRA for the physical constraints and measures required for access. This information, in combination with other data acquired from a desktop study would be used to estimate the capacity of routes within the study to cope with the temporary increase in traffic.

The approach to assessing sensitivity and magnitude of effects is a judgement-based approach as used in recent EIA and the detailed methodology. In terms of road networks, the sensitivity to change in traffic levels of any given road segment or junction is generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic, and therefore the sensitivity may be said to be low. Conversely, where the existing traffic levels are high compared to the road capacity, there is little spare capacity, and the sensitivity to any change in traffic levels would be considered to be high.

The determination of the magnitude of the effects will be undertaken by reviewing the outline proposals for the Development, establishing the parameters of the road traffic that may cause an effect, and quantifying these effects.

In brief, the steps involved in this study would be as follows:

- Consultation with the relevant road authorities and emergency services (the Council, Transport Scotland, Police etc) as well as any local forestry interests;
- Establish baseline traffic flow conditions;
- Carry out route inspections including detailed observations of each community potentially affected by the proposals within the study area;
- Based on the route inspections, sensitive receptors would be identified;

- An initial assessment of traffic generation from the proposed construction works would be undertaken. Assignment of traffic to the network, and an initial assessment of effects. This will be based on professional judgement rather than transportation network modelling;
- Obtain refined project needs, refine traffic generation, and re-assess effects, using obtained baseline traffic data;
- Assess abnormal load movements, including swept path analysis and potential mitigation measures, in order to demonstrate that the selected route is feasible for the size of turbines proposed;
- Assess residual effects following the primary mitigation built in by virtue of the above-mentioned iteration, and any required residual mitigation needs; and
- Identify and assess the potential for cumulative effects based on other known developments.

Formal Traffic Assessments principally relate to developments that generate a significant permanent increase in traffic as a direct consequence of function (for example, retail parks) whereas a wind farm is temporary and the function does not result in a permanent traffic increase, as such it is proposed that a formal traffic assessment is scoped out.

12.3 Key Sensitivities and Baseline Conditions

The main sensitivities relating to the Development are considered to be:

- Increase in overall and HGV traffic;
- Delay related to the movement of abnormal loads;
- Abnormal road wear and tear; and
- Road widening/improvements to accommodate abnormal loads.

The abnormal load route to Site will be identified following completion of the ALRA. General construction traffic is likely to approach the Development from a variety of origins, and as such the impact will be distributed across a variety of routes.

Baseline traffic flow conditions will be established at key locations on the Abnormal Load Route and General Construction Traffic Route. Where available Department for Transport (DfT) traffic count information will be used to inform the assessment.

12.4 Scoped Out Effects

Effects on transport during operation of the Development are expected to be negligible. Operational effects are therefore scoped out of this assessment.

Decommissioning traffic will be lower than that experienced during construction as a result of the majority of below ground infrastructure (foundations) being left in-situ. Baseline traffic flow at the time of decommissioning cannot be reasonably estimated at this stage of assessment. A detailed assessment of the effect of decommissioning on Transport would be undertaken prior to decommissioning. For these reasons assessment of decommissioning effects has been scoped out of this assessment.

12.5 Key Questions for Consultees

- Are consultees content with the proposed methodology and scope of the traffic and transport assessment?
- Are the Council/ Consultees aware of any specific access restrictions or limitations on the proposed abnormal loads route? and
- Are consultees content to scope out operational and decommissioning traffic from further assessment?

13 CLIMATE CHANGE AND CARBON BALANCE

13.1 Introduction

The aim of the Climate Change Impact Assessment (CCIA) Section is to determine how the Development is likely to interact with a changing climate and whether any significant effects could arise. CCIA is a relatively new form of environmental assessment required by the amended EC Directive 2014/52/EU⁵².

This Section of the Report sets out the proposed approach to the assessment of potential effects of the Development on climate change and carbon balance as a result of the construction and operation of the Development.

13.2 Assessment Methodology

In 2017, IEMA published the 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance'⁵³. Accordingly, the proposed CCIA methodology was developed in line with the 2017 IEMA guidance, in order to establish a comprehensive assessment methodology. The methodology focusses on the following elements:

- Assessment of the Development's effects on climate change (calculation of carbon footprint) based on best practice guidelines;
- Assessment of the Development's vulnerabilities and resilience in the context of climate change by identifying appropriate climate change projects and climate change effects; and
- Assessment of the Development's effects upon identified environmental receptors in the context of the emerging baseline.

13.3 Baseline Conditions and Potential Effects

The most recent climate change project iteration, UKCP18⁵⁴ has identified the following climatic trends as a result of climate change:

- Increased temperature;
- Changes in the frequency, intensity and distribution of rainfall events (e.g. an increase in the contribution to wind rainfall from heavy precipitation event and decreases in summer rainfall);
- Increased wind storms; and
- Sea level rise.

Potential effects include:

- Effects of the Development on climate change;
- Effects of climate change on the Development; and
- Effects on climate change assessments made in other topics of the EIA.

The Development will be inherently designed to reduce adverse climate change effects by offsetting the production of carbon dioxide through use of renewable sources for generating electricity. The current baseline with respect to greenhouse gas emissions from existing methods of electricity generation will be identified using existing data from the Government, operational sites, and experience of other similar developments. This

⁵² European Commission (2014) Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052> (Accessed 05/10/20)

⁵³ IEMA (2017) Assessing Greenhouse Gas Emissions and Evaluating their Significance [Online] Available at: https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf (Accessed 05/10/20)

⁵⁴ Met Office (2018) UKCP18 UK Climate Projections [Online] Available at: <https://www.metoffice.gov.uk/research/collaboration/ukcp> (Accessed 05/10/20)

information will provide the baseline information against which to assess the contribution of the Development to reducing greenhouse gas emissions and potential for significant effects. The effects of the Development on climate change are scoped into the EIA.

It is proposed that the Development's vulnerabilities and resilience to climate change can be scoped out of the EIA. None of the identified climate change trends listed above could affect the Development with the exception of increased wind storms. Braking mechanisms installed on turbines allow them to be operated only under specific wind speeds and should a severe wind storms be experienced then the turbines would be shut down. Therefore, climate change is not expected to have a significant effect on the Development, and this topic can be scoped out.

The EIA Report chapter will summarise, for each EIA topic, the potential for the various parameters subject to climate change to alter the assessment of effects, so this aspect is scoped into the EIA.

13.3.1 Scoped In Effects

The Carbon Calculator Tool will be used to determine how the Development affects climate change.

Effects of climate change on environmental receptors identified in other EIA topics will be considered in a future climate scenario, as predicted by UKCP18.

13.3.2 Scoped Out Effects

All assessment regarding the Development's vulnerability and resilience to climate change.

As per Section 9 of this Report, no peat is anticipated to be present on site. Subject to this being confirmed, it is proposed that use of the Scottish Government's Carbon Calculator Tool is scoped out.

13.4 Key Questions for Consultees

The above scope is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely significant do not require assessing under the EIA Regulations.

Key questions for consultees are:

- Are consultees content to scope out the Development's vulnerabilities and resilience to climate change?
- Are consultees content to scope out the use of the carbon calculator tool? and
- Are consultees content with the proposed method of assessment?

14 OTHER ISSUES

14.1 Introduction

The Other Issues chapter in the EIA Report will assess the likely impact of the Development upon receptors surrounding of the Site which are not covered in other technical disciplines.

This Section of the Report sets out the approach in respect to additional assessments that are required in order to provide a comprehensive assessment of the likely environmental impacts of the Development, together with a summary of baseline based on information that is currently available.

14.2 Health and Safety, including Major Accidents and Disasters

The EIA Regulations state that an EIA must identify, describe and assess in an appropriate manner, the expected effects deriving from the vulnerability of the Development to risks, so far as relevant to the Development, of major accidents and natural disasters.

Relevant information available and obtained through risk assessments pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament⁵⁵ on the control of major accident hazards involve dangerous substances. The Directive lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. Directive 2012/18/EU requires the preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the nature of the Development. Throughout all phases of the Development, cognisance should be made through the following guidance documents produced by Renewable UK:

- Wind Turbine Safety Rules Third Edition⁵⁶;
- Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition⁵⁷; and
- Onshore Wind Health & Safety Guidelines⁵⁸.

Health and Safety during the construction and decommissioning phases of the Development will be subject to relevant legislation and best practice. This will involve site inductions, risk assessments, and method statements as implemented by the Construction Management Plan (CMP) produced prior to construction. Therefore, there is no further requirement for Health and Safety to be assessed within the EIA and is scoped out of further assessment.

The risk of a major accident could be increased by the probability of natural disasters associated with the location of the Development. This should be considered during the preparation of major accident scenarios.

The Development is not located within an area known for natural disasters such as hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis. As the most probable

⁵⁵ European Union (2012) Directive 2012/18/EU [Online] Available at: <https://eur-lex.europa.eu/legalcontent/EN/TXT/?uri=CELEX:32012L0018> (Accessed 06/10/20)

⁵⁶ Renewable UK (2015) Wind Turbine Safety Rules. Third Edition. [Online] Available at: https://cdn.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/Docs/Health_&_Safety/WindTurbineSafetyRulesIssue3.pdf (Accessed 04/10/20)

⁵⁷ Renewable UK (2015) Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules. Third Edition [Online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/docs/health_&_safety/WTSR_Guidance_2018.pdf (Accessed 04/10/20)

⁵⁸ Renewable UK (2015) Onshore Wind Health and Safety Guidelines [Online] Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/OnshoreWind_HealthSafety_Guidelines.pdf (06/10/20)

of natural disasters to affect the Development, flood risk will be assessed within the hydrological assessment in the EIA Report.

None of the identified climate change trends listed will affect the Development with the exception of increased windstorms. Risks associated with ice build-up, lightning strike and structural failure are removed or reduced through inbuilt turbine mechanisms in modern machines. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and should severe windstorms be experienced then the turbines would be shut down. Although an unlikely event in the area, the brake mechanisms could also apply to a hurricane scenario.

The Development is not located within an area prone to such disasters and the likelihood of such an event is extremely rare. Therefore, it is concluded that no significant effects will arise due to health and safety including major accidents and natural disasters as a result of the Development, and this topic can be scoped out of the EIA.

14.3 Shadow Flicker

Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as a window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects can only occur inside buildings when the blade casts a shadow across an entire window opening.

Due to the lack of explicit guidance in Scotland, guidance within the UK is considered to be material for assessing shadow flicker effects. Guidance produced by the UK Government, 'Planning Practice Guidance for Renewable and Low Carbon Energy'⁵⁹ states that "*only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK - turbines do not cast long shadows on their southern side.*" In addition, the Online Scottish Planning Guidance Note⁶⁰ on onshore wind provides information on shadow flicker. It states: "*where separation is provided between wind turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem.*" Since the final layout and candidate turbine have yet to be selected, it is difficult to determine whether or not the Development will have a significant effect on the surrounding properties from shadow flicker.

An assessment will be undertaken to determine whether or not there will be any impacts on surrounding properties and the results of the assessment will be included in the EIA Report. This will examine all properties which lie within 10 rotor diameters and 130 degrees either side of north from each turbine. Should any properties be located within this area, Resoft WindFarm, a computer modelling programme, will be used to model the potential effects at surrounding properties to quantify the potential effects.

It is proposed that the industry recognised limits are applied for the purposes of the assessment:

- Worst case scenario – 30 hours per year or 30 minutes per day; and
- Realistic scenario – 8 hours per year.

Should these limits be exceeded the Applicant would consider implementing mitigation measures such as screening or installing a sensor which can "turn off" the turbine in the event of conditions being aligned for effects to be experienced.

⁵⁹ DCLG (2013) Planning Practice Guidance for Renewable and Low Carbon Energy. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010013/EN010013-003019-WR_51_Written%20Representation_RWE%20NPower%20Renewables.pdf (Accessed 04/10/20)

⁶⁰ DECC (2011) Update of UK Shadow Flicker Evidence Base [Online] Available at: <https://www.gov.uk/government/publications/update-of-uk-shadow-flicker-evidence-base> (Accessed 07/10/20)

14.4 Waste

At this stage, the exact quantities and types of waste are unknown. It is expected that they could include:

- Excavated material;
- Forestry Residues;
- Welfare facility waste;
- Packaging;
- Waste chemicals, fuels and oils;
- Waste metals;
- Waste water from dewatering;
- Waste water from cleaning activities; and
- General construction waste (paper, wood, etc.).

A Site Waste Management Plan (SWMP) will detail how waste streams are to be managed, following the Waste Hierarchy⁶¹ of prevention, reuse, recycle, recover and as a last resort, disposal to landfill. The SWMP will be agreed and implemented prior to construction commencing on site. Therefore, it is not considered necessary for waste to be assessed further within the EIA and is scoped out of further assessment.

14.5 Telecommunications, Television Reception and Utilities

Wind farms have the potential to interfere with electro-magnetic signals and utilities passing above ground and physically with existing infrastructure below ground. This can therefore potentially affect television reception, fixed telecommunication links and other utilities.

To identify any existing infrastructure constraints, both consultation and a desk-based study will be conducted. Consultation with relevant telecommunication and utilities providers is a routine part of wind farm development and consultees will include:

- Spectrum Licensing (Ofcom);
- Television and telecommunications providers as appropriate; and
- Water, gas and electricity utilities providers.

Since the introduction of digital television signals, effects on television reception have substantially reduced. Should effects upon reception be identified as a result of the Development, mitigation is available to ensure these effects are not significant.

A consultation exercise will be completed in order to determine whether any telecommunication links and utilities located within or in close proximity to the Site.

14.6 Aviation

Since many issues must be considered when assessing the potential effect of the Development on aviation, the local Air Navigation and Air traffic Services Providers are best placed to provide expert interpretation of what those impacts might be and how they might affect safety, efficiency and flexibility of their operations. There is a well-established regulatory and policy framework that has been in force for a number of years, but which has been the subject of constant amendment and updating.

Where there is line of sight between turbines and air traffic controls radars, it is possible that the turbines may be detected by the radar dependant on atmospheric conditions, and appears as clutter on the controllers' screens; such clutter can have a direct operational impact on air traffic control operations.

⁶¹ Waste Management Licencing (Scotland) Regulations 2011 places a duty on all persons who produce, keep or manage waste to apply the 'Waste Hierarchy' in order to minimise waste production at all stages of a development.

The general approach to wind farm development is to avoid adverse effects on aviation infrastructure where possible, and to find appropriate technical mitigation solutions where this cannot be achieved. Policy guidance and extant regulations in respect of the potential interference effects of wind turbines on air traffic control radars are highlighted in civil and military publications. Furthermore, there are airfield physical safeguarding and telecommunication and navigational infrastructure safeguarding requirements.

Consultation will be undertaken with all airport authorities including National Air Traffic Services (NATS), the Ministry of Defence (MOD) and civil airports including Glasgow Airport and Edinburgh Airport.

14.7 Scoped Out Effects

14.7.1 Health and Safety, including Major Accidents and Disasters

Properly designed and maintained wind turbines are a safe technology. The site design and inbuilt buffers from sensitive receptors will minimise the risk to humans from the operation of the turbines. Risks associated with ice build-up and lightning strike are removed or reduced through inbuilt turbine mechanisms in modern machines, and as such can be scoped out at this stage. Health and Safety during construction and decommissioning phases of the Development will be subject to relevant legislation and best practice as included in the CMP. Therefore, there is no further requirement for Health and Safety to be assessed within the EIA and is scoped out of further assessment.

The Development is not located within an area prone to such disasters and the likelihood of such an event is extremely rare. Therefore, it is concluded that no significant effects will arise due to major accidents and natural disasters as a result of the Development, and this topic can be scoped out of the EIA.

14.7.2 Waste

A SWMP will be implemented prior to construction commencing on site and detail how waste streams are to be managed; therefore, it not considered necessary for waste to be assessed further in the EIA and is scoped out of further assessment.

14.7.3 Television Reception and Utilities

The Development will be designed to ensure that are no effects on utilities with further consultation undertaken prior to construction to ensure there are no effects. As such, utilities are scoped out of further assessment.

Since the introduction of digital television signals, effects on television reception have substantially reduced. Effects on television reception are considered extremely unlikely, and are scoped out of the EIA.

14.8 Key Questions for Consultees

The above scope is based on the requirement for EIA to consider the likely significant effects. Effects that are not likely significant do not require assessing under the EIA Regulations.

Key questions for consultees are:

- Do consultees agree with the suggested approach regarding Human Health and to scope out further assessment?
- Should no properties fall within ten rotor diameters and 130 degrees of north of the Development, are consultees content that shadow flicker can be scoped out of the EIA?
- Do consultees agree with the suggested approach regarding Waste and to scope out further assessment?

- Are any consultees aware of any additional telecommunications, utilities or aviation stakeholders that should be taken into account?
- Are consultees content that effects upon television reception and utilities can be scoped out of the EIA? and
- Following detailed consultation with telecoms providers, should no telecommunications links be found in the immediate vicinity of the Development, are consultees content that telecommunications can be scoped out?

APPENDIX A: FIGURE LIST

This Appendix contains the following figures:

- Figure 1 – Site Location;
- Figure 2 - Indicative Site Layout;
- Figure 3 - Cultural Heritage;
- Figure 4 - Ecological Designations Plan;
- Figure 5 - Landscape Designations Plan;
- Figure 6 – Zone of Theoretical Visibility (ZTV); and
- Figure 7 – Vantage Points and Viewsheds.