

Whiteneuk Wind Farm
Scoping Report
Prepared by Natural Power on behalf of
Vattenfall Wind Power Ltd.

Confidentiality class: None (C1)



VATTENFALL

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1. Introduction

This Scoping Report has been prepared by Natural Power Consultants Limited (Natural Power) on behalf of Vattenfall Wind Power Ltd (Vattenfall) herein referred to as the Applicant in anticipation of an application under Section 36 of the Electricity Act 1989 for a wind farm development to the north of Corsock in Dumfries & Galloway.

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

The purpose of this Scoping Report is to provide information to consultees for determining the scope of the Environmental Impact Assessment (EIA) and EIAR. Consultees will note that the Scoping Report contains a number of questions/comment boxes, on which it would be useful to receive feedback. Not all questions will be relevant to all consultees, therefore we request that consultees provide feedback only on those questions appropriate to them. The questions should not be considered an exhaustive list, and consequently consultees are welcome to provide feedback on any issue they consider relevant to Whiteneuk Wind Farm (herein referred to as the proposed development). If consultees elect not to respond, Vattenfall will assume that consultees are satisfied with the approach adopted/proposed. Further consultation will happen with affected stakeholders throughout the EIA process, including with local communities.

The design of the proposed development to date has been an iterative process, and the layout has avoided impacts as far as possible. It may be that the layout presented in this Scoping Report is further refined during the EIA process and through further consultation. Therefore, it should be noted that any amendments to the design are unlikely to increase the likelihood of a significant effect. However, should any changes occur that are likely to result in a significant or unknown effect on an important feature previously scoped out, then this feature will be scoped back into the EIA process. Any changes will first be discussed with the relevant consultees, to ensure that they too are in agreement with the applicant's understanding and before altering the inclusion or exclusion of features from the EIA. Further

general information about embedded mitigation and layout iterations is provided in Section 8.

1.1. The Applicant

The Applicant, Vattenfall, is a leading European energy company with approximately 20,000 employees, owned by the Swedish state. For more than 100 years Vattenfall has powered industries, supplied energy to people's homes and modernised the way its customers live through innovation and cooperation.

Vattenfall aims to make fossil-free living possible within a generation and is leading the transition to a more sustainable energy system through growth in renewables and climate-smart energy solutions for our customers.

Vattenfall has over 50 wind farms, onshore and offshore, across five countries and pioneered co-locating wind with solar and batteries. We have been in the UK since 2008, investing over £3.5 billion in enough wind to power nearly a million British homes. Vattenfall owns the largest onshore wind farm in England and Wales, Pen y Cymoedd, and in Scotland operates wind farms on the Isle of Skye and in Aberdeenshire. At a local level Vattenfall developed the consented South Kyle wind farm, near Dalmellington, lying within both East Ayrshire and Dumfries and Galloway.

1.2. Previous Application

The Applicant is aware that an application was made to the Scottish Government for a development at Loch Urr in November 2014, known as Loch Urr Wind Farm (14/C/2/0072). The eastern portion of the proposed Loch Urr Wind Farm area extends into the central part of the proposed development.

2. Proposed Development

The proposed development is located in Dumfries and Galloway, on land to the south of Moniaive, to the west of Dunscore and to the north of Corsock. The maximum topographic height of the site is 350m above sea level (ASL). Figure 1 illustrates the current proposed layout of the turbines, which may be subject to change, and location of the site. Figure 2 shows the regional context of the proposed development. Figure 3 presents the site constraints identified to date which the current layout accounts for.

The proposed development presented in this scoping report is considered by the Applicant to comprise of the largest extent of land and biggest number of turbines which is expected to be put forward for permission. It therefore represents what is likely to provide the most benefit, in terms of climate mitigation, net biodiversity gain, supply chain, and community benefit, and have the greatest impacts with regards to potential adverse environmental effects.

The following key elements are currently being considered for the proposed development:

- Up to 35 wind turbines, tip height up to 250m;
- Turbine foundations;
- External transformer housing;
- Crane pads;
- Upgrading and new access tracks;
- Buried electricity export cables;
- Anemometry mast(s);
- Forestry felling and replanting;
- Signage;
- Temporary borrow pits;
- Temporary construction and storage compounds, laydown areas and ancillary infrastructure;
- Drainage and drainage attenuation measures (as required); and
- Battery storage.

The site is wholly within Dumfries and Galloway.

A 30 year operational period may be sought for the proposed development following which decommissioning of this project would be undertaken.

2.1. Wind Turbines

The specific turbine model has not yet been selected but it is expected to be a horizontal axis machine with three rotor blades. Current models have approximately 6MW generating capacity and by the time the project is constructed, such machines may be capable of generating 6.5MW of electricity each. Should the candidate turbine require it, external transformers would also be placed adjacent to each turbine.

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

2.2. Turbine foundations

Reinforced concrete gravity foundations may be used on the proposed development. A typical turbine foundation specification is typically an inverted T shape consisting of a large square pad with protruding upstand left approximately 200mm proud of the finished ground level. Detailed design specifications for each foundation would depend on site-specific factors such as ground conditions, the specific turbine used, and various other engineering considerations. Each turbine foundation would comprise of a volume of concrete reinforced with steel bar.

Following construction of the foundations, a layer of peat, peat turfs and/or mineral soils that was excavated from the turbine foundation area would be reinstated. Stability for the turbine is provided through the weight of the foundation and the material replaced and compacted over it. Depending on the height of the water table at the foundation location, a drainage system may be installed around the foundation to prevent the build-up of water pressure under the foundation. Alternatively, in locations that were particularly sensitive to hydrological disturbance, it may be possible that a submerged foundation design could be employed which would not require a drainage system around the foundation.

2.3. Crane hardstand and temporary laydown areas

To enable the construction and subsequent maintenance of the proposed wind turbines, crane hard stands and temporary laydown areas would be required. At this stage in the process the final design, location and orientation of these has yet to be concluded but would be undertaken in line with the principles identified elsewhere

in this report and any potential residual impacts identified in the EIAR.

2.4. Access Tracks

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

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

- ‘Cut’ track – superficial ground layers are removed, along with soft subsoils until reaching an adequate bearing layer which can be used as a formation level. This construction method would be used on steeper topography where floating track is deemed unacceptable due to ground conditions or slope stability and would generally generate higher volumes of excavated material.
- ‘Floating’ track – superficial layers and subsoils are left in-situ with the track built on the existing ground level, utilising geotextiles and geogrids to reinforce the track materials. This technique is generally used where there are deep soft underlying materials e.g. peat or soft clays. Watercourse crossings would be minimised as far as possible and where these cannot be avoided then indicative water crossings would be identified and assessed.

2.5. Temporary Borrow Pits

Temporary borrow pits on site may be used to reduce the potential effects on the environment and transport network associated with transporting stone to site and using site-won stone is less likely to affect the pH of groundwater systems on site. The EIAR will include search areas of the proposed locations for on-site borrow pits.

The EIAR will present details of the borrow pit designs including indicative borrow pit plans. A detailed working borrow pit scheme and a decommissioning and restoration strategy would be produced pre-construction as part of an appropriately worded suspensive condition.

2.6. Buried Electricity Export Cables

The transformers may be linked to a substation via high voltage underground cables placed in trenches which would generally follow the route of the on-site tracks. In addition, where appropriate, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.

2.7. Anemometry Mast(s)

Anemometry masts are used to monitor wind speed and direction across wind farm sites in order to ascertain the available wind resource on any given site. This allows for a greater degree of certainty within the gathered data, overcoming seasonal variations in wind flow and addressing the potential for mechanical or electrical failure. In larger sites, particularly those with a complex wind regime, there is often a need to move masts around the site in order to gain a fuller understanding of wind characteristics across the site.

2.8. External Transformer Housing

The proposed wind turbines would produce electricity at 690 Volts - 1000 Volts. The electricity would then be transformed to 33,000 Volts (33kV) via a transformer located external to the tower of each turbine, depending on the final turbine model used. The transformers are likely to be linked to an on-site substation via the high voltage underground cables

2.9. Temporary Construction and Storage Compounds, Laydown Areas and Ancillary Infrastructure

To facilitate construction, temporary compounds may need to be developed strategically in the site. Infrastructure ancillary to the construction and operation of the proposed development would be required. These would be constructed in accordance with best practice and relevant guidelines, and to minimise environmental impact.

2.10. Drainage and Drainage Attenuation Measures (as required)

Drainage design would incorporate sediment management measures to attenuate and treat runoff from wind farm infrastructure.

2.11. Substation, Compound and Control Building

A control building would serve as an operational hub. Its compound would provide for services including waste storage and car parking. A substation would step up the electricity generated on site for connection to the national grid.

2.12. Battery/energy storage

A battery energy storage facility primarily consisting of a container/s with some external ancillary infrastructure may be proposed to store excess electricity generated by the proposed development and export it when required. It is likely to be akin to a shipping container with lithium-ion battery cells inside.

2.13. Construction Environmental Management Plan

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

In the past, the use and implementation of a CEMP during wind farm construction has ensured that the environment has not been significantly adversely affected. Should the proposed development be

consented, similar best practice guidelines and method statements would be adopted and agreed with consultees to ensure again that the development does not impact negatively on Loch Urr and other elements of the local environment.

2.14. Forestry

Parts of the site are located in areas of commercial woodlands. The forests are owned and managed privately.

The proposed development would be integrated into the existing forest design plan and should felling be required, compensatory planting would be carried out.

2.15. Grid Connection

The proposed wind turbines would produce electricity at 690 Volts - 1000 Volts. The electricity would then be transformed to 33,000 Volts (33kV) via a transformer located immediately adjacent to the tower of each turbine, depending on the final turbine model used. The transformers would be linked to an on-site substation via high voltage underground cables placed in trenches which would generally follow the route of the on-site tracks. In addition, where appropriate, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.

Connection of the proposed development to the national grid would be subject to a separate application.

2.16. Operational Period

The proposed development would in general operate automatically but would be monitored by an experienced team at a control room on site and by the Applicant's remote operations team. Each individual turbine would operate independently from the others. Within the operational wind speed range, the pitch angle of the turbine blades of each individual turbine would be automatically adjusted by the control system within the turbine, as appropriate for the measured wind speed.

Should sensors, placed within the nacelle of the turbine, register any instability in the structure or any other malfunction in operation or should wind speeds increase over safe limits, then the turbine would automatically shut down. If the cause of the shutdown is high wind speeds then the turbine would automatically recommence operation once average wind speeds fell to within the

operational range (generally between approximately 4 metres per second (m/s) and 25m/s, i.e. 9 miles per hour (mph) and 56mph, although technological improvements may allow for operation during stronger winds. Under other causes of shut down the turbine would remain shut down and in a safe condition until manually restarted by a member of the operations and maintenance team.

Applicant may submit a new application to the relevant authority for such development.

The lifetime of the project is envisaged to be 33 years from commissioning to decommissioning. Turbines are now generally designed with a warranty life of at least 30 years although advances in technology and understanding of turbine life may prolong this. To ensure that turbines continue to operate with acceptable availability in addition to maintenance in the event of malfunctions, regular pre-planned maintenance and servicing programmes are performed at the site on each turbine. Minor scheduled maintenance checks tend to be carried out every six months with major services being performed annually throughout the lifetime of the turbine.

Each turbine would contain lubricating and hydraulic oils. These are often replaced during regular maintenance operations. In the unlikely event of a lubricant leak the fully sealed tower bottom would act as a bund containing the spillage until it can be appropriately cleaned up. Spill kits would be made readily available on site.

Storage of other potentially polluting substances at the site during the operational period of the wind farm would only take place where agreed with the relevant authorities.

Maintenance and operation staff on site would make use of the control building.

2.17. Decommissioning

At least six months prior to the decommissioning of the site a Decommissioning Method Statement would be prepared and agreed with the relevant consultees. Best practice guidelines would be utilised at this time. Vattenfall expects a planning condition regarding decommissioning to be attached to the consent. Should the proposed development be consented, its restoration fund would be expected to include salvage from turbine components. The provision of the fund should be made so as to not unnecessarily create duplication for the landowner and the planning authority.

If, nearer the time of decommissioning, it is considered by the wind farm operator that the development area may be suitable for re-powering or if the existing wind farm infrastructure is suitable for a lifetime extension, the

3. Consultation

3.1. Community Consultation

Vattenfall considers consultation to be a crucial part of the wind farm development process and will engage with the local community throughout the application process. Vattenfall has already engaged a local Regional Liaison Officer to help better understand the local context, seek feedback, and provide information about the project.

A programme of statutory and public consultation will be undertaken to provide information to and seek feedback from interested parties. This may include public exhibitions, a project website, online consultation, one-to-one meetings with local stakeholders, leaflet drops and an established contact for project information requests.

It is also proposed to establish a Community Liaison Group comprising representatives from each of the community councils in the area and other local representatives. The engagement process will include outlining the findings of the baseline studies and assessment process. These meetings will be designed to provide a medium for two-way communication for the project and address any questions or concerns that representative community groups wish to raise. Public information events may be organised for the local community in 2020, designed to present the concepts of the scheme.¹¹ These will be followed by further public consultation as the design evolves through the EIA process. Vattenfall proposes to prepare a Pre-Application Consultation Report (PAC) as part of the Section 36 application, detailing the key outcomes of the consultation process.

Do consultees have any comments in relation to public consultation?

3.2. Stakeholder Consultation

Vattenfall considers consultation with statutory and non-statutory consultees as an integral part of the iterative EIA process and recognises the benefits in carrying out early consultation with all concerned parties.

To date, Vattenfall has discussed the project with Dumfries and Galloway Council via a Pre-application enquiries for a major application and has held informal

discussions with Scottish Natural Heritage, the Ministry of Defence, and NATS.

In March 2020, an update to the project was provided to Dumfries and Galloway Council. The Scottish Government's Energy Consent Units were also provided information about the site development at this time.

Feedback received so far has been very useful in informing these designs, including the removal of a large area of forestry from the development proposal to limit scheme size.

The area of forestry removed is the Garcrogo forestry block which was located in the south west of the site. As this area is no longer part of the proposed development, it has addressed some of the landscape and visual concerns raised by Dumfries and Galloway Council during the pre-application enquires.

The consultation will progress with the circulation of this Scoping Report and will continue for the duration of the EIA process.

Vattenfall will discuss the proposed development with a broad range of interested organisations including government bodies and agencies, local businesses, interest groups, and charities.

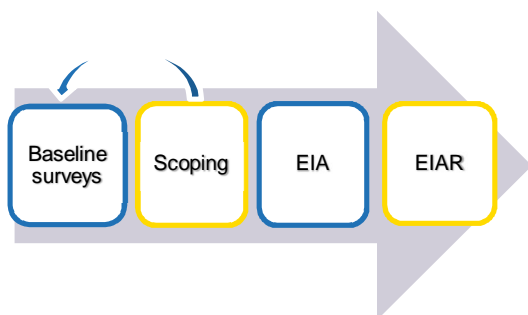
¹¹ At the time of writing, Vattenfall is monitoring the threat from Covid-19 (also commonly known as the coronavirus) and is aware that public health concerns may lead to the imposition of limits on public gatherings to help slow and prevent the spread of the disease in local communities.

4. Approach to the Environmental Impact Assessment

The EIA is a statutory procedure which draws together in a systematic way an assessment of the potential significant environmental effects arising from a proposed development. As the process has numerous steps, it allows for the opportunity to ‘design out’ adverse environmental effects at an early stage through the design of the project. This of course is generally preferable to mitigation or remedy at a later stage.

An iterative design approach is already underway for this project and will continue throughout the EIA process, which will allow the proposed development to have a design that works well for both the local environment and environmental resources within the area as well as being an economically viable scheme. The steps taken for informing and developing the EIA process are identified in the flow diagram below (Diagram 5.1).

Diagram 4.1: EIA Process



Feasibility studies have been undertaken and some baseline surveys commenced, see Section 10: Ornithology for example.

Consultees are requested to respond, where relevant, to the proposed scope in those features and topics that are likely to experience a significant impact and those features and topics which would be ‘scoped out’ of further assessment. In doing so the impact assessment will be focussed on those that will actually influence the decision as to whether to not the project should receive consent.

The impact assessment will determine for those assessed receptors what the impact would be from the proposed development, either directly or indirectly, by

comparing the baseline conditions with the conditions that would prevail should the proposed development be constructed, operated (and decommissioned). The environmental effects of the proposed development will be predicted in relation to environmental receptors (e.g. people), built resources and natural resources.

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

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

4.1. What will the EIA Assess?

The EIA will address the construction phase of the wind farm which would last approximately 12 to 24 months, the operational and maintenance phase which would last approximately 30 years, and the decommissioning phase. The total construction, operational and decommissioning phase would last a total of 33 years. The geographical coverage of the EIA will take account of the following:

- The physical extent of the proposed works;
- The nature of the baseline environment and the manner in which effects are propagated; and
- The pattern of governmental administrative boundaries which provide the planning and policy context for the scheme.

4.2. Gathering Baseline Information

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

The collection of baseline data will be achieved through desk study, consultation, field survey and monitoring and will be clearly reported in the subsequent sections, or within the EIAR (should there be an expected significant impact from the development). In line with the

regulations, the EIAR will also indicate any difficulties encountered in compiling environmental baseline conditions; such as access to land to carryout surveys where permission was not granted.

4.3. Prediction and Evaluation of Impacts and Effects

The prediction of impacts examines the change to the baseline environment that could result from the construction and operation of the proposed development.

The effects will be classified in to one or more of the following:

- Positive effects that have a beneficial influence, negative effects that have an adverse influence;
- Temporary effects that persist for a limited period only, due for example to particular construction activities;
- Permanent effects that result from an irreversible change to the baseline environment or which persist for the foreseeable future;
- Direct effects that arise from activities that form an integral part of the project;
- Indirect effects that arise from activities not explicitly forming part of the project;
- Secondary effects that arise as a result of an initial effect of the scheme; and
- Cumulative effects that arise from the combination of different impacts at a specific location, the recurrence of impacts of the same type at different locations, the interaction of different impacts over time, or the interaction of impacts arising from the scheme in conjunction with other development projects.

There is no statutory definition of what constitutes a significant effect. A significant effect may be broadly defined as an effect which, either in isolation or combination with others, should be taken into account in the decision-making process. This general definition will be used as the basis against which the significance criteria for environmental disciplines will be developed.

The threshold of significance for predicted effects tends to vary between the environmental topics. The assessment team will ensure that a consistent approach is applied to prevent undue weight being given to a particular discipline to the detriment of another.

4.4. Mitigation of Environmental Effects

Mitigation measures will be considered for each significantly adverse effect. The EIAR will include a description of the measures envisaged to prevent, reduce and where possible remedy any significant adverse effects. In line with the regulations, when identifying mitigation measures, the project will take into account the practicability and cost effectiveness of the proposals and their efficiency in reducing environmental impacts. Where practical, mitigation measures will be set out as commitments which will ensure they are implemented.

Once the final design has been adopted and account has been taken of any mitigation measures, residual adverse effects will be listed. The significance of a residual adverse effect will be determined by correlating the magnitude of the change arising from the scheme with the sensitivity of the particular attribute under consideration. The magnitude of change will be evaluated in accordance with the following table, Table 4.1.

Table 4.1: Magnitude of Change

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

Where applicable in carrying out individual assessments, a scale of increasing sensitivity of the resource or receptor will be defined. This may be defined in terms of quality, value, rarity or importance and can be classed as 'Low', 'Medium' or 'High'

For certain assessment areas, guidance will be taken from the value attributed to elements through designation or protection under law. Where assessment of this nature takes place the correlation of magnitude against sensitivity will determine a qualitative expression for the

significance of the residual adverse effect. This is demonstrated in the matrix below, Table 4.2.

Table 4.2: Significance of Effect

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

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

Do consultees have any comments in relation to the approach to the Environmental Impact Assessment?

As per the aim of the Scoping Report, we intend to focus the EIAR on the more significant effects and will therefore seek agreement that non-significant effects can be scoped out.

4.5. Securing Commitments and Mitigation through Planning Conditions

Where commitments have been discussed within this scoping report, they will form part of the EIAR and therefore ensure that they are secured if the proposed development receives consent through specific planning conditions. These conditions may include, for example, requirements for detailed documents including a CEMP to be produced prior to construction.

5. Legal and Policy Context

The application will conform to the statutory requirements legislated by Section 36 of the Electricity Act 1989 and The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (referred to in this report as the EIA Regulations). Deemed planning permission will be sought by the Scottish Ministers under section 57(2) of the Town and Country Planning (Scotland) Act 1997 as amended.

Planning policy in a Planning Statement which would accompany the application for consent. This would assess the proposed development in a legal and policy context against the relevant legislation and planning policies in force. The Planning Statement would assess such documents at international, national, regional and local levels, where applicable, including but not limited to:

- Paris Agreement (effective of November 2016);
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, which amends the Climate Change (Scotland) Act 2009;
- Scottish Energy Strategy (2017)
- Onshore Wind Policy Statement (2017)
- National Planning Framework for Scotland 3 (NPF3);
- Scottish Planning Policy 2014 (SPP);
- Draft National Planning Framework for Scotland 4 (NPF4), depending on timescales; and
- Dumfries and Galloway Local Development Plan 2 (adopted October 2019).

6. Environmental Impact Assessment Report

consultees. A NTS will be submitted alongside the EIAR, which will provide a summary of the main findings and will be written in a non-technical language for ease of understanding by the general public.

The EIA process will result in the production of an Environmental Impact Assessment Report (EIAR). The EIAR will identify those features/ receptors that have been agreed with the competent authority and their advisers as those that are likely to have a significant effect from the proposed development and will make an influence on their decision process.

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

Where features are considered, the assessment methodology, results, effects and mitigation proposed (if any) will be included. This will allow for the residual effect from the proposed development to be identified to allow the competent authority sufficient information to determine the application.

The EIAR will supplement the application and will also be accompanied by a Non-Technical Summary (NTS). A Pre-Application Consultation (PAC) Report, a Planning Statement and a Design and Access Statement are likely to also be provided.

The EIAR is likely to follow the structure below:

- Chapter 1: Introduction;
- Chapter 2: Proposed Development Description;
- Chapter 3: Design Evolution and Alternatives;
- Chapter 4: Landscape and Visual Impact Assessment (LVIA);
- Chapter 5: Ecology;
- Chapter 6: Ornithology;
- Chapter 7: Hydrology, Geology and Hydrogeology;
- Chapter 8: Noise;
- Chapter 9: Cultural Heritage;
- Chapter 10: Traffic and Transport;
- Chapter 11: Forestry;
- Chapter 12: Aviation & Telecommunications; and
- Chapter 13: Schedule of Mitigation.

As per Regulation 17 of the EIA Regulations, the EIAR will be submitted to Scottish Ministers in electronic form and hard copies. Upon submission of the application, the EIAR will be made available for public inspection at appropriate locations to be agreed with Dumfries and Galloway Council and will be distributed to the relevant

7. Embedded Mitigation and Further Layout Iterations

The design of the proposed development has generally avoided environmental and physical constraints which have been identified during initial feasibility studies (embedded mitigation). These will be refined as the EIA progresses.

Throughout the remainder of the EIA process (until the submission of the EIAR), it may be that the layout presented here in the Scoping Report further develops, especially in light of the Scoping Opinion and public consultations. Should the layout change from now to the application, it should be noted that the layout presented within this Scoping Report represents a 'greatest extent scenario' (e.g. turbines have been presented in the greatest number and tallest envisaged height) and therefore the proposal as identified now will have the greatest environmental impacts, and generally any amendments to the design will decrease the likelihood of a significant effect.

Should any changes occur that are likely to have a significant effect on the receptor these will be included within the EIAR. If the changes are not likely to have a significant effect, these will first be discussed with the relevant consultees, to ensure that they too are in agreement with the Applicant's understanding before excluding them from the EIAR.

8. EIA Subjects

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

9. Landscape and Visual Amenity

9.1. Introduction

The purpose of the Landscape and Visual Impact Assessment (LVIA) is intended to identify, predict and evaluate potential landscape and visual effects arising from the proposed development and associated ancillary elements. Wherever possible, effects will be quantified, but the nature of landscape and visual assessment requires interpretation by professional judgement.

In order to provide a level of consistency to the assessment, receptor sensitivity, the prediction of magnitude of impact, and assessment of significance of the residual effects will be based on pre-defined criteria based on guidance provided by the Landscape Institute, as refined for the purposes of wind farm assessment and taking account of relevant technical and planning guidance.

In addition to this scoping submission, detailed consultations are intended with Dumfries and Galloway Council and Scottish Natural Heritage (SNH) in respect of the following:

- The LVIA scope and detailed methodology;
- The scope and inclusions for the cumulative assessment component of the LVIA; and
- Selection of representative viewpoints for inclusion in the LVIA, including night viewpoints for assessment of aviation lighting

9.2. Landscape Policy and Guidance

The LVIA would be prepared in accordance with the *Guidelines for Landscape and Visual Impact Assessment, Third Edition* (GLVIA3) (Landscape Institute and the Institute of Environmental Assessment (2013) and *Landscape Character Assessment, Guidance for England and Scotland*, (The Countryside Agency and Scottish Natural Heritage (SNH) (2002 Edition).

In addition to the above, the LVIA will take account of the following guidance documents:

- *Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity* (Scottish Natural Heritage (SNH) and the Countryside Agency 2004);

- *Landscape Institute GLVIA3 Statement of Clarification 1/13 (2013)*;
- *Siting and Designing Windfarms in the Landscape, Version 3a, (SNH, August 2017)*;
- *Visual Representation of Windfarms, Version 2.2, SNH Feb 2017*
- *Visual Representation of Development Proposals, Technical Guidance Note 06/19 (Landscape Institute, 07/2019)*;
- *Residential Visual Amenity Assessment (RVAA), Technical Guidance Note 2/19 (Landscape Institute, March 2019)*; and
- *Assessing the Cumulative Impact of Onshore Developments (SNH, March 2012)*

The assessment would also take into consideration relevant national and local landscape planning policy and other such material that may be published during the preparation of the LVIA.

9.3. Methodology

A detailed methodology for assessing landscape and visual effects will be included in the LVIA EIA chapter.

9.3.1. Study Area

In accordance with SNH's current guidance on the Visual Representation of Wind Farms, the study area proposed for the LVIA will be 45km.

However, where appropriate, agreement will be sought to concentrate detailed assessment to a smaller radius, depending upon the findings of preliminary appraisal and the extent of likely significant landscape and/or visual effects. This is to ensure the proportionality of the LVIA.

9.3.2. Impacts and effects

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

- Impacts may be defined as changes to the existing landscape and visual baseline context as a result of the construction and operational activities and elements associated with the proposed development; and
- Effects are considered to be the consequence of those impacts on landscape resources or visual amenity and receptors.

It is a requirement of the current EIA Regulations to state whether effects are beneficial, neutral or adverse. For the purposes of the LVIA, effects will be assumed to be adverse unless stated otherwise.

9.3.2.1. Landscape and Visual Effects

In accordance with GLVIA3 the assessment of Landscape effects and visual effects are considered separately.

The level of landscape and visual effects is derived from a combination of receptors sensitivity and the magnitude of impacts.

Landscape Effects

The assessment of landscape effects will consider effects on:

- Landscape fabric;
- Landscape Character; and
- Landscape designations and classifications.

Landscape sensitivity will be ascribed according to the susceptibility of the landscape receptor to the proposed change and its value. Value will be partly determined by reference to formal designation or classifications, but also other factors such as cultural and/or spatial importance, uniqueness or role in respect of adjoining landscapes, including the 'setting' of settlements.

The sensitivity of landscape receptors will be described as High, Medium or Low according to predefined criteria.

The magnitude of landscape impacts will be determined by: size and scale, geographical extent, duration and reversibility of that effect and will be expressed in terms of substantial, moderate, slight and negligible.

Visual Effects

As guided by the GLVIA3, the nature of the visual receptors (sensitivity) will be assessed in terms of the susceptibility of the receptor or viewer (not the view) to the proposed change in views and visual amenity and the value attached to particular views. This will be expressed in terms of High, Medium or Low. The nature of the effect (magnitude) on each visual receptor will be assessed in terms of the size and scale, geographical extent, duration and reversibility of that effect and will be expressed in terms of Substantial, Moderate, Slight and Negligible.

9.3.2.2. Significance of Landscape and Visual Effects

For both landscape and visual effects, an overall judgement will be made on the sensitivity of the receptor and the magnitude of impact resulting from the proposed development. This judgement is based on evaluations of the individual aspects of value, susceptibility, size and scale, geographical extent, duration and reversibility. The four main levels of landscape and visual effects that will be used in this LVIA; Major, Moderate, Minor and Negligible. Three intermediate combinations are also

used for determining landscape and visual effects; Major/moderate, Moderate/minor and Minor/negligible. These levels are not prescriptive and the evaluation of potential effects makes allowance for the use of professional judgement and experience.

Landscape Institute advice, contained in GLVIA3 statement of clarification 1/13 (June 2013), states that following the determination of magnitude and sensitivity, *‘the assessor should then establish (and it is for the assessor to decide and explain) the degree or level of change that is considered to be significant’*. In accordance with this advice, the LVIA will establish at what level in the assessor’s opinion, *‘significant’* effects arise, as referred to in the EIA Regulations.

Those effects considered to be major and major/moderate effects by virtue of the more sensitive receptors and the greater magnitude of effects, are considered to be Significant Landscape or Visual Effects. Moderate, moderate/minor, minor, minor/negligible and negligible effects are considered to be Not Significant Landscape or Visual Effects. However, whilst assessments are based on factual and objective data where possible, they involve qualitative considerations, and are therefore essentially and inevitably a matter of professional judgement undertaken on an individual basis. In some instances, Moderate effects may be judged to be Significant by the assessor and equally some Major/moderate effects may be judged to be Not Significant. In these instances, the level of significance of the effect determined by the assessor will be explained in detail.

Examples of significant landscape effects can arise where changes to important key elements or attributes of a Landscape Character Types occur without necessarily giving rise to a change in character, or where a new landscape type or sub-type and therefore new character type (at various scales) would result from the introduction of the proposed development.

A significant visual effect is considered to be a change in the view that would markedly change the composition of that view.

It should be noted that significant effects need not be unacceptable or necessary adverse and in most cases are reversible.

Cumulative Effects

The Cumulative Landscape and Visual Impact Assessment (CLVIA) will be undertaken in a similar process to the LVIA. The aim of the CLVIA is to identify,

predict and evaluate potential key effects arising from the addition of the proposed development to a theoretical landscape baseline which includes cumulative sites currently present in the landscape and that may or may not be present in the landscape in the future. Cumulative sites consist of other wind farm developments only. As with the LVIA, the CLVIA deals with the effects on landscape and visual receptors separately. Our current understanding of active projects within 45km of the proposed development based on publicly available information is outlined in Table 9.1. Consultees are asked to confirm their understanding of other wind farms in the area.

Table 9.1: Wind Farm Developments Located Within 45km of the Proposed Development

Wind Farm	Status
Afton	Operational
Andershaw	Operational
Arecleoch	Operational
Auchenlosh	Operational
Banks Farm (Resubmission)	Operational
Banks Hill (2nd Resubmission)	Operational
Benbrack	In Planning
Blackcraig	Operational
Brockloch 3	In Planning
Brockloch Rig (Windy Standard)	Operational
Brockloch Rig Extension (Windy Standard Extension)	Operational
Burnswark Garage (Resubmission)	Operational
Callisterhall	In Planning
Clauchrie	In Planning
Clyde (North and Central)	Operational
Clyde Extension	Operational
Clyde South	Operational
Clyde Wind Farm (North, Central and South)	Operational
Crossdykes	In Planning
Dalswinton, Pennyland Moor	Operational

Wind Farm	Status
Dersalloch	Operational
Douglas West	In Planning
Douglas West Extension	In Planning
Enoch Hill	In Planning
Ewe Hill	Operational
Fell	In Planning
Galawhistle	Operational
Glenmuckloch	In Planning
Glenmuckloch Community Energy Park	Operational
Glenshimmeroch	In Planning
Glentaggart Wind Farm	In Planning
Greenburn	
Hagshaw Hill	Operational
Hagshaw Hill - Repower	In Planning
Hagshaw Hill Extension	Operational
Hare Craig	In Planning
Hare Hill	Operational
Hare Hill Extension	Operational
Harestanes	Operational
Harryburn	In Planning
Hazelside Farm (Resubmission)	Operational
Hellrigg (Resubmission)	Operational
High Park Farm	Operational
Kennoxhead	In Planning
Kennoxhead Extension	In Planning
Kirkmabreck Farm	Operational
Kype Muir	Operational
Larg Farm	Operational
Lethans	In Planning
Little Hartfell	In Planning
Littleton Farm	Operational
Lorg	In Planning
Margree	In Planning

Wind Farm	Status
Mark Hill Extension Windfarm	In Planning
Middle Muir	Operational
Minnygap (Resubmission)	Operational
Minsca	Operational
Minsca Farm	Operational
Mochrum Fell	In Planning
North Kyle	In Planning
North Lowther	In Planning
Nutberry	Operational
Over Hill	In Planning
Penbreck	In Planning
Pencloe	In Planning
Plascow Farm (Resubmission)	Operational
Polquhairn	In Planning
Priestgill	In Planning
Quantans Hill	In Planning
Sandy Knowe (Resubmission)	In Planning
Sanquhar	Operational
Sanquhar II	In Planning
Sanquhar 'Six'	In Planning
Scoop Hill	In Planning
Shepherds' Rig	In Planning
Slagnaw Farm	Operational
South Kyle	In Planning
Sunnyside Wind Cluster	Operational
Torrs Hill B	In Planning
Troston Loch	In Planning
Twentyshillin Hill	In Planning
Wether Hill	Operational
Whins Farm	Operational
Whiteside Hill	Operational
Whiteside Hill	In Planning
Windy Rig	In Planning

Wind Farm	Status
Windy Standard	Operational
Windy Standard III	In Planning

Could consultees confirm if the list of cumulative sites included in Table 9.1 is correct and if there are any additions or amendments required?

The difference between LVIA and CLVIA is the different baseline conditions in terms of other wind farm developments that are assumed to be present in the landscape. The LVIA baseline conditions consider the introduction of the proposed development to a landscape with other operational wind farm developments and those under construction. The CLVIA baseline conditions consider the introduction of the proposed development to a landscape with other wind farm developments at more speculative stages of the planning system, such as:

- consented wind farms which have been granted planning consent but are not yet constructed; and
- submitted valid wind farm applications awaiting determination, including those at appeal.

For clarity, the cumulative assessment separates out these different speculative stages of development by identifying different ‘**cumulative baseline scenarios**’.

- The existing scenario of operational wind farms and those under construction is assessed in the LVIA and is referred to as **Scenario 1**. The CLVIA considers the following scenarios;
- **Scenario 2** considers the addition of the proposed development in the context of operational wind farms, those under construction and additionally those developments currently consented. This represents the likely future scenario; and
- **Scenario 3** considers the addition of the proposed development in the context of operational, under construction, consented, undetermined planning applications and wind farm developments currently at appeal i.e. a less certain future scenario.

Scenario 3 represents the most unlikely cumulative baseline as not all planning applications would necessarily be approved. The detailed cumulative assessment will comprise the assessment of the introduction of the proposed scheme into each scenario baseline. Projects which have come forward of relevance at Scoping or pre-application stage would be acknowledged.

In the CLVIA, cumulative effects will be reported as the additional effects of the introduction of the proposed development against different cumulative baseline scenarios. For each receptor, it is clarified as to whether the effect has increased or decreased relative to the LVIA assessment or whether the effects will be the same as in the LVIA assessment.

Types of Cumulative landscape effects

Cumulative landscape effects are defined as effects on either the physical fabric, aesthetic aspects of the landscape or overall character of the landscape, or any special values attributed to it.

Cumulative effects on the physical fabric of the landscape arise when two or more developments affect the landscape components or features such as woodland, dykes or hedgerows.

Cumulative effects on the aesthetic aspects of the landscape arise when two or more developments affect the aesthetic or perceptual components of landscape character including scale, sense of enclosure, diversity, pattern and colour and perceptual or experiential attributes such as naturalness, remoteness or tranquillity.

Cumulative effects on the landscape character can arise when a new proposal results in a progression from a landscape which contains one development which forms an individual, isolated feature, to a landscape in which two or more developments are evident and may form a significant or dominant characteristic.

Types of Cumulative visual effects

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 or sequential effects which occur when the observer has to move to another viewpoint to see different developments e.g. along linear routes or journeys.

Combined visibility can occur as simultaneous visibility, where more than one development is visible in the same angle of view or successive visibility where two or more developments are present in views from the same viewpoint but cannot be seen at the same time as they are not in the same angle of view e.g. the viewer has to turn their head to see the other developments which become visible in succession.

Sequential visibility occurs where two or more developments are not present in views from the same viewpoint and cannot, therefore, ever be seen at the same time. The observer has to move to another

viewpoint to see the other developments so they will then appear in sequence. Sequential effects are most common along linear routes and journeys. Sequential effects range from frequently sequential when the developments keep appearing regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints, to occasionally sequential, where there may be long time lapses between appearances, because the observer is moving very slowly and/or there are large distances between the areas of visibility.

Assessing Cumulative Landscape and Visual Effects

Assessing the significance of cumulative effects requires:

- the identification of the landscape and visual receptors;
- the consideration of the nature of the receptors (sensitivity) as identified in the LVIA; and
- the determination of the nature of the effect (magnitude) which would be experienced by each receptor as a result of the addition of the proposed development to each baseline scenario.

The landscape and visual receptors to be considered in the CLVIA will consist of all the LCTs, designated landscapes, sequential routes and static locations such as viewpoints or settlements assessed in the LVIA as having more than negligible effects.

The susceptibility of receptors may be affected by the presence of other wind energy developments. Some viewers may consider that susceptibility is reduced because other wind farms are '*already there*', but for others it may be that sensitivity is increased because more development would be '*too much*'. However, to retain a consistent and objective approach, the susceptibility of receptors used for the cumulative assessment is taken to be the same as that identified in the LVIA. The value of the receptor would also remain the same in the cumulative assessment and therefore the overall sensitivity of the receptor is considered to be the same as will be identified in the LVIA.

As in the LVIA, the nature or magnitude of the cumulative effect on landscape and visual receptors considers the size and scale, geographical extent, duration and reversibility of the change likely to result from the addition of the proposed development to the different baseline scenarios. With particular regard to cumulative visual effects, the following additional factors are also considered in determining the magnitude of cumulative visual change from each visual receptor:

- The number of turbine developments visible;

- The prominence of the developments likely to be seen;
- The amount of available view affected;
- The arrangement of turbine developments e.g. developments seen in one direction or in only part of the view, or seen in all directions;
- The relationship of the scale of the turbine developments including size and number of turbines which may also be expressed as the horizontal and vertical angle occupied by turbines;
- The position of the turbine developments in the view e.g. on the skyline, against the backdrop of land;
- The distances from the viewer and between developments;
- The landscape setting, context and separation (or coalescence) of turbine developments; and
- Potential screening by land cover such as vegetation and local variations in topography.

As in the LVIA, four main levels of cumulative effect will be used in the CLVIA; Major, Moderate, Minor and Negligible. Three intermediate combinations will also be used; Major/moderate, Moderate/minor and Minor/negligible. The evaluation of potential effects makes allowance for the use of professional judgement and experience.

Significance of cumulative effects

SNH guidance considers that the concept of a 'threshold of acceptable change' beyond which turbine developments in a particular area become unacceptable, is a crucial element in identifying significant adverse cumulative effects. In other words, the effect of the present proposal is limited, but when added to the effect of what has already been permitted, or to new proposals which have been submitted for planning permission, it can become over-dominant in planning terms.

There are varying degrees of cumulative landscape effect. These are as follows:

- Multiple wind farms are seen as separate isolated features within the Landscape Character Type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;
- Multiple wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area;
- Multiple wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape' character area; and
- Wind farms cross different character types, reducing the distinction between the different types.

The appropriateness of such effects will depend on the value of a landscape, the objectives for change as defined in local capacity studies and scale of that effect, i.e. whether affecting a local character type or occurring at a regional level.

A significant cumulative landscape effect is considered to be a Major or Major/moderate landscape effect likely to be when the combination of the multiple wind farms (following the addition of the proposed development) become a defining characteristic of the area and/or reduces the distinction between different character types and/or transforms/re-defines local or wider baseline landscape character.

A significant cumulative visual effect is considered to be a major or major/moderate visual effect and would result in a view whose composition would be markedly changed.

It should be noted that significant cumulative effects need not be unacceptable or necessarily negative and may be reversible. Each effect is evaluated on its own merit.

Do consultees have any comments on the LVIA and CLVIA methodologies?

9.4. Landscape Assessment

The assessment of the levels of effect on the landscape resource will be carried out in the detailed LVIA to be contained in the EIAR and will adopt the following general process:

- Identify and describe the key landscape characteristics of the development site;
- Describe the LCT's and landscape designations identified in the Landscape baseline to represent the wider landscape resource;
- Identify and describe the type of changes which are likely to occur to the development site and wider landscape resource as a result of the construction and operation of the proposed wind farm;
- Describe the extent to which the key characteristics of the development site and the wider landscape resource would be altered in terms of being weakened or strengthened by the introduction of the proposed wind farm; and
- Assess the nature of the effect (magnitude) on the development site and wider landscape resource which are likely to result from the introduction of the

proposed wind farm, at construction and operational stages.

9.5. Visual Assessment

The assessment of the visual effect of the proposed development considers the effect on visual receptors throughout the study area. These visual receptors comprise the visual baseline.

Visual receptors are people who will be affected by changes in views or visual amenity at different places. They are usually grouped by what they are doing at these places, such as residents. They include people living and working in the area, people who view the proposed development sequentially such as people travelling through the area on road, rail or other forms of transport, people visiting promoted tourist attractions and landscapes and people pursuing other recreational activities.

9.5.1. Zone of Theoretical Visibility Mapping

Computer generated ZTV mapping has been undertaken to assist in determining the likely extent of visibility of the proposed development within the study area and the likely landscape and visual receptors affected by the proposed development. The ZTVs (Figures 4a, 4b and 4c) have been undertaken in accordance with the guidance included within 'Visual Representation of Wind farms Good Practice Guidance' Version 2.2 (SNH, 2017). It should be noted that the ZTV is based on a 35 turbine layout and a tip height of 250m to present a worst case scenario, however, the site would not be able to accommodate 35 turbines at this tip height.

9.5.2. Viewpoint Locations

A list of viewpoints is provided in Appendix 9.1 for preliminary assessment and shown on Figure 4a. Further consultation with DGC and SNH will be undertaken following a review of the Scoping Opinion prior to inclusion in the LVIA.

The viewpoints selected should represent the views experienced towards the proposed development throughout the study area by various groups of people or receptors. Selected viewpoints should include representative, specific and illustrative views from publicly accessible locations, which are defined as:

- **Representative viewpoints:** selected to represent the experience of different types of visual receptors, where larger number of viewpoints cannot all be included individually and where the significant effects are unlikely to differ. For example, certain points may

be chosen to represent the views of users of particular public footpaths and bridleways;

- **Specific viewpoints:** chosen because they are key views and sometimes promoted viewpoints within the landscape, including for example scenic viewpoints from roads, specific local visitor attractions, viewpoints in areas that are particularly noteworthy for visual and/or recreational amenity, such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations; and
- **Illustrative viewpoints:** chosen specifically to demonstrate a particular effect or specific issue.

In accordance with SNH guidance, 'Visual Representation of Windfarms' Version 2.2, (SNH Feb 2017), *'the aim is to choose a range of viewpoints from where there are likely to be significant effects and those that are representative of views within the study area...It is preferable not to include too many viewpoints as this can distract attention from the key significant effects...We therefore encourage all applicants and consultees to further scrutinise the list of viewpoints selected and reduce these where possible.'* (SNH, 2017 paras. 76 & 85).

Computer generated wire-frame visualisations of the proposed development will then be produced for each selected viewpoint to determine the potential view and suitability for EIA. It is suggested that between 10 and 20 viewpoints would be an appropriate quantity.

Following a list of final viewpoints being agreed with DGC and SNH, photomontage images will then be produced for the EIA. The photography and visualisation images produced in the EIA will accord with the guidance included in 'Visual Representation of wind farms' Version 2.2 (SNH, 2017).

9.5.3. Aviation Lighting

The proposal for turbines above 150m to blade tip may require further description and illustration of potential effects of aviation lighting. At time of writing the Civil Aviation Authority (CAA) requires visible red aviation warning lighting at up to 2000 candela for any structure at and greater than 150m in height. For the proposed turbines, a 2000 candela light may be positioned on the nacelle and 32 candela lights on the tower of each turbine. At time of writing the CAA guidance for lighting onshore wind turbines allows for the lighting intensity to be reduced to 10% in good visibility conditions and furthermore that the lighting be omni-directional and therefore dim in intensity outside of a 0° - 3° viewing angle. The current guidance is that the lighting would be static and only be operating during night-time hours. The above methods mitigate the potential effects of the

lighting. Vattenfall is aware of proposals accepted by the CAA for other development to install aviation lights on a limited number of turbines (e.g. the perimeter turbines).

As a precautionary measure, it is proposed a description of any lighting proposals visible from each selected viewpoint will be included in the viewpoint assessment. A limited number of viewpoints may be illustrated in additional photomontages using photographs taken at dusk. Following a design freeze, night-time viewpoint locations will be agreed with statutory consultees.

Consultees are asked for comments to the suggested viewpoint locations detailed in Appendix 9.1. It is suggested that a total of 20 viewpoints maximum are taken forward to the EIA.

9.5.4. Residential Visual Amenity Assessment

The Residential Visual Amenity Assessment (RVAA) will consist of a detailed study of the visibility from individual properties within a 2km radius of the outer turbine of the proposed development. In the absence of published guidance on the distance from the proposed development that should be adopted for a detailed study of visual amenity from residential properties, a 2km study area is considered appropriate.

This assessment will focus on the effect on the visual component of residential amenity only and does not consider other components such as noise, dust, shadow flicker etc. The assessments of these effects will be contained in an appendix of the EIA.

For properties considered to experience a high or moderate magnitude of visual change, this assessment will evaluate the potential effects on the visual component of residential amenity or 'living conditions'. The visibility of existing and under construction wind farms considered as scenario 1 cumulative developments will be taken into account as part of the existing visual baseline.

Do consultees have comment on the acceptability of the proposed RVAA study area of 2km and the general methodology outlined above?

9.5.5. Sequential Receptors

Sequential impacts occur when an observer moves through a landscape along a linear route. This can lead to a series of viewpoints and experiences which may include other developments in addition to the proposed development.

An initial list of routes to be assessed includes the Southern Upland Way (SUW), the A76, A702, A712,

B729, and B794. Core Paths to a radius of 5km from the proposed development will also be included. The aim of the initial assessment will be to ascertain which sequential routes have the potential to experience significant visual effects including significant cumulative sequential effects.

Do consultees have comments on the approach to the sequential assessment?

9.6. Cumulative Assessment

As detailed above, the difference between LVIA and CLVIA is the different baseline conditions in terms of other wind farm developments. This cumulative baseline is divided into different scenarios that reflect which groups of wind farm developments are assumed to be present in the landscape.

The cumulative developments are listed in Table 9.1 above. The operational Blackcraig, Wether Hill and Mochrum Hill are likely to be the primary developments against which cumulative effects would be most relevant. Cumulative assessment of other projects such as Fell, Lorg, Margree, Troston Loch and Shepherd's Rig will be dependent on their progress through the planning system.

These most relevant wind farm developments comprise the cumulative baseline (or Cumulative Study Area). As stated in the SNH guidance 'Assessing the Cumulative Effects of Onshore Wind Energy Developments,' (SNH, 2012) 'the key principle for all cumulative impact assessments is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process'. (para 33 SNH 2012).

The cumulative baseline identifies those developments it is considered require further cumulative assessment in the detailed CLVIA. These include all operational, consented and valid planning applications within an approximate 15km radius from the proposed development. Turbines below 50m are only considered within a 5km radius, and are scoped out of the LVIA beyond this distance.

Beyond 30km is considered too distant to present significant cumulative combined and cumulative sequential effects with the proposed development. Such developments are requested to be scoped out of the cumulative baseline.

Do consultees have comments regarding the cumulative baseline?

It should be noted that the cumulative baseline represents the 'maximum development scenario'. It considers the effects of the proposed development in addition to other developments that do not yet exist in the current landscape, but which may exist in the future. This results in a high level of uncertainty in the cumulative baseline as not all of the other undetermined proposals will necessarily gain planning approval.

Owing to this uncertainty with regard to the maximum development scenario, the cumulative baseline is split into different scenarios with a decreasing likelihood of becoming operational.

The continually evolving nature of the cumulative baseline requires a reasonable end date beyond which any further changes to the baseline would not need to be considered in the CLVIA. It is suggested a 'cut-off' date of three months prior to the submission of the LVIA and CLVIA be a reasonable timeframe.

Do consultees have comment regarding a reasonable end date of three months prior to the submission of the LVIA and CLVIA after which point any additional sites will not be assessed with the application?

9.6.1. Cumulative assessment

The landscape and visual receptors to be considered in the CLVIA will also consist of relevant Landscape Character Types, designated landscapes, sequential routes and static locations such as viewpoints and settlements.

In the CLVIA, cumulative effects will be reported as the additional effects of the introduction of the proposed development to the different baseline scenarios over and above the effects identified in the LVIA. For each receptor, it is clarified as to whether the effect has increased or decreased relative to the LVIA assessment or whether the effects would be the same as in the LVIA assessment.

Cumulative wind farms will be shown in the viewpoint visualisations in accordance with SNH Good Practice Guidance (2017). In addition, a ZTV to blade tip height of each wind farm proposal identified in the cumulative baseline will be prepared and then combined with the ZTV of the proposed scheme to create 'paired ZTVs' which illustrate the areas of mutual visibility, i.e. where the proposed scheme and other proposals are both visible from. ZTVs showing the combined visibility of

each cumulative baseline scenario will also be prepared to illustrate the total visibility for each scenario.

9.6.2. Proposed Mitigation

By their nature landscape and visual effects require early consideration of mitigation which is embedded in the design of the proposed development and has been specifically designed to avoid or to minimise the occurrence of adverse environmental impacts. All effects identified in the final detailed assessment will therefore be '*residual effects*'.

10. Ornithology

10.1. Background

This section of the scoping report describes the proposed approach to the assessment of the potential effects from the proposed development on bird populations and their supporting habitats. It includes a summary of the baseline surveys completed to date and the proposed EIA scope and assessment methods.

This scoping report has been informed by the results of baseline ornithological surveys of the proposed development site completed from April 2018 to August 2019. A summary of the results of the baseline surveys is included in this section of the scoping report.

A chapter of the EIAR will be devoted to the assessment of the impacts on key ornithological receptors. The chapter will be supported by a number of Technical Appendices, which will provide the full detail of the data used to inform the assessment.

The potential effects on ornithological receptors arising from a proposed development can be summarised as follows:

- Disturbance and/or displacement from supporting habitats during construction works;
- Loss / degradation of habitats through construction works, permanent structures and access tracks;
- Displacement from and disturbance to foraging, nesting and roosting habitat from the operating wind farm, including consideration of potential barrier effects; and
- Mortality from collision with turbine blades; but also
- Net biodiversity gain and habitat improvement associated with a wind farm site's Habitat Management Plan

There is also the potential for the above to act cumulatively with the effects of other existing and proposed developments within the wider area. Potentially significant cumulative effects will be fully considered within the assessment following methods set out in current guidance.

10.2. Key Ornithological Receptors

Particular focus will be given to the assessment of impacts on certain key bird species whose populations are of conservation concern (in a regional, national or international context), that are subject to specific legal protection, and that are considered to be particularly vulnerable to impacts from wind farm development. These include:

- Bird species of conservation concern listed on Annex I of European Council Directive 2009/147/EC on the Conservation of Wild Birds, in particular those that may be associated with populations of species that are qualifying interests of Special Protection Areas in the wider area;
- Bird species listed in Schedule 1 to the Wildlife and Countryside Act 1981 (as amended); and
- Bird species of national or regional conservation concern, not included within the above categories, but that are present within the study area in nationally or regionally important numbers and are considered to be relatively sensitive to the potential impacts of the proposed development.

Table 10.1 provides a list of the species that will be considered in detail within the assessment (i.e. as key ornithological receptors), based on the results of the surveys carried out in 2018 and 2019 and a review of available information from previously completed wind farm EIA surveys (e.g. for the proposed Loch Urr and Fell wind farms). These species have been selected based on the conservation status / relative rarity of their populations, potential sensitivity to the impacts of onshore wind farm development, the suitability of habitats within the study area and their breeding / wintering ranges (i.e. the likelihood of the species being present in the study area). Also included in this table is a summary of the current conservation status, nature conservation policy and legal designations for each species.

Table 10.1: Potential EIA Receptor Species and their Designations

Common Name	Scientific Name	Species Designations
Greenland white-fronted goose	<i>Anser albifrons flavirostris</i>	Ann. I ⁱ , UK Red List ⁱⁱⁱ , UK BAP ^{iv}
Greylag goose	<i>Anser anser</i>	UK Amber List ⁱⁱⁱ
Whooper swan	<i>Cygnus cygnus</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , UK Amber List ⁱⁱⁱ , SBL ^v
Black grouse	<i>Lyrurus tetrix</i>	UK Red List ⁱⁱⁱ , UK BAP ^{iv} , SBL ^v
Osprey	<i>Pandion haliaetus</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , UK Amber List ⁱⁱⁱ , SBL ^v
Goshawk	<i>Accipiter gentilis</i>	Sch. 1 ⁱⁱ
Hen harrier	<i>Circus cyaneus</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , UK Red List ⁱⁱⁱ , SBL ^v
Red kite	<i>Milvus milvus</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , SBL ^v
Lapwing	<i>Vanellus vanellus</i>	UK Red List ⁱⁱⁱ , UK BAP ^{iv} , SBL ^v
Curlew	<i>Numenius arquata</i>	UK Red List ⁱⁱⁱ , UK BAP ^{iv} , SBL ^v
Black-headed gull	<i>Chroicocephalus ridibundus</i>	UK Amber List ⁱⁱⁱ , SBL ^v
Barn owl	<i>Tyto alba</i>	Sch. 1 ⁱⁱ , SBL ^v
Short-eared owl	<i>Asio flammeus</i>	Ann. I ⁱ , UK Amber List ⁱⁱⁱ , SBL ^v
Nightjar	<i>Caprimulgus europaeus</i>	Ann. I ⁱ , UK Amber List ⁱⁱⁱ , UK BAP ^{iv} , SBL ^v
Merlin	<i>Falco columbarius</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , UK Red List ⁱⁱⁱ , SBL ^v
Peregrine	<i>Falco peregrinus</i>	Ann. I ⁱ , Sch. 1 ⁱⁱ , SBL ^v

i. Species listed on Annex I of the EC Birds Directive (Directive 2009/147/EC on the conservation of wild birds - the codified version). These species are the subject of special conservation

measures concerning their habitat, in order to ensure their survival and reproduction within their area of distribution.

ii. Species listed on Schedule 1 to the Wildlife and Countryside Act 1981 (as amended). All wild birds, their nests, eggs and dependant young are protected under the Wildlife and Countryside Act. Schedule 1 species receive additional legal protection under the Act.

iii. Birds of Conservation Concern (BoCC) in the UK (Eaton et al. 2015). The population status of birds regularly found in the UK is reviewed every five years to provide an up-to-date assessment of conservation priorities. Quantitative criteria are used to assess the population status of each species and to place it on the Red, Amber or Green list. These are global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance.

iv. Priority species in the 2007 UK Biodiversity Action Plan (UK). Local Biodiversity Action Plan species are given in the Dumfries and Galloway LBAP (April 2009). The UK BAP was superseded by the UK Post-2010 Biodiversity Framework (JNCC 2012).

v. Species included on the Scottish Biodiversity List (Scott Wilson 2005), which is part of the Scottish Biodiversity Strategy (published by the Scottish Government in May 2004).

In addition to the species receptors listed in Table 10.1, all relevant statutory designated sites and their cited qualifying interests, such as Sites of Special Scientific Interest (SSSIs) and Special Protection Areas (SPAs) will be considered in the assessment. An overview of statutory designated sites within 20km of the Site is provided in Table 10.2.

10.3. Baseline Conditions

10.3.1. Introduction

The primary land uses within the Site are commercial conifer forestry, sheep and cattle grazing. There is both enclosed pasture and unenclosed rough grazing land and large tracts of commercial forestry.

Outside of the conifer plantation areas, terrestrial habitats include: improved pasture, rush pasture, acid grassland, various mire and heath communities, shelterbelts and small blocks of mature mixed woodland. A number of houses and farm buildings are also present within the Site.

The main waterbody is Loch Urr, at the northern end of the Site. The Urr Water originates at Loch Urr and flows south, to the west of the core survey area, into the Solway Firth approximately 27km away. The site is also intersected by several minor watercourses. Figure 5 illustrates the ornithological survey areas.

The following provides a summary of the baseline conditions relevant to the ornithological assessment. The description of the study area is informed by the results of

survey work completed between April 2018 and August 2019.

Ornithological baseline surveys of the proposed development site were completed between April 2018 and August 2019 (inclusive). The surveys that have been carried to date are as follows:

- Flight Activity Surveys (April 2018 to August 2019);
- Moorland wader and songbird surveys (April to July 2018 and 2019);
- Breeding raptor surveys (April to August 2018 and April to September 2019);
- Black grouse lek survey (April and May 2018 and 2019); and
- Wintering waterfowl surveys (e.g. waterbody and grazing counts) (October 2018 to May 2019).

Further, targeted, surveys for breeding peregrine falcon and red kite and associated flight activity is proposed for March to August 2020 to provide additional data to inform the wind farm design and EIA processes. The spring 2020 survey period has been affected by restrictions during the COVID-19 outbreak. However, it has been possible, with appropriate measures in place to prevent the spread of the disease (i.e. in full compliance with all relevant Scottish Government regulations and guidance), to complete survey work during March and in June/July. This restriction will be fully recognised and addressed in the EIAR. However, the survey constraints during 2020 are not considered to be critical, in terms of the suitability of the baseline data to inform the EIA, given the existing breeding bird data from 2018 and 2019 and the records available from other sources.

Previous surveys completed for other proposed wind farms between 2010 and 2018 (e.g. the Loch Urr and Fell schemes) and the surveys completed for the proposed development during 2018/19 have shown that the survey area does not appear to be particularly sensitive in terms of use by migratory geese. Loch Urr is a locally important site for greylag geese which are part of the resident British breeding population. It is also used as a brief stop-over site by groups of whooper swans during spring migration.

The data collected during 2018/19 and information available from previous surveys are considered to provide a suitably detailed baseline from which to assess the sensitivity of the area and to inform the design and EIA of the proposed development. Therefore, no further winter / passage period flight activity surveys are considered to be necessary to inform the EIA.

10.3.2. Designated Sites

Statutory sites designated fully or in part for their ornithological interest within c.20km of the proposed development are listed in Table 10.2 along with a summary of their cited interest.

Table 10.2: Statutory Designated Sites with Ornithological Interest

Name	Designation	Summary of Species Interest / Condition
Milton Loch	SSSI	8km SE of the proposed development. This SSSI is a shallow eutrophic loach that is important for breeding wildfowl including tufted duck (<i>Aythya fuligula</i>) and mute swan (<i>Cygnus olor</i>).
Loch Ken and River Dee Marshes	SPA / Ramsar Site (including Kenmure Holms and River Dee (Parton to Crossmichael) SSSI)	12km SW of the proposed development. This SPA is an internationally important site for wintering Greenland white-fronted goose and greylag goose. Important breeding populations of common tern (<i>Sterna hirundo</i>), kingfisher (<i>Alcedo atthis</i>), wigeon, teal, mallard (<i>Anas platyrhynchos</i>), shoveler (<i>Anas clypeata</i>), tufted duck, goosander, water rail (<i>Rallus aquatica</i>), coot (<i>Fulica atra</i>), oystercatcher, lapwing, redshank, curlew and black-headed gull (<i>Chroicocephalus ridibundus</i>). The following species of wintering wildfowl are notable: whooper swan; bean goose (<i>Anser fabalis</i>); wigeon; teal; pintail (<i>Anas acuta</i>); goldeneye (<i>Bucephala clangula</i>); smew

Name	Designation	Summary of Species Interest / Condition
		(<i>Mergus albellus</i>); and goosander (<i>Mergus merganser</i>).

10.3.2.1. SPA Connectivity

The SNH document “Assessing Connectivity with Special Protection Areas (SPAs)” (2016) provides guidance on determining if there are likely to be adverse effects on bird populations ranging outside of the SPAs as a result of a proposed development. Included in the document are details of the typical foraging ranges for breeding and wintering populations of species that form the qualifying interests of SPAs.

There are three SPAs, both with internationally / nationally important populations of wintering wildfowl, present within the wider region that have been considered as potential receptors. The Upper Solway Flats & Marshes SPA, approximately 27km from the proposed development, and Castle Loch, Lochmaben SPA, approximately 28km from the proposed development, are both beyond the limit of potential SPA connectivity for any of the species listed as qualifying interests (greater than the reported core foraging ranges). For the Loch Ken and River Dee Marshes, approximately 12km away, the reported ranging distance for wintering greylag goose, estimated to be up to 15-20km from their roosts, overlaps the proposed development site boundary (the full extent of the SPA lies within 20km of the site boundary) but not for Greenland white-fronted goose (core range of 5-8km).

Potential effects of the operational wind farm on the Loch Ken and River Dee Marshes SPA / Ramsar will be fully considered within the assessment, particularly in terms of the potential effects on populations of greylag geese, which are a qualifying species for the SPA and has been recorded using the survey area. However, the current available data indicates that the proposed development area and associated buffer zones do not support migratory Icelandic greylag geese that are part of the SPA population. This is consistent with a study of the feeding distribution of the SPA population (Mitchel 2012²).

10.3.3. Baseline Surveys

10.3.3.1. Introduction

Baseline ornithological surveys were completed between April 2018 and August 2019 inclusive to systematically record and assess the use of all habitats within the study area by breeding and non-breeding birds, with a particular focus on species that are potentially sensitive to wind farm development and are also of conservation concern (i.e. species listed on Annex I of the EC Birds Directive, Schedule 1 of the Wildlife and Countryside Act 1981, species on the UK Red List of birds of conservation concern). All surveys have been undertaken by suitably experienced ornithological surveyors trained in the detailed field and recording methods of each of the surveys undertaken.

10.3.3.2. Summary of Completed Surveys

The survey areas referred to within this report are illustrated on Figure 5 and are based on the proposed development boundary. The various survey areas were defined as follows:

- 'site area' refers to the area enclosed by the proposed wind farm site boundary (i.e. the 'red line boundary');
- 'core survey area', 'breeding bird survey area' and 'wintering water bird survey area' refers to the site area plus an additional 500m wide strip;
- 'black grouse survey area' refers to the site area plus an additional minimum 1.5km wide strip; and
- 'raptor survey area' refers to the site area, plus an additional strip up to 2km wide, depending on the focal species and the presence of contiguous suitable habitat outside of the core survey area.

A suite of ornithological surveys were completed across the study area to inform the design and planning of the proposed development. All surveys follow methods set out in current SNH guidance (*Recommended bird survey methods to inform impact assessment of onshore wind farms*, March 2017). In summary, the following surveys were completed:

- Winter, spring, summer and autumn Flight Activity Surveys, from nine strategically located vantage points (see Figure 6), to systematically quantify the use of the site by target species (i.e. species of conservation concern and susceptibility to adverse effects from wind farm development);
- Breeding Bird Surveys: a range of surveys completed to determine the presence and approximate location of breeding territories/sites within the core and wider survey areas, including the following:

² Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge. 108pp.

- Moorland and woodland breeding bird surveys of the core survey area in April to July of 2018 and 2019;
- Breeding raptor surveys, focusing on species listed on Schedule 1 of the Wildlife & Countryside Act 1981, within suitable habitats in the raptor survey area in the Spring/Summer of 2018 and 2019; and
- Black grouse reconnaissance and lek surveys in spring of 2018 and 2019 within the black grouse survey area; and
- Forest owl and nightjar surveys of the core survey area in June and July 2018.
- Winter waterfowl surveys to assess the use of the site by passage and wintering swans and geese through regular counts of the two waterbodies (Loch Urr and Barr Loch) and the use of any fields in the survey area for grazing. These surveys were carried out from October 2018 to May 2019.

10.3.3.3. Flight Activity Surveys

A flight activity survey was completed in order to systematically sample, record and quantify the use of the airspace over the survey area by certain key species. Surveyors recorded the proportion of time that these key species spent flying at different elevations relative to the potential turbine blade swept height. The data will be used to identify constraints, such as regularly used flight corridors and areas of concentrated flight activity, which may be taken into consideration in the wind farm design process in order to reduce impacts. The flight activity data will also be used in the assessment of displacement effects and will be input into a standard model of bird collision risk to help inform the assessment of collision mortality impacts on receptor populations.

Flight activity data was collected during timed watches from strategically located Vantage Points (VPs). For this study, a total of nine VPs were selected, in order to ensure good visual coverage of the proposed development area and an approximate 500m wide buffer zone. Where possible, the VPs were selected to be outside of the areas where wind turbines might be proposed, in order to minimise observer effort. Vantage points and viewshed are shown on Figure 6.

The height above ground level of target and secondary species observed in flight was assessed by the observer to be within one of several height bands so that an estimate could be made of flight activity within the zone where turbine blades would be operating. Table 10.3 details the location of each of the VPs selected for the flight activity survey (see Figure 6).

Table 10.3: Vantage Point Locations

VP Ref.	Location	Easting	Northing
A1	Craigputtock Moor	277841	582445
A2A	Knockleoch	276735	578894
A2B	Nether Barr Hill	276825	577995
A3	Westland	279456	580164
A4	Lochenkit	279911	578211
W1	Craigmuie Moor	275163	585349
W2	Smithy Hill, Waterhead	274964	583091
W3	Glaisters Forest entrance	277229	581735
W4	Castramon Hill	278052	583654

A minimum of 72 hours of observation were completed at each VP per year (an average of six hours a month), with the surveys spread evenly throughout the survey period. Additional survey effort was made during October-November 2018 and March-May 2019, to coincide with peak passage periods for wildfowl. Table 10.4 provides a summary of the observation effort at each VP per month for the full survey period.

Table 10.4: Monthly Hours of Observation at Vantage Points A1 – A4 (April 2018 to August 2019)

Year	Month	Vantage Point			
		A1	A2	A3	A4
2018	Apr.	6	6	3	6
	May	9	9	9	9
	Jun.	9	12	9	9
	Jul.	6	3	9	6
	Aug.	6	6	3	6
	Sep.	9	9	6	6
	Oct.	15	15	18	18
	Nov.	12	12	12	9
	Dec.	6	6	9	9
2018 Total		78	78	78	78
2019	Jan.	6	6	6	6

Year	Month	Vantage Point			
		A1	A2	A3	A4
	Feb.	6	6	8	6
	Mar.	9	9	9	9
	Apr.	12	12	15	15
	May	15	15	12	12
	Jun.	18	9	9	9
	Jul.	6	9	9	9
	Aug.	6	6	9	6
2019 Total		78	72	77	72
<i>Grand Total</i>		<i>156</i>	<i>150</i>	<i>155</i>	<i>150</i>

Table 10.5: Monthly Hours of Observation at Vantage Points W1 – W5 (April 2018 to August 2019)

Year	Month	Vantage Point				
		W1	W2	W3	W4	W5
2018	Apr.	6	6	6	6	6
	May	9	6	6	9	9
	Jun.	9	12	9	9	9
	Jul.	6	6	6	6	6
	Aug.	6	6	9	6	6
	Sep.	9	6	9	9	6
	Oct.	15	15	15	15	18
	Nov.	9	15	9	12	12
	Dec.	6	6	9	6	6
2018 Total		75	78	78	78	78
2019	Jan.	6	6	9	6	6
	Feb.	6	6	6	6	6
	Mar.	9	9	9	9	9
	Apr.	15	12	12	12	12
	May	12	15	15	15	15
	Jun.	9	9	9	9	9
	Jul.	9	9	9	9	9
	Aug.	6	6	6	6	6
2019 Total		72	72	75	72	72

Year	Month	Vantage Point				
		W1	W2	W3	W4	W5
<i>Grand total</i>		<i>147</i>	<i>150</i>	<i>153</i>	<i>150</i>	<i>150</i>

VP watches were carried out between sunrise and sunset, with watches timed to achieve an even spread throughout the hours of daylight, by a single observer in conditions of good visibility, avoiding periods of very strong wind speeds when bird flight activity is suppressed.

10.3.4. Summary Survey Results

10.3.4.1. Breeding Birds

The study area as a whole, supports a relatively diverse breeding bird assemblage reflecting the range of habitat types present. The bird species recorded are considered broadly representative of the region and the main habitat types within the survey area: that is, unenclosed grassland and moorland, semi-improved grassland, scattered woodland and scrub, marshy grassland, waterbodies and coniferous plantation woodland.

The breeding season surveys completed in 2018 and 2019 confirmed the use of the site by various bird species of conservation concern and potential vulnerability to wind farm development, including breeding raptors such as red kite and peregrine falcon and breeding waders such as curlew and lapwing.

The survey area supports at least one breeding pair of peregrine falcon and at least two pairs of red kite. Barn owl are also known to breed within the survey area. Avoiding / minimising the risk of significant effects on these species will be a key consideration in the wind farm design process and impact assessment.

Other notable raptor species that were occasionally recorded, hunting or in passage, include merlin, osprey and hen harrier. Short-eared owl were also recorded within the survey area on a small number of occasions. There was also one record of a hobby (*Falco subbuteo*) during the flight activity survey. There was no evidence of breeding activity occurring within or near to the site by any of these species.

Despite the presence of some areas of suitable habitat, no black grouse lekking activity was recorded during the surveys in spring 2018 or 2019. An adult female was observed during a flight activity survey in March 2019 from a VP overlooking Craigenvey Moor.

Table 10.6 summarises the results of the breeding wader surveys for 2018 and 2019.

Table 10.6: Summarised Results of the Breeding Bird Surveys (Waders only)

Species	No. Apparent Territories	
	2018	2019
Oystercatcher	-	1
Lapwing	2	3
Curlew	9	4
Common sandpiper	1	3
Common snipe	3	3

No oystercatcher breeding territories were recorded in 2018. In 2019 a single territory was recorded on the north shore of Loch Urr.

Up to three breeding lapwing territories were recorded in 2018 and 2019, mainly located in the northern and central parts of the survey area in both years. Numerous display flights and territorial behaviour observed.

Curlew breeding territories were primarily located in the northern half of the survey area, particularly around Loch Urr, in both years. Numerous display flights and territorial behaviour observed.

All common sandpiper breeding territories were associated with Loch Urr.

Common snipe breeding territories were distributed throughout the open, primarily wet grassland within the core survey area. Numerous display flights were recorded.

A colony of breeding black-headed gull (*Chroicocephalus ridibundus*) was present on a small island within Loch Urr. The colony appears to have declined significantly in numbers over recent years.

There was no evidence of the presence of nightjar during the 2018 or 2019 breeding seasons.

Other species, of national conservation concern, recorded as breeding within the survey area included the following:

- Stock dove (*Columba oenas*) at Westland.
- Cuckoo (*Cuculus canorus*), territorial males were recorded in the core survey area, two within the coniferous plantation and one in a small strip of woodland in the centre of the site, at Craigenputtock, as well as within the extensive plantation areas.

- Skylark (*Alauda arvensis*) were recorded in all open habits within the core survey area. The highest concentration of territories occurred to the north of Loch Urr, with fewer territories to the south and to the east of Black Mark.
- Spotted flycatcher (*Muscicapa striata*) territories were recorded in a small area of woodland south of Craigenputtock and within the coniferous plantation further south.
- Whinchat (*Saxicola rubetra*) were mainly concentrated towards the north-western end of the survey area.
- Tree pipit (*Anthus trivialis*) territories were concentrated within the coniferous plantation areas, with one recorded in a strip of woodland on the west side of Craigenputtock Moor.
- Reed bunting (*Emberiza schoeniclus*) were fairly widely distributed across areas of suitable habitat with the survey area in both years.

10.3.4.2. Passage / Wintering Birds

Loch Urr is a locally important roost site for greylag geese, primarily birds associated with the British breeding population rather than migratory Icelandic birds. There was a peak count of c.550 greylag geese on Loch Urr recorded in July 2018. No geese were recorded on Barr Loch during any of the surveys.

Flights over the survey area by pink-footed geese were recorded infrequently, mostly during spring migration, the largest skein comprising 96 geese. There was no evidence of a build-up of significant numbers of roosting or feeding pink-footed geese near to the proposed wind farm site.

Whooper swans were infrequently recorded using the Loch, or flying over the site. During October 2018 there was a maximum count of 18 on Loch Urr. During March 2019 there was a maximum count of 52 whooper swans on the loch, consistent with a use of the site as a brief stop-over location during passage periods. No whooper swans were recorded using Barr Loch.

Loch Urr was used by a number of common duck species throughout the year, typically in low numbers but during December 2018 there was a peak count of 39 mallard on this loch.

There was no evidence during the survey period of the presence of any significant communal raptor roost sites within the survey area (e.g. red kite or hen harrier roosts).

10.3.4.3. Flight Activity

Table 10.7 provides a summary of the total number of flights by target species, the number of birds in flights per hour of observation and the number of flights occurring entirely or partly at potential collision risk height (N.B. this includes flights recorded between 20m to 250m above ground level and does not reflect actual collision risk which would be modelled during the EIA based on the wind farm layout and the key design parameters of the proposed wind turbine).

Table 10.7: Number of Flights by Target Species and the Percentage of Flights at potential Collision Risk Height (CRH)

Species	Total no. Flights (no. birds)	Birds / hour of obs.*	% Entirely / Partly at CRH
Whooper swan	7 (88)	0.07	85.7
Pink-footed goose	6 (322)	0.24	50.0
Greenland white-fronted goose	1 (1)	n/a	100.0
Greylag goose	57 (345)	0.25	77.2
Black grouse	1 (1)	n/a	0.0
Red kite	517 (605)	0.45	85.5
Hen harrier	31 (31)	0.02	32.3
Goshawk	43 (43)	0.03	83.7
Osprey	4 (4)	0.002	100.0
Golden plover	5 (21)	0.02	100.0
Lapwing	30 (99)	0.07	30.0
Curlew	54 (77)	0.06	61.1
Barn owl	5 (5)	0.004	0.0
Short-eared owl	3 (3)	0.002	66.7
Merlin	12 (12)	0.01	25.0
Hobby	1 (1)	n/a	100.0
Peregrine	24 (25)	0.02	91.7

**This is simply based on the total number of flight activity survey hours and does not account for seasonal variation / varying presence of suitable habitat within viewshed.*

In total there were 517 flight lines recorded for red kite, this was the most frequently recorded target species during the flight activity surveys with a high proportion of flight activity at potential collision risk height. Key focal areas for red kite activity included Glaisters, Craigenputtock and Lochurr Farm and the Westland area, as well as Bogrie Hill / Gairharow Hill along the plantation forestry edges. The potential effects on this species from wind turbine collision risk will be a key focus for the assessment. Options to reduce the risk through wind farm design and habitat management are being carefully considered by Vattenfall.

Four flight lines were recorded for osprey, with three on the western edge of Loch Urr and one to the west of Auchenhay Hill.

In total there were 125 waterfowl flightlines recorded. This included 35 flights partly or entirely at collision risk height, the majority of which were greylag geese. There appeared to be two well-used flight corridors in towards Loch Urr, from the south and from the northwest, used by greylag. Pink-footed geese were also recorded infrequently, with no clear flight corridors. A peak count of 96 pink-footed geese were recorded flying high over the survey area in April 2019.

10.4. Relevant Embedded Mitigation and Design Principles

The proposed development would incorporate a number of embedded mitigation measures to achieve the design objectives and avoid, prevent or minimise likely significant adverse environmental effects. At this early stage in the design process, this includes the following relevant design principles which will be incorporated into the final design of the proposed development:

- Key ornithological constraints have been mapped, based on the existing baseline data collated in 2018/19. This information will be used to inform the development of the detailed wind farm layout to help reduce potential impacts on sensitive ornithological receptors; for example, important flight corridors / activity areas, breeding sites of Schedule 1 bird species and areas of relatively high moorland wader breeding will be identified as a wind farm design constraint with appropriate set-back zones.
- All watercourses and waterbodies would have a minimum 50m wide protection buffer that would be avoided for wind turbine (and other structure)

placement. The access track layout will be optimised to ensure the minimum number of necessary watercourse crossings.

- A suitably qualified and experienced Ecological Clerk of Works (ECoW) would be appointed in advance of works commencing on the site. The ECoW would oversee the implementation of the suite of measures proposed to avoid or minimise potential impacts from the construction phase on sensitive habitats and species. The ECoW would have the authority to halt works on site and help ensure that the environmental commitments made within the EIAR are properly implemented.
- ACEMP would be developed in advance of works commencing on the site. The CEMP would detail all measures, protocols, method statements and monitoring that would be implemented to protect the environment during the works. For example, implementation of best practice measures to protect aquatic habitats from siltation and chemical pollution during construction.
- A site restoration plan would be prepared in outline which would set out the proposed site restoration measures following construction.
- Pre-construction surveys for breeding birds would be completed to ensure that current baseline information is available and that proposed works that have the potential to disturb such species, or destroy important habitats or nests sites and proceed lawfully with respect to the legislation protecting the relevant species (e.g. ground-nesting birds, Schedule 1 raptor species).
- A Habitat Management Plan (HMP) would be provided in outline within the EIAR and would be developed in detail prior to works commencing on the site. The HMP would include measures to alter and improve the quality of upland habitats within / adjacent to the site in order to help offset impacts arising from the construction works and operation of the proposed wind farm (e.g. discouragement of red kite flight activity near to the proposed wind turbines, improvement of habitats away from the wind turbine areas for red kite and black grouse).
- A plan to monitor breeding birds prior to and following wind farm construction and to monitor bird collision rates during wind farm operation will be provided in the EIAR and will follow current best practice methods.

10.5. Potential Effects Proposed to be Scoped Out of Further Assessment

Having regard to the characteristics of the site and the proposed development, key baseline characteristics and proposed embedded mitigation measures, at this stage it is considered that the potential effects listed below have no potential to be significant and can therefore be scoped out of requiring further assessment.

10.5.1. Construction and Decommissioning

- Effects on common breeding bird species will not be formally assessed, although measures to help ensure that active nest sites of all breeding birds are protected, as legally required, will be set out in the EIAR.

10.5.2. Operation

- Potential effects on the Upper Solway Flats and Marshes SPA will be scoped out of the assessment as the proposed development is situated outside of the potential connectivity distances, as defined in the SNH guidance, for all of the relevant species.
- The potential effects on birds arising from the connection of the proposed development to the national grid will not be assessed within the EIAR. Such effects (e.g. collision risk with overhead powerlines) will be considered within the planning and assessment process for the grid connection.

10.6. Scope of the Assessment

Having regard to the characteristics of the site and the proposed development, key baseline characteristics and proposed embedded mitigation measures, at this stage it is considered that the following effects are likely to or have some potential to be significant and therefore require further consideration through the EIA process:

10.6.1. Construction and Decommissioning

Likely, adverse effects during construction, which will be considered in detail in the EIA, are as follows:

- Disturbance and displacement to key receptors (breeding and non-breeding) caused by the presence of construction workers, noise, vibration and artificial lighting during construction;
- Loss of degradation of important supporting habitat for key receptors during construction; and

- The potential for cumulative construction related effects with other proposed developments.

10.6.2. Operation

Likely, adverse effects during the operational phase, which will be considered in detail in the EIA, are as follows:

- Mortality from collision with wind turbines and towers for the key receptor species (including consideration of proposed aviation warning lighting and this potential for this to increase bird collision risk);
- Operational displacement from / disturbance to important habitats supporting key receptor populations (e.g. displacement from foraging, nesting, roosting habitats due to the presence of the wind farm including consideration of potential 'barrier effects'); and
- The potential for cumulative operational effects with other existing and proposed developments.

10.7. Assessment Methodology

An assessment of the likely significant effects and impacts associated with the proposed development will be carried out in accordance with relevant and applicable legislation, policies and technical standards.

The ornithological assessment will be supported by a number of Technical Appendices, which will provide further detail on the baseline survey results and background to some aspects of the assessment. Data from the baseline surveys, along with information from other sources (e.g. local Raptor Study Group, Royal Society for the Protection of Birds, British Trust for Ornithology, Scottish Ornithologists' Club), will be used to inform the evaluations of the relative importance of the proposed development site for key receptor species.

A confidential annex will also be produced which will provide details of the locations of breeding sites of bird species at risk of human persecution (e.g. nest locations of species listed on Schedule 1 to the Wildlife & Countryside Act). These details will not be included in the publicly available EIA documents. The confidential annex will follow current best practice guidance (SNH 2016) and will only be issued to SNH.

10.7.1. Relevant Legislation, Guidance and Technical Standards

The assessment of the likely significant effects will be undertaken in accordance with relevant and applicable

legislation, policies and technical standards. In addition to relevant legislation and policy considerations, the assessment will be undertaken in accordance with subject specific legislation and best practice guidance including the following:

10.7.1.1. Legislation

- The Convention for the Conservation of European Wildlife and Natural Habitat (The Bern Convention) 1979;
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Council Directive 2009/147/EC on the conservation of wild birds (codified version of the 'Birds Directive');
- The Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland);
- Wildlife and Countryside Act 1981 (as amended in Scotland);
- Nature Conservation (Scotland) Act 2004 (as amended); and
- The Wildlife and Natural Environment (WANE) (Scotland) Act 2011.

10.7.1.2. Biodiversity Policy Context

- Relevant biodiversity policies were originally based on the UK Biodiversity Action Plan (UKBAP) which listed 65 Priority Habitats and 1150 Priority Species and created action plans for these priority habitats and species. The UKBAP formally ended in 2010 and was replaced by the UK Post-2010 Biodiversity Framework published in 2012. The UK Post-2010 Biodiversity Framework sets out the priorities for UK-level work to support the Convention on Biological Diversity's (CBD's) Strategic Plan for Biodiversity 2011-2020 as well as its five strategic goals.
- The '2020 Challenge for Scotland's Biodiversity: A Strategy for the Conservation and Enhancement of Biodiversity in Scotland' launched in 2013 provides the overview of Scottish biodiversity policies set within the UK framework (Scottish Government 2012). The 2020 Challenge publication is a supplement to the Scottish Biodiversity Strategy (SBS) published in 2004.
- The SBS emphasises the need to take account of how ecosystems work, particularly across landscapes. It states that both the broad and local scales need to be considered, that the capacity of ecosystems to respond to impacts is not infinite and that resilience is to be built into ecosystems using an adaptive, integrated approach at the scale of river catchments.
- The UK BAP list of priority habitats and species remain integral to the SBS and the Scottish Biodiversity List which is a list of animals, plants and habitats that Scottish Ministers consider to be of

principal importance for biodiversity conservation in Scotland.

- Originally under the UK BAP, and now under the SBS, local authorities have a responsibility to produce their own list of priority habitats and species and associated actions for conservation. These are called Local Biodiversity Action Plans (LBAP). The LBAP applicable to this site is the Dumfries and Galloway Biodiversity Action Plan (2009). The species and habitats identified as a focus for conservation action in the LBAP will be taken into consideration, where relevant, in the assessments.

10.7.2. Relevant Technical Standards

The following guidance will be referred to and followed as appropriate for the ornithological assessment:

- Chartered Institute of Ecology and Environmental Management (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland;
- SNH (2018). Environmental Impact Assessment Handbook. A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultation Bodies, and others involved in the Environmental Impact Assessment Process in Scotland. 5th Edition;
- SNH Guidance on the Habitats Regulation Appraisal process (available online);
- Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas (SNH, February 2018);
- Natural Heritage Zones Bird Population Estimates. SWBSG Commissioned Report Number: 1504 (BTO, 2015);
- Guidance on Assessing Connectivity with Special Protection Areas (SNH, June 2016);
- EU Guidance on wind energy development in accordance with the EU nature legislation (Publications Office of the European Union 2011);
- Calculating a theoretical collision risk assuming no avoiding action (SNH, 2000; Band, 2007);
- Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model (SNH, 2018);
- Avoidance Rates for Wintering Species of Geese in Scotland at Onshore Wind Farms (SNH, May 2013);
- Assessing the cumulative impacts of onshore wind farms on birds (SNH, August 2018);
- A Review of Disturbance Distances in Selected Bird Species (SNH, 2007);
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information (SNH, September 2016); and
- Dealing with construction and birds (SNH, March 2016).

Additional reference materials and guidance which is relevant to the ornithology assessment is referred to within the summary of assessment methods provided below. Consideration will also be given to the potential implications of the proposals for all relevant national and local nature conservation policies and for key species highlighted for conservation action in relevant national and local biodiversity action plans.

10.7.3. Consultations

- The assessment will be carried out based on relevant requirements and guidance contained in an EIA Scoping Opinion to be adopted by the Scottish Ministers in response to this EIA Scoping Report. To maximise the value of this EIA scoping process, in accordance with the EIA Regulations, all relevant consultees are requested to consider:
 - The proposed scope of assessment as outlined in Section 10.6;
 - The assessment methodology as outlined in this section; and,
 - The key questions set out in Section 10.10.

If required, additional consultation will be undertaken with relevant consultees to clarify aspects of the assessment methodology (e.g. any survey requirements) and address topic-specific issues.

10.7.4. Approach to the Assessment of Effect Level and Significance

The following section outlines the proposed approach to determining the level and significance of likely effects.

The assessment will follow a standard, systematic approach which will be informed by the best available scientific evidence and experienced professional judgement. Where there are uncertainties, reasonable worst-case assumptions are made to minimise the risk of effects being under-estimated. The assessment methods follow guidance produced by SNH and the Chartered Institute of Ecology and Environmental Management (CIEEM), as detailed above.

10.7.4.1. Defining Receptor Sensitivity

The importance of each receptor (also referred to as 'receptor sensitivity') can involve a wide range of factors (e.g. habitat naturalness, extent, quality, populations that are of conservation importance at various geographical scales, or at the edge of their natural range). In practice, conservation status and rarity are often the most important criteria to consider. Therefore, ecological receptor sensitivity is usually defined by rarity at different geographical scales (e.g. local, regional, national, international). This is also useful in placing the receptor in the context of natural heritage designations which tend

to be selected and ranked according to the rarity of the qualifying species or habitats at different geographical scales, e.g. habitats or species that are rare at a global or European level are usually covered by European legislation and protected within designated sites defined by the European legislation, namely Special Protection Areas (SPAs).

Although there are a range of factors to be considered, the evaluation of importance in relation to bird population size is primarily based on the estimated proportion of a population that a site supports. Where 1% of the population, for a given geographical scale, is regularly present within the site, then it is considered to be important for that species at that spatial scale. For example, where more than 1% of the national population of a species is regularly present, the site would be considered to be of national importance. The 1% criterion for importance is well established and can be applied at the regional, sub-regional or local scales, providing there is sufficiently accurate information available on population sizes within these geographical units. Where there is uncertainty about the accuracy of the available information a precautionary approach has been adopted to minimise the risk of under-valuing any receptor.

Breeding population estimates, based on Natural Heritage Zone (NHZ) boundaries which divide Scotland into a number of distinct biogeographical areas, have been published for some key bird species (Wilson *et al.* 2015). The proposed development is located within the 'Western Southern Uplands & Inner Solway' NHZ. Population estimates for the NHZ will be used in this assessment where available to assist in informing judgements on the sensitivity of the populations using the site and their supporting habitats.

Definitions of ornithological receptor sensitivity are outlined in Table 10.8 below.

Table 10.8: Defining Receptor Sensitivity

Receptor Sensitivity	Example Criteria / Definitions
International	Populations of bird species, and their supporting habitats, that form part of the cited interest of an internationally protected site or candidate site (for example a Special Protection Area, or Ramsar site).

Receptor Sensitivity	Example Criteria / Definitions
	Bird species listed on Annex I of the EC Birds Directive if regularly present in qualifying numbers / proportions of the national or international populations.
National (i.e. at the Scottish or UK level)	Populations of bird species, and their supporting habitats, that form part of the cited interest of a nationally important designated site (for example, a Site of Special Scientific Interest or a National Nature Reserve). Regularly occurring, but rare bird species (for example, less than 300 breeding pairs in the UK) and/or a species present in nationally important numbers (for example, more than 1% of the UK population). A site that provides critical supporting habitat for any regularly occurring bird population of national importance.
Regional (e.g. Western Southern Uplands & Inner Solway NHZ)	Any regularly occurring population of a nationally important bird species which is threatened or rare in the region (for example, more than 1% of the regional population or NHZ population where reliable estimates are available). Regionally important habitats critical to supporting such populations. In the local authority area context, Local Nature Reserves where bird populations / assemblages are a key component.
Local (High)	Regularly occurring population of bird species and their supporting habitats which are considered to be of conservation importance at a sub-regional / supra-local spatial scale.

Receptor Sensitivity	Example Criteria / Definitions
	Sites with an identified ornithological interest meeting the criteria for local authority area designation (e.g. Site of Importance for Nature Conservation).
Local (Medium)	A population of a species or assemblage of species, and their supporting habitats, of sub-regional importance, which are not considered sufficiently notable to qualify for protection under a local authority designation, but which are considered important at a moderately local spatial scale (e.g. approx. radius of 15-20km).
Local (Low)	A population of a species or assemblage of species which are not considered to qualify for local authority non-statutory designation, but which are considered important in the context of the immediate surrounding area (e.g. approx. radius of <10km).
Negligible	A commonplace species / population of little or no conservation importance at a local scale. Habitats of negligible value to any bird population.

- Reversibility - can the effect be reversed, within a reasonable timescale and with reasonable expectation of recovery, or is it permanent and irreversible;
- Frequency - is the effect acting constantly or intermittently (e.g. occasional noise disturbance in comparison to a longer-term change to the existing baseline levels of disturbance);
- Timing - is the effect occurring during a more or less sensitive period for the receptor (e.g. relative to the bird breeding season);
- Duration - the length of time that the effect is acting on the receptor, this may be longer than the associated impact is occurring for and may be short, medium, long-term or permanent (indicative periods for these categories are given in Table 10.9, in relation to faunal receptors duration may also be defined relative to the lifecycle of the species); and
- Confidence - certain/near certain (95% or greater chance of occurring), probably (50-95%), unlikely (5-49%) or extremely unlikely (<5%).

The overall effect, considering all of the above factors, for each receptor is categorised for each phase of the proposed development (i.e. the construction phase, the operational phase and the decommissioning phase). To help illustrate this, summary descriptions of the various effect levels (primarily considering effect magnitude and duration) are provided in Table 10.9.

Table 10.9: Defining Effect Level

Effect Level	Description of the resultant effect on the ornithological receptor
Total/Near Total	Would cause the loss of a major proportion or whole feature/population, or cause sufficient damage to a feature to immediately affect its viability.
High	Major effects on the feature/population, which would have a sufficient effect to alter the nature of the feature in the short-long term and affect its long-term viability. For example, more than 20% habitat loss or damage.
Medium	Effects that are detectable in short and long-term, but which should not alter the long-term viability of the feature/ population. For example,

10.7.4.2. Effect Characterisation

The overall character of an effect is a function of a wide range of variables acting on the receptor which include the following:

- Direction - whether the effect benefits (positive) or harms (negative) the receptor;
- Extent - the area affected or potentially affected by a particular impact (e.g. distance over which artificial lighting may affect bat behaviour);
- Magnitude - the amount of a habitat or population affected (quantified, where possible, as the proportion of the receptor lost or affected);
- Complexity - relating to whether an effect is direct or indirect, proximal or distal, immediate or delayed;

Effect Level	Description of the resultant effect on the ornithological receptor
	between 10 - 20% habitat loss or damage.
Low	Minor effects, either of sufficiently small-scale or of short duration to cause no long-term harm to the feature/population. For example, less than 10% habitat loss or damage.
Negligible	Minimal change on a very small scale.
Duration definitions	Long-term (5 - 25 years or longer, and refers to wind farm operation). Short-term (<5 years, and refers to construction or decommissioning).

or above, the effect on the receptor is judged to be 'significant'.

10.7.4.3. Effect Significance

Significance is a measure of the importance that should be given to an effect in relation to the consideration of appropriate mitigation and the overall environmental impact of the proposals and the planning process. Effects can be significant at a wide range of geographical scales (i.e. from the local level to effects that are of international importance for the receptor under consideration) but which result in important consequences for the functioning and/or conservation status of the receptor. In general terms, significance is determined through the interaction between receptor sensitivity and the categorised effect level (i.e. taking into account effect extent, duration, reversibility etc.).

Effect significance is reported in categories, from None to Major, through Negligible, Minor and Moderate. A matrix is provided as Table 10.10 to help illustrate how effect level and receptor sensitivity relate to judgements of effect significance. For the purposes of the assessments, effects are considered significant (i.e. 'significant' in terms of the relevant EIA Regulations and of key importance in terms of planning consent decision-making) if they are reported as Moderate or above.

The process of determining the significance of an effect can be illustrated by a simple matrix which shows the interaction between receptor sensitivity and the magnitude of effect as illustrated in Table 10.10. In practice, the determination of significance involves the careful application of informed professional judgment and consideration of a range of parameters, as outlined above. If the likely effect is assessed as being moderate

Table 10.10: Determining the Significance of Effect on Ornithological Receptors

Receptor Sensitivity	Effect Level				
	Total / near total	High	Medium	Low	Negligible
International	Major	Major	Major	Major-Moderate	Negligible
National	Major	Major	Major-Moderate	Moderate	
Regional	Major	Major - Moderate	Moderate	Moderate - Minor	
Local (High)	Major - Moderate	Moderate	Moderate - Minor	Minor	
Local (Medium)	Moderate	Moderate - Minor	Minor	Minor	
Local (Low)	Moderate - Minor	Minor	Minor	Minor	
Negligible	Negligible				

10.7.5. Collision Risk Assessment

Wind turbine collision risk for key species has been estimated following a method developed by Band *et al.* (2007). In summary, the process involves three stages:

- Stage one is the estimation of the number of transits through the proposed rotor swept volume per year based on observed flight activity data and parameters of the wind farm and wind turbine design.
- Stage two involves the estimation of the predicted proportion of transits through the rotor swept volume that would result in a collision between the bird and a wind turbine blade. All predicted collisions are assumed to be fatal. This provides an estimate of the number of fatalities per year for the wind farm but

assumes that no bird takes avoiding action to prevent a collision.

- Finally an assumed rate for collision avoidance is applied to the estimate.

This method is more suitable for some species than others. For example, small and/or fast flying birds such as merlin, golden plover and most songbirds are difficult to detect beyond a distance of a few hundreds of metres and therefore it is rarely possible to generate reliable estimates of flight activity. In the case of these species collision risk is probably best determined through informed reasoning rather than quantitative modelling.

In order to provide a biologically realistic estimate of collision risk it is necessary to assume that birds take action to avoid collision. However, reliable empirical data on which to base estimates for avoidance are generally lacking and therefore the collision rates derived from assumed avoidance values should be considered as cautious estimates.

In the assessment, estimates of collision risk/mortality will be calculated for key receptors where there was sufficient data to carry out the analysis. Species that are not included in the collision risk analysis are either not of conservation concern or are at low collision risk due to their flight behaviour, and/or are species which are infrequently present within the study area.

Various adjustments to the collision risk estimates will be made to account for the turbine blade parameters relative to the height bands which were used to record observations of target and secondary species in flight.

The potential collision risk is calculated for each species based on a number of assumptions. It is assumed that there is no influence on collision risk from weather conditions. In the case of diurnal raptors, as visual hunters, the risk of increased collision rates due to poor visibility is lessened by the likely reduction in flight activity during such periods, as hunting efficiency is greatly reduced. Flight speeds and biometrics will be conservatively estimated and will follow current SNH guidance.

10.7.6. Statement of Significance

At the end of the assessment a statement of residual effect levels and associated significance will be provided. This is a summary of the complete assessment for each receptor, taking into consideration any proposed mitigation measures, and reports the significance of the residual effects in compliance with the EIA Regulations.

10.7.7. Cumulative Impact Assessment

The potential for cumulative impacts on ornithological receptors arising from other wind farm proposals within the Western Southern Uplands & Inner Solway NHZ will be assessed following the approach set out in current SNH guidance. This part of the assessment will focus on those sensitive receptors where there is at least the potential for biologically important cumulative effects to occur (i.e. effects that have the potential to act additively and materially affect annual survival or productivity rates at the relevant population level). The assessment will include consideration of operational projects; projects under construction; consented projects which are not yet under construction; and projects for which planning applications have been submitted and for which ornithological impact assessment information is available.

10.8. Identification of Further Mitigation and Enhancement Measures

Where likely or potentially significant adverse effects are identified through the assessment, the design will be reviewed to consider if further mitigation can reasonably be embedded into the proposed development. Alternatively, further mitigation may be proposed in order to reduce effect severity. Such mitigation may include alternative construction methods, the timing of works and effective habitat restoration and creation. In some cases, mitigation measures may also be specified where effects are not considered to be significant as part of a best practice approach to development. Following consideration of the proposed mitigation then the residual effect and significance is reported in the assessment.

10.9. Risks, Limitation and Uncertainties

10.9.1. Survey constraints

There are considered to be no significant constraints or gaps in the baseline data that will be used to inform the assessment.

10.9.2. Assessment Limitations

Ecological impact assessments are always subject to some degree of uncertainty as to the potential scope, scale, duration and magnitude of effects and the range and sensitivity of receptors affected. Such factors can be accounted for by assuming a reasonable 'worst case

scenario' in relation to the potential effects of construction works, taking into consideration prior experience and what can reasonably be expected of a prudent construction contractor given the nature of the proposed development.

Limitations with respect to bird collision risk modelling methods are well known (Band *et al.* 2007). As discussed above, the method is limited by the current understanding of how bird flight activity and behaviour is affected by wind farms in the long-term and in proximity to individual wind turbines. However, this method includes parameters that can be adjusted to some extent to account for species-specific differences in morphology and flight behaviour and incorporates variables for individual turbine design, wind farm layout and operational regime. A further advantage of the Band Model, which has become widely adopted in wind farm EIA, is that it enables comparison of collision risk between proposals, which also helps to inform cumulative assessment.

10.10. Key Questions

A collaborative design process is being adopted and comments are therefore sought at this stage from consultees regarding both the proposed scope of assessment and the optimum design of the proposed development within the maximum development parameters (refer to Section 3.4). Specifically, in responding to this Scoping Report, consultees are asked to consider the following key questions:

Is the proposed scope and extent of the available and proposed baseline data considered to be sufficient to inform a reliable assessment of the potential effects of the proposed development?

Do the consultees agree with the list of key potential receptors for the EIA and with the issues to be scoped out of the assessment?

11. Ecology

The intention of this section of the scoping report is to provide the competent authority and its advisers with sufficient information (where it currently exists) on the likely impacts of the proposed development on important ecological features, ornithological features will be covered by a third-party in the subsequent section. This will allow for an EIAR that focusses on features which could be significantly affected, or for which the predicted effects are currently unknown. Baseline survey work on the proposed development to inform the EIA is still to commence, therefore this scoping report is based on desk study information on the species and habitats most likely to be present and potentially impacted by this development.

11.1. Legislation and Guidance

The recommended ecological surveys presented in this report will be carried out with reference to a number of national policy documents. Legislative and guidance documents with relevance to ecology are listed below:

11.1.1. Legislation

- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive);
- Environmental Impact Assessment Directive 85/337/EEC (the EIA Directive);
- The Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations), which transposes the Habitats Directive into UK law;
- The Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007;
- The Conservation of Habitats and Species (Amendment) Regulations 2012, relating to reserved matters in Scotland;
- Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011;

- Protection of Badgers Act 1992 (as amended);
- Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, which transpose the EIA Directive into the Scottish planning system; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

11.1.2. National Policy Guidance

- PAN 51: Planning, Environmental Protection and Regulation (revised 2006);
- PAN 60: Planning for Natural Heritage (Scottish Government 2000);
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Planning Policy (SPP) (2014).

11.1.3. Other Guidance

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

- European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements³;
- Guidelines for Ecological Impact Assessment in the UK and Ireland⁴ ;
- Land Use Planning System SEPA Guidance Note 4: Planning Guidance on Windfarm Developments⁵;
- Good Practice during Wind Farm Construction⁶;
- Bats and Onshore Wind Turbines (2019)⁷;
- Natural England's interim guidance on 'Bats and Onshore Wind Turbines' (Technical Information Note (TIN) 051)⁸;
- Scottish Biodiversity List (SBL)⁹; and
- Dumfries and Galloway Local Biodiversity action Plan (LBAP).

³ Scottish Executive, 2001 (updated 2006). European protected species, development sites and the planning system: Interim guidance for local authorities on licensing arrangements. Scottish Executive, Edinburgh.

⁴ CIEEM, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

⁵ SEPA, 2012. Land Use Planning System Guidance Note 4: Planning guidance on windfarm developments. Appendix 2. Version 7: 14 May 2014

⁶ Scottish Renewables, SNH, SEPA, Forestry Commission Scotland, 2019. Good practice during windfarm construction. 4th Edition

⁷ Scottish Natural Heritage. 2019. Bats and onshore wind turbines: survey, assessment and mitigation. Available at: <https://www.nature.scot/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation>

⁸ Natural England, 2012. Interim guidance on 'Bats and Onshore Wind Turbines' (Technical Information Note (TIN) 051

⁹ The SBL forms a list of species and habitats of importance for biodiversity conservation in Scotland, produced by the Scottish Government

11.2. Desk Study

The desk study identifies species and habitats known to, or likely to, occur at the site by reviewing survey data from NBN Atlas¹⁰ for the study area and its surroundings. Ecological data was also available from planning applications for some developments within the local area.

11.2.1.1. Designated Sites

Information regarding designated sites in the area surrounding the site was obtained using MAGIC online GIS tool¹¹ and Scottish Natural Heritage (SNH) Sitelink¹². Data were sought for the following:

- Special Areas of Conservation (SACs) – within 10km of the proposed site boundary;
- Sites of Special Scientific Interest (SSSIs) – within 5km of the proposed site boundary; and
- Local and National Nature Reserves (including RSPB and Wildlife Trust Reserves) – within 5km of the proposed site boundary.

11.2.1.2. Nearby Development EIA Chapters

All wind farm applications with survey data from within the past five years (2015 to 2020) from within a 10km radius of the proposed site boundary were identified using the local planning application portal¹³. Additionally, a previous application which covers Craigenputtock Moor and the area around Loch Urr within the proposed site boundary was also consulted. The ecology survey information from relevant wind farm EIA chapters was searched to identify which protected vertebrate species, excluding birds, were recorded on those sites. In addition, EIAs were checked to determine if any significant impacts had been predicted for any of the species recorded.

11.2.1.3. Ecology Records

For this Scoping Report, ecological records from within 5km of the site boundary were searched for using NBN Atlas. Records from the last five years (2015 – 2020) were obtained.

To inform the baseline, it is recommended that the following organisations are also consulted to request any records they hold for the site and the surrounding area:

- South West Scotland Environmental Information Centre (SWSEIC) (for records within 5km of the development boundary); and

- Galloway Fisheries Trust (GFT) (for records within 5km of the development boundary).

It is assumed that the Scottish Badger Trust, Bat Conservation Trust, SNH and the Scottish Wildlife Trust submit their records to the SWSEIC and therefore would not need to be contacted. If records from these groups are missing from the SWSEIC then data requests will be sent where appropriate.

11.2.1.4. International and National Designations

No statutory designated sites are located within the site boundary. Five statutory designated sites were identified within 10km of the site boundary (Table 11.1).

Due to the distance of these sites from the site boundary and a lack of connectivity, these receptors are not anticipated to be impacted by the proposed development as there is no route to impact and so they are not considered further in this assessment.

Table 11.1: Details of statutorily protected nature conservation sites located within 10km of the proposed development

Site name	Designation	Designated Feature	Distance to proposed development (km)
Stenhous e Wood	SSSI	Upland mixed ash woodland	6.9
Upper Nithsdale Woods	SAC	Mixed woodland on base-rich soils associated with rocky slopes (indicates priority habitat)	7.3

¹⁰ <https://nbnatlas.org/> accessed 23/01/2020

¹¹ <https://magic.defra.gov.uk/> accessed 16/01/2020

¹² <https://sitelink.nature.scot/home> accessed 16/01/2020

¹³ <https://eaccess.dumgal.gov.uk/online-applications/> accessed 24/01/2020

Site name	Designation	Designated Feature	Distance to proposed development (km)
Tynron Juniper Wood	SAC/SSSI	Juniper on heaths or calcareous grasslands/ Juniper scrub	7.8
Milton Loch	SSSI	Eutrophic loch and beetle assemblage	7.8
Lag Meadow	SSSI	Lowland neutral grassland and fen meadow	8.1

Source: MAGIC and SNH web searches, January 2020

11.2.1.5. Local Designations

MAGIC provided information for the Galloway and Southern Ayrshire Biosphere Reserve which covers where the proposed development is situated and the surrounding area within 5km of the site boundary. The Galloway and Southern Ayrshire Biosphere promotes the following three fundamental, complementary functions required of a UNESCO Biosphere Reserve:

- Conservation,
- Learning and research; and
- Sustainable development.

The core purpose of the biosphere reserve is for ‘testing and demonstrating sustainable development on a regional scale’. This designation does not bring any additional regulation of activities within the biosphere area.

11.2.1.6. Review of Nearby EIA Developments

Ecology information was obtained from one wind farm EIA: Troston Loch, which is less than 10km north-west from the proposed site boundary. Additionally, ecology information was obtained from a previous EIA: Loch Urr, which covers part of the proposed site boundary. The surveys for Loch Urr were undertaken between 2010 and 2013 (therefore the results of these surveys are out of date), however this application covered the Craigenputtock and Loch Urr areas of the site and

therefore it was considered in this desk review for site context.

The EIA data from both Troston Loch and Loch Urr contained records of 17 vertebrate species; those of particular interest due to their potential sensitivity to wind farm developments were:

- Five terrestrial mammals: otter, water vole, badger, red squirrel and pine marten (of which no evidence of pine marten were recorded but suitable habitat is present);
- Seven species of bat: common pipistrelle, soprano pipistrelle, Nathusius’ pipistrelle, Leisler’s bat, noctule, Natterer’s bat and brown long-eared bat;
- Two species of reptile: common lizard and adder; and
- Two species of fish: Atlantic salmon and brown trout.

In the Loch Urr EIA, live sightings of otters were recorded at Loch Urr and live sightings of water vole were recorded on Fell Burn just outside of the proposed new development boundary.

No significant impacts were predicted for any of these species.

11.2.1.7. Ecology Records

Records returned from the NBN Atlas provided information on protected species within 5km of the site from the last five years (2015 – 2020), summarised in Table 11.2.

Table 11.2: Ecological records from 2015 - 2020

Common Name	NBN Records	Protected status
Pine marten	1	Wildlife and Countryside Act Schedule 5
Eurasian red squirrel	35	Wildlife and Countryside Act Schedule 5 and 6 LBAP/UKBAP/SBL
Brown hare	5	LBAP/UKBAP/SBL
Mountain hare	1	Annex 5 LBAP/SBL
Lesser noctule	1	LBAP/SBL/EPS
Soprano pipistrelle	4	LBAP/SBL/EPS
Common pipistrelle	4	LBAP/SBL/EPS

Source: NBN Atlas
 LBPA = Local Biodiversity Action Plan
 SBL = Scottish Biodiversity List
 EPS = European Protected Species protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)
 Annex 5 = Species listed under Annex 5 of the Habitats Directive

- Undertaking habitat loss calculations for the ecology EIAR Chapter;
- Identifying and mapping sensitive areas to avoid e.g. potential Ground Water Dependant Terrestrial Ecosystems (GWDTE) and priority habitats; and
- Identifying less sensitive habitats potentially suitable for development to inform the project design.

11.3.1.1. Extended Phase 1 Habitat Surveys

An extended Phase 1 habitat survey of the proposed site will be carried out, following the standard habitat survey method described in the Handbook for Phase 1 habitat survey: a technique for environmental audit¹⁴. This survey will aim to characterise the habitats present on site, and to identify any habitats of significant conservation value and/or protected plant species. During the extended Phase 1 habitat survey, the surveyor will also assess habitat suitability to support protected species, which may inform the requirement for further species-specific survey work. Target notes will be taken on protected species signs, habitat and sightings as appropriate, including fish habitats within watercourses and potential reptile hibernacula. Extended Phase 1 Habitat Survey will also include a great crested newt Habitat Suitability Index (HSI) (Oldham *et al.* 2000)¹⁵ assessment of all ponds within the site boundary. The results of this survey coupled with consultation responses and desk study data would then be used to target Phase 2 Habitat Surveys for flora and/or fauna (i.e. bats, great crested newt, etc.) where required.

Any non-native invasive species such as Japanese knotweed will also be recorded as target notes.

11.3.1.2. National Vegetation Classification Survey

National Vegetation Classification (NVC) survey is recommended to provide more detailed information regarding protected habitats on site. NVC will focus on sensitive habitats recorded during the phase 1 survey, such as peat forming habitats and potential Ground Water Dependent Terrestrial Ecosystem (GWDTE). There is a requirement under the Water Framework Directive to carry out assessment to carry out assessment of the likely impacts of development on habitats which are dependent on groundwater, in line with Scottish Environment Protection Agency (SEPA) LUPS guidance¹⁶. The potential for groundwater dependency is initially identified via NVC survey. GWDTE need consideration within 250m of excavations greater than 1m deep. Surveys will be undertaken

11.3. Proposed Surveys

The ecological survey work suggested below for the proposed site boundary is based on species and habitats identified as potentially present within the vicinity of the site during the desk-based study.

11.3.1. Habitat Surveys

It is proposed that surveyors will work to a minimum polygon size of 10m², areas of habitat smaller than this will be recorded as target notes or mosaics - whichever is most appropriate. Where mosaics are recorded, target notes will include a description which will indicate mean habitat patch sizes and integration. Survey work will include:

- Extended Phase 1 and NVC surveys;

¹⁴ Joint Nature Conservation Committee. 2010. Handbook for Phase 1 habitat survey: a technique for environmental audit. JNCC, Peterborough.
¹⁵ Oldham et al. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal. Vol. 10 pp143-155
¹⁶ Land Use Planning System (LUPS) Guidance Note 4: Planning Guidance on Onshore Windfarm Developments

following the standard survey method as described in the National Vegetation Classification Users' Handbook¹⁷.

11.3.2. Protected Species Surveys

11.3.2.1. Bats

Habitat with the potential to support bat species is present within the site (e.g. sheltered woodland edge, mature broadleaf woodland, watercourses and standing waterbodies, farm buildings and pasture

It is proposed that a bat roost survey coupled with activity surveys using static detectors are undertaken between April and September, as summarised below, in order to determine the level of bat activity. Bat surveys will be based on current SNH guidance⁵.

- **Bat roost survey:** There are buildings within the proposed site boundary with the potential to support roosting bats. A ground-based assessment of buildings, trees and other structures within 200m plus the rotor radius of the proposed site boundary (access permitting) will be required to determine suitability to support roosting bats and to identify whether additional emergence/return surveys are required. In addition, surveyors will search for any other potential bat roost structures (e.g. mine shafts, bridges) which may be present.

- **Fixed position recording static detector surveys:** Static bat detectors will be utilised to record bat activity during the active season (April to September). The number of detectors required is dependent on the number of turbines proposed, for a 35-turbine site, a minimum of 17 detectors will be required.

The 2020 survey period has been affected by restrictions during the COVID-19 outbreak. However, it will be possible, with appropriate measures in place to prevent the spread of the disease (i.e. in full compliance with all relevant Scottish Government regulations and guidance), to carry out bat activity surveys during June to September. It is intended that 30 nights of bat activity monitoring will be completed for each sampling point. This will be divided into three survey bouts, of at least 10 nights, spread across the June to September period. The restriction during the spring 2020 survey period will be fully recognised and addressed in the EIAR. In this case, the June-September bat activity data, in combination with data from other sources, is likely to be sufficient to inform the EIA process and any mitigation measures to avoid / reduce the risk to bat populations from the proposed development.

- **At height surveys:** Under current SNH guidance, deployment of static bat detectors at height will be required due to proposed key-holing to be undertaken on site.

Robust site-specific weather data is required to aid interpretation of all bat activity data. This will either be obtained from the met mast and/or weather stations present on the site.

Bat calls identified in the detectors deployed will be analysed using Kaleidoscope Pro Software. Manual quality assurance will be conducted on a 10% sample of the recorded bat calls.

Current guidance indicates that bat activity levels should be assessed using the online tool Ecobat which compares data entered by the user with bat survey information from similar areas at the same time of year and in similar weather conditions. This requires that the bat data are submitted to Ecobat and form part of the data repository that it uses to make bat activity assessments.

11.3.2.2. Protected Terrestrial Mammals

EIAs from nearby developments and NBN data indicated that otter, water vole, badger and red squirrel are present in the area and that habitat in the site boundary is suitable for pine marten.

Otter and Water Vole Surveys

All watercourses within the development area, will be surveyed for otter and water vole using a combined survey. Live sightings of otters and water vole have been recorded on and near the site (see section 1.2.3.3) alongside signs and suitable habitat. All evidence of otter and water vole presence will be recorded and mapped.

These ecology surveys will be carried out under suitable weather conditions, when water levels are low. It is expected that the surveys will be carried out in late summer (July to September). The ideal survey period for water voles is mid-April to September as this is when water voles establish breeding territories and mark latrines.

Badger, Red Squirrel and Pine Marten Surveys

The development area will be surveyed for badger. All signs of presence shall be recorded and mapped. Additionally, during the badger survey, any forested areas that lie within the development area shall be

¹⁷ Rodwell, J. S. 2006. National Vegetation Classification: Users' handbook. JNCC, Peterborough.

surveyed for signs of red squirrel and pine marten presence.

It is expected that the surveys will be carried out in late summer (July to September).

Fish

The Loch Urr EIA identified possible adverse impacts to salmon and sea trout associated with pollution incidents during construction and assessed that tributaries of this watercourse may be important for spawning, as nursery areas for fry and as juvenile rearing areas. The EIA contained a commitment to a fish monitoring plan, which will include pre-construction, construction and operational phase monitoring. Given existing knowledge of the importance of fish within the local catchments, and best practice mitigation measures, it is not considered that baseline fish surveys will be required. In the light of this we would seek to scope out the requirement for baseline fish surveys altogether.

Do consultees have any comment with regard to the proposed baseline non-avian ecology survey programme?

11.4. Summary

The following species and ecological features are considered to be present on the site and can be potentially affected by this development, thus are proposed to be included in the EIA:

- Habitats;
- Bats,
- Otter,
- Water vole;
- Badger;
- Pine marten; and
- Red squirrel.

In order to ensure that the EIAR is compliant with the EIA Directive, and to ensure that the EIA is focussed on potentially significant effects only, we propose that only those important ecological features are carried forward for EIA within the relevant EIAR chapter, unless further baseline survey work shows otherwise.

Do consultees have any comments regarding the EIA concentrating on those receptors which may be subject to significant effects from the proposed development (either directly or indirectly)?

11.5. EIA Assessment

Based on a review of the ecological data available, an assessment of the effects associated with construction, operation, and decommissioning of the project will be undertaken including habitat loss and gain calculations associated with the development.

The assessment will follow CIEEM and other relevant guidelines, and effects will be assessed as being either not significant (for predicted negligible or low impacts) or significant (for predicted moderate or high impacts). Whilst it is intended that much of the non-significant elements can be scoped-out it is important to note that the potential effects can include the following:

- Disturbance and/or displacement of protected species; and
- Damage, destruction or pollution of protected species habitats/other resources.

Any proposed mitigation measures will be developed in conjunction with industry best-practice standards. In keeping with the principle of proportionate EIA, only summary data and methodologies will be included within Chapters. Other detailed methods and data will be provided in technical appendices or on request as considered appropriate.

Does SNH agree with this approach?

12. Hydrology, Geology and Hydrogeology

12.1. Introduction

This section outlines baseline conditions using a desk-based study methodology and highlights the presence of features relating to hydrology, geology and hydrogeology which will require to be included within the scope of the EIAR.

The red line boundary within which the 'proposed development' covers is referred to in this section as the 'development area'.

12.2. Limitations

Information provided in Sections 12.4 to 12.9 has been obtained through a desk-based assessment only. Further constraints may be identified during the EIA process and after field-based work has been undertaken.

Private Water Supply (PWS) information in this report was obtained from the Drinking Water Quality Regulator for Scotland (DWQRS) and will be less accurate than PWS information held by Dumfries and Galloway Council (DGC).

This scoping report has been based on the current proposed development boundary and layout of up to 35 turbines. Further information obtained during the EIA process may require changes to the infrastructure layout.

12.3. Relevant Legislation

This scoping report takes account of the following legalisation:

- The Electricity Act 1989;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Water Environment and Water Services (Scotland) Act 2003;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- Water Environment (Miscellaneous) (Scotland) Regulations 2017;
- A CAR license is required to be put in place prior to commencing construction works which involve discharging water to the water environment for

projects which are larger than 4 hectares, have access road longer than 5km, or have an area of more than 1 hectare or length >500m with slope of more than 25 degrees;

- Pre-construction, a site-specific Pollution Prevention Plan (PPP) is prepared and a CAR license is applied for. Note that the applications can have a four-month determination period;
- Flood Risk Management (Scotland) Act 2009;
- The Private Water Supplies (Scotland) Regulations 2006; and
- Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017.

12.4. Hydrology

12.4.1. Surface Water Features

The development area drains into the Urr Water and the Cairn Water catchments. The main stem of the Urr Water partly defines the Western boundary of the proposed development. Surface water features within the development area include lochs, watercourses, and headwaters.

Loch Urr is part of the Urr Water catchment and is situated in the Northern part of the development area. Loch Urr is fed by several watercourses originating from the slopes of Castramon Hill, and hills east of Bogrie Hill. Craigenputtock Burn, Auchenhay Burn and Knarie Burn also flow west into the Urr Water.

The Castramon Burn runs from the Southern slopes of Bogrie Hill into the Cairn Water catchment to the east of the development area.

There are multiple headwaters within the development area. These features may include flush zones with waterlogged ground forming the source of watercourses at higher elevations.

Details of the layout of proposed access track infrastructure has not been provided at this stage. Due to the extent of surface water features across the development area, it is likely that watercourses would be intersected by infrastructure. The presence of the surface water features outlined above have the potential to be impacted by the construction, operation and decommissioning of the proposed development. Potential impacts will be assessed in the EIAR. Within the EIAR, it is also expected there will be a requirement for considerations given to watercourse crossings, water quality monitoring, and embedded suggested mitigation.

A Watercourse Crossings Assessment will also be undertaken in order to provide a conceptual assessment of watercourse crossings in line with SEPA Guidance. It will provide information on crossing locations, CAR requirements, channel dimensions and likely crossing types.

12.4.2. Flood Risk

The Scottish Environment Protection Agency (SEPA) online Flood Maps service¹⁸ shows the Urr Water, the Craigenputtock Burn, the Auchenhay Burn, and the Knarie Burn are at a High likelihood (1 in 10 years) of fluvial (watercourse) flooding. The areas at risk of fluvial flooding generally do not extend far from the banks of the watercourses. There are also small patches of land within the development area which are at High likelihood of pluvial (surface water) flooding, however these areas have a limited spatial extent.

It is essential that the proposed development would not cause an increase in flood risk. Within the EIAR it is expected that there will be an assessment of the impact of the proposed development on site drainage and flood risk.

12.4.3. Water Quality

The Urr Water, and the Glesslin Burn are classified by SEPA under the River Basin Management Plan (RBMP) process which sets requirements to protect and improve classified waterbodies. Table 12.1 presents classification information for these two waterbodies which are both part of the Solway Tweed river basin district. River waterbody classification is based on measures including ecology, water quality, water levels, and morphology.

Table 12.1: RBMP River Classifications¹⁹

River	Status (2018)	2021 Objective	2027 Objective	Long Term Objective
Urr Water (ID 10584)	Good	Good	Good	Good
Glesslin Burn (ID 10608)	Good	Good	Good	Good

The EIAR chapter will consist of a baseline assessment (both desk-based and from fieldwork), the development of hydrological constraints, associated guidance and mitigation and an assessment of the impacts. Distinct and separate reports shall be provided, suitable for incorporation as Technical Appendices to the EIAR covering:

- Watercourse Crossings Assessment; and
- Flood Risk Assessment (if required).

12.5. Geology

The British Geological Survey (BGS) 1:50 000 scale geology of Britain map provides information on bedrock and superficial geology underlying the development area²⁰.

The development area is underlain by New Galloway Wacke formations. Wacke is a sedimentary rock of marine origins, composed of coarse to fine-grained slurries forming graded beds. The development area is underlain by bands of Wackes of varying ages which are separated by thrust faults.

The 1:50 000 scale OS mapping indicates that there are crags mapped on the south-eastern slopes of Castramon Hill where the bedrock is likely to be exposed.

There are various dykes of igneous rocks, mainly in the Northern part of the development area. These rocks are formed from cooled magma and may be intruded through surrounding formations.

Superficial deposits within the development area is comprised primarily of glacial tills, composed of unsorted diamicton with sand gravel and mud. Hummocky tills are deposited along the river valleys North and South of Castramon Hill, and an area of well sorted glaciofluvials is mapped just North of Craigenvey. Younger formations of alluvial sand and gravels are mapped alongside watercourses including the Urr Water, Auchenhay Burn, and Knarie Burn.

There are no statutory or non-statutory designations relating to geological features within the development area.

¹⁸ SEPA, Flood Maps, 2020, available at <http://map.sepa.org.uk/floodmap/map.htm>, accessed 06/02/2020

¹⁹ SEPA, 2020, Water Environment Hub, available at <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>, accessed 06/02/2020

²⁰ British Geological Survey, 2020, Geology of Britain Viewer, available at <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>, accessed 06/02/2020

12.6. Soils and Peat

The SNH Carbon and peatland map²¹ shows areas mapped as Class 1 and Class 2 peatland within the Northern half of the proposed development boundary. Class 1 and Class 2 soils are considered to be carbon rich, and likely to be of high importance and conservation value. Patches of peat are also mapped within the development area on the BGS 1:50 000 scale Geology of Britain map.

An assessment of potential significant impacts on soils and peat will be included within the scope of the EIAR. Field investigations to determine the depth and extent of peat deposits will be completed. The peat probing surveys would be divided into two key stages. Stage 1 would complete a 100m refined grid in areas >1.0m from historic survey information. No peat sampling is planned to be undertaken with Stage 1. Stage 2 surveys would provide detailed design peat depth and condition to inform turbine micro-siting, access track design and other infrastructure. Peat samples would be taken to inform peat slide risk assessment, carbon calculation and Peat Management Plan.

The siting of proposed infrastructure would be required to avoid areas of peat and deep peat where reasonably possible, considering all other constraints.

The outcomes of the peat study will be included as an appendix to the EIAR and will include:

Peat Slide Risk Assessment:

- An assessment of the character of the peatland within the site boundary including thickness and extent of peat, and an understanding of site hydrology and geomorphology;
- An assessment of evidence for past landslide activity and present-day instability e.g. pre-failure indicators;
- A qualitative or quantitative assessment of the potential for or likelihood of future peat landslide activity (or a landslide susceptibility or hazard assessment);
- Identification of receptors (e.g. habitats, watercourses, infrastructure, human life) exposed to peat landslide hazards;
- A site-wide qualitative or quantitative risk assessment that considers the potential consequences of peat landslides for the identified receptors; and

- Provide appropriate mitigation and control measures to reduce risks to acceptable levels such that the proposed development is developed safely and with minimal risks to the environment.

Outline Peat Management Plan:

- Summary of peat conditions;
- Excavation and reuse volume estimates;
- Classification of excavated materials;
- Design of site works to minimise peat removal;
- Site reinstatement including use of peat in site restoration;
- Treatment, re-use and handling of excavated materials;
- Temporary storage of peat soils; and
- Site management plans/protocols.

Carbon Calculator covering:

- Project works likely to lead to carbon emissions;
- Estimation of core data and construction data; and
- Completion of carbon calculator spreadsheet tool to assess greenhouse gas emissions and carbon payback time.

12.7. Hydrogeology

The BGS 1:625 000 scale hydrogeology map layer²² defines the Wacke formations underlying the proposed development area as a low productivity aquifer. Any groundwater flow within the Wacke bedrock will be limited to the weathered zone or secondary fractures. It is possible that groundwater flow may be higher where there are igneous dykes, or along thrust faults, and these may act as pathways for contaminants.

It is likely that the key aquifers within the proposed development area will be limited to superficial deposits and the weathered bedrock zone. The highest permeability deposits are likely to be the small area of glaciofluvials near Craigenvey.

In absence of groundwater level information, it can be assumed groundwater within the development area flows from high to low elevation, with the water table situated below ground level and reflecting the shape of the topography.

The construction, operation, and decommissioning phases of the proposed development pose a risk of alterations to groundwater quality and natural flow

²¹ Scottish Natural Heritage, 2016, Carbon and Peatland map, available at <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>, accessed 06/02/2020

²² British Geological Survey, 2020, Geindex Onshore, available at <http://mapapps2.bgs.ac.uk/geindex/home.html?layer=BGSHydroMap>, accessed 06/02/2020

regimes. Groundwater occurring in the superficial deposits is likely to be the key groundwater receptor. An assessment of potential significant impacts on groundwater will be included within the scope of the EIAR. A site specific CEMP and Pollution Prevention Plan is also likely to be considered, taking into account the hydrogeological context of the proposed development area.

12.7.1. Groundwater Dependant Terrestrial Ecosystems

There are no statutory or non-statutory designations related to GWDTE within the development area. However, a NVC survey will be required to identify the presence of vegetation associated with GWDTE within the proposed development area.

GWDTE can be found in areas such as flush zones near river headwaters, along riverbanks, or boggy wetlands fed by groundwater. These features could reasonably be expected occur within the proposed development area. GWDTE will therefore be included within the scope of the EIAR.

It is required that any identified GWDTE are considered in line with SEPA's land use planning system guidance document LUPS-GU31²³. This guidance requires that proposed excavations are sited out-with relevant buffer zones from GWDTE in the first instance. The buffer zones to be considered are 100m from excavations down to 1m bgl (below ground level), and 250m from excavations deeper than 1m bgl. Excavations situated within the relevant buffer zone from a GWDTE must be subject to a quantitative or qualitative risk assessment.

12.8. Designated Areas

There are no designated areas (for example, Sites of Special Scientific Interest, or Special Areas of Conservation) within the development area, or within 3km of the development area boundary.

12.9. Water Resources

12.9.1. Private Water Supplies

Information on Private Water Supplies (PWS) was obtained from The Drinking Water Quality Regulator for Scotland (DWQR)²⁴. PWS records mapped both within the proposed development area, and within a 3km buffer

from the development area are summarised in Appendix 12.1.

12.9.1. Public Water Supply

It is recommended that Scottish Water is consulted to determine whether there are any Scottish Water assets which may be impacted by the construction and operation of the proposed development.

The EIAR chapter will consist of a baseline assessment (both desk-based and from fieldwork), the development of hydrological constraints, associated guidance and mitigation and an assessment of the impacts. Distinct and separate reports shall be provided, suitable for incorporation as Technical Appendices to the EIAR covering:

- Private Water Supply Risk Assessment (if required);

12.10. Summary

12.10.1. Scoping Considerations

This Scoping Report has outlined baseline conditions relating to soils, geology, and the water environment which may be impacted by the proposed development. From the findings in Sections 12.4 to 12.9, it is recommended that the following areas are considered within the EIA process and EIAR:

- Impacts on peat and soils;
- Impacts on Private Water Supplies;
- Impacts on Public Water Supplies;
- Impacts on water resources;
- Impacts on surface water quality;
- Watercourse crossings;
- Flood risk assessment;
- Impacts on GWDTE;
- Impacts on groundwater; and
- Impacts on hydrogeology.

12.11. Mitigation

The EIAR will consider, where appropriate, sustainable drainage principles with a view to minimising the potential risk of flooding and preventing the proposed development from causing flooding, groundwater or watercourse pollution.

Mitigation by design will be considered at this stage. Any identified areas of deep peat, PWS, and GWDTE will be taken into account during the initial design of the

²³ SEPA, 2017, Land Use Planning System SEPA Guidance Note 31, available at <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf>, accessed 06/02/2020

²⁴ DWQR, 2020, Private Water Supply map, available at <https://dwqr.scot/private-supply/pws-location-map/>, accessed 06/02/2020

infrastructure layout. Mitigation measures and good practice industry construction measures would be agreed in a site-specific CEMP, in order to reduce the impact of the proposed development on the hydrological, geological and hydrogeological environment.

12.12. Key Issues and Recommendations

Private Water Supplies, GWDTE, and Soils and Peat are key issues which will be considered at this early stage. These issues are likely to constrain the layout of the proposed infrastructure. At this stage, it is proposed that:

- A Phase 1 Peat Depth survey will be undertaken within the development area;
- The location of PWS households and their sources will be determined both within the development area, and within a 3km buffer;
- An NVC survey will be carried out within the development area.
- Scottish Water will be consulted regarding Scottish Water assets which may be impacted by the proposed development.

13. Population and Human Health

A requirement of the EIA Regulations is to consider potential effects upon population and human health. Issues considered under this topic include:

- Noise;
- Air Quality;
- Shadow Flicker;
- Ice Throw;
- Lightning;
- Socio-economics; and
- Major Accidents and Disasters.

As set out below, a standalone noise chapter would be included in the EIAR. Air quality would be scoped out of further assessment. Shadow flicker will be addressed in the Aviation and Telecommunications chapter of the EIAR. Ice throw and lighting will be scoped out of further assessment. Socio-economics will be covered in the Planning Statement which will accompany the planning application. Major accidents and disasters would be scoped out of further assessment. As such, a separate population and human health EIAR chapter is not required as the topics will be included within the remainder of the EIAR.

13.1. Noise

Noise and vibration would occur during the construction, operation, and de-commissioning phases of the Proposed Development. The extent to which this is significant depends on the noise sources, in each case, and the distance of each of the noise sources to potential receptors.

Potential receptors in this case are considered to be residential properties. During the construction and de-commissioning phases, the effects can be divided into noise and vibration from on-site activities and from construction traffic accessing the site. During operation, noise is generated by the turbines as they rotate with noise output depending on wind speed, and from occasional service vehicles accessing the site.

For on-site construction noise, and operational noise at different wind speeds, the levels received at residential properties would depend on wind direction. Vibration

from on-site construction activities and during operation would not be perceptible at residential properties, except for vibration from blasting if such activities are required. Vibration from construction vehicles accessing the site may be perceptible at roadside properties but would be no greater than vibration levels from other heavy good vehicles and would not be significant.

13.1.1. Assessment Methodology

The principal planning guidance on noise is contained in Planning Advice Note (PAN) 1/2011, Planning and Noise, which contains advice on assessment of noise from new sources as well as the effects of noise on new residential development.

For construction noise it refers to the Control of Pollution Act and the Pollution and Prevention Control Act 1999 for relevant installations. The accompanying Technical Advice Note, Assessment of Noise, lists BS 5228, Noise and Vibration Control on Construction and Open Sites as being applicable for Environmental Impact Assessment (EIA) and planning purposes.

In respect of operational noise from wind farms, PAN 1/2011 refers to 'web based planning advice' on renewables technologies which in turn refers to ETSU-R-97, The Assessment and Rating of Noise from Wind Farms, as the appropriate method for assessment of operational noise. Additional guidance on assessment of operational noise is contained in the UK Institute of Acoustics (IOA) document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (GPG) which has been endorsed by the Scottish Government.

In respect to operational noise from non-wind developments, such as battery energy storage sites, PAN 1/2011 refers to Assessment of Noise: Technical Advice Note (TAN). The TAN identifies BS 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'²⁵ and BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'²⁶ as appropriate methodologies for the assessment of environmental noise from proposed new developments or activities.

13.1.2. Proposed Study Area

The proposed study area for construction and decommissioning noise differs to the study area for operational noise.

²⁵ British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. UK : BSI, 2014. BS4142:2014 + A1:2019.

²⁶ British Standards Institute. Guidance on Sound Insulation and Noise Reduction for Buildings. UK : BSI, 2014. BS8233:2014.

For construction noise all residential properties within 500m of the proposed access track, or any other construction activity, will be assessed, although if the noise impacts are determined to be acceptable at the nearest residential property, then detailed predictions and assessment may not be required for more distant properties.

Any potentially significant increase in road traffic noise along the road network will be assessed in terms of the increase in noise level due to the increase in road traffic noise.

The study area for operational noise is related to the predicted operational noise levels. An initial study area will be defined to include all residential properties where the maximum predicted noise levels from the Proposed Development are above 30dB L_{A90} , although detailed consideration may only be required for noise sensitive properties that have predicted noise levels resulting from the wind farm above 35dB L_{A90} . The study area for operational noise is therefore defined by the noise predictions rather than by a set distance.

If there are any proposed (consented) or operational wind farms within 10km of the site, cumulative noise predictions will be carried out and the initial study area will be expanded (if necessary) to include noise sensitive properties with maximum cumulative predicted noise levels above 35 dB L_{A90} .

13.1.3. Desk Study and Field Surveys

No field surveys are proposed in relation to construction and decommissioning as noise levels are expected to be below the relevant criteria which applies irrespective of existing baseline noise levels.

Where predicted cumulative operational noise levels are below 35dB L_{A90} noise will be assessed against criteria that apply irrespective of the existing baseline noise levels, and therefore baseline noise measurements are not required. Where cumulative operational noise levels are predicted to exceed the lower limiting criterion values, then baseline noise surveys may be required, and it should be noted that baseline noise data for the purposes of deriving appropriate noise limits must not include existing wind turbine noise.

It is likely that there will be a number of residential properties that will require baseline noise monitoring, which is usually undertaken over a 2-3 week measurement period to encompass a suitable range of wind speed and direction conditions. Where this is proposed, Dumfries and Galloway Council will be consulted over the selection of the measurement

locations and the specifics of the measurement and assessment methodology. This consultation will also include an invitation to attend the installation of the measurement equipment.

13.1.4. Assessment Method

13.1.4.1. Construction Noise

Due to the large separation distances from the Proposed Development and the nearest noise-sensitive receptors, significant construction noise effects are not anticipated, and a detailed assessment of construction noise effects is scoped out of the noise assessment. The exception to this is if construction of the access track passes within 500m of noise-sensitive receptors, in which case detailed predictions and assessment will be carried out.

Where an indicative assessment is carried out, the noise assessment will provide a summary of relevant guidance and best practice construction methods, along with a commitment to adhere to practicable means of controlling noise from construction activities, as advocated by BS 5228.

Where detailed predictions are carried out, typical plant for each construction activity that requires assessment will be selected from the list provided in BS 5228, or manufacturer's data, and will be combined with a prediction model to calculate the impact at noise sensitive receptors.

The potential influence of construction traffic will be reviewed, and assessed as necessary in terms of the increase in traffic noise at roadside locations, except where there is little or very little in the way of existing traffic flow in which case it will be assessed against the criteria in BS 5228. It is considered that if the predicted noise increase due to construction traffic is less than 3dB then the impact can be considered to be not significant.

As described in the noise paragraph above, vibration would not be significant and will be scoped out of the assessment. The exception to this is vibration from blasting which could be perceptible at residential properties. If blasting is proposed, it will be assessed in the environmental impact assessment report (EIAR).

13.1.4.2. Operational Noise

Operational noise will be assessed according to the requirements of ETSU-R-97 as clarified and refined by the UK IOA GPG. The ETSU-R-97 methodology sets noise limits for the day and night-time periods by deriving 'prevailing' background noise levels from the results of measurements of baseline/background noise and wind

speed, and setting limits at 5dB above this subject to lower limiting values which are different for day and night periods or where properties are deemed to be 'financially involved' with the development. If the lower limiting values are met, then baseline measurements are not required as the limits set relative to background do not need to be applied.

Initial predictions for the Proposed Development acting cumulatively with other consented wind farms in the vicinity will be carried out to identify properties where predicted cumulative noise levels are above 35dB L_{A90} for standardised 10m height wind speeds of up to 12m/s.

Where predicted cumulative noise levels are either shown to be less than 35dB L_{A90} up to 12m/s, or predicted noise levels from the Proposed Development are below 25dB L_{A90}, the impact is considered to be not significant. In addition, if the Proposed Development adds less than 1dB to the cumulative total from other consented sites then this is sufficient to show that impact would not be significant irrespective of existing baseline noise levels.

A detailed cumulative noise assessment will be carried out for any receptor location where the combined predicted noise level contribution from the Proposed Development and other neighbouring consented wind farms are above 35dB L_{A90} and the Proposed Development adds more than 1dB to the cumulative noise level. Operational noise levels will be assessed against noise limits derived from baseline noise measurements across a range of wind speeds. Where predicted cumulative noise levels are either shown to be less than the derived night and daytime noise limits up to 12m/s, or predicted noise levels from the Proposed Development are at least 10dB below the derived limit, the impact is considered to be not significant. In addition, if the Proposed Development adds less than 1dB to the cumulative total from other consented sites then this is sufficient to show that impact would not be significant.

The provisions of ETSU-R-97 require that all wind turbine noise at a given residential location meet its requirements, irrespective of whether it emanates from a single site or from multiple sites acting together.

The results of the noise predictions for the Proposed Development acting alone, and cumulatively with nearby

consented wind farms, will be presented graphically, and in a tabular form, showing the predicted noise levels in relation to the relevant noise limit(s).

Should a battery energy storage facility be proposed to store excess electricity generated by the proposed development, an operational noise assessment may be required. Where necessary, an assessment will be undertaken in line with BS 4142:2014+A1:2019 and BS 8233:2014.

13.1.4.3. Low Frequency Noise

A study²⁷, published in 2006 by acoustic consultants Hayes McKenzie on the behalf of the Department of Trade and Industry (DTI), investigated low frequency noise from wind farms. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines.

In February 2013, the Environmental Protection Authority of South Australia published the results of a study into infrasound levels near wind farms²⁸. This study measured infrasound levels at urban locations and rural locations with wind turbines close by, and rural locations with no wind turbines in the vicinity. It found that infrasound levels near wind farms are comparable to levels away from wind farms in both urban and rural locations. Infrasound levels were also measured during organised shut downs of the windfarms; the results showed that there was no noticeable difference in infrasound levels whether the turbines were active or inactive.

Bowdler et al., (2009)²⁹ concluded that:

"...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours".

More recently during a planning Appeal (PPA-310-2028, Clydeport Hunterston Terminal Facility, approximately 2.5km south-west of Fairlie, 9 Jan 2018), the health impacts related to low frequency noise associated with wind turbines were considered at length by the appointed Reporter (Mr M Croft). The Reporter considered evidence from Health Protection Scotland and the National Health Service. In addition, he also considered low frequency noise surveys undertaken by the Appellant and the Local Authority both of which demonstrated

²⁷ Hayes McKenzie (2006). 'The measurement of low frequency noise at three UK windfarms', Hayes Mckenzie, The Department for Trade and Industry, URN 06/1412, 2006.

²⁸ Environment Protection Authority (2013). 'Infrasound levels near windfarms and in other environments'. Available Online At: http://www.epa.sa.gov.au/xstd_files/Noise/Report/infrasound.pdf

²⁹ Bowdler et al (2009). 'Prediction and Assessment of Wind Turbine Noise: Agreement about relevant factors for noise assessment from wind energy projects'. Acoustics Bulletin, Vol 34 No2 March/April 2009, Institute of Acoustics.

compliance with planning conditions and did not identify any problems attributable to the turbine operations; some periods with highest levels of low frequency noise were recorded when the turbines were not operating.

The Reporter concluded that:

- The literature reviews by bodies with very significant responsibilities for the health of local people found insufficient evidence to confirm a causal relationship between wind turbine noise and the type of health complaints cited by some local residents.
- The NHS's assessment is that concerns about health impact are not supported by good quality research.
- Although given the opportunity, the Community Council failed to provide evidence that can properly be set against the general tenor of the scientific evidence.

It is therefore not considered necessary to carry out specific assessments of low frequency noise and that it should be scoped out.

13.1.5. Potential Significant Effects

The assessment of construction, operational, and decommissioning noise will compare predicted noise levels with the relevant noise limits. If the relevant noise limits are met, then the predicted effect will be determined to be not significant in EIA terms.

Where predicted noise levels are above the limit, and potential significant effects are predicted, mitigation measures would be designed and included within the proposed development to reduce the impacts to an acceptable level.

13.1.6. Effects Scoped Out

Vibration from construction (with the exception of blasting if required), operation, and decommissioning of the Proposed Development has been scoped out of the assessment, as described in section 13.1.4.1.

Low-frequency noise from the operational wind farm has been scoped out of the assessment, as described in Section 13.1.4.3.

13.1.6.1. Approach to Mitigation

It is unlikely that specific mitigation would be required for the majority of construction activities and generic mitigation measures would be incorporated into site design by following good practice in construction techniques including avoiding work outside normal day-time construction hours wherever possible.

There is the possibility that noise from construction could be close to the relevant limit at residential locations along the site access track during its construction, and detailed predictions will be carried out to ascertain whether mitigation is required. If noise from construction activities are predicted to exceed the relevant noise limits, mitigation would be implemented through plant selection, working hours, and with the use of noise barriers.

For operational noise, it is not anticipated that specific mitigation would be required because the site will be designed so that the relevant noise limits are predicted to be met. It should be noted that modern pitch regulated turbines, of the type proposed here, have the ability to reduce noise under certain wind speed and direction conditions by reducing rotor speed, at the cost of a certain amount of power output. This facility could be utilised in the unlikely scenario that a reduction is required to meet noise limits in practice

13.2. Air Quality

The proposed development is not considered likely to give rise to significant impacts on air quality. The main activities would be limited to construction works (dust from soil stripping and earthworks, from excavation and from vehicles running over unsurfaced ground) and exhaust emissions from fixed and mobile construction plant and construction vehicles. Construction works would be localised, short term, intermittent and controllable through the application of good construction practice.

The contributions of exhaust emissions (NO₂ and PM₁₀) from construction vehicles would likely be low, and orders of magnitude below current Air Quality Objectives. Therefore, it is proposed that the EIA will not address air quality impacts. An Outline CEMP will be included in the EIAR which will include general pollution control measures for air quality.

13.3. Shadow Flicker

The EIAR will also assess the potential effect of shadow flicker associated with the proposed development.

Standard guidance states that shadow flicker occurs within ten rotor diameters of the turbine, and that effects only occur within 130 degrees either side of north relative to the turbines. Beyond these limits it is considered that potential impacts associated with shadow flicker would not be significant.

There are currently eight potential residential properties identified near to the site boundary. An assessment will be undertaken to predict any shadow flicker effects that could be experienced and appropriate mitigation would be proposed if required.

The shadow flicker assessment will be included in the Aviation and Telecommunications chapter of the EIAR.

13.4. Ice Throw

Ice throw is the process of ice falling or being launched from the blades of a turbine. As imbedded mitigation, the turbines would have sensors on them to detect the build-up of ice and automatically prevent the turbines spinning when ice has developed on them, thus preventing the ice being thrown. Scottish Government's Onshore Wind Farm Advice Sheet states that danger to human or animal life from falling parts or ice is rare. Ice throw will not be assessed in the EIA.

13.5. Lightning

As stated in Scottish Government's Onshore Wind Farm Advice Sheet, the danger to human or animal life from lightning strike via a turbine is rare since lightning is directed down the turbine to the earth. Maintenance of the turbines would not be undertaken during high lightning risk weather conditions. Lightning will not be assessed in the EIA.

13.6. Socio-Economic Assessment

Consideration of sustainable economic development has become a cornerstone of government policy and a key driver of the planning system in recent years. The underlying socio-economic wellbeing of an area is also itself a driver in terms of population change.

Existing local socioeconomics issues are likely to include a narrow local business base and limited access to services, while local tourism/ leisure activity is likely to be primarily related to outdoor activities such as walking, cycling, fishing etc.

The potential effects on visual amenity for tourism and recreational locations will be fully assessed in the EIAR Report as part of the LVIA. However, it should be noted that there is no evidence to support the suggestion that the presence of a wind farm would result in a significant adverse effect on tourism or recreation resources and no relationship has been identified between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at local authority nor in the areas immediately surrounding wind farm development³⁰.

The construction of the proposed development would not entail significant road works, closures or diversions which would have potential to adversely affect access to tourism assets and no potential for significant effects is identified.

As such it is proposed that socio-economics will be covered in the Planning Statement which will accompany the planning application.

13.1. Major Accidents and Disasters

Due to the nature of the proposed development, the risk of a major accident or disaster is considered to be extremely low. In addition, the site is located in a remote area, with few nearby receptors. A risk assessment process will be followed by the Principal Designer during the design stage as part of the requirements of the Construction (Design and Management) Regulations 2015. This will ensure that all potential risks are identified at an early stage and appropriate mitigation is implemented.

During the operational stage of the proposed development, routine maintenance inspections would be completed in order to ensure compliant operation of the proposed development.

No further assessment of the risk of major accidents and/or disasters is proposed.

14. Cultural Heritage

³⁰ BiGGAR Economics, July 2016. Wind Farms and Tourism Trends in Scotland [pdf]. Available at: <http://www.biggareconomics.co.uk/wp-content/uploads/2016/07/Research-Report-on-Wind-Farms-and-Tourism-in-Scotland-July-16.pdf> [Accessed 07.08.2017]; and Renewables UK, 2010. Wind Farms and Tourism Fact Sheet 03. [pdf] Renewables UK. Available at: <<http://www.helensburghrenewables.co.uk/wp-uploads/2013/02/ReUK-Tourism.pdf>>.

14.1. Introduction

AOC Archaeology Group have advised Vattenfall on cultural heritage matters and contributed text for this scoping report. AOC is a Registered Archaeological Organisation (RAO) of the Chartered Institute for Archaeologists, and as such its work is required to conform to the standards of professional conduct outlined in the Institute's Code of Conduct. AOC is also ISO 9001:2015 accredited, in recognition of the Company's Quality Management System.

The proposed EIAR will include a chapter which will include detailed consideration of the potential for effects upon the cultural heritage resource. This will include an assessment of both direct effects on heritage assets within the proposed development resulting from the construction of the proposed development, and also for effects upon the settings of designated heritage assets within the wider landscape during the operational phase. The potential for effects upon the settings of non-designated assets of national significance will also be considered. The chapter will also identify measures that should be taken to mitigate any predicted significant adverse effects.

Cultural heritage assets and other archaeological features that are relevant in the context of the proposed development include;

- Scheduled Monuments;
- Listed Buildings;
- Inventoried Gardens and Designed Landscapes;
- Conservation Areas
- Non-designated archaeological landscapes, monuments, sites and findspots; and
- Non-designated historic buildings and structures.
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There are no Inventoried Battlefields within 53km, and no World Heritage Sites within c.59km. Consequently, consideration of impacts upon assets with these designations can be excluded from the assessment.

³¹ UK Government, 1979

³² UK Government, 1997

³³ Scottish Government, 2014

³⁴ Scottish Government, 2014

³⁵ Scottish Government, 2014

³⁶ Historic Environment Scotland (HES). (2019a). Historic Environment Policy for Scotland (HESP). [https://www.historicenvironment.scot/advice-chartered-institute-for-archaeologists-\(cifa\)-\(2014\).](https://www.historicenvironment.scot/advice-chartered-institute-for-archaeologists-(cifa)-(2014).) Available at: [https://www.archaeologists.net/codes/cifa-\(03/02/2020\)and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/\(03/02/2020\)](https://www.archaeologists.net/codes/cifa-(03/02/2020)and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/(03/02/2020))

³⁷ Scottish Government, 2011

³⁸ Chartered Institute for Archaeologists (CIfA) (2014). Available at: [https://www.archaeologists.net/codes/cifa-\(03/02/2020\)](https://www.archaeologists.net/codes/cifa-(03/02/2020))

³⁹ Chartered Institute for Archaeologists (CIfA) (2017). Available at: [https://www.archaeologists.net/codes/cifa-\(03/02/2020\)](https://www.archaeologists.net/codes/cifa-(03/02/2020))

⁴⁰ Dumfries and Galloway (2019) Local Development Plan 2. Available at: [https://www.dumgal.gov.uk/ldp2-\(03/02/2020\)](https://www.dumgal.gov.uk/ldp2-(03/02/2020))

⁴¹ Historic Environment. [https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549-\(03/02/2020\)](https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549-(03/02/2020))

14.2. Key Planning Policy and Guidance

Legislation concerning the protection and conservation of cultural heritage assets includes:

- Ancient Monuments and Archaeological Areas Act³¹;
- Town and Country Planning (Scotland) Act, as amended in the Planning (Listed Buildings and Conservation Areas) (Scotland) Act and as modified by the Historic Environment (Amendment) (Scotland) Act,³² and
- Historic Environment Scotland Act 2014³³.

Relevant planning policy and guidance concerning cultural heritage matters includes:

- The National Planning Framework for Scotland (NPF3)³⁴;
- Scottish Planning Policy (SPP)³⁵;
- Historic Environment Policy for Scotland (HEPS)³⁶;
- Planning Advice Note 2/2011(PAN 2)³⁷;
- Chartered Institute for Archaeologists (CIfA) Standards and Guidance for commissioning work and providing consultancy advice on archaeology and the historic environment³⁸; and Standards and Guidance for historic environment desk-based assessment³⁹;
- The Dumfries and Galloway Local Plan 2 (LDP2)⁴⁰; and
- Change in the Historic Environment: Setting⁴¹.

14.3. Consultation

Vattenfall submitted a pre-planning enquiry to Dumfries and Galloway Council in regard to the proposed development in 2018.

The Council Archaeologist stated that the proposed development has the potential to have “a significant impact on cultural heritage assets” and as such an assessment on heritage assets was requested as part of

any future EIA. The Council Archaeologist noted that the following Dumfries and Galloway planning policies should be taken into account in any future cultural heritage assessment:

- Planning Policy IN2: Wind Energy Development⁴²;
- Local Development Plan Policy HE1: Listed buildings⁴³;
- Local Development Plan Policy HE2: Conservation Areas⁴⁴;
- Local Development Plan Policy HE3: Archaeology⁴⁵;
- Local Development Plan Policy HE6: Gardens and Designed Landscapes⁴⁶;
- Local Development Plan Supplementary Guidance on the Historic Environment⁴⁷
- Local Development Plan 2 Policy HE4: Archaeologically Sensitive Areas⁴⁸
- Emerging supplementary planning policy from Dumfries and Galloway Council.

The response stated that direct impacts for the Site and any access route would need to be scoped into the assessment and that a walkover survey should be undertaken to inform the assessment

Section 14.4.1 and Appendix 14.1 outlines the methodology for Direct Effects which will be used to assess the potential for direct impacts in line with Consultation received.

The Council's response also considered the potential for effects upon the settings of heritage assets, the Council's Archaeologist recommended that wider landscape designations including non-inventoried designed landscapes, Conservation Areas and Archaeological Sensitive Areas should be included within the scope of the assessment and that Zone of Theoretical Visibility (ZTV) mapping should be used to identify assets that could potentially be affected. The Council requested that a list of visualisations, which will be used to inform the assessment, be agreed with their Archaeologist.

Appendix 14.1 and section 14.4.2 outlines the Indirect Effects methodology which will be used to assess the potential for indirect effects.

Vattenfall arranged an on-site meeting with the Council's Archaeologist on the 22nd March 2019 to discuss the

potential effects of the proposed development upon both designated and non-designated heritage assets. AOC Archaeology also attended this meeting. The Council's Archaeologist indicated that direct impacts should be avoided where possible by micro-siting and locating infrastructure around known heritage assets within the Site boundary. It was noted that where it is available, LiDAR data could be utilised when assessing the archaeological potential on the site.

The potential for effects upon the settings of three Scheduled monuments were discussed in detail at the meeting:

- The Scheduled Rough Island Crannog (SM659) within the site boundary;
- The Scheduled Watch Knowe fort on Craigmuir Moor (SM1101) approximately c.785m west of the north western corner of the site;
- The Scheduled Brochloch Farmstead and Field System (SM5694) approximately c.1km to the east of the site;
- Two sites that are included on Dumfries and Galloway Council's non-statutory list of sites of national significance (NSSNP) were also discussed;

- NSSNP Loch Knowe Promontory Fort, on Loch Urr (NX78SE 62; MDG5294); and,
- White Isle Earthwork, Loch Urr (NX78SE 1; MDG4355); and

Visits were made to three assets; the Rough Island crannog, the Brochloch farmstead and the Loch Knowe promontory fort.

It is proposed to include a range of visualisations in support of the EIAR chapter. These will include views from:

- The Scheduled Rough Island Crannog (SM659);
- The Scheduled Watch Knowe fort on Craigmuir Moor (SM1101)
- The Scheduled Brochloch Farmstead and Field System (SM5694)
- Tynron Doon, hill fort (SM663)
- White Isle Earthwork, Loch Urr (NX78SE 1; MDG4355);
- NSSNP Loch Knowe Promontory Fort, on Loch Urr (NX78SE 62; MDG5294);

⁴² Dumfries and Galloway Council. (2017). Local Development Plan Supplementary Guidance Available at:

<https://www.dumgal.gov.uk/article/17034/LDP2-draft-supplementary-guidance> (03/02/2020)

⁴³ Dumfries and Galloway Council. (2019) Local Development Plan 2 Available at: <https://www.dumgal.gov.uk/ldp2> (03/02/2020): 40

⁴⁴ Dumfries and Galloway (2019) Local Development Plan 2. Available at: <https://www.dumgal.gov.uk/ldp2> (03/02/2020)

⁴⁵ Dumfries and Galloway (2019) Local Development Plan 2. Available at: <https://www.dumgal.gov.uk/ldp2> (03/02/2020)

⁴⁶ Dumfries and Galloway (2019) Local Development Plan 2. Available at: <https://www.dumgal.gov.uk/ldp2> (03/02/2020)

⁴⁷ Dumfries and Galloway Council. (2018). Local Development Plan 2: Historic Built Environment, Draft Supplementary Guidance. Available at: <https://www.dumgal.gov.uk/article/17034/LDP2-draft-supplementary-guidance> (03/02/2020)

⁴⁸ Dumfries and Galloway Council. (2019) Local Development Plan 2 Available at: <https://www.dumgal.gov.uk/ldp2> (03/02/2020): 45

- Category B Listed Craigenputtock (LB4250); and
- Moniaive Conservation Area (Site 231).
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14.4. Methodology

All cultural heritage assets within a distance of up to 1km from the site will be identified to allow for an assessment of the potential for hitherto unknown archaeological remains to survive within the site; which could therefore potentially be directly impacted by the proposed development.

All designated heritage assets within a 5km radius of the site will similarly be identified in order to allow for the consideration of the potential for settings effects upon their settings resulting from the proposed development. All internationally and nationally designated heritage assets (Scheduled Monuments, Category A Listed Buildings and Inventoried Garden and Designed Landscapes), non-designated landscapes, Conservation Areas, d Archaeological Sensitive Areas and sites included on Dumfries and Galloway Council's non-statutory list of sites of national significance (NSSNP) between 5km and 10km of the Site will similarly be identified in order to allow for the consideration of the potential for settings effects resulting from the proposed development.

14.4.1. Direct Effects

Construction of the proposed development has the potential to disturb, damage, or destroy features or buried remains of cultural heritage interest. Other construction activities, such as vehicle movements, soil and overburden storage and landscaping also have the potential to cause direct permanent and irreversible impacts on cultural heritage assets.

The assessment will collate known archaeological information on the site and identify any previously unknown archaeological features through inspection of aerial photographic records, archive records, cartographic records and a walkover survey. The following data sources will be consulted:

- Designated asset data, including GIS downloads, maintained by HES
- Historic Environment Record (HER), maintained by Dumfries and Galloway Council;
- The National Record for the Historic Environment (NRHE), maintained by (HES);
- Historic maps including superseded Ordnance Survey editions held by the National Library of Scotland (NLS);

- Unpublished historic maps and documents held by the National Archives of Scotland;
- Vertical and oblique aerial photographs held by the National Collection of Aerial Photography (NCAP) at HES;
- Published bibliographic sources, including historical descriptions of the area (Statistical Accounts, Parish Records);
- The Historic Land-use Assessment Data (HLAMap) for Scotland (HES);
- British Geological Survey (BGS) for geological data and historic borehole data; and
- Available LiDAR data.

14.4.2. Settings Effects

The setting assessment will identify those assets which could potentially be affected using ZTV mapping, assess and characterise the individual setting of each asset and consider its sensitivity to change, and then assess the significance of any potential setting effect.

14.4.3. Walkover Survey

An archaeological walkover survey of the site will be undertaken with the aim of confirming the results of the desk study and identifying any previously unknown remains. The site will be surveyed along transects spaced at 20m intervals (dependant on topography). All known heritage assets will be assessed in the field to establish their survival, extent, significance and relationship to other assets. Weather, vegetation and any other conditions affecting the visibility during the survey will also be recorded. All heritage assets encountered will be recorded and photographed. ArcGIS Collector will be used to record the position and extent of each asset. All assets will be marked on plans, at a relevant scale keyed by means of Grid References to the Ordnance Survey mapping.

The walkover survey will also identify areas of the Site that may require further earthwork survey or intrusive investigations and will be used to inform the overall mitigation strategy for the proposed development.

14.4.4. Impact Assessment

The approach to the assessment will involve establishing the value and importance of the heritage receptor and then assessing the sensitivity of the asset to change. A judgement regarding the impact magnitude that may be experienced will be made.

Historic Environment Policy for Scotland notes that to have cultural significance an asset must have a particular “*aesthetic, historic, scientific or social value for past,*

*present and future generations*⁴⁹. Heritage assets also have value in the sense that they “...create a sense of place, identity and physical and social wellbeing, and benefits the economy, civic participation, tourism and lifelong learning”.⁵⁰

For clarity, and to avoid confusion with ‘significance’ in EIA terms, the term ‘cultural value’ will be applied throughout this assessment though, as outlined above, it is acknowledged this is the same as cultural significance as defined in HEPS.

All heritage assets have some intrinsic value; however, some heritage assets are judged to be more important than others. The level of that importance is, from a cultural resource management perspective, determined by establishing the asset’s capacity to contribute to our understanding or appreciation of the past⁵¹. In the case of many heritage assets their importance has already been established through the designation (i.e. Scheduling, Listing and Inventory) processes applied by Historic Environment Scotland.

The criteria used to rate importance of heritage assets are presented in Appendix 14.1, Table A14.1 and relate to the criteria for designations as set out in Designation Policy and Selection Guidance⁵², Scotland’s Listed Buildings,⁵³ and professional judgement.

Potential direct impacts, that is the physical change to known heritage assets, and unknown buried archaeological remains, in the case of the proposed development relate to the possibility of disturbing, removing or destroying in situ remains and artefacts during construction works.

The magnitude of the direct impact upon heritage assets caused by the proposed development is rated using the classifications and criteria outlined in Appendix 14.1, Table A14.2.

The predicted level of direct effect on each heritage asset is determined by considering the asset’s importance in conjunction with the predicted magnitude of the impact. The method of deriving the level of a direct effect is provided below in Appendix 14.1, Table A14.3.

Determining cultural heritage value can be made with reference to the intrinsic, contextual and associative characteristics of an asset as set out in HEPS⁵⁴ and its accompanying Designation Policy and Selection Guidance⁵⁵ a determination of value. HEPS Designation Policy and Selection Guidance⁵⁶ indicates that the relationship of an asset to its setting or the landscape makes up part of its contextual characteristics. The Xi’an Declaration⁵⁷ set out the first internationally accepted definition of setting with regard to cultural heritage assets, indicating that setting is important where it forms part of or contributes to the significance of a heritage asset. SPP does not differentiate between the importance of the asset itself and the importance of the asset’s setting. Indeed, under the section on Scheduled Monuments it states that ‘where there is potential for a proposed development to have an adverse effect on a scheduled monument or on the integrity of its setting, permission should only be granted where there are exceptional circumstances’.⁵⁸ However, it is widely recognised⁵⁹ that the importance of an asset is not the same as its sensitivity to changes to its setting. Elements of setting may make a positive, neutral or negative contribution to the value of an asset.⁶⁰ Thus, in determining the nature and significance of impacts upon assets and their settings by the development, the contribution that setting makes to an asset’s value and importance and thus its sensitivity to changes to setting need to be considered.

This approach recognises the importance of preserving the integrity of the setting of an asset in the context of the contribution that setting makes to the experience,

⁴⁹ Historic Environment Scotland (HES). (2019a). Historic Environment Policy for Scotland (HESP). <https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/> (03/02/2020)

⁵⁰ Scottish Government. (2014). Scottish Planning Policy (SPP). <https://www.gov.scot/publications/scottish-planning-policy/> (03/02/2020)

⁵¹ Historic Environment Scotland (HES). (2019b) Designation Policy and Selection Guidance. <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b> (03/02/2020)

⁵² Ibid

⁵³ Historic Environment Scotland (HES). (2019). Scotland’s Listed Buildings. <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=34c90cb9-5ff3-45c3-8bc3-a58400fcbc44> (03/02/2020)

⁵⁴ Historic Environment Scotland (HES). (2019a). Historic Environment Policy for Scotland (HESP). <https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/> (03/02/2020)

⁵⁵ Historic Environment Scotland (HES). (2019b) Designation Policy and Selection Guidance. <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b> (03/02/2020)

⁵⁶ Ibid

⁵⁷ ICOMOS (2005). Xi’an Declaration. <https://www.icomos.org/xian2005/xian-declaration.htm> (03/02/2020)

⁵⁸ Scottish Government. (2014). Scottish Planning Policy (SPP). <https://www.gov.scot/publications/scottish-planning-policy/> (03/02/2020)

⁵⁹ Lambrick, G. Setting Standards: A Review

⁶⁰ Historic England (HE). (2017). The Setting of Heritage Assets. <https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/> (03/02/2020)

understanding and appreciation of a given asset. It recognises that setting is a key characteristic in understanding and appreciating of some, but by no means all, assets. Indeed, a nationally important asset does not necessarily have high sensitivity to changes to its setting (e.g. does not necessarily have a high relative sensitivity). An asset's relative sensitivity to alterations to its setting refers to its capacity to retain its ability to contribute to our understanding and appreciation of the past in the face of changes to its setting. The ability of an asset's setting to contribute to an understanding, appreciation and experience of the asset and its value also has a bearing on the sensitivity of that asset to changes to its setting. While all nationally important heritage assets are likely to be sensitive to direct impacts, not all will have a similar sensitivity to impacts on their setting; this would be true where setting does not appreciably contribute to their value or importance.

Assets with high sensitivity to indirect settings impacts may be vulnerable to any changes that affect their settings, and even slight changes may reduce their information content or the ability of their settings to contribute to the understanding, appreciation and experience of them. Less sensitive assets will be able to accommodate greater changes to their settings without material reduction in their ability to contribute to our understanding of the past and in spite of such changes the relationship between the asset and its setting will still be legible.

The criteria for establishing an asset's relative sensitivity to changes to its setting is detailed in Appendix 14.1 Table A14.4. This table has been developed based on AOC's professional judgement and experience in assessing setting impacts. It has been developed with reference to the policy and guidance noted above including SPP⁶¹, HEPS⁶² and its Designation Policy and Selection Guidance⁶³, the Xi'an Declaration⁶⁴ and Historic Environment Scotland's guidance on the setting of heritage assets⁶⁵.

The determination of a heritage asset's sensitivity to changes to its setting is first and foremost reliant upon the determination of its setting and the elements of setting which contribute to its cultural value and an understanding and appreciation of that cultural value.

The criteria set out in Appendix 14.1, Table A14.5 are intended as a guide. Assessment of individual heritage assets is informed by knowledge of the asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This allows for the use of professional judgement and each asset is assessed on an individual basis. It should be noted that individual heritage assets may fall into a number of the sensitivity categories presented above, e.g. a country house may have a high sensitivity to alterations within its own landscaped park or garden, but its level of sensitivity to changes may be less when considered within the wider landscape context. It is also the case that the wider landscape may not contribute to the understanding or appreciation of the asset at all.

It is acknowledged that Table A14.5 (Appendix 14.1) primarily deals with visual factors affecting setting. While the importance of visual elements of settings, e.g. views, inter-visibility, prominence etc., are clear, it is also acknowledged that there are other, non-visual factors which could potentially result in setting impacts. Such factors could be other sensory factors, e.g. noise or smell, or could be associative. Where applicable these are considered in coming to a conclusion about magnitude of impact upon setting.

Once the above has been considered, the prediction of the level of magnitude of impact upon setting is based upon the criteria set out in Appendix 14.1, Table A14.6. In applying these criteria, particular consideration is given to the relationship of the proposed development to those elements of setting which have been defined as most important in contributing to the ability to understand, appreciate and experience the heritage asset and its cultural value.

The level of indirect effects on the setting of heritage assets is judged to be the interaction of the asset's relative sensitivity (Appendix 14.1, Table 14.4) and the magnitude of the impact (Appendix 14.1, Table 14.6) and also takes into consideration the importance of the asset (Appendix 14.1, Table 14.5). In order to provide a level of consistency, the assessment of sensitivity, the prediction of magnitude of impact and the assessment of level of effect have been guided by pre-defined criteria. However, a qualitative descriptive narrative is also

⁶¹ Scottish Government. (2014). Scottish Planning Policy (SPP). [https://www.gov.scot/publications/scottish-planning-policy/ \(03/02/2020\)](https://www.gov.scot/publications/scottish-planning-policy/ (03/02/2020)

⁶² Historic Environment Scotland (HES). (2019a). Historic Environment Policy for Scotland (HESP). [https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ \(03/02/2020\)](https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/ (03/02/2020)

⁶³ Historic Environment Scotland (HES). (2019b) Designation Policy and Selection Guidance. [https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b \(03/02/2020\)](https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=8d8bbaeb-ce5a-46c1-a558-aa2500ff7d3b (03/02/2020)

⁶⁴ ICOMOS (2005). Xi'an Declaration. [https://www.icomos.org/xian2005/xian-declaration.htm \(03/02/2020\)](https://www.icomos.org/xian2005/xian-declaration.htm (03/02/2020)

⁶⁵ Historic Environment Scotland (HES). (2016) Managing Change in the Historic Environment. [https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549 \(03/02/2020\)](https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549 (03/02/2020)

provided for each asset, in its own right, to summarise and explain each of the professional value judgements that have been made in establishing sensitivity and magnitude of impact for each individual asset.

The interactions determining level of indirect effect on the setting of the heritage assets in question are shown in Appendix 14.1, Table A14.7.

Using professional judgment, and with reference to the Guidelines for Environmental Impact Assessment (as updated), effects established as moderate and greater are defined as significant (those shaded grey in Appendix 14.1, Table A14.7), while those determined to be minor-moderate and less, are considered not significant.

14.4.5. Cumulative Effects

Cumulative effects relating to cultural heritage assets are for the most part limited to effects upon setting. As there are no specific guidelines with regard to undertaking cumulative assessment for heritage assets, this assessment will follow the criteria for assessing setting effects as set out above. The assessment of cumulative effects will consider whether there would be an increased impact upon the setting of heritage assets as a result of adding the proposed development to a baseline, which may include operational, under construction, consented or proposed developments as agreed with the planning authority.

Those heritage assets which are included in the detailed setting assessment will also be considered when assessing the potential for cumulative effects. However, only those assets which are judged to have the potential to be subject to significant cumulative effects will be included in the detailed cumulative assessment.

14.5. Baseline Conditions

This baseline summary has been compiled using readily available online sources including designation documents and National Record for the Historic Environment (NRHE) data as well as historic datasets including Historic Environment Record data (HER) for the northern portion of the Site and a brief review of historic maps. These assets are mapped on Figure 2 and Figure 3.

Within the Site boundary there are:

- One Scheduled Monument, Rough Island, crannog (Site 157);
- One Category B Listed Building, Craigenputtock (Site 185);

- Eight heritage assets included on Dumfries and Galloways' non-statutory list of sites of national significance (Sites 234); and
- 83 known non-designated heritage assets.

Prehistoric remains have been recorded within the site and are largely located within the northern portion. These assets include the Scheduled Rough Island Crannog (Site 157) in the north western portion of the Site as well as four assets on Dumfries and Galloway Council's non-statutory list of sites of national significance (NSSNP Sites) including burnt mounds, cairn fields and a promontory fort (Sites 235, 236, 245, 247). Further non-designated sites including thirty burnt mounds, eighteen cairns or cairn fields, three potential hut circles, and a log boat found in Loch Urr have been recorded within the site boundary. These remains suggest that the northern portion of the Site was part of an active, prehistoric landscape.

There is a paucity of evidence of the Roman, Early Historic and medieval periods (AD43-1600), although the post medieval farmsteads and agricultural remains recorded within the site may have earlier antecedents.

NSSNP sites and non-designated assets within the site boundary evidence agricultural land use in the post medieval and modern periods. The Category B Craigenputtock (Site 185) is an early 19th century farmstead located in the centre of the Site and has associations with the writer Thomas Carlyle (1795-1881).

The Ordnance Survey of 1897 records the Site within an agricultural landscape. Loch Urr and the "*remains of a castle*" potentially Site 157, are annotated in the north western area of the Site. A number of "*tumuli*" are noted within the northern area of the Site, and a designed plantation is drawn around the Listed Craigenputtock (Site 185). A number of small farmsteads or individual buildings are annotated within and around the Site, which reflects a dispersed settlement landscape.

Heritage assets within the 1km study area further evidence prehistoric and post-medieval activity within the wider landscape. Within the 1km study area one Scheduled Monument, Craigmuir Moor, Watch Knowe, fort (Site 160); a Category B Listed Building, Shankfoot Bridge (Site 204); and the Category C Listed Auchenchyne Bridge (Site 213) have been identified.

This report has identified within 5km:

- Seven Scheduled Monuments;
- One Inventoried Garden and Designed Landscape (GDL), Maxwellton (Glencairn Castle) (GDL00276);
- One Conservation Area, Moniaive;

- Four Category A Listed Buildings;
- 37 Category B Listed Buildings; and
- 15 Category C Listed Buildings.

There are 16 Scheduled Monuments (Sites 151, 152, 154-156, 158, 159, 162, 164-167, 169-171, & 174), which date to the between 5km and 10km from the Site. These monuments consist of prehistoric domestic and defensive, and ritual and funerary sites as well as medieval defensive structures. A NSSNP site (Site 275), of prehistoric date has also been identified within 5km and 10km of the Site. There are five Category A Listed Buildings (Sites 175-178 & 180) and two Conservation Areas Tynron (Site 232) to the north and Kirkpatrick Durham (Site 233) to the south between 5km and 10km of the Site.

A preliminary list of potential cultural heritage viewpoints is requested from HES and DGC for consideration and agreement?

14.6. Mitigation

The proposed development will seek to avoid direct impacts upon any known heritage assets during construction through careful siting of infrastructure and where appropriate fencing off known heritage assets. The finalised turbine array and access track layout would be informed by the results of the archaeological walkover survey and wherever possible direct impacts upon heritage assets will be avoided or minimised during the iterative design process. This could include rerouting and micro-siting so as to avoid direct impacts upon identified archaeological assets.

Where impacts cannot be entirely avoided, or where the potential for previously unrecorded buried remains cannot be excluded then a programme of archaeological work is likely to be required and the proposed archaeology and cultural heritage chapter include a detailed mitigation strategy developed in consultation with the Council Archaeologist at Dumfries and Galloway Council and, if their input is required, Historic Environment Scotland. The overall objective would be to develop appropriate design responses or mitigation measures required to avoid, minimise or offset significant effects.

Full assessment of the potential for indirect impacts will only be undertaken in cases where ZTV analysis suggests either that the proposed development could be visible from the asset or that it could appear in key views which include the asset. It is not possible to assess indirect impacts in detail prior to the finalising of the design of the proposed development and the preparation of the ZTV.

15. Traffic and Transport

15.1. Introduction

This section sets out the proposed approach to the assessment of potential effects of the proposed development on access and transport during construction and operation of the proposed development. The following policy and guidance documents will be used to inform the Transport & Access chapter:

- Transport Assessment Guidance (Transport Scotland, 2012);
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
- SPP (Scottish Government, 2014);
- Dumfries & Galloway Local Transport Strategy (DGC); and
- Dumfries & Galloway Local Development Plan (DGC).

15.2. Baseline Conditions

Due to the current Covid-19 situation, traffic flows will have been significantly affected. The traditional approach of obtaining traffic survey data for use in the assessment from new Automatic Traffic Count (ATC) surveys would not be appropriate.

As an alternative, traffic flow data from the Department for Transport (DfT) UK review would be used along with other publicly available traffic flow data for the A75, A713, A713 and A702.

Traffic accident data would be obtained from Crashmap UK for the study network to inform the accident review for the immediate road study area.

15.3. Potentially Significant Effects

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

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

- The potential effects of these will be examined in detail.

The decommissioning phase of the proposed development is proposed to be scoped out from the assessment. Traffic levels associated with this stage of the development's life cycle would be less than those associated with the construction phase as elements such as access junctions and associated items of infrastructure are likely to be retained on site following the decommissioning of the turbine equipment. As such, the construction phase represents a worst case assessment scenario.

15.4. Effects Evaluation

A Transport Assessment will be provided to review the impact of transport related matters associated with the proposed Development. This will be appended to the EIAR and will be summarised into a Transport and Access chapter within the EIAR.

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

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

The main transport impacts would be associated with the movement of general HGV traffic travelling to and from the site during the construction phase of the development.

Each turbine is likely to require between 11 and 13 abnormal loads (depending upon model selected) to deliver the components to site. The components would be delivered on extendable trailers which would then be retracted to the size of a standard HGV for the return journey.

Detailed swept path analysis will be undertaken for the main constraint points on the route from the port of entry through to the site access junction to demonstrate that the turbine components can be delivered to site and to identify any temporary road works which may be necessary. The likely route is expected to be from the south via the A75 and A713 and A712 to site.

Once operational, it is envisaged that the level of traffic associated with the proposed wind farm would be minimal.

It is expected regular monthly visits would be made to the wind farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the wind farm for specific maintenance and/or repairs.

An operational review would be undertaken to assess the potential impact of hydrogen production from the site. The following rules taken from the guidance would be used as a screening process to define the scale and extent of the assessment:

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

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

The estimated traffic generation of the proposed development would be compared with baseline traffic flows, obtained from existing traffic survey data, in order to determine the percentage increase in traffic.

Traffic flows for the future year assessments will be estimated from surveyed data, subjected to growth forecasts. The forecasts will be undertaken using Low National Road Traffic Forecast (NRTF) assumptions unless otherwise agreed.

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

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

15.5. Key Questions

Could the consultees please confirm:

- ***that the proposed methodology is acceptable?***
- ***that the methods proposed for obtaining traffic flow data are acceptable?***
- ***that the use of NRTF is acceptable?***
- ***what developments should be included as committed developments within the baseline traffic flows in the assessment, noting that these should have planning consent at the time of scoping?***
- ***details of any upgrades or network changes that may be undertaken to the study area network within the next five years?***

16. Forestry

16.1. Introduction

This section sets out the approach which will be used to integrate the proposed development into the existing woodland structure, should the forested Auchenhay and Blackmark land be developed. A Wind Farm Forest Design Plan would be prepared, which would detail felling and replanting proposals, illustrating the forestry requirements associated with the construction and operation of the proposed development.

Parts of the site are located in areas of commercial woodlands. The forests are owned and managed privately. They consist primarily of areas of commercial conifers at various states of felling. It is proposed that keyholing should be undertaken at the site in order to accommodate the proposed development

In the UK there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, this felling is dealt with under the Scottish Government's "Control of Woodland Removal Policy" (FCS 2009)⁶⁶. The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. The requirements of the policy will be addressed within the EIA and reported in the EIAR.

16.2. Consultation

The main forestry consultee is Scottish Forestry (SF), South Scotland Conservancy as this is the conservancy in which the areas of commercial forestry within the site fall. Consultation would be welcomed to ensure that the proposed changes to the woodlands are appropriate and address the requirements of the Control of Woodland Removal Policy and other guidance. In addition, there may be interrelated issues raised by other consultees e.g. SEPA on forestry residues, which would be addressed within the forestry assessment.

16.3. Legislation and Guidance

The forestry proposals will be prepared in accordance with the current industry best practice and guidance including, but not limited to:

- Forestry Commission (2017). The UK Forestry Standard: The Government's Approach to Sustainable Forestry, 4th edition, Forestry Commission, Edinburgh.
- Forestry Commission (2017): The UK Forestry Standard Guidelines. Edinburgh.
- Forestry Commission Scotland (2009). The Scottish Government's Policy on Control of Woodland Removal. Edinburgh.
- Forestry Commission Scotland (2019): Scottish Government's policy on control of woodland removal: implementation guidance.
- The Scottish Government (2019). Scotland's Forestry Strategy 2019. Edinburgh.
- The Scottish Government (2011). Scottish Land Use Strategy. Edinburgh.
- The Scottish Government (2012): Waste (Scotland) Regulations 2012.
- The Scottish Government (2014a). Scotland's Third National Planning Framework (NPF3). Edinburgh.
- The Scottish Government (2014b). Scottish Planning Policy. Edinburgh
- SEPA (2013): SEPA Guidance Notes WST-G-027 "Management of Forestry Waste".
- SEPA (2014): LUPS-GU27 "Use of Trees Cleared to Facilitate Development of Afforested Land.
- UKWAS (2012). The UK Woodland Assurance Standard Third Edition, UKWAS, Edinburgh.

16.4. Methodology

Commercial forests are dynamic and constantly changing through landowner activities, market forces and natural events such as windblow or pests and diseases. Commercial forestry is therefore not regarded as a receptor for a formal impact assessment. Instead it will be a factual assessment describing the changes to the forest structure resulting from the incorporation of the wind farm into the forest. This will include the changes to, for example, the woodland composition and felling programmes. The effects of forest felling and restocking will be assessed in the relevant chapters of the EIAR including Ornithology; Landscape and Visual; Hydrology, Geology and Hydrogeology; Ecology; and Traffic and Transport.

The forestry baseline will describe the crops existing at the time of preparation of the EIAR. This will include current species; the planting year; felling and restocking plans; and other relevant woodland information. It will be prepared from existing forest records; desk-based assessments; site visits; and aerial photographs.

⁶⁶ Scottish Government, 2009, Control of Woodland Removal Policy. Available at <https://forestry.gov.scot/support-regulations/control-of-woodland-removal> Accessed 14 April 2020

There is potential for changes to the forest structure resulting from the proposed development, with consequential implications for the wider felling and restocking plans across the forest area. Areas of woodland may need to be felled for the construction and operation of the proposed development including access tracks, turbine locations and other infrastructure. The potential effects would be changes to the structure of the woodlands, which may result in a loss of woodland area.

This would be addressed through a redesign of the existing forest including, for example, the use of designed open space, alternative woodland types, changing the management intensity, or the provision of compensation planting on an alternative site.

The changes to the forests for a particular development are regarded as site specific and it is considered that there are no cumulative forestry issues to be addressed. The principal output will be the preparation of the Wind Farm Forest Design Plan. This will include a felling plan to show which woodlands are to be felled and when they are to be felled during the life of the proposed development. It will further include a restocking plan showing which woodlands are to be replanted and when during the life of the proposed development. The changes to the woodland structure will be analysed and described including changes to species composition, age class structure, timber production, traffic movements and the felling and restocking plans.

The resulting changes to the woodland structure and any requirement for compensation planting to mitigate against any woodland loss will be considered in the context of the Control of Woodland Removal Policy and in consultation with SF.

The integration of the proposed development into the forest design plan will be a key part of the development process. Should felling be required and compensatory planting needed as a result this can be enforced through a planning condition should the eventual application be consented. As part of the condition discharge process, SF will be consulted.

16.5. Deer Management

The effect of deer is proposed to be scoped out a no significant impact is expected. The landowner would be able to continue to manage deer on their property.

17. Aviation and Telecommunications

This section of the EIAR will assess the potential impact on any existing telecommunications infrastructure and aviation activity in the vicinity of the proposed development. The approach to the assessment will be to consult with statutory undertakers and other relevant organisations to ascertain if the proposed development would have an impact on their services and if so, what mitigation if any would be necessary. In this respect, the EIA will consider:

- Civil aviation;
- Military interests including aviation, radar and Eskdalemuir seismic array;
- Microwave fixed link; and
- Telecoms.

17.1. Defence interests

The Applicant is engaging with the MoD over the proposed development and any low flying concerns related to the Borders Tactical Training Area.

17.2. Civil aviation

The Applicant is in consultation with NATS regarding radar line of sight across the site from the NATS Great Dun Fell and Lowther Hill radars.

Visual impact of aviation lighting will be considered given proximity to Dark Sky Park. Approval would be sought from the CAA for reduced lighting scheme. The design process carefully consider turbine locations to minimise light visibility. Pre-application consultation will be undertaken with the CAA to advise the methodology and proposed aviation consultees for a reduced lighting study. The reduced lighting scheme will require consultation with key aviation stakeholders including MCGA Prestwick SAR base, Police Scotland ASU and Scottish Air Ambulance.

Assessment of impact on the Glenswinton airstrip (located 8.4km south west of the site boundary) would be included to assess potential impacts on airstrip approach and climb-out paths and visual circuit.

The site is also just beyond the 50km restricted zone around the Eskdalemuir seismic array (51km from nearest site boundary). Other than Glenswinton, there are no airfields, airstrips, gliding or other aviation

sites within 10km of the site which would require consideration.

17.3. Telecoms and radiocommunications

Fixed microwave and scanning telemetry link radio facilities with the potential to be affected by the proposed development will be identified through consultation with Ofcom and the Ofcom Spectrum Information Portal. The paths of any links through the site will be plotted and appropriate separation buffers applied to inform the design process.

Determination of the impact of the proposed wind turbine on any potentially affected telecommunications facilities will be conducted principally through consultation with the operators of the facilities. Analysis of the required turbine-link separations using the Bacon Formula. Pre-application consultation will be undertaken with any telecommunications operators identified through the Ofcom Spectrum Information Portal. In addition, BT, Atkins and JRC will be consulted directly.

18. Climate Change

18.1. Introduction

The EIA regulations require the EIA process to have had regard to the impact of the development on climate, including the nature and magnitude of greenhouse gas emissions and the vulnerability of the development to climate change.

It is anticipated that the proposed development will result in a net-reduction/saving of greenhouse gas (GHG) emissions. A GHG assessment is proposed to consider the influence of the proposed development on climate change. The assessment will consider the following:

- total GHG emission savings with respect to emissions from different power generating sources;
- GHG emissions due to production, transportation, erection, operation and dismantling of the wind farm;
- GHG emissions due to the need for backup power generation; and
- GHG emissions due to change in fixing potential of peat land, loss of carbon dioxide stored in peat land, balanced against carbon saving due to restoration of habitat and loss of carbon fixing potential as a result of forest felling.

The Scottish Government's carbon calculator tool⁶⁷ would be used for the GHG assessment. This would be presented in a Technical Appendix to the EIAR.

The proposed development would be designed to accommodate the predicted effect of climate change. As such, a climate change resilience assessment is proposed to be scoped out of the EIA.

⁶⁷ Scottish Government (no date). Carbon calculator for wind farms on Scottish peatlands: factsheet. Available at: <https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/>

19. EIAR Accompanying Documents

19.1. Non-Technical Summary

The non-technical summary (NTS) details the main components of the proposed development and summarises the main findings of the environmental studies carried out to build and operate the proposed development. It is designed to be an easily readable document that will communicate the main elements of the EIA to any interested party without the need for the reader to have specialist background knowledge. It will also contain maps that show the extent and geographical location of the development.

19.2. Planning, Design & Access Statement

A Planning Statement and a Design and Access Statement (DAS) would be produced and would seek to highlight the design principles and concepts behind the proposed development. It will detail how the Applicant has applied these principles to the proposed development in tandem with input from consultation activities and will review how successful the proposed development has been in realising the design strategy.

The Planning Statement will also provide a commentary of the EIA findings and assess the proposed development accounting for residual effects (both beneficial and adverse) against national policy and legislation, the Development Plan and other material planning considerations relevant to the proposed development.

19.3. Pre-Application Consultation Report

Although not a statutory requirement for applications submitted under Section 36 of the Electricity Act 1989, the Applicant intends to submit a Pre-Application Consultation (PAC) Report to accompany the application.

It is proposed that the legislation and best practice guidance in relation to public consultation for Major Developments will be broadly followed as contained in PAN 3/2010 - Community Engagement - Planning with People.

The PAC report will:

- outline the scope of the consultation programme including when and who has been consulted;
- confirm how the consultation programme meets the best practice standards;
- set out how the applicant has responded to the comments made, including whether and the extent to which the proposals have changed as a result of PAC;
- provide documentary evidence that the planned consultation programme has taken place e.g. copies of advertisements of the public events and reference to display materials and records of response from such events;
- demonstrate that steps were taken to explain the nature of PAC i.e. that it does not replace the application process whereby representations can be made to the planning authority; and
- make an assessment of the success of the Pre-application Consultation activities.

20. Responding to this Scoping Report

Consultee responses to this report should be directed to the Energy Consents Unit which will form a Scoping Opinion. The Applicant will welcome such response to inform the scope of EIA to be undertaken for the proposed development and further consultation to be undertaken with each consultee as the EIA progresses.

Members of the public making representations in are encouraged to do so electronically rather than in paper form.

All representations may be submitted electronically either through the online portal at www.energyconsents.scot, or by emailing representations@gov.scot.

Otherwise, representations in paper form should be sent to:

Energy Consents Unit
5 Atlantic Quay
150 Broomielaw
Glasgow
G2 8LU

The following questions were asked in the relevant sections of the report:

- *Do consultees have any comments in relation to public consultation?*
- *Do consultees have any comments in relation to the approach to the Environmental Impact Assessment?*
- *Consultees are asked for comments to the suggested LVIA viewpoint locations detailed in Appendix 9.1 and in Figure 4a, 4b and 4c. It is suggested that a total of 20 viewpoints maximum are taken forward to the EIA.*
- *Do consultees have comment on the acceptability of the proposed RVAA study area of 2km and the general methodology outlined in Section 9.5?*
- *Do consultees have comments on the approach to the sequential LVIA assessment?*
- *Could consultees confirm if the list of cumulative sites included in Table 9.1 is correct and if there are any additions or amendments required?*
- *Do consultees have comments regarding the LVIA cumulative baseline?*
- *Do consultees have comment regarding a reasonable end date of three months prior to the submission of the LVIA and CLVIA after which point any additional sites will not be assessed with the application?*
- *In relation to ornithology, is the proposed scope and extent of the available and proposed baseline data considered to be sufficient to inform a reliable assessment of the potential effects of the proposed development?*
- *Do the consultees agree with the list of key potential ornithological receptors for the EIA and with the issues to be scoped out of the assessment?*
- *Do consultees have any comment with regard to the proposed baseline non-avian ecology survey programme?*
- *Do consultees have any comments regarding the ecology assessment concentrating on those receptors which may be subject to significant effects from the proposed development (either directly or indirectly)?*
- *A preliminary list of potential cultural heritage viewpoints is requested from HES and DGC for consideration and agreement. Please could this be provided?*
- *Could the consultees confirm that the proposed traffic and transport methodology is acceptable?*
- *Could the consultees confirm that the methods proposed for obtaining traffic flow data are acceptable?*
- *Could the consultees confirm that the use of Low National Road Traffic Forecast (NRTF) is acceptable?*
- *Could the consultees confirm what developments should be included as committed developments within the baseline traffic flows in the traffic and transport assessment, noting that these should have planning consent at the time of scoping?*
- *Could the consultees confirm details of any upgrades or network changes that may be undertaken to the traffic and transport study area network within the next five years?*

21. Figure List

- Figure 1 – Site Layout
- Figure 2 – Regional Context
- Figure 3 – Site Constraints
- Figure 4a – ZTV
- Figure 4b – Landscape Character and ZTV
- Figure 4c – Landscape Designations and Classifications and ZTV
- Figure 5 – Ornithological Survey Areas
- Figure 6 – Vantage Point Locations and Viewsheds

Appendices

Appendix 9.1: LVIA Viewpoints

Table A10.1: Viewpoint Locations

VP No.	Location	Easting	Northing	Receptor			
				Landscape Character Type (LCT) / Landscape Designation	Visual Receptor	Wireline	Photomontage
1	Southern Upland Way at Benbrack (Striding Arch)	267995	596980	LCT 178: Southern Uplands with Forest – Dumfries & Galloway	Walkers	•	•
2	Auchengibbert Hill	280605	594418	LCT 175: Foothills – Dumfries & Galloway Thornhill Uplands Regional Scenic Area (RSA)	Walkers	•	•
3	Southern Upland Way at Correglass	263707	586085	LCT 176: Foothills with Forest – Dumfries & Galloway Galloway Hill RSA	Walkers	•	•
4	Moniaive	277750	590259	LCT 166: Upland Glens – Dumfries & Galloway Thornhill Uplands RSA	Residential	•	•
5	A702 Road	274539	587335	LCT 166: Upland Glens – Dumfries & Galloway Thornhill Uplands RSA	Road users	•	
6	Minor road east of Loch Urr	277458	584536	LCT 175: Foothills – Dumfries & Galloway	Road users	•	
7	Minor road north east of Moniaive	278921	591642	LCT 175: Foothills – Dumfries & Galloway Thornhill Uplands RSA	Road users	•	
8	Southern Upland Way at Waterside	260745	582040	LCT 165: Upper Dale – Dumfries & Galloway Galloway Hills RSA	Walkers	•	•
9	A702, east of St John's Town of Dalry	263462	581290	LCT 164: Flooded Valley	Road users	•	•
10	Cemetery north of New Galloway	263175	578553	LCT 164: Flooded Valley Galloway Hills RSA	Visitors	•	

VP No.	Location	Easting	Northing	Receptor			
				Landscape Character Type (LCT) / Landscape Designation	Visual Receptor	Wireline	Photomontage
11	Balmaclellan War Memorial	265490	579149	LCT 164: Flooded Valley Galloway Hills RSA	Visitors	•	•
12	A712 Blackcraig entrance	269725	579368	LCT 176: Foothills with Forest – Dumfries & Galloway	Road users	•	
13	Dunscore	286706	584387	LCT 161: Pastoral Valley – Dumfries & Galloway	Residential	•	•
14	Bishop Forest Hill	284930	579647	LCT 175: Foothills – Dumfries & Galloway Terreglas Ridge RSA	Walkers	•	
15	Merrick	242776	585557	LCT 180: Rugged Uplands – Dumfries & Galloway Galloway Hills RSA	Walkers	•	•
16	A712 near Auchenvy junction	273555	577340	LCT 172: Upland Fringe – Dumfries & Galloway	Road users	•	•
17	Corsock Church	276170	575988	LCT 160: Narrow Wooded River Valley – Dumfries & Galloway	Visitors	•	•
18	A762 / Red Kite Trail at west bank of Loch Ken	264565	574189	LCT 164: Flooded Valley	Road users / Visitors	•	•
19	Cairsmore of Fleet	250161	567087	LCT 179: Coastal Uplands Galloway Hills RSA	Walkers	•	
20	Neilson's Monument at Barstobrick	268780	560700	LCT 169: Drumlin Pastures	Visitors	•	

Appendix 12.1 Hydrology, Geology and Hydrogeology

Table A12.1: PWS Locations

PWS Name	PWS Class	Number of properties served	Inside development boundary?
Glaisters Corsock (PWS)	Type A1	4	No
Nether Glaisters (PWS)	Type B	1	No
Craigenputtock (PWS)	Type B	1	Yes
Craigenvey (PWS)	Type B	1	Yes
Slongaber (PWS)	Type B	1	No
Muil Farm (PWS)	Type B	1	No
Lochenkit (PWS)	Type A1	2	No
Auchenhay Corsock (PWS)	Type B	1	No
Upper Barr (PWS)	Type B	1	No
Shalloch (PWS)	Type B	1	No
Nether Monybuie (PWS)	Type B	1	No
Drumwhirn (PWS)	Type B	1	No
Knocklearn (PWS)	Type B	1	No
Crogo Mill (PWS)	Type B	1	No
Netherbar Croft (PWS)	Type B	1	No
Waterhead Farmhouse (PWS)	Type B	1	No
Locherben (PWS)	Type B	1	Yes
Lochurr (PWS)	Type B	1	Yes
High Glencrosh (PWS)	Type B	1	No
Two Merkland Mill (PWS)	Type B	1	No
Gateside (PWS)	Type B	1	No
Auchencheyne (PWS)	A1	5	No
Craigneston (PWS)	Type B	1	No
Castlefairn (PWS)	Type B	1	No
Craigmue (PWS)	Type B	1	No

PWS Name	PWS Class	Number of properties served	Inside development boundary?
Beech Drive Craigmuirie (PWS)	Type B	4	No
Dalmacallan (PWS)	Type B	1	No
Bogrie (PWS)	Type B	1	No
Shank (PWS)	Type B	1	No
Fraserford Cottage (PWS)	Type B	1	No
Fraserford (PWS)	Type B	1	No
Whiteside (PWS)	Type B	1	No
Whiteside Cottage (PWS)	Type B	1	No
Whiteside House (PWS)	Type B	1	No

Appendix 14.1 Cultural heritage

Table A14.1: Criteria for Establishing Relative Importance of Heritage Assets	
Importance	Receptors
International and National	World Heritage Sites; Scheduled Monuments (actual and potential); Category A Listed Buildings; Inventory Gardens and Designed Landscapes; Inventory Battlefields; and/or Fine, little-altered, and therefore outstanding, examples of some particular period, style or type.
Regional	Category B Listed Buildings; Conservation Areas; Major examples of some period, style or type, which may have been altered; or Assets of a type which would normally be considered of national importance that have been partially damaged (such that 'their inherent capability or potential to make a significant addition to the understanding or appreciation of the past' has been diminished).
Local	Category C Listed Buildings; Representative examples of any period, style or type, as originally constructed or altered, and simple, traditional sites, which group well with other significant remains, or are part of a planned group such as an estate or an industrial complex; and/or Assets of a type which would normally be considered of regional importance that have been partially damaged or assets of a type which would normally be considered of national importance that have been largely damaged (such that their inherent capability or potential to make a contribution to the understanding or appreciation of the past has been diminished).
Negligible	Relatively numerous types of remains; and/or findspots of artefacts that have no definite archaeological remains known in their context; and/or Assets of a type which would normally be considered of local importance that have been largely damaged (such that their inherent capability or potential to make a contribution to the understanding or appreciation of the past has been diminished).

Table A14.2: Criteria for Classifying Magnitude of Direct Impact	
Physical Impact	Criteria
Substantial	Major loss of information content resulting from total or large-scale removal of deposits from an asset Major alteration of an asset's baseline condition
Moderate	Moderate loss of information content resulting from material alteration of the baseline conditions by removal of part of an asset Moderate alteration of an asset's baseline condition.
Slight	Minor detectable impacts leading to the loss of information content. Minor alterations to the baseline condition of an asset

Physical Impact	Criteria
Negligible	Barely measurable loss of information content. Loss of a small percentage of the area of an asset's peripheral deposits. Very slight and reversible alterations to an asset
None	No physical impact anticipated

Magnitude of Impact	Importance of Asset			
	Negligible	Local (Low Sensitivity)	Regional (Medium Sensitivity)	National/International (High Sensitivity)
Substantial	Minor-Moderate	Moderate	Moderate-Major	Major
Moderate	Minor	Minor-Moderate	Moderate	Moderate-Major
Slight	Negligible	Minor	Minor-Moderate	Moderate
Negligible	Negligible	Negligible	Minor	Minor-Moderate
None	None	None	None	None

Relative Sensitivity	Criteria
High	An asset whose setting contributes significantly to an observer's understanding, appreciation and experience of it should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets whose settings, or elements thereof, contribute directly to their cultural value (e.g. form part of their Contextual Characteristics (HES, 2019b, Annex 1). For example, an asset which retains an overtly intended relationship with its setting and the surrounding landscape. These may in particular be assets such as ritual monuments which have constructed sightlines to and/or from them or structures intended to be visually dominant within a wide landscape area e.g. castles, tower houses, prominent forts etc.; and/or An asset, the current understanding, appreciation and experience of which, relies heavily on its modern setting. In particular an asset whose setting is an important factor in its protection and in retention of its cultural value (as per SPP 2014 definition of setting).
Medium	An asset whose setting contributes moderately to an observer's understanding, appreciation and experience of it should be thought of as having Medium Sensitivity to changes to its setting. This could be an asset for which setting makes a contribution to value but whereby its value is derived mainly from its other characteristics. ⁶⁸ This could for example include assets which had an overtly intended relationship with their setting and the surrounding landscape but where that relationship

Table A14.4 – Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting	
Relative Sensitivity	Criteria
	<p>(and therefore the ability of the assets’ surroundings to contribute to an understanding, appreciation and experience of them) has been moderately compromised either by previous modern intrusion in their setting or the landscape or where the asset itself is in such a state of disrepair that the relationship cannot be fully determined;</p> <p>An asset for which the current understanding, appreciation and experience of it relies partially on its modern setting regardless of whether or not this was intended by the original constructors or users of the asset; and/or</p> <p>An asset whose setting is a contributing factor to its protection and the retention of its cultural value.</p>
Low	<p>An asset whose setting makes some contribution to an observer’s understanding, appreciation and experience of it should generally be thought of as having Low Sensitivity to changes to its setting. This may be an asset whose value is mainly derived from its other characteristics and whereby changes to its setting will not materially diminish our understanding, appreciation and experience of it. This could for example include assets which had an overtly intended relationship with their setting and the surrounding landscape but where that relationship (and therefore the ability of the assets’ surroundings to contribute to an understanding, appreciation and experience of them) has been significantly compromised either by previous modern intrusion to its setting or the landscape or where the asset itself is in such a state of disrepair that the relationship cannot be determined.</p>
Marginal	<p>An asset whose setting makes minimal contribution to an observer’s understanding, appreciation and experience of it should generally be thought of as having Marginal Sensitivity to changes to its setting. This may include assets for which the original relationship with their surrounding has been lost, possibly having been compromised by previous modern intrusion, but who still retain cultural value in their intrinsic and possibly wider contextual characteristics.</p>

Site Details	Importance of Detail for Assessing Magnitude of Setting Impact
Proximity to the site (for this assessment this is measured to the nearest proposed turbine)	Increasing distance of an asset from the site will, in most cases, diminish the effects on its setting.
Visibility of Proposed Varied Development	The proportion of the view from each asset which will feature the Proposed Varied Development will also affect the magnitude of impact. The existence of features (e.g. tree belts, forestry, landscaping or built features) that could partially or wholly obscure the development from view will also affect the magnitude of impact.
Complexity of landscape	The more visually complex a landscape is, the less prominent the Proposed Varied Development may appear within it. This is because where a landscape is visually complex the eye can be distracted by other features and will not focus exclusively on the new development. Visual complexity describes the presence, extent, character and scale of the existing built environment ⁶⁹ and the extent to which there are various land types, land uses, and built features producing variety in the landscape and how the Proposal compares to and fits in with this.
Design of Development	This refers to the perceived scale of the proposed change relative to the scale of the historic asset or place and its setting. Depending on the individual asset, the design of the Proposed Varied Development could affect the perception of dominance or foci of a particular asset and its relationship with other cultural and natural features within the landscape (SNH 2012). For example, whether the development would be seen against the skyline or against a backdrop of hills may affect the perception of the prominence of an asset and/or the Proposed Varied Development.

Magnitude of setting impact	Criteria
Substantial	Direct and substantial visual impact on a key sightline to or from an asset; Direct and substantial visual impact on a key 'designed-in' view or vista from an asset Direct severance of the relationship between an asset and its setting An impact that changes the setting of an asset such that it affects the integrity of its setting (SPP 2014) and materially affects an observer's ability to understand, appreciate and experience the asset'
Moderate	Oblique visual impact on an axis adjacent to a key sightline to or from an asset, but where the key sightline of the asset is not obscured; Oblique visual impact on a key 'designed-in' view or vista from a Designed Landscape or building Partial severance of the relationship between an asset and its setting; Notable alteration to the setting of an asset beyond those elements of the setting which directly contribute to the understanding of the cultural value of the asset;

Table: A14.6: Criteria for Assessing Magnitude of Settings Impact	
Magnitude of setting impact	Criteria
	An impact that changes the setting of an asset such that the understanding of the asset and its cultural value is marginally diminished.
Slight	Peripheral visual impact on a key sightline to or from an asset; Slight alteration to the setting of an asset beyond those elements of the setting which directly contribute to the understanding of the cultural value of the asset; An impact that changes the setting of an asset, but where those changes do not materially affect an observer's ability to understand, appreciate and experience the asset.
Negligible	All other setting impacts.
None	No setting impacts anticipated.

Table A14.7: Level of Direct Effects based on Inter-Relationship between the Importance of a Heritage Asset and the Magnitude of Impact				
Magnitude of Impact	Importance of Asset			
	Negligible	Local (Low Sensitivity)	Regional (Medium Sensitivity)	National/International (High Sensitivity)
Substantial	Minor-Moderate	Moderate	Moderate-Major	Major
Moderate	Minor	Minor-Moderate	Moderate	Moderate-Major
Slight	Negligible	Minor	Minor-Moderate	Moderate
Negligible	Negligible	Negligible	Minor	Minor-Moderate
None	None	None	None	None

