

Shepherds' Rig Wind Farm

Updated Scoping Report

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Applicant

INFINERGY

Co-ordinating consultant



Contributing consultants



BiGGAR Economics

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INTRODUCTION

Purpose of the Updated Scoping Report

- 1.1. This report constitutes the request for a Revised Environmental Impact Assessment (EIA) Scoping Opinion for a proposed wind farm (the Development) on land at Shepherds' Rig (the Site) approximately 5 kilometres (km) east of Carsphairn, Dumfries and Galloway. The Site encompasses an area of approximately 810 hectares (ha) within an upland rural area which includes forestry plantations. The Site location is shown in Figure 1, Appendix A. This Updated Scoping Report has been prepared by Arcus Consultancy Services Ltd (Arcus) on behalf of Infinergy Ltd (the Applicant).

Project History

- 1.2. The original Scoping Report for the Development was prepared in April 2013. This included a layout of up to 45 turbines with a tip height of 149.5 metres (m). A Scoping Opinion was received from the Energy Consents Unit in July 2013 (included as Appendix B). A range of initial baseline surveys were undertaken during and after the original scoping exercise as part of the EIA. These included:
- Ornithological surveys between October 2012 and August 2013;
 - Ecological surveys involving an extended phase 1 habitat survey and protected species surveys in September 2013;
 - Cultural heritage desk based assessment and supplementary site visit;
 - Peat depth surveys across the Site undertaken in October 2013;
 - Hydrological site visits and baseline work;
 - Baseline noise surveys between November 2013 and January 2014;
 - Strategic access and transport baseline studies in November 2013; and
 - Aviation baseline analysis and modelling in December 2013.
- 1.3. As part of the application process, a series of community open days were held in July 2013 allowing the community to find out more about the Development and provide comment on the proposals. Constraint analysis and layout design work also continued during 2014 to ensure that a scheme that was both environmentally sensitive and economically viable could be designed for the Site.
- 1.4. In 2015, assessment and design work on the project was put on hold due to the uncertainty associated with the United Kingdom (UK) Government's proposed changes to the funding arrangements for onshore wind.
- 1.5. In April 2017, following consideration of the economic viability of the Development in a post-subsidy environment, further ornithological

survey work commenced and is due to continue until the end of March 2018.

Progression of the Application

- 1.6. Now that the Applicant has confirmed the viability of the Development they can confirm their intention to apply to the Scottish Government for consent under Section 36 of the Electricity Act 1989¹ for the construction and operation of a wind farm on the Site. In the interests of being a responsible developer, this Updated Scoping Report has been prepared to reflect the current situation, taking account of previous surveys and consultation efforts.
- 1.7. The aim of the scoping process is to confirm the key environmental issues following the pause in the EIA process, to help determine which elements of the Development are likely to cause significant environmental effects and identify issues that can be scoped out of the assessment. This Updated Scoping Report has been prepared with a view to providing structure for re-consultation on the approach to EIA and the further work required for preparation of the EIA Report. Comments are therefore welcomed from consultees on the relevance of work undertaken to date, the topics to be scoped into the EIA and the proposed assessment methodologies.
- 1.8. This report forms the Applicant's written request to the Scottish Government, under Regulation 12 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017² as amended (the EIA Regulations), for its opinion as to the information to be provided in the EIA Report (a Scoping Opinion) for the development of the Site.

The Applicant

- 1.9. Infinergy is a renewable energy developer with a strong focus on onshore wind development. Infinergy possesses in-house expertise along with the experience needed to design, develop, build and operate wind energy schemes.
- 1.10. Infinergy believes wind energy has an important role to play in reducing the combined threats of decreasing energy security, climate change and energy poverty, all of which have been identified by successive governments as key issues facing the energy supply of the UK. The Scottish Government has set a target of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources by 2030³.

¹ The Electricity Act 1989. Available at:

https://www.legislation.gov.uk/ukpga/1989/29/pdfs/ukpga_19890029_en.pdf [Accessed 25/01/2018]

² The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <http://www.legislation.gov.uk/ssi/2017/101/contents/made> [Accessed 25/01/2018]

³ Scottish Government (2017). Scottish Energy Strategy: The future of energy in Scotland. Available at: <http://www.gov.scot/Resource/0052/00529523.pdf> [Accessed 01/03/2018]

- 1.11. When developing a wind energy scheme, Infinergy aims to put the right sized wind farm in the right place, whilst in close consultation with statutory consultees and local communities. This approach allows Infinergy to consistently design wind developments that are sympathetic to local landscapes, while maximising operational efficiency and hence energy output. Infinergy currently have a wind farm project portfolio of over 500 megawatts (MW).
- 1.12. Infinergy is a member of the trade organisations Scottish Renewables and Renewable UK. For more information please visit <http://www.infinergy.co.uk>.

ENVIRONMENTAL IMPACT ASSESSMENT

- 2.1. EIA is a legal requirement for certain types of development. In assessing the EIA requirement for wind turbine developments over 50 MW, the decision on whether or not an EIA is required is delegated to Scottish Ministers. Given that prior to the Development being put on hold, it was considered that it was an EIA development, it is assumed that this remains the case and a screening request has not been obtained.

EIA Process

- 2.2. The EIA is an iterative process of assessment and design, whereby prediction and assessment of effects will inform the eventual design of the Development. The Development can then be refined in order to avoid or reduce potential environmental effects where necessary.
- 2.3. The EIA Report, which reports the findings of the EIA as set out in the EIA Regulations, is required to "*describe the likely significant effects*" of a development; effects that are not considered significant do not need to be described to meet the requirements of the EIA Regulations.
- 2.4. The EIA Regulations implement European Union (EU) Directive 2014/52/EU⁴ which amended Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, insofar as it relates to applications for consent to construct, extend or operate a power station or install or keep installed overhead electricity lines under Sections 36 and 37 of the Electricity Act 1989¹. EIA is a process which identifies the potential environmental effects of a development and then seeks to avoid, reduce or offset any adverse effects through 'mitigation measures'. EIA follows a series of stages:
- Site selection and feasibility;
 - Screening - is an EIA required;
 - Pre-application consultation and scoping;
 - Baseline studies to establish the current environmental conditions at the Site;
 - Identification of potential environmental effects;
 - Mitigation to avoid or reduce the effects through iterative design process;
 - Assessment of residual effects;
 - Preparation of an EIA Report;
 - Submission of the EIA Report;
 - Consideration of application and environmental information by the Scottish Government, Dumfries and Galloway Council (the Council) and other consultees;

⁴ DIRECTIVE 2014/52/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN> [Accessed 01/03/2018]

- Determination of application (with or without conditions); and, if approved
 - Implementation and monitoring.
- 2.5. EIA is an iterative process of assessment and design, during which prediction and assessment of potential effects will inform the evolving design of the Development. Consultation, a vital component of the EIA process, continues throughout each stage and contributes both to the identification of potential effects and mitigation measures.

Assessment Methodology

- 2.6. In order to assess the potential effects arising from the Development, the significance of such effects will be determined. The determination of significance relates to the sensitivity of the resource or receptor being affected and the magnitude of change as a result of the impact. The assessment of effects will combine professional judgement together with consideration of the following.
- The sensitivity of the resource or receptor under construction;
 - The magnitude of potential impact in relation to the degree of change which occurs as a result of the Development;
 - The type of effect, i.e. adverse, beneficial, neutral or uncertain;
 - The probability of the effect occurring, i.e. certain, likely or unlikely; and
 - Whether the effect is temporary, permanent and/or reversible.
- 2.7. A generalised methodology for assessing significant effects is detailed below; however, each individual technical area will have a specific assessment methodology which may vary from that detailed in the following subsections.

Sensitivity of Receptors

- 2.8. The sensitivity of the receptors, including the importance of environmental features on or near to the Site of the sensitivity of potentially affected receptors, will be assessed in line with the best practice, legislation or statutory designations and/or judgement.
- 2.9. Table 2.1 details a framework for determining the sensitivity of receptors. Each technical assessment will specify their own criteria that will be applied during the EIA and details will be provided in the relevant EIA Report chapter.

Table 2.1: Framework for Determining Sensitivity of Receptors

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

Magnitude of Impact

- 2.10. The magnitude of potential impacts will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an impact and professional judgement, best practice guidance and legislation.
- 2.11. General criteria for assessing the magnitude of an impact are presented in Table 2.2. Each technical assessment will apply their own appropriate criteria during the EIA, with the details provided in the relevant EIA Report chapter.

Table 2.2: Framework for Determining Magnitude of Effects

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

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

Significance of Effect

- 2.13. The sensitivity of the asset and magnitude of the predicted impacts will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 2.3 summarises guideline criteria for assessing the significance of effects.

Table 2.3: Framework for Assessment of the Significance of Effects

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

- 2.14. Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the above table.
- 2.15. Zero magnitude impacts upon a receptor will result in no effect, regardless of sensitivity.

Mitigation & Enhancement

- 2.16. Where the EIA identifies likely significant adverse effects, mitigation measures will be proposed in order to avoid, reduce, offset or compensate those effects. These mitigation measures may be embedded in the design or compensatory. Such embedded mitigation measures will likely include the movement or loss of turbines, access tracks and other infrastructure; and management and operational measures.
- 2.17. In line with the mitigation hierarchy identified in Planning Advice Note (PAN) 1/2013, Revision 1.0 (2017)⁵, the strategy of avoidance, reduction, offsetting and compensation seeks:
- First to avoid significant adverse effects;
 - Then to minimise those which remain; and
 - Lastly, where no other remediation measures are possible, to propose appropriate compensation.
- 2.18. In addition, enhancement measures may be incorporated into design of the Development to maximise environmental benefits.

⁵ The Scottish Government (2017). PAN 1/2013 Revision 1.0 Environmental Impact Assessment. Available at: <http://www.gov.scot/Resource/0052/00521028.pdf> [Accessed 01/03/2018]

Residual Effects

- 2.19. Taking a cognisance of the suggested mitigation (and enhancement) measures, the predicted effects will be re-assessed to determine the residual effects.

Cumulative Effects

- 2.20. At the time of writing it is known that there are other operational wind farms and a number of wind energy proposals located in the vicinity of the Site. Known wind farm developments are shown on Figure 2, Appendix A. The methodology adopted for assessing the cumulative effects of wind energy developments will be in accordance with advice from SNH^{6,7}. Cumulative effects will be considered for each technical area assessed within the EIA and include two forms:
- Combined effects of two or more similar developments; and
 - Combined effects within the Development.
- 2.21. The cumulative assessment will include descriptions of the effects in relation to proposed and upgraded transmission lines in the vicinity of the Development.
- 2.22. The extent of the cumulative assessment relative to each technical assessment will be agreed during the consultation process. For example, the potential landscape and visual effects, which relate to the visibility of the Development, will be much more wide ranging than noise effects, which will be limited to receptors in the more immediate vicinity of the Development. Specific guidance and policy exist for certain technical areas which advise how effects should be considered cumulatively and these will be used where relevant.

Alternatives

- 2.23. Schedule 4, Part 2 of the EIA Regulations 2017 requires a description of the reasonable alternatives (such as project design, technology, location, size and scale) studied by the developer, which are relevant to the Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of environmental effects. Consideration of alternative designs has already begun. The final layout of the Development will be based on a range of technical criteria, such as separation distances between turbines, wind speed, prevailing wind direction, existing infrastructure, topography, ground conditions, local environmental issues and landscape and visual considerations. The identification of these criteria is an iterative process: as they are identified the layout of the Development, including ancillary infrastructure, will undergo a series of modifications to avoid or reduce

⁶ SNH, 2005, *Cumulative effect of Windfarms (Version 2)* [Online] Available at:

<http://www.snh.org.uk/pdfs/strategy/cumulativeeffectsonwindfarms.pdf> [Accessed 02/02/2018]

⁷ SNH, 2012, *Assessing the Cumulative Impact of Onshore Renewable Energy Developments* Available at: <http://www.snh.gov.uk/docs/A675503.pdf> [Accessed 02/02/2018]

potential effects through careful design. This process will be set out in the EIA Report.

Structure and Content of the EIA Report

- 2.24. The content of the EIA Report will broadly follow the specifications detailed within Schedule 4 of the EIA Regulations. The EIA Report will consist of three volumes and a Non-Technical Summary (NTS).
- Volume 1 – Main EIA Report text;
 - Volume 2 – Figures; and
 - Volume 3 – Technical Appendices.
- 2.25. The front end of the main EIA Report text will include:
- An introduction;
 - Description of the site and its surroundings;
 - Details of alternative considered and scheme evolution;
 - Description of the Development;
 - Details of the EIA process and methodology, including a summary of consultation; and
 - Policy context.
- 2.26. The technical chapters of the EIA Report will present details of the assessments undertaken, including any cumulative effects, required mitigation and residual effects.

PROJECT DESCRIPTION

- 3.1. The Development will consist of:
- Wind turbines and turbine foundations;
 - Access tracks and crane pads;
 - On site power collection system (transformers and underground cables);
 - Substation compound including a battery energy storage array;
 - Construction compound;
 - Borrow Pit workings; and
 - Permanent meteorological mast.

Turbines

- 3.2. The proposed details are as follows:
- Number of turbines – up to 30;
 - Maximum height to blade tip – 149.5 m;
 - Maximum generating capacity (per turbine) – 3 - 4 MW; and
 - Total generation capacity – over 50 MW.
- 3.3. An indicative turbine layout is shown in Figure 3, Appendix A. This layout has been developed with due consideration to known constraints e.g. topography, watercourses, cultural heritage features, peat depth, and proximity to dwellings.
- 3.4. For the purposes of the EIA, a precautionary approach will be taken and the largest prospective turbine will be assessed as the selected option. The worst case scenario will be evaluated for each topic, for example the maximum tip height and rotor diameter for landscape and visual and the maximum rotor diameter and a lower feasible hub height for ornithology.

Access Tracks

- 3.5. The turbine components would be delivered to the Site using the existing road network. The use of public roads will require further consultation with the appropriate bodies.
- 3.6. Previous site visits and route modelling and inspection suggests that turbine components could be delivered to site from the Port of Ayr via the A77, A713 and then via the western end of the B729 where access would be taken from. However, a detailed further abnormal loads assessment will be undertaken to determine the most suitable route of turbine delivery to the site. The traffic assessment would determine any requirements for upgrading of junctions or minor roads and would include swept path analysis.

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- 3.7. Existing forestry access tracks on Site will be used as far as possible to provide access to the turbines, construction compound, substation and meteorological mast. Where required, tracks will be upgraded and new tracks will be constructed of a graded stone and be up to 6 m in width.
- 3.8. An access and traffic assessment will be conducted as outlined in Chapter 14 of this scoping report.

Construction of the Development

- 3.9. The construction phase of the Development will comprise on-site site preparation and construction activities, supported by deliveries of materials, components and staff to the Site.
- 3.10. Construction is expected to take approximately 18 to 24 months, depending on weather and ground conditions, as well as other technical and environmental factors and is likely to consist of the following principal operations:
- Forestry activities;
 - Extraction of stone from onsite borrow pits;
 - Construction and upgrading of site tracks including water crossings/culverts;
 - Construction of a temporary construction compound and office facilities;
 - Construction of the substation buildings/compounds;
 - Construction of turbine foundations;
 - Construction of crane hardstanding areas;
 - Excavation of cable trenches and cable laying adjacent to the site tracks;
 - Installation of temporary and permanent drainage;
 - Erection and commissioning of wind turbines; and
 - Reinstatement of borrow pits and temporary construction compounds.

Grid Connection

- 3.11. Underground cabling, laid where possible alongside the access tracks, will link the turbine transformers to a single storey control building. Each turbine transformer will be located either within the turbine nacelle, within the base of the tower or in a small enclosure at the base of the turbine.
- 3.12. The connection to the grid falls under a separate consent process and will be subject to a separate application. As such it will not be considered as part of this EIA. However, a high level desk based environmental review of the likely connection route will be included as an appendix to the EIA Report.

Decommissioning

- 3.13. The Development will be designed to operate for a period of 25 years. Provision will be made for the Development to be decommissioned and the site restored at the expiry of consent. Typically all above ground infrastructure will be dismantled and removed from the site, cables and turbine foundations will be cut 1 m below ground level and covered with topsoil. Alternatively, the Applicant may apply for consent to extend the operational life of the Development in accordance with the relevant legislation at the time of any such application.

SITE SELECTION AND DESIGN EVOLUTION

- 4.1. The Applicant has identified the Site through an iterative site selection process seeking to avoid areas of high environmental sensitivity whilst choosing sites which are technically and economically viable. In doing so the following criteria have been used:
- No international or national landscape designations within the Site;
 - No European Protected Species listed on Annex 1 of European Council Directive 2009/147/EC⁸ on the conservation of wild birds or species listed in Schedule 1 to the Wildlife and Countryside Act 1981⁹, as amended, located within the turbine envelope area;
 - An assessment of known ecological/ ornithological constraints within the vicinity of the Site;
 - Located more than 2 km from densely populated settlements;
 - Exposed location with good wind speeds;
 - Close proximity to a potential grid connection point;
 - Land area available to accommodate sufficient and viable generating capacity;
 - Availability of a good access route options to the site involving minimal environmental disruption; and
 - No, or potentially resolvable, civil and military radar issues.
- 4.2. The purpose of a wind farm is to harness energy from the wind. It is important that wind turbines are sited in the optimum position to maximise the wind yield whilst minimising environmental effects.
- 4.3. The optimum layout of a wind farm depends on a range of criteria. These vary depending on the type and size of turbine as well as the local topography and the turbulence created by the ground conditions within and around the Site. Turbine manufacturers recommend that the turbines be spaced between four and five rotor diameters apart depending on the prevailing wind direction, turbine type and site characteristics. The available capacity of the electricity grid into which a wind farm will connect can also limit its size.
- 4.4. Throughout the remainder of the EIA process, the layout will further evolve to take into consideration the results of additional surveys and data gathered through the assessment process. This iterative design process ensures that the final layout of the wind farm submitted responds to the constraints identified onsite. The iterative design process and the reasoning behind the key changes will be reported in the EIA Report.

⁸ DIRECTIVE 2009/147/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 30 November 2009. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0147&from=EN> [Accessed 01/03/2018]

⁹ The Wildlife and Countryside Act 1981. Available at: https://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf [Accessed 01/03/2018]

PLANNING AND ENERGY POLICY

- 5.1. The Planning and Energy Policy Chapter of the EIA Report will consider the Development in the context of adopted and emerging planning and energy related documents. The EIA Report Chapter will not undertake a detailed assessment of the Development against relevant planning policies and other material considerations, rather it will identify those documents considered to be material to determination of the application, identifying and briefly discussing individual plans, policies, aims and objectives considered to be particularly pertinent to the Development.
- 5.2. The application will be accompanied by a Planning Statement in support of the Development. The Planning Statement will draw upon the contents of the Planning and Energy Policy Chapter and consider the Development against identified planning and other policy objectives, concluding with substantiated comments about the extent to which the Development complies with the aims and objectives of identified plans and policies.
- 5.3. For clarity, the Planning Statement will draw upon the residual effects, post mitigation, of the Development identified in the various technical chapters of the EIA Report, in discussing the extent to which it complies with the aims and objectives of identified planning, energy and other relevant policy objectives. The purpose of this Chapter of the Scoping Report is to establish agreement on the planning and energy related documents that should be considered by the Applicant in the EIA.

National Planning Policy

National Planning Framework 3¹⁰

- 5.4. The Third National Planning Framework (NPF3) for Scotland sets the overall context for development planning across the country and provides a framework for the spatial development of Scotland as a whole. NPF3 was introduced in June 2014 and represents an up to date expression of Scottish Government policy on land use matters. NPF3 sets out the Scottish Government's development priorities over the next 20 to 30 years and identifies national developments which support the development strategy. NPF3 is a material consideration in the determination of applications submitted under Section 36 of the Electricity Act 1989¹ (Section 36 applications).
- 5.5. The Planning and Energy Policy Chapter will identify those elements of NPF3 considered relevant to determination of the Development. While Section 3 of NPF3 'A low carbon place' is likely to contain material of most relevance to the Development, other sections of NPF3, notably Section 2 'A successful, sustainable place' and Section 4 'A natural, resilient place' will also contain relevant commentary and the Planning and Energy Policy Chapter will identify and discuss these matters.

¹⁰ National Planning Framework 3 (2014). Available at:
<http://www.gov.scot/Resource/0045/00453683.pdf> [Accessed 01/03/2018]

Scottish Planning Policy¹¹

- 5.6. The most up to date version of Scottish Planning Policy (SPP) was introduced by the Scottish Government in June 2014 alongside NPF3. SPP states that its purpose *"is to set out national planning policies which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land"*. As a statement of Scottish Ministers' priorities, the content of SPP is a material consideration that carries significant weight in the assessment of Section 36 applications, although SPP makes it clear that it is for the decision maker to determine the appropriate weight in each case.
- 5.7. The subject policies contained in SPP mirrors the structure of the NPF3 and are set out under the following headings:
- A Successful, Sustainable Place;
 - A Low Carbon Place;
 - A Natural, Resilient Place; and
 - A Connected Place.
- 5.8. The narrative and policies under the 'Low Carbon Place' heading are likely to be of most relevance to the Development, as this section contains commentary relating to renewable energy matters in general and in relation to onshore wind in particular. Table 1 of SPP 'Spatial Frameworks' shows areas where wind farms will not be acceptable (Group 1), areas of significant protection (Group 2) and areas with potential for wind farm development (Group 3). As far as it is possible to tell from the scale of the Wind Energy Interim Spatial Framework Maps (2014) on the Council's website, the Site is located partly within a Group 3 area.
- 5.9. The Planning and Energy Policy Chapter will consider the Development in the context of the Spatial Framework and other relevant commentary in SPP, including aims and objectives regarding the creation of a low carbon economy, the presumption in favour of development that creates sustainable development and other relevant matters relating to rural and island development.

Onshore Wind Turbines, Online Renewables Planning Advice (May 2014)¹²

- 5.10. The Scottish Government introduced online renewables advice in February 2011, which has been regularly updated since then. The most recent specific advice note regarding onshore wind turbines was published in May 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines, including landscape impact, impacts on wildlife and ecology, shadow

¹¹ Scottish Planning Policy (2014). Available at: <http://www.gov.scot/Resource/0045/00453827.pdf> [Accessed 01/03/2018]

¹² Scottish Government (2014). Onshore Wind Turbines, Online Renewables Planning Advice. Available at: <http://www.gov.scot/Resource/0045/00451413.pdf> [Accessed 01/03/2017]

flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.

- 5.11. The Planning and Energy Policy Chapter will consider the most up to date version of the advice note in place at the time of preparation.

*Planning Advice Notes*¹³

- 5.12. Alongside NPF3 and SPP, the Scottish Government provides technical advice on specific land use planning matters through a series of Planning Advice Notes (PANs). A number of PANs are potentially relevant to the Development and these would be briefly discussed in the Planning and Energy Policy Chapter, with more detailed commentary reserved for the relevant technical chapters. At this stage, it is envisaged that the following PANs may be of relevance:

- PAN 1/2011: Planning and Noise (2011);
- PAN 1/2013: Environmental Impact Assessment, Revision 1.0 (2017);
- PAN 2/2011: Planning and Archaeology (2011);
- PAN 3/2010: Planning Advice on Community Engagement (2010);
- PAN 51: Planning, Environmental Protection and Regulation (2006);
- PAN 60: Planning for Natural Heritage (2000);
- PAN 61: Planning and Sustainable Urban Drainage Systems (2001);
- PAN 68: Design Statements (2003);
- PAN 69: Planning and Building Standards Advice on Flooding (2004);
- PAN 75: Planning for Transport (2005); and
- PAN 79: Water and Drainage (2006).

*Historic Environment Scotland Policy Statement (June 2016)*¹⁴

- 5.13. The Historic Environment Scotland (HES) Policy Statement sets out Scottish Ministers' policies for the historic environment, provides greater policy direction for HES and provides a policy framework to inform the work of organisations that have a role and interest in managing the historic environment. This statement complements and has the same authority as the SPP. In paragraph 1.6 of the introductory section it notes that the historic environment faces many challenges, including the needs of renewable energy generation.

- 5.14. The Planning and Energy Policy Chapter will consider the Development against this statement, notably the 'key principles' which include conservation and management for the benefit of present and future generations and an understanding that the people of Scotland should be

¹³ Scottish Government (various). Planning Advice Notes. Available at: <https://beta.gov.scot/publications/planning-advice-notes-index/> [Accessed 01/03/2017]

¹⁴ HES (2016). Historic Environment Scotland Policy Statement. Available at: <https://pub-prod-sdk.azurewebsites.net/api/file/d60d93c4-90ad-41af-ba52-a67a00c7b383> [Accessed 01/03/2017]

able to enjoy, appreciate, learn from and understand Scotland's historic environment.

Strategic and Local Planning Policy

Dumfries and Galloway Local Development Plan¹⁵

- 5.15. The Development Plan for Dumfries and Galloway comprises the Dumfries and Galloway Local Development Plan (LDP) which was adopted in September 2014 and is the established planning policy for the area.
- 5.16. A review of the LDP is currently underway, the most recent stage being the approval by members at a Full Council meeting on 18 January 2018 to publish a Proposed LDP2¹⁶ for consultation. It is therefore expected that the currently adopted LDP will provide the established planning policy throughout the anticipated EIA Report preparation stage and determination period for the Development. Progress of the Proposed LDP2 will be monitored throughout the EIA and it is proposed that the Planning and Energy Policy Chapter will contain a section that discusses the Proposed LDP2, noting its status at the time of the EIA Report publication.
- 5.17. The LDP will be a significant material consideration in shaping the Council's consultation response to the Section 36 Application, and the Planning and Energy Policy Chapter will identify those aims, objectives and planning policies of the LDP considered to be of relevance to the Development. Policies IN1 Renewable Energy and IN2 Wind Energy are the key LDP policies, however other LDP policies of relevance will also be discussed as appropriate in the context of the EIA.

Dumfries and Galloway Supplementary Planning Guidance

- 5.18. The Council adopted their Supplementary Guidance (SG) relating to onshore wind development in June 2017. The SG comprises two parts; Wind Energy Development: Development Management Considerations¹⁷ and Dumfries and Galloway Wind Farm Land Capacity Study¹⁸. As adopted SG, this forms part of the LDP and is afforded the same weight as the LDP for decision making purposes.

¹⁵ Dumfries and Galloway Council (2014). Local Development Plan. Available at: [https://www.dumgal.gov.uk/media/17412/Local-Development-Plan-Section-1/pdf/Section1_LDP_\(policy\).pdf](https://www.dumgal.gov.uk/media/17412/Local-Development-Plan-Section-1/pdf/Section1_LDP_(policy).pdf) [Accessed 01/03/2018]

¹⁶ Dumfries and Galloway Council (2018). Local Development Plan 2, Proposed Plan. Available at: https://www.dumgal.gov.uk/media/19739/LDP2-Proposed-Plan/pdf/PROPOSED_PLAN_JAN_2018.pdf [Accessed 01/03/2018]

¹⁷ Dumfries and Galloway Council (2017). Wind Energy Development: Development Management Considerations. Available at: https://www.dumgal.gov.uk/media/17607/Part-1-Wind-Energy-Development-Development-Management-Considerations-Screening-Determination/pdf/0892-16_Wind_Energy_Guidance_Part_1.pdf [Accessed 01/03/2018]

¹⁸ Dumfries and Galloway Council (2017) Dumfries and Galloway Wind Farm Land Capacity Study. Available at: https://www.dumgal.gov.uk/media/18596/Dumfries-and-Galloway-Wind-Farm-Land-Capacity-Study-Appendix-C/pdf/Wind_Energy_Appendix_C_Landscape_June_2017.pdf [Accessed 01/03/2018]

- 5.19. As part of the production of the Proposed LDP2, the SG is also being reviewed. The Draft SG documents are also subject to consultation, following approval of such by members at the Full Council meeting in January 2018. Progress of the Draft SG will be monitored throughout the EIA Report preparation process and it is proposed that the Planning and Energy Policy Chapter will contain a section that discusses the Draft SG, noting its status at the time of EIA Report publication.

Energy Policy

- 5.20. According to the United Nations Intergovernmental Panel on Climate Change's fifth assessment report¹⁹, fossil fuel power generation should be phased out almost entirely by the end of the century to limit global warming to 2 degrees Celsius (°C) above pre-industrial levels. The report states that low carbon electricity supply will have to increase from 30% currently to more than 80% by 2050.
- 5.21. Most of the energy policy documents of relevance to the Development are concerned with reducing the amount of greenhouse gases (GHG) that are emitted as a result of energy production and a related objective of increasing the proportion of energy derived from renewable sources. The Planning and Energy Policy Chapter will identify and discuss the key aims and objectives of the most pertinent energy policy documents to the Development, at the time of EIA Report preparation. The discussion will include relevant European, UK and Scottish energy related legislation and policy. It is anticipated that the commentary on energy policy will identify and discuss the following publications:
- 2009 Copenhagen Accord²⁰ - As a party to the Copenhagen Accord, the UK has agreed a range of proclamations and objectives, including that climate change is 'one of the greatest challenges of our time', which must be combated 'urgently'.
 - 2009 European Renewable Energy Directive²¹ - The Directive encourages energy efficiency, energy consumption from renewable sources and the improvement of energy supply.
 - The Climate Change (Scotland) Act 2009²² - Sets out the statutory framework for GHG emission reductions in Scotland. The Scottish Government is in the process of finalising its third Climate Change Plan, setting out proposals to drive emissions down by 66% by 2032.

¹⁹ IPCC (2014) Fifth Assessment Report. Available at: <http://www.ipcc.ch/report/ar5/index.shtml> [Accessed 01/03/2018]

²⁰ UN (2009). Copenhagen Accord. Available at: <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf> [Accessed 01/03/2017]

²¹ DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN> [Accessed 01/03/2018]

²² Climate Change (Scotland) Act 2009. Available at: https://www.legislation.gov.uk/asp/2009/12/pdfs/asp_20090012_en.pdf [Accessed 01/03/2018]

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- Renewables Action Plan (2009)²³ including associated updates – The overall aim is to support and accelerate the implementation of renewable energy in line with EU targets.
 - Onshore Wind Policy Statement (December 2017)²⁴ - This newly published statement by the Scottish Government examines a number of issues relating to the maintenance and continued support of onshore wind as a more mature technology for renewable energy generation. The statement covers a range of topics including route to market, strategic approach to development, protection for residents and the environment and community benefits.
 - Scottish Energy Strategy: The future of energy in Scotland (December 2017)³ - This strategy document aims to guide Scottish Government decisions and priorities in the context of a 'whole system' approach to energy production and consumption. Two new 2030 targets are set by the strategy. Firstly, that the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources. Secondly, an increase in 30% in the productivity of energy use across the Scottish economy.
 - Electricity Generation Policy Statement, 2013²⁵ - This Scottish Government publication examines the way in which Scotland generates electricity and is underpinned by four key principles, one of which includes a largely decarbonised electricity generation sector by 2030.
- 5.22. These documents comprise the main energy related publications that will be considered in the Planning and Energy Policy Chapter, with any other publications and/or updates to these documents considered on a case by case basis.

²³ Scottish Government (2009). Renewables Action Plan. Available at: <http://www.gov.scot/Resource/Doc/278424/0083663.pdf> [Accessed 01/03/2018]

²⁴ Scottish Government (2017). Onshore Wind Policy Statement. Available at: <http://www.gov.scot/Resource/0052/00529536.pdf> [Accessed 01/03/2018]

²⁵ Scottish Government (2013). Electricity Generation Policy Statement. Available at: <http://www.gov.scot/Resource/0042/00427293.pdf> [Accessed 01/03/2018]

FORESTRY

- 6.1. This Chapter of the Scoping Report sets out the approach which would be used to integrate the Development into the existing woodland structure. A Wind Farm Forest Plan would be prepared, which would detail felling and replanting proposals, illustrating the forestry requirements associated with the construction and operation of the Development.
- 6.2. The Site is located in an area with extensive commercial woodlands, both private and publicly owned. The land available for the Development is largely forested, with the remainder comprising open ground for management boundaries, roads, unplantable land and margins beyond the woodland edge. The forests within the Site are privately owned and managed. They consist primarily of commercial conifers with areas of native broadleaves, open ground habitats and water bodies.
- 6.3. A desk based assessment reveals there are no woodland designations affecting the Site. Areas are identified as Primary and Secondary Zones under the Native Woodland Integrated Habitat Network, as potential areas for native woodland expansion. The associated core areas of the Native Woodland Integrated Habitat Network and Primary Zones for native woodland expansion are located outwith the Site. The commercial conifer crops are now moving into the second rotation, with ongoing felling and replanting of mature woodlands.
- 6.4. Timber from the Site will be despatched via the B729. The B729 is a consultation route for timber traffic and is subject to an agreed usage protocol with the Council and forestry users. Development related timber traffic would need to be integrated into all other timber traffic using this route, in agreement with the forestry industry and the Council.

2013 Scoping Opinion

- 6.5. In 2013, the only response in relation to forestry was received from the Scottish Environment Protection Agency (SEPA); the Forestry Commission Scotland provided no comment to the scoping request. SEPA noted that the Applicant should consider waste from forestry and how this could be managed. The use of waste materials on site for ecological benefits, must be proven to be beneficial onsite and result in no harm, otherwise it would be classed as a waste under the waste regulations. The release of nutrients during felling processes is also a key consideration in terms of water quality. SEPA also welcomed the approach of key holing the turbines and noted that clear felling would be acceptable on areas of deep peat enabling their restoration as guided by a Habitat Management Plan (HMP).

Assessment Methodology

Guidance and Legislation

- 6.6. In the UK there is a strong presumption against permanent woodland removal, unless it addresses other environmental concerns or where it would achieve significant and clearly defined additional public benefits. In Scotland, such woodland removal is dealt with under the Scottish Government's Control of Woodland Removal Policy²⁶ (2009). The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. It is essential that the requirements of the Policy are addressed within the EIA. The integration of the Development into the Forest Plan will be a key part of the development process.
- 6.7. The forestry proposals would be prepared in accordance with the current industry best practice and guidance including, but not limited to:
- Dumfries and Galloway Council (2014): The Dumfries and Galloway Forestry and Woodland Strategy. Dumfries.
 - Forestry Commission (2017). The UK Forestry Standard: The Government's Approach to Sustainable Forestry, Forestry Commission. Edinburgh.
 - Forestry Commission Scotland (2009). The Scottish Government's Policy on Control of Woodland Removal. Edinburgh.
 - Forestry Commission Scotland (2015): Guidance to Forestry Commission Scotland staff on implementing the Scottish Government's Policy on Control of Woodland Removal.
 - The Scottish Government (2006). The Scottish Forestry Strategy. 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 (2018). The UK Woodland Assurance Standard 4th Edition, UKWAS, Edinburgh.

²⁶ FCS (2009). Control of Woodland Removal Policy. Available at: Control of Woodland Removal Policy [Accessed 01/03/2018]

Consultation

- 6.8. The main forestry consultee is FCS, South Scotland Conservancy. FCS would be consulted throughout the design of the Development 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 which would be addressed within the forestry assessment, for example from SEPA on forestry residues and the Council on timber transport.

Assessment

- 6.9. Forestry does not fit well into the standard EIA methodology. Commercial forests are dynamic and constantly changing through landowner activities, market forces and natural events such as windblow or pest and diseases. The forestry assessment would therefore not be a formal EIA assessment, rather it would be an assessment which describes the changes to the forest structure resulting from the incorporation of the Development into the forest. This would include the changes to, for example, the woodland composition and felling programmes. The forestry assessment would be presented in an individual EIA Report Chapter. The effects of the Development relating to forest felling and restocking would be assessed in the relevant chapters of the EIA Report, including Ecology; Landscape and Visual; Hydrology, Hydrogeology, Geology and Peat; Ornithology; and Traffic and Transport.

Baseline Conditions

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

Potential Effects and Assessment

- 6.11. There is potential for changes to the forest structure resulting from the 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 Development including for 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.

- 6.12. The principal output would be the preparation of the Wind Farm Forest Plan. This would include a felling plan to show which woodlands are to be felled and when they are to be felled during the life of the Development. It would further include a restocking plan showing which woodlands are to be replanted and when during the life of the Development. The changes to the woodland structure would be analysed and described including changes to species composition, age class structure, timber production, traffic movements and the felling and restocking plans.
- 6.13. The resulting changes to the woodland structure and any requirement for compensation planting to mitigate against any woodland loss would be considered in the context of the Control of Woodland Removal Policy and in consultation with FCS.

Key Questions for Consultees

- 6.14. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Do the consultees agree with the proposed methodology and scope of the forestry assessment?
 - Do the consultees have any information, particularly with reference to any new guidance, which should be taken into account within the assessment?

LANDSCAPE AND VISUAL

- 7.1. It is acknowledged from the outset that, in common with almost all commercial wind energy developments, some landscape and visual effects would occur as a result of the proposals.
- 7.2. A key principle of the European Landscape Convention is that all landscapes matter and should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area.
- 7.3. It is therefore proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and a Landscape and Visual Chapter be included in the EIA Report. The LVIA will be undertaken by Chartered Landscape Architects, who are experienced in the assessment of large scale, onshore wind energy projects and are familiar with the landscapes in and around Dumfries and Galloway.
- 7.4. It is proposed that the LVIA will consider the potential effects of the Development upon:
- Individual landscape features and elements;
 - Landscape character; and
 - Visual amenity and the people who view the landscape.

2013 Scoping Opinion

- 7.5. In the 2013 Scoping Opinion, SNH made a number of points:
- The Applicant should consider a number of layout and turbine height iterations during the EIA process to ensure that the Development is well designed to work with the landscape.
 - It was noted that the Site is located within the Galloway Hills Regional Scenic Area (RSA) and therefore the effects on the key characteristics of this area (i.e. Glenkens and Rhinns of Kells) must be investigated.
 - The apparent saturation of the area with wind energy developments was a key consideration.
 - Photomontages were requested for all viewpoints up to 17 km from the Development.
 - The suggested viewpoints were acceptable, although it was requested that a viewpoint from Corserine was included.
- 7.6. These points have all been considered through the Updated Scoping Report to development a methodology which satisfies SNH's concerns.

Baseline Landscape Conditions

Landscape Character

- 7.7. The Dumfries and Galloway landscape assessment was undertaken by Land Use Consultants in 1998²⁷ and formed part of the national programme of landscape character assessment (LCA) commissioned by Scottish Natural Heritage (SNH) in partnership with local authorities.
- 7.8. The study defines 27 landscape character types across Dumfries and Galloway. Each character type is further sub-divided into landscape units which comprise discrete geographical areas. A total of 104 of these smaller landscape units occur across Dumfries and Galloway.
- 7.9. The larger proportion of the Site and its immediate surroundings lie within the '19a: Southern Uplands with Forest' landscape character type and the 'Ken' landscape character unit. A small proportion of the Site is also located within landscape character type '4: Narrow Wooded River Valley'.
- 7.10. The key characteristics of the Southern Uplands with Forest were identified in the landscape assessment to be its "*large, smooth dome-shaped hills with large scale dark green plantations on slopes and over lower summits*". It was also identified that the area was a "*changing landscape with large scale felling, ploughing and replanting*".
- 7.11. The key characteristics of the Narrow Wooded River Valley include "*narrow incised valleys with wooded slopes enclosing pasture floors, small pasture and arable fields enclosed by hedges/fences, dominant broadleaf woodland character with conifers on the higher slopes, lush tough shaped river valleys with pasture/arable floors enclosed by deciduous wooded slopes, intimate unspoilt landscape focusing on river views with some adjacent policy landscape*". The key landscape issues identified for this character type include increase in coniferous forests and hedgerow loss.
- 7.12. It is considered that the landscape in the vicinity of the Site does not share the characteristics of the Narrow Wooded River Valley character type as set out within the Dumfries and Galloway LCA. Large scale coniferous forestry encloses the valley road to both sides, limiting intervisibility to the wider landscape. There are also active areas of plantation felling and forestry management within the 'Ken' landscape character area of the Narrow Wooded River Valley type, that have a strong influence upon the perception of the landscape.
- 7.13. It is known, as stated within the Guidelines for Landscape Character Assessment²⁸, that "*In Scotland, the Landscape Character Assessment programme was carried out typically at 1:50,000 scale, working with*

²⁷ Land Use Consultants (1998). Dumfries and Galloway Landscape Assessment. Available at: <http://www.snh.org.uk/pdfs/publications/review/094.pdf> [Accessed 01/03/2018]

²⁸ Land Use Consultants (2002). Landscape Character Assessment: Guidance for England and Scotland. Available at: <http://www.snh.org.uk/pdfs/publications/LCA/LCA.pdf> [Accessed 01/03/2018]

local authorities across the country". The scale of assessment at which the Dumfries and Galloway landscape assessment was undertaken therefore presents a broader brush analysis of the landscape, rather than a detailed local level assessment, carried out at the 1:10,000 scale. It is therefore not unusual to find that when the published character area boundaries are reviewed in the field, they do not always correspond to the characteristics of the landscape as they appear on the ground. The LVIA will include an assessment of local landscape character and how this might differ from the published landscape character assessment; some of this analysis has already taken place as part of the preparation of this Scoping Report.

- 7.14. Having undertaken initial analysis of the character of the landscape in and around the Site, it is considered, for the purposes of the LVIA, that the landscape of the Narrow Wooded River Valley in the vicinity of the Site is more characteristic of the adjacent Southern Uplands with Forest and thus the assessment will consider that the Development is located within the Southern Uplands with Forest character type.
- 7.15. The Dumfries and Galloway Wind Farm Landscape Capacity Study¹⁸ (DGWLCS) forms Appendix C to the Wind Energy Development: Development Management Considerations¹⁷ Supplementary Guidance Document. The study assesses the sensitivity of landscape character types, and more locally defined character areas, to different sizes of wind turbine development. The study was revised and updated to reflect the current position in relation to wind farm development in Dumfries and Galloway and the emergence of larger turbines.
- 7.16. The study considers landscape sensitivity to a wide range of turbines, based primarily on turbine height. It focusses on the remaining capacity for large turbines and a consideration of potential cumulative effects.
- 7.17. With regard to the sensitivity of the Southern Uplands with Forest landscape the Capacity Study sets out that this would be "*Medium for the large typology (turbines 80-150m)*".
- 7.18. It is set out in the Executive Summary to the Capacity Study that it "*identifies the greatest scope for additional [wind energy] development in parts of the Southern Uplands with Forest*". However, with regard to the 'Ken' landscape, it is set out that "*Capacity for additional development is likely to be very limited within the Ken unit, although some scope for repowering and/or small extensions to operational wind farms may be possible provided that effects on promoted recreational routes and on more sensitive glens are minimised. Limiting turbines within repowering schemes to around 150m high would fit better with the scale of the Ken unit*". From the site work undertaken as part of the preparation of this Scoping Report, it is considered that the part of the 'Ken' landscape in which the Development would be located does have the capacity to accommodate the Development. This matter will be considered in further detail through the assessment of landscape character to be set out within the LVIA.

- 7.19. With regard to the Narrow Wooded River Valley the Capacity Study states that *"There is no scope for turbines >50m high to be accommodated within this character type without significant adverse impacts occurring on key landscape and visual sensitivities"*. As discussed above, it is considered that the tract of the Narrow Wooded River Valley landscape that falls within the Shepherd's Rig site does not share the characteristics of the character type as a whole, rather it appears more characteristic of the adjacent Southern Uplands with Forest character type. Again, this matter will be considered in further detail through the assessment of landscape character and capacity to be set out within the LVIA.

Landscape Designations

- 7.20. The Site lies outwith any national landscape designation, including, National Parks or National Scenic Areas. It also lies outwith Wild Land, Inventoried Gardens and Designed Landscapes and the Galloway Forest Park (including the Dark Skies Park). A part of the site, at its north western edge, lies within the Galloway Hills Regional Scenic Area. Landscape designations in the wider area are illustrated on Figure 4, Appendix A.

Visual Receptors

- 7.21. There are a relatively limited number of potential visual receptors in the area surrounding the Site, with few settlements and towns in the nearby locality. There would be the potential for some views from the local road network, including the A713; B729; and B7000 as well as from the Southern Upland Way as it passes to the east of the Site. A detailed consideration of the potential for impacts to the visual amenity of receptors in the landscape surrounding the Site will be set out in the LVIA. This visual assessment will be informed by a selection of representative assessment viewpoints, which are discussed further in the methodology section, each of which will be illustrated with visualisations prepared in line with SNH best practice guidance.

Residential Visual Amenity

- 7.22. Detailed consideration with regard to residential visual amenity will also be given within in the LVIA. The Residential Visual Amenity Study (RVAS) will consider views from all properties located within 2 km of the Development.

Methodology

- 7.23. It is proposed that the main objectives of the LVIA will be as follows:
- To identify, evaluate and describe the current landscape character of the Site and its surroundings, and also any notable individual or groups of landscape features within the Site;
 - To determine the sensitivity of the landscape to the type of development proposed;

- To identify potential visual receptors (i.e. people that would be able to see the Development) and evaluate their sensitivity to the type of changes proposed;
- To identify and describe any impacts of the Development in so far as they affect the landscape and/or views of it and evaluate the magnitude of change due to these impacts;
- To identify and describe any mitigation measures (including mitigation which is embedded in the design and layout of the Development) that have been adopted to avoid, reduce and compensate for landscape and visual effects;
- To identify and assess any cumulative landscape and visual effects;
- To evaluate the level of residual landscape and visual effects; and
- To make a professional judgement about which effects, if any, are significant.

Published LVIA Guidance

7.24. The LVIA shall be undertaken in accordance with the principles of best practice, as outlined in published guidance documents, notably the third edition of the Guidelines for Landscape and Visual Assessment²⁹ (GLVIA3)

7.25. The methodology and assessment criteria proposed for the assessment has been developed in accordance with the principles established in this best practice document. It should be acknowledged that GLVIA3 establishes guidelines, not a specific methodology. The preface to GLVIA3 states:

"This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand."

7.26. The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose.

7.27. As part of the development of the proposed methodology, consideration has also been given to the following documents:

- Guidelines for Landscape Character Assessment, (2002) Countryside Agency and SNH;
- Landscape Character Assessment Guidance for England and Scotland: Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity, (2002) The Countryside Agency and SNH;
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (March 2012) SNH;
- Siting and Design of Wind farms in the Landscape, Version 3 (February 2017) SNH;

²⁹ LI & IEMA (2013). Guidelines for Landscape and Visual Impact Assessment, Third Edition.

- Visual Representation of Wind farms – Version 2.2 (February 2017), SNH;
- Landscape Institute (LI) Advice Note 02/17 Visual representation of development proposals (March 2017) Landscape Institute; and
- LI Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment, (2011) Landscape Institute.

7.28. Full details of the methodology will be provided within the LVIA chapter. The following provides an outline of the key aspects of the assessment.

Distinction between Landscape and Visual Effects

7.29. In accordance with the published guidance, landscape and visual effects shall be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

- Landscape effects relate to the effects of the Development on the physical and perceptual characteristics of the landscape and its resulting character and quality; and
- Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

Types of Landscape and Visual Effects Considered

7.30. The LVIA will address all phases of the Development and effects will be considered during the construction phase, when the Development is being built (temporary effects), following completion of the Development (permanent effects) and during decommissioning of the Development (temporary effects).

7.31. The LVIA will not only assess the effects associated with the turbines, but also any related effects resulting from the anemometer mast, control building/substation, underground cabling, borrow pit workings and site tracks and access road.

7.32. Consideration shall be given to seasonal variations in the visibility of the Development and these will be described where necessary.

7.33. The LVIA will also consider the potential for any cumulative effects to arise. The requirement for consideration of cumulative effects under the EIA Regulations is set out in Schedule 4, as follows:

*"5. A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other **existing and/or approved development**, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources"*

7.34. This represents a change to the wording of the previous Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2010 which stated: "A description of the likely significant effects of the development

on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development".

- 7.35. There is therefore apparently no longer any minimum requirement under the current EIA Regulations to consider the potential for cumulative impacts in relation to other developments which are yet to be awarded consent.
- 7.36. Notwithstanding this, it is acknowledged that current best practice guidance for cumulative impact assessment (Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH, 2012) still refers to a consideration of proposals which are "*awaiting determination within the planning process with design information in the public domain*" and states that "*The decision as to which proposals in the planning / consenting system should be included in an assessment is the responsibility of the determining authority.*"
- 7.37. As such, it is proposed in this LVIA to consider cumulative effects caused by the development of the Site in conjunction with other sites which are either operational, under construction, consented or the subject of a full planning application. The SNH best practice guidelines identify two principle types of cumulative visual impact:
- Combined visibility – where the observer is able to see two or more developments from one viewpoint; and
 - Sequential visibility – where two or more sites are not visible at one location but would be seen as the observer moves along a linear route, for example, a road or public right of way.
- 7.38. The guidelines state that combined visibility may either be in combination (where two or more sites are visible from a fixed viewpoint in the same arc of view) or in succession (where two or more sites are visible from a fixed viewpoint, but the observer is required to turn to see the different sites). Each of the above types of cumulative effect will be considered in the LVIA.

Study Areas

- 7.39. In order to assist with defining the study area, a digital Zone of Theoretical Visibility (ZTV) model was created as a starting point to illustrate the geographical area within which views of development on the Site are theoretically possible. This was based on a 'bare-earth' scenario, whereby the screening effect of areas of existing vegetation or built features in the landscape are not taken into account. The ZTV was modelled to blade tip height using the currently proposed turbine height of 149.5 m and is presented at Figure 5, Appendix A.
- 7.40. The ZTV is a useful tool used to provide a focus on the area and receptors that are most likely to be affected by a proposed development, but should always be subject to verification in the field. In this regard,

initial site visits have been conducted during January 2018 to understand the actual likely visibility of development at the Site.

- 7.41. Having reviewed the ZTV and with regard to best practice guidance, it is proposed that the LVIA will consider an initial 35 km radius study area. Detailed assessment will then be provided for a 15 km section of this study area, which it is considered represents a proportionate extent of the study area and the limit within which any potential significant effects might occur.
- 7.42. For the cumulative assessment, consideration was initially given to a 60 km radius from the Site, as recommended by SNH best practice guidance. Following this review, it is proposed that a 20 km study area be adopted to consider cumulative effects, which is considered to represent a proportionate extent of the study area and the limit within which any potential significant cumulative effects might occur. Cumulative sites within 35 km of the site are illustrated on Figure 2, Appendix A and listed in Appendix C.
- 7.43. It is also proposed to carry out a separate Residential Visual Amenity Study covering all properties located within 2 km of all proposed turbines. This additional assessment will be presented in an appendix to the LVIA Chapter and will complement the assessment of visual receptors within the LVIA, providing further detail in relation to the effect on the views and amenity from different parts of each property and its curtilage.

Proposed LVIA Viewpoint Locations

- 7.44. It is proposed that the 21 locations set out in Table 7.1 are included as viewpoints in the LVIA. The locations which are illustrated on Figure 5, Appendix A represent visual receptors and character types at a range of distances and directions from the Site.
- 7.45. It is acknowledged that the Development is located in relative close proximity to the proposed Longburn Wind Farm. This scheme of 10 no. turbines, 134 m to blade tip, is located on land to the west of the Site and is understood to be visible from similar locations to the Development. A planning application for Longburn Wind Farm was submitted to the Council in June 2016 (application reference 16/P/2/0187), and a series of viewpoints were agreed with SNH and the Council. The application was refused consent in September 2017 and is currently subject to an appeal (reference PPA-170-2129) which was lodged in October 2017. At the time of preparing this Scoping Report it remains undetermined.
- 7.46. A comparative exercise of ZTV coverage between the Development and the Longburn Wind Farm has been undertaken to understand the potential cumulative effects of the two schemes. This in turn has influenced the choice of viewpoint locations, which have been purposefully chosen to replicate those that were included in the Longburn LVIA to allow for a comprehensive understanding of potential effects.

7.47. Although there are minor differences in ZTV coverage between the Development and Longburn Wind Farm; the following list of 21 viewpoints remains relevant for the Development.

Table 7.1: Proposed Assessment Viewpoints

No	Location	OS Grid Ref	Direction	Receptor Type
1	Stroanfreggan Bridge (B729)	264564, 591794	South east	Minor Road
2	Stroanfreggan Craig Fort	263710, 592069	South east	Heritage Asset
3	Guttery Glen (B729)	265951, 591540	South east	Minor Road
4	Smittons Bridge	263301, 591879	South	Minor Road
5	Stroanfreggan Cairn	264101, 591433	South south east	Heritage Asset
6	Carroch Hill	267389, 592210	East	Hill summit
7	Culmark Hill	264448, 589670	South south east	Southern Upland Way
8	National Byway Cycle Route (minor road south of B729)	268635, 590766	South east	Recreational Route
9	High Bridge of Ken	261972, 590163	South	Minor Road
10	Southern Upland Way west of Benbrack	267950, 597005	North east	Long distance footpath. Limited view from summit of Benbrack
11	B7000	261856, 589322	South	Minor road
12	Dundeugh Hill	260976, 589724	South south west	Hill summit
13	Beninner	260584, 597157	North west	Hill summit
14	Cairnsmore of Carsphairn	259472, 597985	North west	Hill summit
15	Craig of Knockgray	257042, 594364	West	Hill summit
16	Alhang	264229, 601026	North	Hill summit
17	Mullwhanny	271668, 597343	North east	Hill summit near to Cairnhead and Striding Arch Sculptures
18	Straongassel (A713)	260313, 586825	South south west	Tourist Route
19	Bardennoch Hill	256679, 591479	West	Hill summit

No	Location	OS Grid Ref	Direction	Receptor Type
20	Woodhead Mines	252988, 593806	West	Minor Road
21	Corserine	250365, 587143	South west	Hill summit

- 7.48. Each of the representative viewpoints will be visited to evaluate the sensitivity of views. In addition, the study area will also be extensively visited to consider visibility of the Development as receptors move through the landscape.
- 7.49. The viewpoints will be used as the basis for determining the effects on visual receptors within the study area. The sensitivity of different receptor groups will be set out in the LVIA methodology.
- 7.50. The level of effect experienced by different visual receptor groups will be determined by considering in tandem the sensitivity and view with the magnitude of impact.

Visualisations

- 7.51. For each of the viewpoints, photography will be undertaken and visualisations will be prepared in line with SNH best practice guidance³⁰.
- 7.52. A digital model will be generated to enable the production of wirelines of the Development from locations throughout the study area to help identify the scale, arrangement and visibility of the proposed turbines. These images will be reviewed on site to assess how natural and built screening would affect visibility of the Development.
- 7.53. Each of the wireframe models will then be developed further into photomontages to help illustrate the predicted impact of the Development.
- 7.54. For each viewpoint where it is possible to view a long distance 360 degree (°) panorama, a series of four 90° baseline photography panoramas will be produced, illustrating the full panorama as seen from the viewpoint locations. Each panorama will be accompanied with an associated wireline illustrating cumulative schemes. These will be presented so that each 90° angle of view is read in a clockwise direction, starting with the section which includes the Development. For those viewpoints where a wide panorama is not available, a 90° baseline panorama in the direction of the Site will be produced, along with any other 90° angles of view to illustrate the wider panorama as appropriate.
- 7.55. Ancillary elements such as the permanent anemometer mast, access tracks and the substation will be shown in photomontages for viewpoints within 5 km when they would be visible. Beyond 5 km it is considered

³⁰ SNH (2017). Visual Representation of Wind Farms, Version 2.2. Available at: <https://www.nature.scot/sites/default/files/2017-07/A2203860%20-%20Visual%20representation%20of%20wind%20farms%20-%20Guidance%20-%20Feb%202017.pdf> [Accessed 01/03/2018]

unlikely that the ancillary elements would form more than a limited element of the entire Development when compared to the turbines.

Key Questions

- 7.56. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Are there any comments with regard to the position taken that the 'Ken' landscape of the 'Narrow Wooded River Valley' character type, does not share the characteristics of the overall character type in the area local to the Site, and thus will be considered as being part of the adjacent 'Southern Uplands with Forest' character type for the purposes of the character assessment?
 - Are there any comments on the proposed list of viewpoint locations?
 - Are there any further wind farm sites, to those listed in Appendix C, to consider as part of the cumulative assessment?

ECOLOGY

- 8.1. This section of the Updated Scoping Report describes the proposed methods that will be followed to confirm and further establish the ecological baseline relevant to the Development. The methods and approach that will be followed to evaluate and assess the potential effects of the Development on the ecological baseline (Important Ecological Features (IEFs)) will also be identified. A discussion of ornithological methods and assessment is provided separately in Chapter 9.
- 8.2. Initial baseline surveys were carried out between May and September 2013. The survey areas were defined with reference to the Site and encompassed a series of buffers. The buffer size is dependent on the sensitivity of key species to potential effects associated with the Development. Survey methods followed contemporaneous best practice guidance at the time.
- 8.3. As outlined in SNH's document 'General advice, sources of guidance and information for onshore wind farms'³¹, after 18 months, the non-avian protected species baseline data may be considered out of date. This may therefore need updating to provide a sufficiently robust baseline to inform the Ecological Impact Assessment (EcIA) for accurate determination of the potential impacts from the Development. As a result, it is proposed that baseline surveys will be undertaken in 2018 to provide an updated baseline.

2013 Scoping Opinion

- 8.4. In 2013, SNH confirmed they were satisfied with the breadth of surveys being undertaken for the ecological assessment; the only request they made was that any Annex 1 habitats or UK Biodiversity Action Plan (BAP) Priority Habitats should be covered by a National Vegetation Classification (NVC) survey. Cognisance has been taken on this when developing the current update survey and assessment methodology.

Desk Study

Statutory Designated Sites

- 8.5. A search was undertaken for statutory designated sites within 5 km, with this search area extended to 10 km for Special Areas of Conservation (SAC). A review of the SNH Information service (SNHi³²) identified only one site of (non-avian) nature conservation value within the search area (Table 8.1).

³¹ SNH (2016) General advice, sources of guidance and information for onshore wind farms. Available at: <https://www.snh.scot/sites/default/files/2017-07/A1150291%20-%20SNH%20General%20pre-application%20and%20scoping%20advice%20to%20to%20developers%20of%20onshore%20wind%20farms.pdf> [Accessed Feb 2018]

³² SNHi – Available at: <http://www.snh.gov.uk/publications-data-and-research/snhi-information-service/> [Accessed Feb 2018]

Table 8.1: Summary of Statutory Designated Sites within the Search Area

Site	Designation	Distance and Direction	Description/Principal Interest
Cleugh	SSSI	3.5 km S	Best example of unimproved lowland neutral grassland in the region.

- 8.6. Dundeugh Wood, to the south of the Development, is listed in the Ancient Woodland Inventory (AWI).
- 8.7. Designated sites within the wider area are shown on Figure 6, Appendix A.

Previous Baseline Survey Results Summary

Habitats & Vegetation Surveys

- 8.8. An Extended Phase 1 Habitat Survey and National Vegetation Classification (NVC) Survey were carried out in September 2013 within the Site. Habitats recorded were dominated by Sitka spruce (*Picea sitchensis*) plantation, some of which was planted on poorly drained blanket bog peatland. Further habitats included areas of felled plantation, some of which had been recently replanted with native broadleaf trees (to the north of the Site) and Sitka spruce, and others which had become established with bracken and scattered scrub. Woodland rides were predominately purple moor-grass (*Molinia caerulea*) dominated marshy grassland. Dry heath was recorded on the edges of forest roads and tracks which interspersed the Site.

Protected Species Surveys

- 8.9. Protected species surveys were carried out between May and September 2013, and included surveys for otter (*Lutra lutra*), water vole (*Arvicola amphibius*), pine marten (*Martes martes*), badger (*Meles meles*) and red squirrel (*Sciurus vulgaris*). The results of these surveys are summarised below.

Red Squirrel

- 8.10. Surveys recorded potential evidence of red squirrel presence; however this could not be distinguished from grey squirrel evidence, as both species were known to be present in the area. It was considered possible that red squirrel were present within the Site but in low numbers.

Pine Marten

- 8.11. No evidence of pine marten was recorded during surveys, however due to the geography of the Site and limited habitat suitability, the species was considered likely to exist within the areas of coniferous woodland within the Site.

Badger

- 8.12. No evidence of badger was recorded and the majority of the habitats present within the Site, such as dense coniferous woodland, offer limited foraging opportunities and were considered unsuitable for establishing setts. Badger were considered unlikely to reside on the Site however, transient badger use was considered possible.

Bat Surveys

- 8.13. Bat surveys were carried out monthly between May and September 2013. Surveys included transects, remote monitoring and roost suitability. The results of these surveys are presented below.
- 8.14. Transect surveys were undertaken on three occasions seasonally, in May, July and September 2013, in accordance with Bat Conservation Trust (BCT) survey guidelines³³. The survey recorded very low levels of bat activity, and was dominated by common and widespread species of low to moderate risk from wind farm development³⁴ including common and soprano pipistrelle (*Pipistrellus pipistrellus/pygmaeus*). A single pass from a possible Nathusius pipistrelle (*Pipistrellus nathusius*) represented the only potential activity from high risk species³⁴.
- 8.15. Remote monitoring surveys were undertaken on three occasions seasonally, in May, July and September 2013, in accordance with BCT survey guidelines³³. The survey recorded low levels of bat activity, dominated by common and widespread species of low to moderate risk from wind farm development³⁴ including common and soprano pipistrelle, as well as *Myotis* species. Survey also recorded very infrequent activity from potential high risk species³⁴ (approximately 1% of activity) such as Nathusius' pipistrelle and *Nyctalus* species.
- 8.16. No evidence of, or suitability for, roosting bats were recorded during 2013 surveys.

Fisheries Surveys

- 8.17. Fisheries surveys were carried out between April and September 2013 across nine sampling sites within close proximity to the Site.
- 8.18. The habitat quality and utilisation potential of the survey sites was generally good with a small number of sites recorded as moderate. The majority of assessed sites generally consisted of moderate/good combinations of flow types, depths and variable substrates providing good habitat for juvenile salmonids. Within the selected survey reaches, there were few areas of suitable habitat for juvenile lamprey (*Lampetra sp.*), however none were recorded at the time of survey.
- 8.19. The fish fauna surveys predominantly recorded brown/sea trout (*Salmo trutta*) which were recorded as being widespread across the survey area.

³³ Hundt, L. (ed.) (2012) Bat Surveys: Good Practice Guidelines (2nd Edition). Bat Conservation Trust.

³⁴ Natural England (2014) Bats and onshore wind turbines (Interim guidance) (TIN051)- Third edition

Trout were recorded within a range of age-classes, suggesting spawning activity in the previous four years, an overall low-moderate trout population. There are many suitable habitat for Atlantic salmon (*Salmo salar*), however the species was not recorded during surveys. This was considered to be as a result of the presence of the Galloway Hydro Scheme, which may create barriers to fish migration. These obstacles were considered to possibly have contributed to the absence of lamprey species and European eel (*Anguilla anguilla*), and suggest that brown trout population are resident and not migratory.

Baseline Update Methodology

Desk Study

- 8.20. In order to augment baseline survey data collected and, if necessary, refine the survey scope, recent records (within 20 years) of protected and/or notable species and details of sites of ecological interest will be sought. Data consultation will aim to collect up-to-date records of the following: non-statutory designated sites located within 2 km of the Site, (extended to 5 km for those designated for bats); rare, notable or protected flora and fauna within 5 km of the Site (extended to 10km for bats); and records of invasive, non-native species within 2 km of the Site.
- 8.21. In the first instance, records will be sought from publically available data resources, as well as the following organisations:
- SNH;
 - Dumfries and Galloway Environmental Resources Centre (DGERC);
 - Dumfries and Galloway Bat Group;
 - Red Squirrels in South Scotland;
 - Scottish Wildlife Trust;
 - Galloway Fisheries Trust;
 - Nith District Salmon Fisheries Board;
 - Dumfries and Galloway Biodiversity Action Plan; and
 - National Biodiversity Network.

Field Surveys

- 8.22. Ecological surveys are necessary to provide an up-to-date baseline against which the potential effects of the Development can be assessed. The limit of baseline surveys has been defined by the Site boundary and thus, encompasses all areas in which development may take place. Where necessary and accessible, some surveys will extended beyond this Site boundary to provide the required baseline information.

Habitats and Vegetation

- 8.23. Due to extensive clear-felling, there are likely to be significant changes in the baseline habitats. As such, it is recommended that the Extended Phase 1 habitat survey is ground truthed and updated in areas where the existing baseline appears to differ from the previous 2013 conditions outlined above.
- 8.24. The survey will be carried out during the optimum period (April to September 2018) following standard methods³⁵. The survey will cover the relevant areas of the Site and immediately adjacent areas (up to 200 m), with additional effort targeted at identifying the locations of any rare or scarce plants or invasive species. The survey will allow features of ecological constraint to influence design, an assessment of the potential impact of habitat loss due to the construction of the Development and will also help to guide the scope of other ecological surveys by assessing the potential of habitats to support notable fauna.
- 8.25. Should the presence of notable or sensitive habitats be recorded during the survey, such as peatlands or Ground Water Dependant Terrestrial Ecosystems (GWDTE), an NVC³⁶ survey will be carried out up to 200 m of the Site.

Protected Species

Bat Surveys

- 8.26. Bat activity at the Site will be surveyed according to BCT³³, SNH and Natural England (NE)^{37, 34} guidance and as follows:
- Transect surveys - Habitats within the survey area will be walked and/or driven, where accessible, to provide a transect route with five-minute point counts at regular intervals. Transect surveys will be carried out seasonally (Spring, summer & autumn) on three separate occasions between May and September 2018.
 - Automated Surveys - AnaBat detectors will be deployed to automatically record bat activity on three occasions seasonally between May and September 2018. On each occasion the AnaBat detectors will be deployed for a minimum of five consecutive nights. The AnaBats will be located within the potential turbine layout, as well as in a range of representative habitats and control sites.
 - Roost Suitability surveys – Data searches will be conducted to identify any known roost sites in the vicinity of the Site. Potential bat roosts onsite will be identified and, if necessary, emergence/re-entry surveys will be conducted at potential roost sites considered to be at risk.

³⁵ Joint Nature Conservation Committee (JNCC) (2004) Handbook for Phase 1 habitat survey: a technique for environmental audit. JNCC.

³⁶ Rodwell, J. S. et seq. (1992) British Plant Communities Vols 1–5, Cambridge University Press: Cambridge.

³⁷ SNH has adopted NE TIN051 guidelines in relation to bats and wind farm developments.

- 8.27. As habitats with the Site are likely to be sub-optimal for high risk bat species and very low levels of these species were recorded during 2013 baseline surveys, a precautionary low risk seasonal approach will be taken to bat activity surveys. Data will be analysed immediately after being collected, and should bat activity, or high-risk species such as noctule (*Nyctalus noctula*) or Leisler's bats (*Nyctalus leisleri*) be recorded at notably higher levels of activity than previously recorded, then the survey scope will be increased appropriately, for example to a moderate risk monthly survey approach.

Otter and Water Vole

- 8.28. Surveys for evidence of otter and water vole will be carried out in accordance with SNH survey guidelines^{38, 39}, across suitable habitats including up to 200 m upstream and downstream of riparian features, as well as waterbodies and wetland areas within the Site during spring to autumn 2018.

Red Squirrel

- 8.29. Suitable habitats (particularly mature coniferous plantation) within 50 m of the Site will be surveyed in accordance with SNH guidance⁴⁰, for evidence of red squirrel such as dreys and feeding cones. If deemed necessary, camera trapping will be deployed to confirm the presence of red squirrel dreys.

Pine marten

- 8.30. Suitable habitats within 250 m of the Site will be surveyed in accordance with SNH guidance⁴¹, to assess their potential to support pine marten and to identify field signs including dens. If deemed necessary, camera trapping and DNA analysis of scats will be undertaken to confirm the presence of pine marten.

Fisheries Surveys

- 8.31. Due to habitat suitability and presence of salmonids such as brown trout, recorded during previous baseline surveys, update fish fauna surveys will be carried out in Spring–Autumn 2018. Fish populations will be surveyed by electrofishing and will be carried out to Scottish Fisheries Co-ordination Centre protocols⁴², and under licence from the Nith District Salmon Fisheries Board or the Scottish Government. Surveys will include both fully quantitative and semi-quantitative assessments where possible.

³⁸ SNH (2016) Protected Species Advice for Developers: Otter

³⁹ SNH (2016) Protected Species Advice for Developers: Water Vole

⁴⁰ SNH (2016) Protected Species Advice for Developers: Red Squirrel

⁴¹ SNH (2016) Protected Species Advice for Developers: Pine Marten

⁴² Scottish Fisheries Co-ordination Centre (2007) *Electrofishing Team Leader Training Manual*. Fisheries Management SVQ Level 3: Manage Electrofishing Operations. Inverness College.

Other species

- 8.32. Habitats will be assessed for their potential to support other notable species and a watching brief will be maintained during ecological surveys to record observations. Additional species-specific surveys will be undertaken as dependent on the results of consultation, desk study and field observations.

Ecological Impact Assessment Methodology

- 8.33. The Site is dominated by commercial forestry plantation, much of which has been recently felled. It is interspersed by tributaries of the Water of Ken. The remainder of the Site is surrounded by open moorland and other areas of existing and felled forestry plantation. The scale and location of the Development will limit potential ecological effects, since the turbines and the majority of associated infrastructure will be located within commercial forestry, which is a habitat generally considered to be of limited ecological value.
- 8.34. The assessment of ecological impacts will follow the guidance document produced by the Chartered Institute of Ecology and Environmental Management (CIEEM) ensuring a transparent and scientifically rigorous approach to EcIA⁴³. These guidelines set out the process for assessment through the following:
- Collation of baseline ecological information through desk study and field surveys;
 - Identification and characterisation of ecological impacts from all phases of the Development;
 - Incorporation of measures to mitigate identified effects;
 - Assessment of significance of residual effects following mitigation;
 - Identification of appropriate compensation to offset significant residual impacts; and
 - Identification of opportunities for ecological enhancement.
- 8.35. The assessment will include proposals for the avoidance and mitigation of potentially adverse effects and will consider enhancement measures to increase biodiversity in the area. Potential cumulative ecological effects with other nearby developments will also be addressed. Mitigation will be identified where the assessment indicates that there is a potential significant impact on important habitats and species as a consequence of the Development.

Important Ecological Features (IEFs)

- 8.36. Although some baseline surveys require updating, the known baseline at the time of writing suggests that a number of ecological sensitivities may

⁴³ CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. 2nd edition, Chartered Institute of Ecology and Environmental Management, Winchester

exist. In the context of EcIA these features are defined as IEFs, and for the Development may include:

- Sensitive habitats (such as Annex I, Scottish Biodiversity List (SBL), and potential GWDTEs (SEPA, 2014));
- Riparian mammals – a number of watercourses and waterbodies located within and in close proximity to the Site have potential to support water vole and likely support otter;
- Woodland mammals – standing and recently felled coniferous plantation woodland as well as marginal and connecting habitats have the potential to support pine marten & red squirrel;
- Aquatic species – aquatic habitats within and in close proximity to the Site have the potential to support salmonid species; and
- Bats – habitats within the Site support commuting and foraging bats of low risk from wind farm development.

Determining Significance

- 8.37. The approach to assessment outlined in Chapter 2 will generally be followed in the EIA Report. Definitions of sensitivity and magnitude specific to ecology receptors will be used and defined in detail.

Potential Effects

- 8.38. The ecological assessment will focus on the potential effects of indirect and direct impacts upon IEFs during construction, operation and decommissioning of the Development. This will be assessed in terms of, but not limited to, the effects of the following;
- Direct impacts on nearby designated sites and their qualifying interests;
 - Direct and indirect habitat loss and disturbance - temporary or permanent loss to terrestrial or aquatic habitats;
 - Turbine-related bat mortality - death or injury by collision with the turbine blades; and
 - Indirect and direct effects on protected fauna including, but not limited to, otter, pine marten, water vole, red squirrel, and Salmonid fish.

Key Questions for Consultees

- 8.39. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Is the list of potential effects and key sensitive receptors comprehensive?
 - Are the baseline survey methods and level of proposed survey effort appropriate taking into consideration current guidance; the proposed scale and location of the Development; survey work

completed to date; and the key findings and identified sensitive receptors?

- Are the proposed receptor evaluation and impact assessment methods considered appropriate and comprehensive?

ORNITHOLOGY

- 9.1. This chapter of the Updated Scoping Report describes the proposed approach to the assessment of potential effects from the Development on bird populations and their supporting habitats (i.e. key ornithological receptors). It includes the methods for the desk study, baseline survey, receptor evaluation and the assessment of the significance of any identified effects.

2013 Scoping Opinion

- 9.2. SNH provided the below comments in regard to ornithology for the 2013 scoping opinion:
- It was advised that autumn and spring migratory surveys were not required for the Site.
 - Following review of the supporting figures it was noted that the vantage point surveys did not cover the entire Site and of most concern was the fact that Turbine 44 was not covered by the surveys.
 - It was noted that a 'flexible approach' was to be taken for the survey methods and advised against this, as this was not the norm.
- 9.3. RSPB also provided comment in 2013, stating:
- The Site is located in an area of medium sensitivity for breeding and wintering birds, and is located in an area for wildfowl migratory birds. Further it was noted that black grouse leks are known within 1 to 2 km of the Site and breeding raptors are within the area.
 - They were generally satisfied with the level of survey work which had been undertaken and agreed with the target species, but recommended that whooper swans were included.
 - Concerns were also raised about the vantage point survey coverage of the full Site.
- 9.4. The Applicant can confirm that the points raised in 2013 by the consultees have been considered throughout the survey effort and in developing the assessment methodology.

Survey Effort

- 9.5. SNH guidance⁴⁴ (2005, revised 2014) recommends that a minimum of two years' of bird survey are required. Furthermore, it recommends that a minimum of 72 hours of Vantage Point (VP) observations are gathered per VP, split by season (36 hours breeding and 36 hours non-breeding), per year.

⁴⁴ SNH (2014). Recommended bird survey methods to inform impact assessment of onshore wind farms. Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf> [Accessed 01/03/2018]

- 9.6. To comply with SNH guidance baseline surveys commenced in October 2012 and continued until end of August 2013 (providing Year 1 of data). The second round of surveys commenced in April 2017 and will continue until end of March 2018 (providing Year 2 of data). In Year 1, a total of 302 hours of VP observations were undertaken across four VPs, providing a minimum of 75 hours per VP (38 hours breeding and 37 hours non-breeding). In Year 2, a total of 144 hours of VP observations were undertaken across four VPs during the breeding season, meeting the minimum requirement. VP observations are still ongoing and it is fully expected that by the end of March 2018 the required survey effort will be met for the non-breeding season.
- 9.7. The survey area was defined with reference to the Site and encompassed a series of buffers of up to 2 km radius from the Site Boundary, with buffer size dependent on the sensitivity of key species to potential effects associated with the Development (Figure 7, Appendix A).
- 9.8. Survey methods followed contemporaneous best practice guidance; further details of the survey methods and survey effort are provided in Appendix D.
- 9.9. Baseline ornithological surveys included flight activity surveys covering all seasons from strategically located vantage points, breeding bird surveys and winter transects. Vantage point locations and viewsheds are illustrated in Figure 8, Appendix A.

Baseline

Designated sites

- 9.10. The Site is not located within or adjacent to any statutory sites designated for ornithological interest and there are no such sites within 10 km of the Site.
- 9.11. The only statutory designated site for ornithological interest within 20 km of the Site is the Loch Ken and River Dee Marshes Special Protection Area (SPA) which is situated c.13 km to the south and supports wintering populations of Greenland white-fronted goose (*Anser albifrons flavirostris*) and greylag goose (*Anser anser*).
- 9.12. Following current SNH guidance⁴⁵ on the connectivity of SPA populations with supporting habitats in the wider environment, the distances to all SPAs in the surrounding area are greater than the reported range/connectivity distance for the qualifying species listed for the individual SPAs or despite being within 20 km of a goose SPA have no connectivity with the qualifying interests of the SPA (Mitchell, 2012⁴⁶).

⁴⁵ SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs). Available at: SNH guidance (SNH, 2012) on the connectivity of SPA [Accessed 01/03/2018]

⁴⁶ 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

Desk Study and Consultations

- 9.13. Having conducted baseline wind farm surveys across Dumfries and Galloway over many years, NRP has familiarity with the general area and its birds. In addition, the NRP principal surveyor lives locally to the Site and has a sound knowledge of the area. He is also an active member of the Dumfries and Galloway Raptor Study Group.
- 9.14. The Applicant consulted with SNH in 2012 regarding the need for migration watches and SNH commented, via John Gibson (Operations Officer, South of Scotland)⁴⁷, that there was not felt to be a need for migration watches. It is considered that this remains the case.

Summary of Baseline Surveys

- **Geese and swans** – no regular local or passage movements of geese or swans over the Site.
- **Raptors** – two active nests of red kites were recorded within 2 km of the Site in 2017. Breeding, within 2 km of the Site, was suspected for osprey in 2013 and goshawk in 2017; however, despite searches, no nest locations were found.

Low levels of flight activity, gathered from over 530 hours of observation, were recorded for red kite, goshawk, osprey and hen harrier within 500 m of the Site.

- **Black grouse** – there was no evidence of lekking black grouse within the Site or survey area.
 - **Waders** – breeding wader species, typical of the habitats present within 500 m of the Development, were present in very low numbers.
 - **Barn owl** – one barn owl breeding site was confirmed during 2017, however this was at a distance greater than 2 km from the Site.
 - **Other species** – the survey area supports a suite of breeding songbirds typically associated with upland moorland habitats and commercial conifer plantation in south-west Scotland.
- 9.15. Further detail on baseline survey results is provided in Appendix D.

Potential Significant Effects

- 9.16. Particular consideration will be given in the assessment to potential effects on bird species whose populations are of moderate to high conservation concern and that belong to taxonomic groups that are considered to be particularly susceptible to impacts from the Development. These include:

⁴⁷ Email from J Gibson (SNH) to Infinergy 13/09/12.

- Species listed on Annex1 of European Council Directive 2009/147/EC⁸ on the conservation of wild birds (i.e. 'Annex 1' species), in particular those that may be associated with populations of species that are qualifying interests of SPAs in the wider area;
 - Species listed in Schedule 1 to the Wildlife and Countryside Act 1981⁹, as amended (i.e. 'Schedule 1' species); and
 - Species of national conservation concern, not included within the above categories, but that are present within the study area in nationally or regionally important numbers (e.g. species on the UK Red List of birds of conservation concern⁴⁸).
- 9.17. The key potentially significant effects on ornithology receptors arising from the Development can be broadly 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, roosting habitat from the operational Development; and
 - Mortality from collision with wind turbine blades; and
 - The potential for cumulative effects arising from the combined effects of other existing and proposed developments within the wider area affecting the same bird populations.

Evaluation and Impact Assessment

- 9.18. The assessment will follow the process set out in the EIA Regulations and guidance on the implementation of the Birds and Habitats Directives (SERAD 2000). The process of evaluating the effects of the Development on birds will seek to ensure that the Scottish Ministers have sufficient information to determine whether the Development (either alone or in combination with other developments) is likely to have a significant effect on bird interests.
- 9.19. Effects will be assessed against the existing baseline conditions, i.e. without the Development present. This assessment will be carried out assuming that there would be no significant adverse effects on the existing population, range or distribution of a species (i.e., no significant effect on the species' conservation status); and no significant interference with the flight paths of migratory birds.
- 9.20. The assessment will therefore first identify the possible effects of the Development and will then consider the likelihood of their occurrence. A judgement will then be made as to whether or not these effects are significant with respect to the EIA Regulations. In judging whether a

⁴⁸ Eaton, M.A., Brown, A.F., Noble, D.G., Musgrove A.J., Hearn, R., Aebischer, N.J., Gibbons, D.W., Evans, A. and Gregory, R.D. 2009. *Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and Isle of Man*. British Birds 102: pp. 296-341

possible effect is significant or not, two principal factors will be taken into account:

- The nature conservation importance of the bird populations present; and
- The magnitude of the likely effect.

- 9.21. In assessing the effects, emphasis will be given to the national and regional populations of the species. Inconsequential effects will be excluded.
- 9.22. The EIA Report chapter will include proposals for measures to mitigate any identified adverse effects of the Development on bird species. Potential measures including micro-siting, the review of construction timing and land management regimes will be considered, as appropriate, in consultation with the appropriate statutory consultees. The need for, and scope of, further post consent monitoring of bird activity in relation to the Development will also be defined as part of the assessment process.
- 9.23. Impacts will be assessed in relation to species' population, range and distribution. Key considerations will include territory occupancy, breeding success, foraging success and ranging behaviour. The assessment will:
- Evaluate the nature conservation importance of the bird interest in a systematic manner; and
 - Estimate the magnitude of likely impacts on each species as a result of the proposals.
- 9.24. The significance of each potential effect will be judged by integrating scales relating to ecological value, behavioural sensitivity and effects magnitude in a reasoned way, in the context of the status of, and trends within, species' regional populations (as defined by SNH Natural Heritage Zones [NHZ]). Measures will be presented to mitigate any effects deemed to be significant in terms of the EIA Regulations.
- 9.25. The effects of the Development will be assessed in isolation and in combination with predicted effects of other wind farm developments in the same NHZ. As part of this process, data for other wind farm developments will be sought.

Key Sensitive Receptors

- 9.26. Given the habitat within the Site and within a 2 km buffer, potential sensitive receptors include **red kite, goshawk, osprey** and **hen harrier**. Surveys to assess the status of these species during the breeding season are described in Appendix D. The status of these species during the non-breeding season will be ascertained following completion of the winter surveys which are due to be completed in March 2018.

Key Questions for Consultees

- 9.27. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Do the consultees agree that SPAs can be scoped out of the EIA given the lack of connectivity?
 - Are the consultees content with and / or have any comments on the list of effects and key sensitive receptors?
 - Are the consultees content with and / or have any comments on the baseline survey methods and level of survey effort, taking into consideration current guidance, the proposed scale and location of the Development, survey work completed to date and the key findings and identified sensitive receptors?
 - Are the consultees content with and / or have any comments on the proposed receptor evaluation and impact assessment methods?

CULTURAL HERITAGE

- 10.1. For the purposes of the assessment, cultural heritage interests are deemed to include both above ground (built heritage) and below ground remains. The assessment will consider both direct and indirect (largely visual) effects as well as cumulative effects upon the following cultural heritage receptors:
- Archaeology – above and below ground, designated or not. Consideration will be given to the potential for unknown (buried) archaeological remains to exist within the Site;
 - Cultural Heritage - World Heritage Sites, Scheduled Monuments, Listed Buildings, Inventoried Gardens and Designed Landscapes (GDL), Inventoried Battlefields, Protected Wrecks and Conservation Areas;
 - Archaeological Areas as shown on the relevant Local Development Plan; and
 - Heritage assets marked or publicised (for example archaeological/heritage trails).
- 10.2. The assessment will be conducted with reference to the relevant statutory and planning frameworks for cultural heritage and in particular cognisance will be taken of HES Policy Statement June 2016 (HESPS)¹⁴. The assessment will be undertaken in accordance with current best practice and guidelines, which includes the Chartered Institute for Archaeologists (CIfA) Standards and Guidance⁴⁹ and HES's Managing Change in the Historic Environment Series, specifically 'Managing Change in the Historic Environment: Setting' (2016)⁵⁰.
- 10.3. Initial analysis was undertaken in 2013 of the Site and cultural heritage receptors with the potential to be affected by the Development. Whilst this was not published, it forms the basis upon which the assessment will be built, with additional data searches and site visits undertaken to confirm effects.

2013 Scoping Opinion

- 10.4. Comments were received from both the Council Archaeologist and Historic Scotland (now Historic Environment Scotland). The Council Archaeologist noted the potential for effects to be direct, indirect and had a particular interest in the cumulative effects. They noted key receptors included
- Stroanfreggan Craig fort;
 - Stroanfreggan cairn;

⁴⁹ Chartered Institute for Archaeologists (2017) Standard and Guidance for Historic Environment Desk-Based Assessment, Published December 2014, Updated January 2017 Available at: http://www.archaeologists.net/sites/default/files/CifAS%26GDBA_3.pdf [Accessed 01/05/2017]

⁵⁰ HES (2016). Managing Change in the Historic Environment: Setting. Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549> [Accessed 01/05/2017]

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- Woodhead Mines;
 - Smittons Bridge; and
- 10.5. Stroanfreggan Bardenoch to Garryhorn Archaeological Sensitive Areas (ASAs). Historic Scotland considered that there was the potential for wind development at this location, however they had concerns of the effects on the setting of a number of scheduled monuments and made the following points:
- Stroanfreggan Craig fort – turbines should be no closer to this scheduled monument from the south;
 - Stroanfreggan Bridge, cairn – concerns from the effects of turbines in the north-west and the cumulative effects with Longburn Wind Farm;
 - Craigengillan, cairn – it was proposed within the forestry management plan a 20 m buffer would be in place around this scheduled monument and that views would be opened to and from the south east which may result in significant effects from a number of turbines and cumulative effects from Longburn Wind Farm.
- 10.6. It was also considered that effects may be experienced on the setting of Dundeugh Castle, Braidenoch Hill and Polmaddy.
- 10.7. The above points have been considered when developing the below detailed assessment methodology, taking into account the concerns of the consultees.

Methodology

- 10.8. A desk-based assessment (DBA) of cultural heritage records will be compiled to establish the baseline against which the impact assessment will be carried out. Data will be gathered from the following sources:
- Dumfries and Galloway Historic Environment Record (HER);
 - Aerial photographs and other cartographic information on pre-recent land uses;
 - The National Monuments Record of Scotland Canmore datasets;
 - HES's databases of nationally designated sites; and
 - Local Studies Libraries and other archives as appropriate.
- 10.9. A study area of 1 km around the Site will be used to collect data to inform on the archaeological potential of the Site. For purposes of indirect impact assessment, data on nationally designated cultural heritage features will be collected to a maximum of 15 km from the Site centre.
- 10.10. Initial information relating to cultural heritage and archaeology will be gathered through a preliminary desk top search to identify potential features of interest.

- 10.11. The DBA will be augmented by a walkover survey to provide information on the archaeological potential of the area and to validate the documentary evidence. This fieldwork will be conducted to:
- Assess and validate documentary data collected;
 - Identify the extent and condition of any visible monuments;
 - Determine whether previously unrecorded historic features are visible; and
 - Subject to the findings of the DBA the requirement for and extent of any additional surveys will be agreed in consultation with the Council's Historic Environment Team.
- 10.12. An assessment will be made of the potential indirect effects upon the setting of cultural heritage features including historic landscapes. This assessment will be made against the ZTV produced as part of the LVIA. This may also include visual representations such as photomontages and / or wirelines.
- 10.13. The assessment will proceed from a consideration of the sensitivity of a cultural heritage feature against the magnitude of any potential change, to arrive at the significance of the effect. The assessment of sensitivity of archaeological and historical assets reflects the relative weight which statute and policy attach to them, principally as published in HESPS, with regard for professional judgement.
- 10.14. The assessment will be supported by presentation of the data in assessment tables, with a gazetteer and location plan. The Cultural Heritage Chapter will also include proposals for mitigation of any identified effects, where necessary.
- 10.15. Consultation will be undertaken with the Dumfries and Galloway Archaeologist, HES and other stakeholders, as appropriate.

Current Baseline Knowledge

- 10.16. Preliminary DBA indicate that there are no Inventoried Battlefields, Inventoried Gardens and Designed Landscapes or World Heritage Sites within 15 km of the Site; however, Loch Doon Castle, Property in Care is situated approximately 12.8 km west of the Site.
- 10.17. There are six Scheduled Monuments within 5 km of the Site, which are considered to have the potential to receive a significant effect. These are detailed in Table 10.1.

Table 10.1: Scheduled Monuments within 5 km of the Site

Scheduled Monument Number	Scheduled Monument Name	Approximate Distance and Direction
223	Craigengillan, cairn	Situated within the site boundary
1095	Stroanfreggan Craig, fort, Smittens Bridge	200 m east

Scheduled Monument Number	Scheduled Monument Name	Approximate Distance and Direction
1043	Stroanfreggan Bridge, cairn	700 m east
2476	Dundeugh Castle	3.8 km south-west
5391	Polmaddy, medieval and post-medieval settlement	4.5 km south-west
1105	Braidenoch Hill, cross slabs	4.5 km west

10.18. There are nine Listed Buildings (of varying grades) situated within 5 km of the Site. There are no Category A Listed Buildings within 5 km of the Site; however, as Table 10.2 shows there are five Category B Listed Buildings.

Table 10.2: Category B Listed Buildings with 5 km of the Site

Historic Building Number	Listed Building name	Category	Approximate Distance/ Direction
3628	Smittons Bridge	B	10 m south
3627	High Bridge of Ken	B	900 m south-west
51691	Galloway hydroelectric Power Scheme, Kendoon North Dam	B	1.4 km south-west
51694	Kendoon Power Station	B	3.7 km south-west
51694	Kendoon Valve House	B	3.7 km south-west

10.19. Figure 9, Appendix A shows the location of these Listed Buildings and Scheduled Monuments.

Key Questions for Consultees

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

- Do the Consultees agree with the proposed methodology and scope of assessment?
- Is there any current or recent archaeological work or projects being undertaken within or in the vicinity of the Site, that the results of which may not yet be recorded in the HER or National Monuments Record for Scotland?
- Are the Consultees aware of any further sites with statutory protection within the wider landscape whose settings may be affected by the Development?
- Do the Consultees have details of any cultural heritage sites in the vicinity of the Site which it considers may raise significant issues within the EIA process for this Development?

GEOLOGY AND PEAT

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

2013 Scoping Opinion

- 11.2. Minor comments were received in relation to geology and peat in the 2013 Scoping Opinion:
- SNH requested that the peat is surveyed and analysed.
 - SEPA requested that a borrow pit assessment was undertaken demonstrating the need and impact of any onsite borrow pit. The borrow pit assessment should include details of the location size and nature of the borrow pit; the depth to which it will be excavated; and associated drainage and storage to minimise effects.
- 11.3. These points have been considered in the methodology below.

Baseline Conditions

- 11.4. The Site occupies an undulating upland location with available British Geological Survey (BGS) mapping⁵¹ indicating that a part of the north-western area of the Site is underlain by peat with the remainder dominated by either glacial till or shallow rock.
- 11.5. Consistent with the BGS mapping, peat investigations comprising 100 m centre spaced probing was undertaken as part of the initial EIA survey works in October 2013. During the survey works a total of 368 probes were sunk. The probing was undertaken in accessible areas, within forestry rides and along existing access tracks.
- 11.6. Peat deposits varied across the Site however, typically shallow peat was recorded within steep topography. Peat deposits were recorded up to 3.0 m thick within flatter areas, mainly in the north-western part of the Site and localised pockets of peat were also recorded across the south of the Site. As a large proportion of the southern area of the Site was not accessible during the 2013 survey works, these areas will be revisited as part of the survey works for the EIA.
- 11.7. BGS mapping information on solid geology indicates that the Site is underlain by Wacke of the Portpatrick Formation. Minor dykes were noted in the north of the Site described as North Britain Siluro-Devonian Calc-Alkaline Dyke Suite comprising Microdiorite Porphyritic rocks.

⁵¹ British Geological Survey (BGS) Geindex Onshore. Available at: <http://mapapps2.bgs.ac.uk/geindex/home.html> [Accessed on 08/02/2018]

Potential Effects

- 11.8. It is unlikely that the Development will have significant adverse effects on the geology of the Site, with the exception of effects on peat; therefore it is proposed that this Chapter will solely focus on effects on peat as a result of the Development.
- 11.9. Development of wind farms on peatlands can lead to potential peat slide risk. An assessment of the likely effects on peatlands and the potential for peat slide risk will be undertaken as part of the EIA.
- 11.10. Excavation of peat during construction of site infrastructure, including access tracks, crane hardstandings, turbine foundations and cable trenches may lead to potential effects on peat habitat. In addition, natural surface drainage systems may change which could lead to drying and oxidation of in-situ peat.
- 11.11. Disturbance of organic rich peat soils could result in carbon loss and is further considered within Chapter 19.

Potential Mitigation

- 11.12. Measures will be taken during the design phase of the Development to ensure that infrastructure is located appropriately to reduce the potential risk of peat slide. This includes siting turbines and other infrastructure within areas of shallow topography which contain limited or no peat. Peat greater than 1 m is classified as 'deep peat' and should be avoided where possible during the design phase.
- 11.13. The excavation of peat will be minimised or avoided where possible. Where peat excavation cannot be avoided, an approach will be developed for peat restoration and reinstatement in accordance with best practice. Monitoring of peat re-instatement or restoration will be carried out throughout the lifetime of the Development.
- 11.14. A detailed Peat Management Plan (PMP) would be prepared post-consent and would take account of information produced in the Peat Chapter to specify management techniques. The PMP would include details of expected peat excavation and re-use volumes based on recorded peat thickness, the infrastructure dimensions and anticipated re-use streams.

Assessment Methodology

- 11.15. The purpose of this assessment will be to:
- Define the peat extent, depth and properties across the Site;
 - Identify any areas susceptible to peat slide, using peat thickness and digital terrain model (DTM) data to analyse slopes;
 - Advise on the micrositing of turbines and tracks to areas of shallow or no peat;

- Assess potential effects on soils, peat and geology, and sensitive habitats; and
- Develop an acceptable code for construction that will adopt best practice procedures, effective management and control of onsite activities to reduce or offset any detrimental effects on the geology and soils including peat.

Stage 1 Peat Probing

- 11.16. Initial phase 1 peat probing from 2013 will be supplemented by additional Phase 1 probing survey works. This will be carried out in accordance with Energy Consents Unit (ECU) Scottish Government guidance Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)⁵², focussing of areas where it was previously not possible to collect peat data. The information gathered will be utilised in preparation of Peat Landslide Hazard and Risk Assessment.

Stage 2 Peat Probing

- 11.17. Following design freeze, the Stage 2 peat probing survey will be undertaken at 50 m centres from site infrastructure. Peat probing will also be undertaken at 10 m centres from each turbine location.

Peat Condition Assessment

- 11.18. During Stage 2 peat probing, a selection of core sample locations will be selected to provide a full peat depth profile. This will be achieved by taking 50 cm cores from the surface layer through to the basal layer. A record of each core will be kept and will include, but not be limited to the following information:
- Photograph of each core;
 - Depth of acrotelm layer;
 - Degree of humification;
 - Course and fine fibre content;
 - Water content; and
 - Information on the water table and the average soil pH level.
- 11.19. This approach is consistent with the document Good Practice During Windfarm Construction⁵³ produced by Scottish Renewables, SNH, SEPA, FCS and HES.

⁵² Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Available at: <http://www.gov.scot/Publications/2017/04/8868/0> [Accessed 08/02/2018]

⁵³ Scottish Renewables, SNH, SEPA, FCS and HES (2015), Good Practice During Windfarm Construction. Available at: <http://www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/good-practice-during-windfarm-const/> [Accessed on 08/02/2018]

Peat Slide Risk Assessment

- 11.20. Should significant quantities of peat be present within the Site, a Peat Slide Risk Assessment will be undertaken in accordance with Scottish Government guidance and Guidance on Developments on Peatland - Site Surveys⁵⁴ along with full consultation with the relevant consultees.
- 11.21. The Peat Slide Risk Assessment will comprise of detailed analysis and reporting on the design freeze and will include a hazard and slope stability assessment and preliminary peat management recommendations.
- 11.22. In accordance with the Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments⁵⁵, , hazards existing on Site will be ranked based on factors that influence stability; namely peat depth and slope gradient. In addition, the exposure of potential receptors to risk will be established and hazard rankings applied across the Site, with management and mitigation measures recommended for an acceptable construction.

Borrow Pit Assessment

- 11.23. Given the limitations on traffic movements to and from the Site, an onsite borrow pit to support the construction works is essential. The presence of historical quarries on site indicate that this is a viable option. In order to confirm this, a Borrow Pit Assessment will be undertaken to understand the nature of the underlying rock geology and identify borrow pit areas for purposes of construction purposes.

⁵⁴ Scottish Government (2014) Guidance on Developments on Peatland - Site Surveys. Available at: <http://www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185/17852-1/CSavings/PSG2011> [Accessed on 08/02/2018]

⁵⁵ Scottish Government (2017) Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Available at: <http://www.gov.scot/Publications/2017/04/8868/0> [Accessed 08/02/2018]

HYDROLOGY AND HYDROGEOLOGY

- 12.1. The Site comprises a forestry plantation, with an undulating topography and there are isolated areas of peat in the north western part of the Site. The Site rises from approximately 200 m above ordnance datum (AOD, approximately equivalent to sea level) along Dry Burn (in the southern section of the Site) to 380 m at Marscalloch Hill in the south western part of the Site and 400m at Craigenjillen Hill in the northern part of the Site.
- 12.2. A site walkover was undertaken during 2013 to assess the hydrological receptors on site. An assessment of Private Water Supplies (PWS), including a site visit, was also undertaken in 2013 which identified a number of properties with the potential to be affected by the Development.
- 12.3. A hydrogeological assessment will be undertaken in order to establish the baseline conditions and assess the potential effects of the Development, significance and the potential for mitigation.

2013 Scoping Opinion

- 12.4. Comments were received from SEPA in relation to the hydrological assessment in 2013 as summarised below:
- Watercourse crossing must be detailed with supporting photographs.
 - Details of any water abstraction required as part of the Development must be given.
 - The flood risk must be identified.
- 12.5. Concerns were also raised by SEPA, Scottish Water and Marine Scotland Science about nutrients and acidification which may occur as a result of felling associated with the Development and advised that method statements and monitoring would be essential.
- 12.6. Consideration of these points has been given in development of the assessment methodology.

Methodology

- 12.7. Further consultation, desk studies and data requests will be undertaken to inform the updated baseline for the assessment.
- 12.8. Hydrology and hydrogeology data will be obtained including, (but not limited to), the following aspects:
- Review of published data and maps;
 - Consultation with the SEPA, the Council and the British Geology Survey;
 - Identification of solid and surface geologies;

- Review of Pollution Prevention Guidelines;
 - Identification of surface water features, catchments and GWDTEs;
 - Collation of flood plain information, water quality data and groundwater vulnerability information; and
 - Preparation of a catchment plan;
 - Confirmation of data on public and private abstractions and supplies, and risk assessment of these; and
 - Identification of other similar developments within 10 km to identify potential cumulative effects.
- 12.9. The EIA Report Chapter will present the assessment of potential effects on hydrology and hydrogeology resources, including:
- Details of consultation undertaken;
 - Assessment methodologies;
 - Hydrological walkover survey details and results;
 - Assessment of the different phases of the Development to establish the effect on the hydrological resource;
 - Identify mitigation measures, where necessary;
 - Identify any residual effects following mitigation;
 - Cumulative assessment with other developments within 10 km of the Development; and
 - Statement of significance in accordance with the Environmental Impact Assessment Regulations 2017⁵⁶.
- 12.10. A draft Water and Construction Management Plan (WCMP) will be included as an appendix to the Hydrology and Hydrogeology Chapter. The WCMP will detail recognised best practice methods to control effects on hydrology and hydrogeology and will form part of the overarching Construction Environmental Management Plan (CEMP).

Baseline Conditions

- 12.11. An initial review of the hydrological and ground conditions of the site has been undertaken. This section outlines the potential hydrological receptors which have been identified within the Site and its wider area.

Surface Water

- 12.12. The receptors which have been identified on the Site include several named and unnamed tributaries of the Water of Ken, namely Black Burn, Dry Burn, and Craigengillan Burn. Polifferie Burn is located outwith, but adjacent to, the north eastern boundary of the Site. The Water of Ken is classified by SEPA as having a 'Moderate' ecological status under the

⁵⁶ The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
<http://www.legislation.gov.uk/ssi/2017/101/contents/made> (Accessed 25/01/2018)

Water Framework Directive. The Water of Ken discharges into Kendoon Loch, approximately 1.4 km from the Site, which is noted as a trout fisheries resource.

Statutory Designated Sites

- 12.13. There are no statutory designated sites in the area surrounding the Site which are potentially hydrologically connected.

GWDTEs

- 12.14. Should potential GWDTEs be identified through the ecological surveys, further consideration would be given to the hydrological function of these habitats to determine their actual dependency on groundwater.

Private and Public Water Supplies

- 12.15. A request will be made to the relevant statutory consultees for information pertaining to the location, type and source of public and PWSs to ensure that the information obtained in 2013 remains accurate.

Groundwater

- 12.16. The groundwater unit underlying the Site is identified as the 'New Galloway bedrock and localised sand and gravel aquifers', which is classified as having a 'Good' SEPA River Basin Management Plan (RBMP) quantitative and qualitative status.

Flood Risk

- 12.17. The Indicative River and Coastal Flood Map (Scotland) produced by SEPA shows the areas of Scotland with a 0.5 % (1:200) or greater chance of flooding. These areas are known as medium to high risk areas for flooding. Whilst every effort will be made to avoid locate Development infrastructure outwith areas of flooding, consideration will be given to ensuring the Development does not increase the risk of flooding elsewhere.

Key Sensitivities

- 12.18. At this stage, the main key sensitivities are considered to be named and unnamed tributaries of the Water of Ken and Kendoon Loch, groundwater, the hydrological function of GWDTEs and PWSs.

Key Questions for Consultees

- 12.19. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Do the consultees agree with the proposed methodology and scope of the hydrology and hydrogeology assessment?

- Do the consultees have any information that would be useful in the preparation of the hydrology and hydrogeology assessment?

NOISE

- 13.1. Sources of noise during operation of a wind turbine are mechanical (from machinery housed within the turbine nacelle) and aerodynamic (from the movement of the blades through the air). Modern turbines are designed to minimise mechanical noise emissions from the nacelle through isolation of mechanical components and acoustic insulation of the nacelle. Aerodynamic noise is controlled through the design of the blade tips and edges. In most modern wind turbines, aerodynamic noise is also restricted by control systems which actively regulate the pitch of the blades.
- 13.2. While noise from the wind turbines does increase with wind speed, at the same time ambient background noise (for example wind in trees) usually increases at a greater rate. Planning conditions are used to enforce compliance with specified limits.

2013 Scoping Opinion

- 13.3. Comments were provided by the Environmental Health Officer (EHO) at the Council on the proposed assessment; these included:
- The assessment should be undertaken in line with ETSU-R-97;
 - The Development should consider whether the lower limits in ETSU-R-97 can be met; and
 - A method statement should be produced for construction.
- 13.4. These points have been considered through subsequent consultation with the EHO and in refining the assessment methodology below.

Operational Noise

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

- 13.5. The assessment methodology for operational noise is described in ETSU-R-97 'The Assessment and Rating of Noise from Windfarms'. The basic aim of ETSU-R-97 is to provide:
- "Indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development or adding unduly to the costs and administrative burdens on wind farm developers or local authorities".*
- 13.6. The report makes it clear from the outset that any noise restrictions placed on a development must balance the environmental impacts of the development against the national and global benefits which would arise through the development of renewable energy sources.
- 13.7. The specific methodologies involved in applying ETSU-R-97 to the Development will be detailed in full in the EIA Report however, in summary, these provide recommendations for noise limits relating to the

existing levels of background noise for quiet day-time and night-time periods.

- 13.8. To carry out a noise assessment in accordance with ETSU-R-97, the following steps are required:
- Specify the number and locations of the wind turbines;
 - Identify the locations of the nearest, or most noise sensitive, neighbours;
 - Determine the background noise levels as a function of site wind speed at the nearest neighbours, or at least at a representative sample of the nearest neighbours;
 - Determine the quiet day time and night time criterion curves from the background noise levels identified at the nearest neighbours;
 - Specify the type and noise emission characteristics of the wind turbines proposed for the Development;
 - Calculate the noise immission⁵⁷ levels due to the operation of the wind turbines as a function of site wind speed at the nearest neighbours; and
 - Compare the calculated noise immission levels with the derived criterion curves and assess in the light of relevant planning requirements.

Good Practice Guide to the Application of ETSU-R-97 for Wind Turbine Noise Assessment

- 13.9. The Good Practice Guide (GPG)⁵⁸ was published by the Institute of Acoustics (IOA) in May 2013 (IOA, 2013). It presents current good practice in the application of the ETSU-R-97 assessment methodology for wind turbine developments at the various stages of the assessment, and has been endorsed by the Scottish Government as current industry good practice. It is accompanied by six Supplementary Guidance Notes (SGNs), which provide greater detail and examples of good practice in various aspects of the assessment process. The GPS and SGNs will be followed throughout the assessment.

Local Development Plan Supplementary Guidance: Part 1 Wind Energy Development: Development Management Considerations 2017¹⁷

- 13.10. Reference will also be made to the requirements in terms of noise contained within Dumfries and Galloway Council's ('the Council's') Supplementary Guidance Part 1 Wind Energy Development: Development Management Considerations adopted in 2017.

⁵⁷ 'Immission' refers to the noise at a receiver location, whereas 'emission' relates to noise produced by a source.

⁵⁸ Institute of Acoustics (IOA) (2013), A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

Baseline

- 13.11. A baseline noise survey was carried out at seven properties in the vicinity of the Development in November 2013 to January 2014. The methodology for this survey was in accordance with the requirements of the GPG. The resulting data will be re-analysed to ensure that this aspect of the assessment is in accordance with SGN 2, which relates to data processing⁵⁹.

Cumulative Assessment

- 13.12. ETSU-R-97 and the GPG state that the noise limits that ETSU-R-97 recommends apply to the cumulative effect of noise from all wind turbines that may affect a particular location. A search will be undertaken in consultation with the Council to identify any wind energy developments either operational, consented or in planning which may also require consideration in the assessment process.
- 13.13. Cumulative noise levels will be established in line with the requirements of the GPG, and assessed against the ETSU-R-97 noise limits to determine the level of headroom present (i.e. the level of noise which may be generated by the Development, after taking all relevant cumulative developments into account).
- 13.14. Noise due to the Development will then be assessed against the remaining headroom to determine compliance with ETSU-R-97.

Low Frequency Noise and Infrasound

- 13.15. A study⁶⁰, published in 2006, by Hayes McKenzie on behalf of the DTI investigated low frequency noise from wind turbines. This study concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines. It also noted, however, that a phenomenon known as Aerodynamic Modulation was in some isolated circumstances occurring in ways not anticipated by ETSU-R-97.
- 13.16. In addition, Bowdler *et al.* (2009) concludes:
- "...there is no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms, generally has adverse effects on neighbours".*
- 13.17. It is therefore not considered necessary to carry out specific assessments of low frequency noise or infrasound.

⁵⁹ Institute of Acoustics (IOA) (2014) Supplementary Guidance Note 2: Data Processing & Derivation of ETSU-R-97 Background Curves

⁶⁰ The Department for Trade and Industry, (2006). The measurement of low frequency noise at three UK windfarms. Hayes Mckenzie.

Amplitude Modulation

- 13.18. In its simplest form, Amplitude Modulation, by definition, is the regular variation in noise level of a given noise source. This variation (the modulation) occurs at a specific frequency, which, in the case of wind turbines, is defined by the rotational speed of the blades.
- 13.19. There is a distinction between 'normal' AM of wind turbine noise, characterised as blade swish and increased AM, typically referred to as Enhanced AM (EAM) or Other AM (OAM). It should be noted that ETSU-R-97 describes and makes allowance for normal AM or blade swish.
- 13.20. A study⁶¹ was carried out in 2007 on behalf of the Department for Business, Enterprise and Regulatory Reform (BERR) by the University of Salford, which investigated the incidence of noise complaints associated with wind farms and whether these were associated with AM. This report defined AM as aerodynamic noise from wind turbines with a greater degree of fluctuation than normal at blade passing frequency. Its aims were to ascertain the prevalence of AM on UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required.
- 13.21. The study concluded that AM had occurred at only a small number (4 of 133) of wind farms in the UK, and only for between 7% and 15% of the time. It also stated that, the causes of OAM are not well understood and that prediction of the effect was not currently possible.
- 13.22. This research was updated in 2013 by an in-depth study undertaken by Renewable UK⁶² which has identified that the generation of OAM is based upon the interaction of a number of factors, the combination and contributions of which are unique to each site. With the current state of knowledge, it is not possible to predict whether any particular site is more or less likely to give rise to OAM, and the incidence of OAM occurring at any particular site remains low, as identified in the University of Salford study. The report includes a sample planning condition to address AM, however that has not yet been validated or endorsed by Government.
- 13.23. In 2016, the IOA proposed a measurement technique⁶³ to quantify the level of AM present in any particular sample of wind farm noise. This technique is supported by the Department of Business, Energy & Industrial Strategy (BEIS, formerly The Department of Energy & Climate Change) who have published guidance⁶⁴, which follows on from the conclusions of the IOA study in order to define an appropriate assessment method for AM, including a penalty scheme and an outline planning condition. Notwithstanding this, the suggested outline planning

⁶¹ University of Salford (2007). 'Research into aerodynamic modulation of wind turbine noise'. Report by University of Salford, The Department for Business, Enterprise and Regulatory Reform, URN 07/1235, July 2007.

⁶² Renewable UK (2013). 'Wind Turbine Amplitude Modulation: Research to improve understanding as to its Cause and effects', Renewable UK, 2013

⁶³ Institute of Acoustics, (2016) A Method for Rating Amplitude Modulation in Wind Turbine Noise,

⁶⁴ BEIS, (2016), Review of the evidence on the response to amplitude modulation from wind turbines

condition remains in a draft form and would require site-specific legal advice on its appropriateness to a specific development. Section 7.2.1 of the GPG therefore remains current, stating: "*The evidence in relation to 'Excess' or 'Other' Amplitude Modulation (AM) is still developing. At the time of writing, current practice is not to assign a planning condition to deal with AM*"

- 13.24. It is therefore not considered necessary to carry out specific assessments of amplitude modulation.

Construction Noise

- 13.25. The following legislation and standards are of particular relevance to construction noise:

- The Control of Pollution Act 1974 (CoPA 1974);
- The Environmental Protection Act 1990 (EPA 1990); and
- BS 5228: 2009+a1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

- 13.26. CoPA 1974 provides local authorities in Scotland, England and Wales with powers to control noise and vibration from construction sites. Section 60 of CoPA 1974 enables a Local Authority to serve a notice to persons carrying out construction work of its requirements for the control of site noise. Section 61 of CoPA 1974 allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works.

- 13.27. The EPA 1990 specifies mandatory powers available to Local Authorities in respect of any noise that either constitutes or is likely to cause a statutory nuisance, which is also defined in the EPA 1990. A duty is imposed on Local Authorities to carry out inspection to identify statutory nuisances, and to serve abatement notices against these. Procedures are also specified with regards to complaints from persons affected by a statutory nuisance.

- 13.28. BS 5228 provides guidance on controlling noise and vibration from construction sites. It:

- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction sites;
- Recommends procedures for noise and vibration control in respect of construction operations; and
- Stresses the importance of community relations, stating that early establishment and maintenance of these relations throughout the carrying out of site operations will go some way towards allaying people's fears.

- 13.29. The acceptability of construction noise is likely to be affected by the location of the Site, relative to the noise sensitive premises; existing ambient noise levels; the duration and working hours of site operations;

the characteristics of the noise produced and the attitude of local residents to the site operator.

Key Questions for Consultees

- 13.30. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Do the Consultees agree with the proposed method of assessment?
 - Are the Consultees aware of any additional potential noise-sensitive receptors, such as new housing developments?
 - Which other wind energy developments should be taken into consideration in the cumulative noise assessment?
 - What are the Council's requirements for information on noise during construction?

TRAFFIC AND TRANSPORT

Introduction

- 14.1. The Traffic and Transportation Chapter will consider the effects of vehicle movements to and from the Site associated with construction, operation and decommissioning phases of the Development. Vehicle movements to the Site will likely consist of abnormal load vehicles (for the delivery of turbine components), heavy goods vehicles (HGVs), light goods vehicles and cars.
- 14.2. This Updated Scoping Report will outline the proposed methodology to be employed in the EIA for assessment of Traffic and Transportation effects on the chosen delivery routes and on the wider road network as required.

2013 Scoping Opinion

- 14.3. Whilst no comments were received from Transport Scotland in 2013, the following comments were received from the Council's traffic department:
- A swept path analysis should be undertaken;
 - The number and type of construction vehicles must be detailed;
 - Details must be given of mitigation, including any widening and management; and
 - A Traffic Management Plan (TMP) and condition survey would be required prior to commencement of the works.
- 14.4. Consideration of these points has been given when refining the methodology below.

Methodology

- 14.5. Assessment methodology will follow the 'Guidelines for the Environmental Impact of Road Traffic'. A screening process using two broad rules outlined in the aforementioned guidelines is used to identify the appropriate extent of the assessment area. These include:
- Highway links where traffic will increase by more than 30% (or where the number of HGVs will increase more than 30%); and
 - Any other specifically sensitive areas where traffic flows have increased by 10% or more.
- 14.6. Where the predicted increase in traffic flows is lower than the thresholds, the guidelines suggest the significance of effects can be stated to be low or not significant and further detailed assessments are not warranted. Peak traffic flows will be identified to assess a worst case scenario. Assessment of driver distraction will be undertaken as appropriate.
- 14.7. Traffic movements on the public roads resulting from construction, operation and decommissioning will be based on the Development

design. Traffic generation will take into account the import of construction materials and the export of surplus materials; and the movement of equipment, construction plant and labour required during each phase of the Development.

- 14.8. Predicted traffic generation associated with any forestry clearance required to accommodate the Development will be included in the assessment. Only forestry clearance that deviates from ongoing forestry management activities will be considered (i.e. forestry traffic attributable to the Development).
- 14.9. Peak traffic flows will be identified to assess a worst case scenario. An assessment of effects on road safety, driver delay, pedestrian amenity, severance, noise and vibration will be undertaken as appropriate.
- 14.10. In addition to the aforementioned guidance, the Traffic and Transport Chapter will take into account the following statutory guidance documents published by the Scottish Government:
- SPP;
 - PAN 75 – Planning for Transport; and
 - Scottish Government Planning Specific Advice Sheet for Onshore Wind Turbines (last updated December 2013).
- 14.11. It should be noted that the above list may be subject to change in the case that various policies and guidance are replaced or updated during the delivery of the project.
- 14.12. As Transport Assessments (TA's) principally relate to developments that generate a significant permanent increase in traffic as a direct consequence of function, it is not proposed a formal TA will accompany the application, as wind farms are temporary in nature and the function will not result in a permanent increase.

Baseline Conditions

- 14.13. An initial study of the access route has been undertaken and has identified that the preferred strategic access route is likely to be from the Port of Ayr via A77, A713 and then the western end of the B729 from where access to the Site would be taken. The access route is shown on Figure 10, Appendix A. Further Abnormal Load Assessment work will be undertaken as part of the remaining EIA studies.
- 14.14. Baseline traffic flow conditions on routes within the vicinity of the Site will be established and detailed in the EIA. The geographic scope of baseline assessment will be confirmed in consultation with the Council and Transport Scotland as appropriate. This scope is expected to extend to all approach routes to the Site, except where justification for their omission can be demonstrated.
- 14.15. It is proposed that where publically available traffic count information is available (for example, that provided by the Department for Transport

(DfT)), this shall be used for the baseline assessment. Where no such information is available, traffic surveys shall be conducted in accordance with best practice. It is anticipated that a combined research approach will be required (i.e. use of DfT information and primary traffic surveys).

Assessment of Effects

- 14.16. The findings of the access route study will be used to identify physical constraints and measures required for appropriate access to the Site.
- 14.17. The study would consider effects on:
- Road Users (delay and safety);
 - Road Infrastructure (dilapidation); and
 - Adjacent community/properties (safety and congestion).
- 14.18. Numerical analyses of delay through network or junction modelling is not to be required. The study would consider effects during construction, operation and decommissioning.
- 14.19. Assessing the sensitivity of receptors and magnitude of impacts is based on professional judgement. In terms of road networks, the sensitivity to change in traffic levels of any given road segment or junction is generally assessed by considering the residual capacity of the network under existing conditions. Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic and therefore, the sensitivity is considered low. Conversely, where existing traffic levels are high in comparison to the road capacity, there will be little spare capacity, and the sensitivity to any change in traffic levels would be considered as high.
- 14.20. The magnitude of the impacts will be determined through a review of the outline proposals for the Development; establishing the parameters of the road traffic that may cause an impact; and quantifying these effects.
- 14.21. To summarise, the study would involve:
- Consultation with the relevant roads authorities and emergency services (the Council, Transport Scotland, Police and FCS, etc.);
 - Procurement of existing traffic data, and arranging additional surveys where necessary;
 - Route inspections including detailed observations of communities potentially affected by the Development within the identified study area. The detailed and numeric assessment would be limited to the roads in close proximity to the Site, i.e. between the exit from the A77 and the Site entrance on the B729;
 - Following a route inspections, sensitive receptors would be identified;
 - In consultation with the Applicant and the relevant roads authorities, alternative route options would be identified;

- An initial assessment of traffic generation as a result of the Development would be undertaken. An initial assessment of effects will be based on professional judgement rather than transportation network modelling;
- Obtain refined project needs, refine traffic generation, and re-assess effects, using obtained baseline traffic data;
- Assessment of residual effects following the primary mitigation built in by virtue of the above-mentioned iteration, and any required residual mitigation needs; and
- Identify and assess the potential for cumulative effects based on other known developments in construction or in the planning process.

Key Questions

- 14.22. The following questions have been designed to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:
- Do the Consultees agree with the proposed method of assessment?
 - Are the Consultees aware of any specific access restrictions or limitations on the proposed abnormal loads route?

AVIATION

2013 Scoping Opinion

- 15.1. No specific comments were received from the Civil Aviation Authority, NATS or Defence Infrastructure Organisation (DIO) in the 2013 Scoping Opinion. Prestwick Airport provided comment stating that initial analysis indicated that their radar was well shielded by the terrain.

Assessment Criteria

- 15.2. Wind turbines have the potential to affect civil and military aviation operations. The assessment of effects of the Development will be based upon the guidance laid down in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines, Version 6 dated February 2016. Consultation criteria for aviation stakeholders is defined in Chapter 4 of that document and the recommended distances include:
- Airfield with a surveillance radar – 30 km;
 - Non radar licensed aerodrome with a runway of more than 1,100 m – 17 km;
 - Non radar licensed aerodrome with a runway of less than 1,100 m – 5 km;
 - Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
 - Unlicensed aerodromes with runways of more than 800 m – 4 km;
 - Unlicensed aerodromes with runways of less than 800 m – 3 km;
 - Gliding sites – 10 km; and
 - Other aviation activity such as parachute sites and microlight sites within 3 km – in such instances developers are referred to appropriate organisations.
- 15.3. CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved, or within which they will always be objected to. These ranges are intended as a prompt for further discussion between developers and aviation stakeholders and will be reported upon in the EIA Report.
- 15.4. It is necessary to take into account the aviation and air defence activities of the Ministry of Defence (MOD) as safeguarded by the DIO. The types of issues that will be addressed in the EIA Report include:
- MOD Airfields, both radar and non-radar equipped;
 - MOD Air Defence Radars;
 - MOD Meteorological Radars; and
 - Military Low Flying.

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- 15.5. It is necessary to take into account the possible effects of wind turbines upon the National Air Traffic Services En Route Ltd (NERL) communications, navigation and surveillance systems – a network of primary and secondary radars and navigation facilities around the country.
- 15.6. As well as examining the technical impact of wind turbines on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 Licensing of Aerodromes to determine whether a proposed development will breach obstacle clearance criteria. This will also be reported on in the EIA Report, however initial surveys show there are no physical safeguarding issues associated with the Development.
- 15.7. Licenced Aerodromes - An initial review undertaken using the above criteria shows that there are no radar equipped aerodromes within 30 km of the site; Prestwick Airport is the nearest, approximately 40 km north-west of the northern section of the Site. Initial radar modelling indicates, that neither the existing Primary Surveillance Radar (PSR), nor the newly installed Terma Scanter 4000 radar, will be affected by the turbines as there is sufficient terrain screening. This will be confirmed in an assessment to be included in the EIA Report.
- 15.8. ATC Radars - the closest MOD ATC radar is at West Freugh, approximately 62 km to the south-west of the Site. Initial radar modelling indicates that the radar will be unaffected and in any case there is no operational requirement for the use of this radar in or near the location of the Development. The next closest ATC radars are those associated with the RAF Spadeadam range, over 100 km to the east of the Site. Initial radar modelling again indicates that the radars will be unaffected by the Development. This will be confirmed and reported in the EIA Report.
- 15.9. MOD Low Flying – The Site is located around 10 km north of St John's Town of Dalry and 2 km to the east of the Glenkens (A713) valley. The Glenkens valley is an important MOD/RAF tactical low flying route by day and night. Fortunately, the Site sits on high ground and is set back from the immediate area of the valley where the Water-of-Ken/Water-of-Deugh split around Dundough Hill to significantly widen the valley floor, meaning that low flying is unlikely to be undertaken over the Site.
- 15.10. Tactical Training Area 20 - The Site is located within MOD Tactical Training Area 20 (TTA20). Tactical Training Areas are highly valuable parts of the UK Low Flying System and are carefully monitored, managed and safeguarded by the MOD Low Flying Operations Squadron (LFOS) through DIO. To aid wind energy developers, LFOS publish a Low Flying/Wind Farm Safeguarding Map on the DECC Restats web-site (Moving to the RUK site). The Map is colour coded Red, Amber, Blue and Green in descending order of Low Flying importance. TTA20 is mostly coded Red and the Site is in a Red area, meaning it is an area of high importance.

- 15.11. Local Area Low Flying Congestion - The Site is near the St John's Town of Dalry complex of villages and small towns. This is a MOD priority noise avoidance area and wind farm sites that increase the risk of military aircraft flying closer to the complex may raise concerns. In addition, the presence of existing sites (Wether Hill) and proposed sites (Longburn & Quantans) will be a factor when LFOS assesses the site.
- 15.12. The Development has been known to DIO and LFOS for some years now. Initial concerns and possible objections must be expected when MOD DIO are consulted; nonetheless, experience indicates that the Site has the potential to be successful dependent upon final turbine numbers and locations. MOD DIO consultation discussions will be reported in the EIA Report.
- 15.13. NATS En Route Ltd (NERL) – Initial radar modelling indicates that there are two NERL radars with low level coverage in this area, located at Lowther Hill and Great Dun Fell. In the case of Lowther Hill it is possible that there would be marginal visibility of northerly turbines and this may require negotiation with NERL to resolve. In the case of Great Dun Fell, there is theoretical radar line of sight across the Site, however at a distance of over 125 km it is possible that the radar signal will have been sufficiently attenuated by the terrain so as to remove any technical or operational impact from the surveillance system. This will be addressed initially through the provision of a Technical and Operational Assessment (TOPA) provided by NERL and subsequent technical discussions, if required. The outcome of any assessments and discussions will be reported in the EIA Report. NERL have not previously objected to other sites in the vicinity that have a similar exposure to the Great Dun Fell radar.
- 15.14. NERL navigation infrastructure – Examination of aviation charts indicates that there is a non-directional beacon (NDB) (a radio navigation aid) located 2.8 km to the south of the Site; a technical safeguarding assessment will be undertaken and reported in the EIA Report in accordance with the requirements laid down in CAP 670 ATS Safety Requirements. NERL will comment upon this in any case in the TOPA if it is likely to be an issue of concern.
- 15.15. Met Office Radars – The Met Office safeguards its network of radars using a European methodology known as OPERA. In general they will object to any turbine within 5 km in line of sight and will examine the impact of any turbines within 20 km. Where a site is within 20 km, the Met Office will undertake an operational assessment based on three main criteria, having determined that there is a technical impact on the radar. The factors they will consider include the following:
- Proximity to Airports;
 - River catchment response times; and
 - Population density.
- 15.16. In this case the closest Met Office radar is well beyond 20 km. It is expected that there will be no Met Office radar objection to this

Development; this will be confirmed through consultation and reported in the EIA Report.

- 15.17. Consultation with relevant aviation providers is a routine part of wind farm development and in accordance with CAP 764 consultees will include:
- Civil Aviation Authority (CAA) as the Development is expected to be greater than 50 MW;
 - MOD DIO; and
 - NERL.
- 15.18. A search for private airfields has been conducted and none were identified within consultation distance; however, not all private strips are listed in publications or marked on charts. Operators of any such private airstrips that are identified during EIA Report preparation will be consulted in accordance with CAP 764 CAP and CAP 793 Safe Operating Practices at Unlicensed Aerodromes.

EXISTING INFRASTRUCTURE

- 16.1. Wind farms have the potential to interfere with electro-magnetic signals passing above ground and physically with existing infrastructure below ground. This can therefore potentially affect television reception, fixed telecommunication links and other utilities. To identify any existing infrastructure constraints, a desk based study as well as consultation will be conducted. Consultation with relevant telecommunication and utilities providers is a routine part of wind farm development and consultees will include:
- Spectrum licensing/ OFCOM;
 - Television and telecommunications providers as appropriate; and
 - Water, gas and electricity utilities providers.
- 16.2. Other additional information obtained from consultation will be used to inform the future layout iterations.

2013 Scoping Opinion

- 16.3. No issues were highlight in the 2013 Scoping Opinion and the Applicant seeks confirmation that this remains the case.

SOCIO-ECONOMICS AND TOURISM

- 17.1. This chapter will consider the potential socio-economic and tourism effects from the Development. This includes a consideration of existing land uses within the site, local tourism activity, employment generation and any indirect economic effects from the Development.

2013 Scoping Opinion

- 17.2. Receptors were highlighted in the 2013 Scoping Opinion by Visit Scotland and ScotWays and included:
- 7 Stanes Biking Trail;
 - Galloway Forest Park, including the Dark Sky aspect;
 - Paths DS15, DS16 (both Rights of Way) and DS21 with the potential to be affected by the Site boundary;
 - Southern Upland Way; and
 - Path DS17 which forms part of a route which was promoted for its historic interest by the Heritage Paths project.
- 17.3. The Applicant can confirm that these receptors will be considered in the EIA.

Relevant Guidance and Advice

- 17.4. There is no specific legislation or guidance available on the methods that should be used to assess the socio-economic impacts of a proposed onshore wind farm development. The proposed method has however been based on established best practice, including that used in UK Government and industry reports on the sector. In particular this assessment will draw from two studies by BiGGAR Economics on the UK onshore wind energy sector, a report published by RenewableUK and DECC in 2012 on the direct and wider economic benefits of the onshore wind sector to the UK economy (BiGGAR Economics, 2012) and a subsequent update to this report published by Renewable UK in 2015 (BiGGAR Economics, 2015). These reports will provide the input assumptions if the data for the Development is not available.
- 17.5. There is also no formal legislation or guidance on the methods that should be used to assess the effects that wind farm developments may have on tourism and leisure interests. The proposed method would consider individual attractions and tourism facilities to assess if there could be any effects from the Development.
- 17.6. It is also important that the socio-economic and tourism chapter takes account of the relevant local and national policy objectives. The most relevant objectives for this are expected to be included in the following strategies:
- Scotland's Economic Strategy;

- Dumfries and Galloway Regional Economic Strategy;
- Tourism Scotland 2020; and
- Dumfries and Galloway Regional Tourism Strategy 2016 - 2020.

Summary of Baseline Environment

- 17.7. The assessment will include a description of the current socio-economic baseline within the local area. This will include a summary of economic performance data for each study area and a description of the relevant tourism assets that will be considered in the assessment.
- 17.8. The baseline environment will cover and compare three study areas, namely:
- Local Area, comprising of electoral wards that cover the location of the Development and nearest settlements;
 - Dumfries and Galloway Council Area; and
 - Scotland.
- 17.9. The economic impacts will be quantified for Dumfries and Galloway Council Area and Scotland.
- 17.10. The socio-economic baseline will cover:
- The demographic profile of the local area within the context of the regional and national demographic trends;
 - Employment and economic activity in the local area, within the context of the regional and national economic trends;
 - The industrial structure of the local area within the context of the regional and national economies;
 - The role of the tourism sector in the local and regional economy; and
 - Wage levels within the local economy compared to regional and national levels.

Key Issues for Consideration in the EIA Report

- 17.11. The issues that will be considered in this assessment will include the potential socio-economic and tourism effects associated with the Development.
- 17.12. An economic impact analysis will be undertaken using the methodology developed by BiGGAR Economics, which has been used to assess over 100 onshore wind farms across the UK. The potential socio-economic effects that will be considered are:
- Temporary effects on the regional and/or national economy due to expenditure during the construction phase;

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- Permanent effects on the regional and/or national economy due to expenditure associated with the on-going operation and maintenance of the Development;
 - Permanent effects on the local economy as a result of any additional public expenditure that could be supported by the additional tax revenue that would be generated by the Development during the operational phase;
 - Permanent effects on the local economy that could be supported by any community benefit funding that might be provided by the Applicant during the operational phase; and
 - Temporary effects on the regional and/or national economy due to expenditure during the decommissioning phase.
- 17.13. The link between onshore wind energy developments and the tourism sector is a subject of debate; however the most recent research has not found a link between tourism employment, visitor numbers and onshore wind developments. For example, in 2017 BiGGAR Economics published an updated study that considered 28 wind farms constructed between 2009 and 2015 and the trends in tourism employment in the areas local to these developments. This analysis found that there was no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at local authority level nor in the areas immediately surrounding wind farm developments.
- 17.14. Nevertheless, the tourism sector is an important contributor to the local and Scottish economies; therefore there is merit in considering whether the Development will have any effect on the tourism sector. This assessment will consider the potential effect that the Development could have on tourism attractions, routes, trails and local accommodation providers, such as:
- Galloway Forest Park; and
 - the Southern Upland Way.
- 17.15. This will consider the implications of any effects identified for the tourism sector in the local area and wider region.
- 17.16. Other issues, such as implications for the agricultural sector, may emerge during the assessment that will require consideration.
- 17.17. Effects will be considered based on the guidance from Guidelines for Environmental Impact Assessment and a Handbook for EIA.
- 17.18. It is anticipated that the contents of the assessment chapter will include:
- Introduction including scope of assessment and methodology;
 - Economic development and tourism strategic context;
 - Baseline socio-economic context;
 - Baseline tourism context;
 - Socio-economic assessment;

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- Tourism impact assessment;
 - Proposed measures and actions to maximise local economic and community impacts;
 - Proposed measures and actions to mitigate any harmful effects (if required); and
 - Summary of findings and conclusions.

17.19. This will be a desk-based study and therefore there will be no stakeholder consultations undertaken as part of this study.

Key Issues for Consultees

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

- Do the Consultees agree with the proposed method of assessment?
- What additional wind energy developments are under consideration in the area that have a similar development timeframe?
- Are the Consultees aware of any additional sensitive economic activities in the area that would not be covered in the proposed method of assessment?

SHADOW FLICKER AND REFLECTIVITY

Introduction

- 18.1. Reflectivity is the potential for the sun to 'glint' off structures which, in the case of wind turbines, can be an intermittent glint when the turbines are rotating. This effect can be minimised by selecting a matt coating for the wind turbines, designed to reduce the potential for reflection and is therefore scoped out of further assessment.
- 18.2. Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. Shadow flicker is an effect that can occur when the shadow of a blade passes over a small opening (such as window), briefly reducing the intensity of light within the room, and causing a flickering to be perceived. Shadow flicker effects only occur inside buildings where the blade casts a shadow across an entire window opening.

Methodology

- 18.3. Due to the lack of explicit guidance in Scotland, guidance within England is considered to be material for assessing shadow flicker effects. Guidance produced by the UK Government, Planning Practice Guidance for Renewable and Low Carbon Energy⁶⁵ states that "*only properties within 130 degrees either side of north, relative to the turbines can be affected at these latitudes in the UK- turbines do not cast long shadows on their southern side*". In addition, the Scottish Government Online Planning Guidance note on onshore wind¹² provides information on shadow flicker. It states: "*Where separation is provided between turbines and nearby dwellings (as a general rule 10 rotor diameters), "shadow flicker" should not be a problem*".
- 18.4. An assessment will be undertaken to determine whether or not there will be any shadow flicker effects properties surrounding the Site. This assessment will examine all properties which lie within 10 rotor diameters and 130° either side of north from each turbine. Effects will be quantified using a computer model during the EIA process and mitigation, if required, will be outlined.

⁶⁵ DCLG (2013). Planning Practice Guidance for Renewable and Low Carbon Energy. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225689/Planning_Practice_Guidance_for_Renewable_and_Low_Carbon_Energy.pdf [Accessed 01/03/2018]

CLIMATE CHANGE AND CARBON BALANCE

Introduction

- 19.1. The aim of the Climate Change Impact Assessment (CCIA) is to determine how the Development is likely to interact with a changing climate and whether any significant effects could arise. CCIA one of the new assessment topics which must be given consideration as specified within the EIA Regulations.
- 19.2. The purpose of the Development will be to produce electricity from a renewable source, the wind, thereby displacing carbon dioxide (CO₂) and other GHG emissions that would occur through the production of the equivalent amount of electricity from fossil fuel sources. The EIA will consider the current electricity generation mix and assess the level of CO₂ savings that could potentially be made depending on the source of electricity generation the wind farm is displacing at any given time.
- 19.3. CO₂ emissions can also be generated from the degradation of peatland should a wind farm be constructed in peatland habitat, as peat based soils can act as carbon sinks or carbon sources depending on how they are managed. Given that peat is present on the Site, the potential effects associated with construction on peatland would be considered as part of this chapter.

Methodology

- 19.4. As CCIA is a new category of assessment currently only provisional guidelines exist to standardise the process in the UK. IEMA published Environmental Impact Assessment Guide to Climate Change Resilience and Adaption⁶⁶ in November 2015 with the intention of providing an update once the directive was transposed. As of early 2018, this guidance has not yet been published. Accordingly, the proposed CCIA methodology is developed in line with the 2015 IEMA guidance and the text of the EU Directive and EC guidance in order to establish a comprehensive assessment methodology.
- 19.5. The proposed methodology focuses on the following elements:
- Assessment of the Development's effects on climate change (calculation of carbon footprint based on best practice guidelines, e.g. Scottish Government Carbon Calculator Tool⁶⁷) to include calculation of GHG emissions relating to construction, operation, decommissioning and the production of electricity;

⁶⁶ IEMA (2015) Environmental Impact Assessment Guide to Climate Change Resilience and Adaption. Available at:

[https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_and_adaptation%20\(1\).pdf](https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_and_adaptation%20(1).pdf) [Accessed 01/03/2018]

⁶⁷ Scottish Government (2018) Carbon Calculator Toll v1.4.0. Available at: <https://informatics.sepa.org.uk/CarbonCalculator/index.jsp> [Accessed 06/02/18]

- Assessment of the Development's vulnerabilities and resilience in the context of climate change by identifying appropriate climate change projections and climate change effects; and
- Assessment of the Development's effects upon identified environmental receptors in the context of the emerging baseline.

Baseline and Potential Effects

- 19.6. The most recent climate change projection iteration, UKCP09, has identified the following trends as a result of climate change:
- Increased temperature;
 - Changes in the frequency, intensity and distribution of rainfall events (e.g. an increase in the contribution to winter rainfall from heavy precipitation events and decreases in summer rainfall);
 - Increased windstorms; and
 - Sea level rise.
- 19.7. The UK Climate Projections 18 (UKCP18) project will build upon the UKCP09 projections. Due to be released in May 2018, academics and other researchers will use the core set of UKCP18 data to support the next Climate Change Risk Assessment.
- 19.8. The Development will be inherently designed to reduce adverse climate change effects by offsetting the production of carbon dioxide through use of renewable sources for generating electricity. The current baseline with respect to GHG emissions from existing methods of electricity generation will be identified using existing data from the Government, operational sites, and experience of other similar developments. This information will provide the baseline information against which to assess the contribution of the Development to reducing greenhouse gas emissions and potential for significant effects.
- 19.9. It is proposed that the assessment of the Development's effects on climate change will be scoped into the EIA, given the associated carbon reduction properties of wind farms and the need for felling and potential for peat disturbance.

MAJOR ACCIDENTS AND DISASTERS

Introduction

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

Assessment

- 20.2. Relevant information available and obtained through risk assessments pursuant to legislation of the European Union such as Directive 2012/18/EU of the European Parliament⁶⁸ on the control of major-accident hazards involve dangerous substances. The Directive lays down rules for the prevention of major accidents which might result from certain industrial activities and the limitation of their consequences for human health and the environment. Directive 2012/18/EU requires the preparation of emergency plans and response measures which will be covered under equivalent documents relevant to the nature of the Development. Throughout all phases of the Development, cognisance should be made of the following guidance documents produced by Renewable UK:
- Wind Turbine Safety Rules Third Edition⁶⁹;
 - Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules Third Edition⁷⁰; and
 - Onshore Wind Health & Safety Guidelines⁷¹.
- 20.3. Health and Safety during the construction and decommissioning phases of the Development will be subject to relevant legislation and best practice. This will involve site inductions, risk assessment and method statements as implemented by the Construction Management Plan (CMP). Therefore there is no further requirement for Health and Safety to be assessed within the EIA and is scoped out of further assessment.
- 20.4. The risk of a major accident could be increased by the probability of natural disasters associated with the location of the Development. This should be considered during the preparation of major-accident scenarios.

⁶⁸ European Union (2012) Directive 2012/18/EU. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0018&from=en> [Accessed 06/02/18]

⁶⁹ Renewable UK (2015) Wind Turbine Safety Rules, Third Edition. Available at: [https://c.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/Docs/Health & Safety/WindTurbine SafetyRulesIssue3.pdf](https://c.ymcdn.com/sites/www.renewableuk.com/resource/resmgr/Docs/Health%20&%20Safety/WindTurbineSafetyRulesIssue3.pdf) [Accessed 06/02/2018]

⁷⁰ Renewable UK (2015) Guidance & Supporting Procedures on the Application of Wind Turbine Safety Rules, Third Edition. Available at: <https://c.ymcdn.com/sites/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/Wind-turbine-safety-rules-guidance.pdf> [Accessed 06/02/2018]

⁷¹ Renewable UK (2015) Onshore Wind Health & Safety Guidelines. Available at: http://c.ymcdn.com/sites/www.renewableuk.com/resource/collection/AE19ECA8-5B2B-4AB5-96C7-ECF3F0462F75/OnshoreWind_HealthSafety_Guidelines.pdf [Accessed 06/02/2018]

-
- 20.5. The Development is not located within an area known for natural disasters such as floods, hurricanes, tornadoes, volcanic eruptions, earthquakes or tsunamis. At 200 m Above Ordnance Datum (AOD, approximately equivalent to sea level) and 30 km east of the Firth of Clyde, the Development is not at risk from tsunamis and there are no known volcanoes nearby. As the most probable of natural disasters to affect the Development, flood risk will be assessed within the hydrological assessment in the ER. It is noted that the Development is not located in an area of flood risk.
- 20.6. As stated in the CCIA Chapter, none of the identified climate change trends listed will affect the Development with the exception of increased windstorms. Brake mechanisms installed on turbines allow them to be operated only under specific wind speeds and should severe windstorms be experienced then the turbines would be shut down. Although an unlikely event in the area, the brake mechanism could also apply to a hurricane scenario.
- 20.7. Whilst unlikely to occur in Scotland, ice throw is a phenomenon which can occur when ice, which builds up on the blades, is dislodged when the blades begin to turn. Modern turbines are fitted with sensors which can shut the turbine down during icy conditions to prevent ice throw, thereby negating the need for concern.
- 20.8. Appropriate health and safety protocol will be implemented to minimise the occurrence of any major accidents. Infrastructure will be placed outwith flood zones to mitigate likelihood of flooding and braking mechanisms installed to allow shut down of the turbines during severe windstorms. Although it is difficult to plan for natural disasters such as earthquakes or tornados, the Development is not located in an area prone to such disasters and the likelihood of such an event is extremely rare. Therefore, it is concluded that no significant effects will arise due to major accidents and natural disasters as a result of the Development, and this topic can be scoped out of the EIA.

CUMULATIVE EFFECTS

- 21.1. At the time of writing it is known that there are other operational wind farms and a number of wind energy proposals in the region. The methodology adopted for assessing the cumulative effects of wind energy developments will be in accordance with advice from SNH and the Scottish Government. Cumulative effects, which are the combined effects of two or more wind energy developments, will be considered for each technical area assessed within the EIA Report.
- 21.2. The extent of any cumulative assessment relative to each technical assessment will be agreed during the consultation process and can include both existing and proposed wind farm developments and other forms of development. The potential landscape and visual effects, for example, which relate to the indivisibility of an individual wind farm development scheme, will be much more wide ranging than noise effects which will be limited to receptors in the more immediate vicinity of the Development.
- 21.3. In relation to some of the technical assessments, specific guidance and policy exists advising that effects associated with existing wind farm developments should be considered cumulatively.
- 21.4. An initial list of cumulative sites located within 35 km of the Site is located in Appendix C.

CONSULTATION

- 22.1. The process of identifying environmental effects is both iterative and cyclical, running in tandem with the iterative design process. Consultation forms an integral role throughout the EIA process.

Scoping Consultation

- 22.2. Infinergy is fully committed to a thorough engagement process aiming to ensure that communities are consulted and informed of developments during, and beyond, the EIA process on all projects. This is achieved by a variety of methods as appropriate including public exhibitions, meetings and circulars. Public consultation will be incorporated into the iterative design process and recorded in appropriate sections of the EIA Report. Planning Advice Note (PAN) 81 on Community Engagement provides advice on how communities should be properly engaged in the planning process and forms a basis for potential activities.
- 22.3. Comments are specifically invited on:
- The proposed content of the EIA Report;
 - Assessment methods;
 - Additional data sources; and
 - Additional consultees.
- 22.4. In terms of the proposed content of the EIA Report it should be emphasised that one of the aims of this scoping report is to scope out any issues which are known not to be significant from further consideration and to highlight and focus on the main issues which should be assessed within the EIA Report.

Public Consultation

- 22.5. It is hoped that a positive relationship can be maintained with local community members. Initial community open days were held in July 2013.
- 22.6. As part of the consultation process, the Applicant will engage with the local community in order to inform local people about the proposals, to explain the development and its likely effects and to take on board any concerns or issues.
- 22.7. The following further pre-application community involvement activity is proposed:
- Information, such as a development brief to be included on Infinergy's website (<http://www.infinergy.co.uk>) in relation to the project;
 - Written consultation to Councillors and the Chair of the relevant committee to include information about the project along with a summary of public consultation to be carried out;

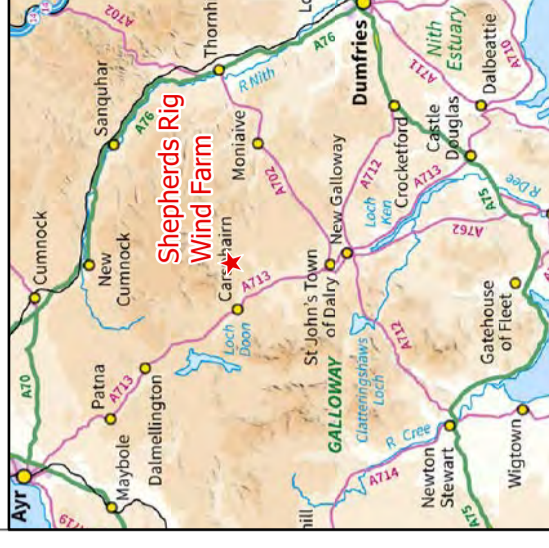
- Placement of an advert in local paper(s) announcing the project with reference to Infinergy's website for further information and including information on public exhibitions; and
- Public exhibitions – Infinergy will closely assess the consultation zone and will then decide on the location and timing of a public exhibition.

22.8. The EIA Report will include a summary of all pre-application public consultation carried out.

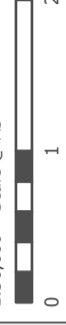
APPENDIX A – FIGURES

- Figure 1 Site Location
- Figure 2 Cumulative Developments
- Figure 3 Indicative Layout
- Figure 4 Landscape Designations
- Figure 5 Zone of Theoretical Visibility with Viewpoints
- Figure 6 Ecological Designations
- Figure 7 Ornithology Study Areas
- Figure 8 Ornithology Vantage Points and Viewsheds
- Figure 9 Cultural Heritage Designations
- Figure 10 Indicative Turbine Delivery Route

Site Boundary



1:50,000 Scale @ A3



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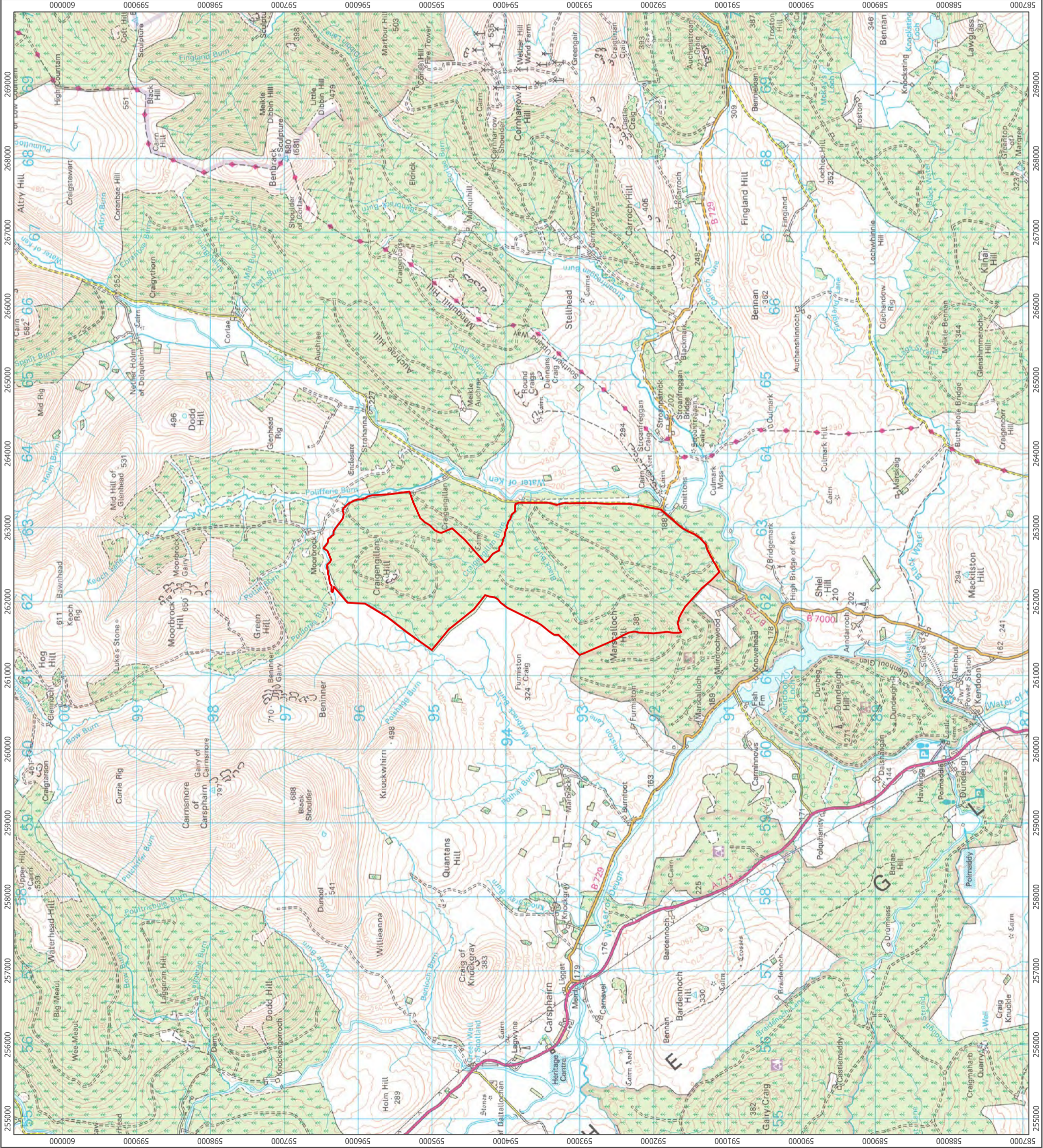
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Date: 08/03/2018

Site Location
Figure 1

Shepherds Rig Wind Farm
Scoping Report



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P:\Projects\Environment\Scoping Reports\2966 Shepherds Rig.aprx\2966-REP-001-Fig01 Site Location

- Site Boundary
- 35 km Buffer of the Site Boundary
- Appeal Granted
- Appeal Lodged
- Operational
- Planning Application Submitted
- Planning Permission Granted
- Scoping
- Under Construction

1:300,000 Scale @ A3



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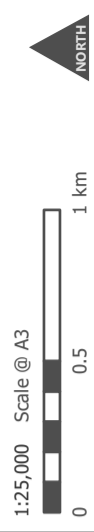
Cumulative Developments
 Figure 2

Shepherds' Rig Wind Farm
 Scoping Report



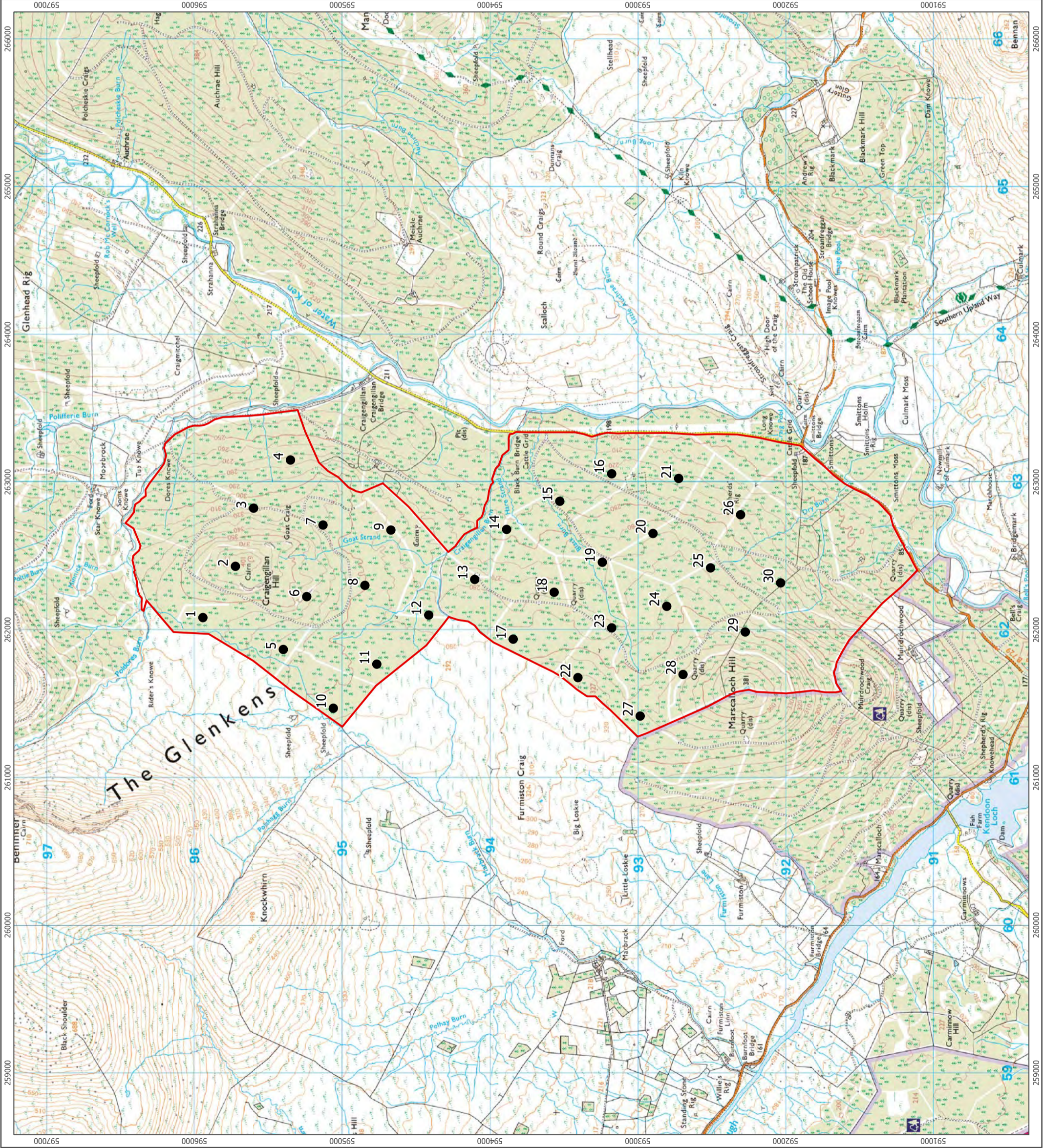
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- Site Boundary
- Potential Turbine Location



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Indicative Layout
Figure 3



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P:\Projects\Environment\Scoping Reports\2966 Shepherds' Rig.aprx\2966-REP-003_Fig03 Indicative Layout

- Site Boundary
- 35 km Buffer of Site Boundary
- Local Landscape Designation
- Garden and Designed Landscape
- National Scenic Area
- Conservation Area

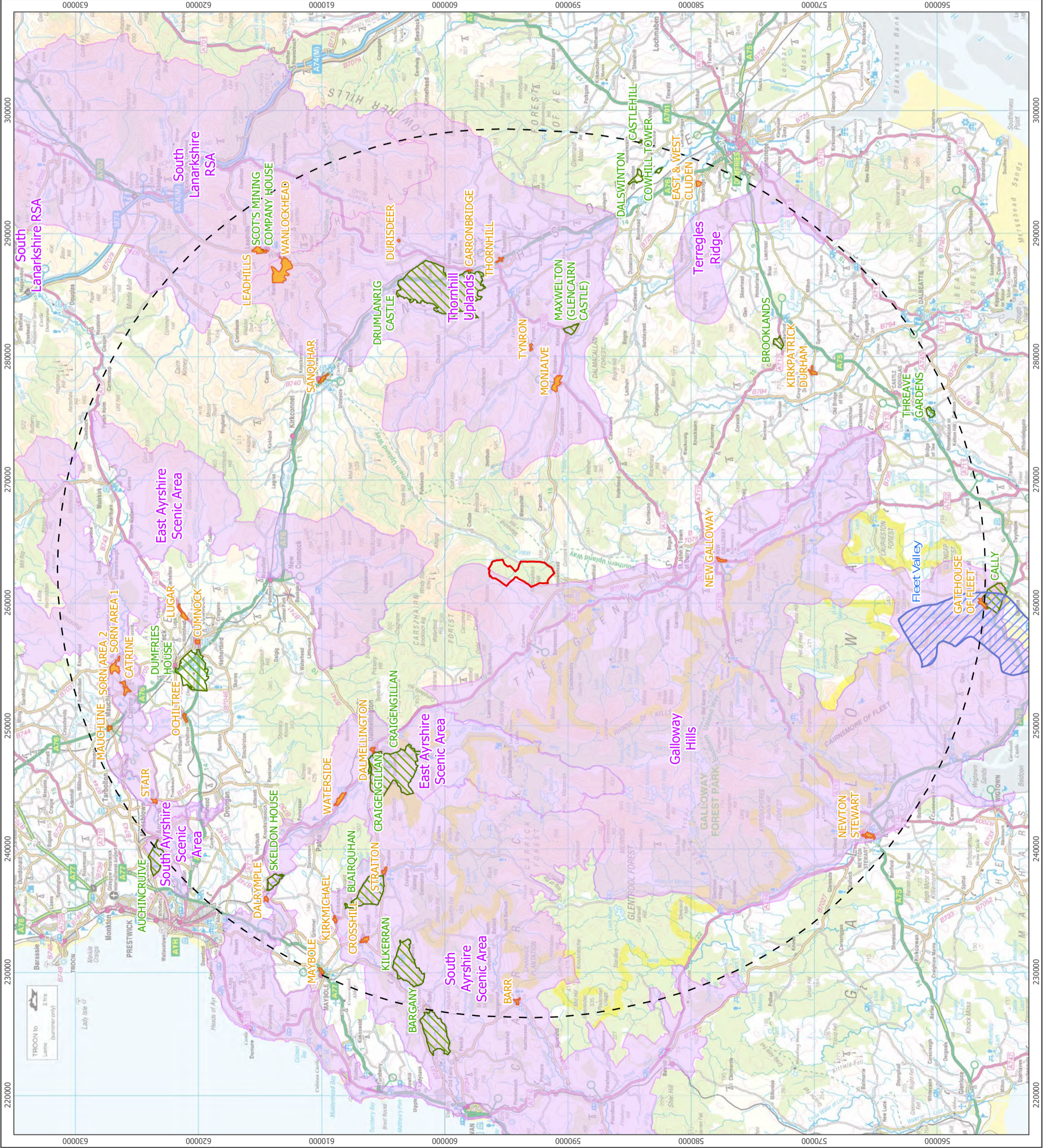
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Landscape Designations
Figure 4



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 P:\Projects\Environment\Scoping Reports\2966 Shepherds' Rig.aprx\2966-REP-004 Fig04 Landscape Designations