KINTRADWELL WIND FARM

EIA Scoping Report

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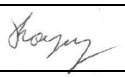
Signature				
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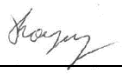
Signature				
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EXECUTIVE SUMMARY

Renewable Energy Systems Ltd (RES) ('the Applicant) are preparing an application for the Kintradwell Wind Farm ('Proposed Development'), located on the Kintradwell Estate, near Brora, Highlands. The application will be made to Scottish Ministers via the Scottish Government Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989. The application will be supported by an Environmental Impact Assessment Report (EIA Report) as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations).

The total capacity of the Proposed Development is unknown at this early stage of the design process. However, it is proposed to be over 50MW, comprising turbines with a tip height of up to 149.9m and a rotor diameter of up to 136m. Preliminary analysis has enabled an indicative site layout to be produced comprising of an expected 22 turbines. This will be subject to further technical and environmental review throughout the Environmental Impact Assessment (EIA) process.

This EIA Scoping Report forms part of the EIA process. The aim of the document is to inform stakeholders about the Proposed Development and provide information on the proposed approach to the EIA. For each environmental parameter, the potential effects of the project that require further investigation are identified and the proposed scope of assessment in terms of studies and surveys to be undertaken discussed.

The detailed assessment methodologies for the various environmental parameters will be informed by responses to this EIA Scoping Report and through further consultation with relevant statutory consultees.

1 Introduction

1.1 Background and Context

1.1.1 RES ('the Applicant) are preparing an application for the Kintradwell Wind Farm ('Proposed Development'), located on the Kintradwell Estate, near Brora, Highlands. The application will be made to Scottish Ministers via the Scottish Government Energy Consents Unit (ECU) under Section 36 of the Electricity Act 1989.

1.1.2 The Proposed Development (Figure 1.1) is located on rough moorland approximately 9km to the north of Brora.

1.1.3 The total capacity of the Proposed Development is unknown at this early stage of the design process. However, it is proposed to be over 50MW, comprising turbines with a tip height of up to 149.9m and a rotor diameter of up to 136m. Preliminary analysis has enabled an indicative site layout to be produced comprising of an expected 22 turbines (Figure 1.2). This will be subject to further technical and environmental review throughout the Environmental Impact Assessment (EIA) process.

1.1.4 The associated infrastructure will include: site access, access tracks, crane hardstanding, turbine foundations, underground cabling, on-site substation and maintenance building, temporary construction compound(s), laydown areas, compound for potential battery storage, concrete batching plant, potential excavations/borrow workings, and one or more permanent meteorological masts.

1.1.5 This document forms the Scoping Report submitted to ECU in order to request a Scoping Opinion from the Scottish Ministers, on the EIA of the Proposed Development.

1.2 Need for Development

1.2.1 The science behind climate change is well established and points strongly towards a need to reduce our reliance on fossil fuels in order to avoid negative economic, environmental and social effects. International and European commitments to reducing CO_2 and tackling climate change have been made by all major economies. In response to these issues the UK has made significant, legally binding commitments to increase the use of renewable energy. As recently as May 2019 the Scottish Government announced its intention to set a legally binding goal to achieve net-zero greenhouse gas emission by 2045 at the latest (Scottish Government, 2019) and The Highland Council (THC) declared a climate and ecological emergency (THC, 2019). The Proposed Development relates directly to both the need and those commitments.

1.3 The Applicant

1.3.1 RES is the world's largest independent renewable energy company active in onshore and offshore wind, solar, energy storage and transmission and distribution. At the forefront of the industry for over 35 years, RES has delivered more than 17GW of renewable energy projects across the globe and supports an operational asset portfolio exceeding 5GW worldwide for a large client base. Understanding the unique needs of corporate clients, RES has secured 1GW of power purchase agreements (PPAs) enabling access to energy at the lowest cost. RES employs more than 2,000 people and is active in 10 countries.

1.3.2 From its Glasgow office RES has been developing, constructing and operating wind farms in Scotland since 1993. RES has developed and/or built sixteen wind farms in Scotland with a total generation capacity of 417MW. RES is currently preparing to construct Solwaybank Wind Farm in Dumfries and Galloway and has recently finished constructing Freasdail Wind Farm in Argyll and Bute and Glenchamber Wind Farm in Dumfries and Galloway.

1.4 ITPEnergised

1.4.1 ITPEnergised (ITPE) have been commissioned by the Applicant to coordinate the EIA process for the Proposed Development.

2 Environmental Impact Assessment

2.1 Environmental Impact Assessment

2.1.1 The application will be supported by an Environmental Impact Assessment Report (EIA Report) as required by the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations).

2.1.2 The EIA Regulations require that before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require EIA if they are above certain thresholds and are likely to give rise to significant environmental impacts (Schedule 2 development).

2.1.3 The Proposed Development falls within Schedule 2(1) of the EIA Regulations and has the potential to have some significant environmental effects. Therefore, it is the opinion of the Applicant that the Proposed Development qualifies as "EIA Development" and therefore the Applicant will submit an EIA Report, as part of the Section 36 application to the Scottish Ministers.

2.1.4 EIA is an iterative process which identifies the potential environmental effects that in turn inform the eventual design of the Proposed Development. It seeks to avoid, reduce, offset and minimise any adverse environmental effects through mitigation. It takes into account the effects arising during the construction, operation and decommissioning phases. Consultation is an important part of the EIA process and assists in the identification of potential effects and mitigation measures.

2.2 Purpose of EIA Scoping Report

2.2.1 The EIA Regulations provides for potential applicants to ask Scottish Ministers to state in writing the information that should be provided within the EIA Report. The 'Scoping Opinion' will be offered following discussion with the consultation bodies.

2.2.2 The Applicant recognises the value of the scoping process and the purpose of this report is to ensure that relevant issues are identified and to confirm that the assessment process described will meet legislative requirements.

2.2.3 This EIA Scoping Report:

- describes the existing site and its context;
- identifies key organisations to be consulted in the EIA process;

- establishes the format of the EIA Report;
- provides baseline information; and
- describes key issues and the proposed assessment methodologies for various technical assessments to be covered in the EIA Report.

2.2.4 In addition, each technical chapter concludes by listing the key questions we would like the Scoping Opinion to answer.

2.2.5 This EIA Scoping Report will be issued to the Scottish Ministers via the ECU, who will seek opinions from a range of statutory and non-statutory consultees. Where requested, the report can be made available to other interested parties.

2.3 The EIA Report

2.3.1 The structure of the EIA Report will follow the requirements of EIA Regulations and other relevant good practice guidance. The EIA Report will comprise the following volumes:

- Volume 1 – Non-Technical Summary;
- Volume 2 – Written Statement;
- Volume 3 – Landscape and Visual Impact Assessment GIS Output;
- Volume 4 - Landscape and Visual Impact Assessment SNH Output;
- Volume 5 - Landscape and Visual Impact Assessment THC Output;
- Volume 6 – Technical Appendices; and
- Volume 7 – Confidential Annex.

2.3.2 Volume 2 will comprise of the following chapters:

- Chapter 1 – Introduction;
- Chapter 2 – Proposed Development;
- Chapter 3 – Design Evolution and Alternatives
- Chapter 4 – Approach to EIA;
- Chapter 5 – Landscape and Visual;
- Chapter 6 – Cultural Heritage and Archaeology;
- Chapter 7 – Ecology;
- Chapter 8 – Ornithology;
- Chapter 9 – Geology, Hydrology and Hydrogeology;
- Chapter 10 - Traffic and Transport;
- Chapter 11 – Noise;
- Chapter 12 - Aviation;
- Chapter 13 – Potential Grid Connection;

- Chapter 14 – Climate Change;
- Chapter 15 - Other Issues;
- Chapter 16 - Schedule of Environmental Mitigation; and
- Chapter 17 – Summary of Residual and Cumulative Effects.

2.3.3 Each chapter[1] will include, as a minimum, the following sections:

- Introduction;
- Legislation, Policy and Guidance;
- Consultation;
- Methodology;
- Baseline;
- Assessment of Potential Effects;
- Mitigation;
- Assessment of Residual Effects;
- Assessment of Cumulative Effects; and
- Summary.

2.4 EIA Report Format

2.4.1 The EIA Report will be made available online, on USB flash drive and hard copy although in the interest of the sustainability we would encourage take up of the online format.

3 The Proposed Development

3.1 Introduction

3.1.1 This section describes the Proposed Development and provides information on its location, physical characteristics, proposed components and design. The turbine and infrastructure layout will be subject to an iterative design process as part of the EIA.

3.1.2 The Proposed Development is located on land, near Brora in the Sutherland area of the Highlands.

3.1.3 The principal components of the Proposed Development are expected to include:

- wind turbines;
- turbine foundations;
- crane hardstandings;
- on-site access tracks between turbines and from the point of access to the turbines;

[1] Excludes front-end (1-4) and closing (13-17) chapters.

- underground cabling between the turbines;
- on-site substation;
- wind farm control building with welfare facility;
- temporary construction compound(s), laydown area(s);
- compound for potential battery storage;
- borrow pits (if suitable locations available);
- concrete batching plant; and
- permanent communications mast.

3.2 Site Description

3.2.1 The Proposed Development (Figure 1.1) is located on rough moorland approximately 9.2km to the north of Brora. The site red line boundary comprises an area of approximately 3084 hectares (ha) and rises steeply from sea-level in the south to 545m Above Ordnance Datum (AOD) at Carn Garbh in the north.

3.2.2 The southernmost section of the site abuts the A9 road corridor, the Highland Railway, power lines and scattered dwellings and farm buildings. Gordonbush wind farm (and the consented Gordonbush Extension) are located to the north-west c.1.5km, from the Proposed Development.

3.3 Site Design

3.3.1 The Proposed Development will be optimised through the EIA process considering environmental, technical and socio-economic constraints and opportunities.

3.3.2 The dimensions of the proposed turbines will be determined as the project design progresses. At this stage it is anticipated that the turbines will have a tip height of up to 149.9m and a rotor diameter of up to 136m. Preliminary analysis has enabled an indicative site layout to be produced comprising of an expected 22 turbines. It is anticipated that the total capacity will be in excess of 50MW.

3.3.3 The blades will be made from fibreglass-reinforced epoxy and the tower will be constructed from rolled steel plate. The finish and colour of the turbines is likely to be semi-matt and pale grey.

3.4 Cumulative Developments

3.4.1 Schedule 4, regulation 5 of the EIA Regulations details the information for inclusion in EIA Reports. Schedule 4, regulation 5 (e) states the following with respect to cumulative effects: *"the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".*

3.4.2 Cumulative sites within 20km of the site are illustrated on Figure 5.3 and listed in Table 3.1.

Table 3.1: Cumulative sites within 20km

Site Name	Status	Number of turbines	Height to Blade Tip	Distance and Direction from the Site
Gordonbush	Operational	35	110m	1.5km
Gordonbush Extension (as consented)	Consented	15	12no. x 130m and 3no. x 115m	2km
Gordonbush Extension (variation scheme)	In planning	11	149.9m	2km
Kilbraur	Operational	19	115m	8.5km
Kilbraur Extension	Operational	8	125m	9km

3.4.3 The approach taken to identify the development projects that should be included in the baseline for the cumulative impact assessment will be tailored so that it is appropriate to each topic under consideration.

3.5 Electrical Layout and Grid Connection

3.5.1 Turbines will be electrically connected to each other via inter-array cable circuits. An onsite substation, which would house transformer(s) and associated switchgear, would convert the electricity generated by the turbines onto an appropriate voltage for onward transmission onto the National Grid.

3.6 Construction Phase

3.6.1 It is anticipated that the construction phase of the Proposed Development would be completed over a period of approximately 12-18 months.

3.6.2 Compound(s) would be required during construction. The site compound(s) would include site cabins and welfare facilities for construction workers and could also be used as a laydown area for the delivery of some materials. A concrete batching plant would also be in operation.

3.6.3 Stone and sand required to construct any new access tracks could potentially be obtained from onsite borrow pits. The exact location of borrow pits would be dependent upon site surveys, availability of suitable material and proximity to where it is required. Should a suitable borrow pit search area not be identified within the site, the Applicant will need to make provision for the import of aggregate from a suitable offsite source.

3.6.4 All statutory legislation and other best practice guidance would be fully complied with during construction.

3.6.5 Construction mitigation and environmental protection measures would be implemented via a Construction Environmental Management Plan (CEMP).

3.7 Operational Phase

3.7.1 The assessments undertaken to inform the EIA will consider the operational phase of the Proposed Development in perpetuity.

3.7.2 Routine operational and maintenance work would be carried out as necessary.

3.8 Decommissioning Phase

3.8.1 When decommissioning is required, it is considered that the impacts would be less than the impacts experienced during the construction phase. Should consent be granted, it is anticipated that there would be a condition which would require the removal of elements of the Proposed Development should they become non-operational for a defined period of time.

4 Planning Policy Context

4.1 Introduction

4.1.1 The application will be submitted under Section 36 of the Electricity Act 1989 (Section 36 application) and accompanied by a Planning Statement in support of the Proposed Development. The Planning Statement will consider the Proposed Development against identified planning and other policy objectives, concluding with substantiated comments about the extent to which the Proposed Development complies with the aims and objectives of identified plans and policies.

4.1.2 For clarity, the Planning Statement will draw upon the residual effects, post mitigation, of the Proposed 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 planning and energy related documents that will be considered by the Applicant are set out below.

4.2 National Planning Policy

National Planning Framework 3

4.2.1 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 Section 36 applications.

4.2.2 The Planning Statement will identify those elements of NPF3 considered relevant to determination of the Proposed Development. While Section 3 of NPF3 'A low carbon place' is likely to contain material of most relevance to the Proposed 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 Statement will identify and discuss these matters.

Scottish Planning Policy

4.2.3 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 polices which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land*" (Scottish Government, 2014). 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.

4.2.4 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.

4.2.5 The narrative and policies under the 'Low Carbon Place' heading are likely to be of most relevance to the Proposed 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 Onshore Wind Energy Supplementary Guidance (2016) on The Highland Council's website, the site is located partly within a Group 2 and partly within a Group 3 area.

4.2.6 The Planning Statement will consider the Proposed 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 development.

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

4.2.7 The Scottish Government introduced online renewables advice in February 2011, which has been 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 flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.

4.2.8 The Planning Statement will consider the most up to date version of the advice note in place at the time of preparation.

Planning Advice Notes

4.2.9 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 Proposed Development and these may be briefly discussed in the Planning Statement, with more detailed commentary reserved for the relevant technical chapters of the EIA Report. 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 Policy for Scotland (2019)

4.2.10 The Historic Environment Policy for Scotland (HEPS) sets out policies for the historic environment, provides greater policy direction for Historic Environment Scotland and provides a policy framework to inform the work of organisations that have a role and interest in managing the historic environment. HEPS is a material consideration which should be taken account of whenever a planning decision will affect the historic environment. Pages 10 and 11 illustrate the challenges and opportunities facing the historic environment including climate change and the effort required to mitigate and adapt to its effects.

4.2.11 The Planning Statement will consider the Proposed Development against HEPS, notably the 'Policies and Principles' which include conservation and management of change for the benefit of present and future generations. HEPS recognises that changes in society, climate change and economy can create challenges for the historic environment requiring that resources are managed sustainably to balance competing demands.

4.3 Strategic and Local Planning Policy

Highland-wide Local Development Plan, Caithness and Sutherland Local Development Plan and Onshore Wind Supplementary Guidance

4.3.1 The Development Plan covering the site is the Highland–wide Local Development Plan (adopted 2012) (HwLDP) and the Caithness and Sutherland Local Development Plan (adopted 2018) (CaSPlan). Onshore Wind Supplementary Guidance adopted in 2016 also forms part of the Development Plan documents.

4.3.2 A review of the HwLDP commenced in 2015 and consultation was held on the Main Issues Report to inform the first stage of the replacement HwLDP process. The review was postponed during 2017 when The Highland Council confirmed their intention to wait until the implications of the Scottish Government's review of the planning system has become clearer. The Planning (Scotland) Act 2019 has very recently received royal assent (July 25th 2019), however there is no update at the time of writing as to when the review may resume. Therefore, it is expected that the currently adopted HwLDP will provide the established planning policy throughout the EIA Report preparation stage and the determination period for the Proposed Development. Progress of the HwLDP review will be monitored and if appropriate the Planning Statement will contain a section that discusses relevant progress.

4.3.3 The HwLDP will be a significant material consideration in shaping The Highland Council's consultation response to the Section 36 application and the Planning Statement will identify

those aims, objectives and planning policies of the HwLDP considered relevant to the Proposed Development. Policy 67 of the HwLDP is the principal policy relating to renewable energy development, however other policies of the HwLDP will also be discussed as appropriate within the context of the EIA. The CaSPlan contains commentary on the relevance of renewable energy development for the Highlands and will also be considered.

4.3.4 The Highland Council adopted their Onshore Wind Supplementary Guidance in 2016, which also forms part of the Proposed Development Plan and is afforded the same weight as the Local Development Plan documents for decision making purposes. The Planning Statement will identify the relevant sections of the Supplementary Guidance.

4.4 Energy Policy

4.4.1 According to the United Nations Intergovernmental Panel on Climate Change's fifth assessment report, 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.

4.4.2 Most of the energy policy documents of relevance to the Proposed 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 Statement will identify and discuss the key aims and objectives of the most pertinent energy policy documents to the Proposed Development, as at the time of EIA Report preparation. The discussion will include relevant European, United Kingdom (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 Accord - 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 Directive - The Directive encourages energy efficiency, energy consumption from renewable sources and the improvement of energy supply.
- The Climate Change (Scotland) Act 2009 - Sets out the statutory framework for GHG emission reductions in Scotland. The Scottish Government published its updated Climate Change Plan in February 2018, setting out proposals to drive emissions down by 66% by 2032.
- Renewables Action Plan (2009) 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) - This 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) - 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, 2013 - This Scottish Government publication examines the way in which Scotland generates electricity and is underpinned by 4 key principles, one of which includes a largely decarbonised electricity generation sector by 2030.

4.5 Questions

4.5.1 **Do you agree that the Proposed Development falls partly within a Group 2 and partly within a Group 3 area?**

4.5.2 **Are the planning policies identified appropriate for inclusion in the Planning Statement?**

4.5.3 **Are there any other planning policies not listed in this Scoping Report that should be considered?**

5 Landscape and Visual

5.1 Introduction

5.1.1 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.

5.1.2 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.

5.1.3 It is therefore proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and an LVIA 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 fully familiar with the landscape in the vicinity of the site.

5.2 Legislation, Policy and Guidance

5.2.1 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 Assessment (GLVIA3), (Landscape Institute and the Institute for Environmental Management and Assessment, 2013).

5.2.2 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."

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

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

- Guidelines for Landscape Character Assessment, Countryside Agency and SNH (2002);
- Landscape Character Assessment Guidance for England and Scotland: Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity, The Countryside Agency and SNH (2002);
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, March 2012);
- Siting and Design of Wind farms in the Landscape, Version 3 (SNH, February 2017);
- Visual Representation of Wind farms – Version 2.2 (SNH, February 2017);
- Visualisation Standards for Wind Energy Developments (The Highland Council, July 2016);
- LI Advice Note 02/17 Visual representation of development proposals (Landscape Institute, March 2017);
- LI Advice Note 02/19 Residential Visual Amenity Assessment (RVAA), (Landscape Institute, March 2019);
- LI Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment (Landscape Institute, 2011).
- Assessing the Impacts on Wild Land Interim Guidance Note (SNH, 2007);
- Assessing Impacts on Wild Land Areas – Technical Guidance (Consultative Draft) (SNH, 2017); and
- Assessment of Highland Special Landscape Areas (THC, 2011)

5.2.5 Full details of the methodology will be provided within the LVIA chapter of the EIA Report.

5.3 Proposed Scope of Assessment

5.3.1 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 Proposed Development) and evaluate their sensitivity to the type of changes proposed;
- to identify and describe any impacts of the Proposed 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 inherent 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.

Distinction between Landscape and Visual Effects

5.3.2 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 Proposed 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 Impacts Considered

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

5.3.4 The LVIA will not only assess the impacts associated with the turbines, but also any related impacts resulting from any anemometer masts, control building/substation, underground cabling, site tracks and access roads.

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

5.3.6 The LVIA will also consider the potential for any cumulative effects to arise. The requirement for consideration of cumulative effects under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 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"

5.3.7 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'*

5.3.8 There is therefore no longer any 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.

5.3.9 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.'*

5.3.10 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.

5.3.11 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

5.3.12 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 maximum turbine blade tip height of 149.9m and is presented at Figure 5.1.

5.3.13 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 work has been conducted during July 2019 to understand the actual likely visibility of development at the site.

5.3.14 Having reviewed the ZTV and with regard to best practice guidance, it is proposed that the LVIA will consider an initial 35km radius study area. Detailed assessment will then be provided for a 15km 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.

5.3.15 For the cumulative assessment, consideration was initially given to a 60km radius from the site, as recommended by SNH best practice guidance. Following this review, it is proposed that a 20km detailed study area be adopted to consider cumulative effects, which is considered represents a proportionate extent of the study area and the limit within which any potential significant cumulative effects might occur. Cumulative sites within 20km of the site are illustrated on Figure 5.3 and listed in Table 5.1.

Table 5.1: Cumulative sites within 20km

Site Name	Status	Number of turbines	Height to Blade Tip	Distance and Direction from the Site
Gordonbush	Operational	35	110m	1.5km
Gordonbush Extension (as consented)	Consented	15	12no. x 130m and 3no. x 115m	2km
Gordonbush Extension (variation scheme)	In planning	11	149.9m	2km
Kilbraur	Operational	19	115m	8.5km
Kilbraur Extension	Operational	8	125m	9km

Proposed LVIA Viewpoint Locations

5.3.16 It is proposed that the 15 locations set out in Table 5.2 are included as viewpoints in the LVIA. The locations which are illustrated on Figure 5.1 represent visual receptors and character types at a range of distances and directions from the site.

5.3.17 It is acknowledged that the Proposed Development is located immediately south east of the Gordonbush Wind Farm. This operational scheme comprises of 35 no. turbines, 110 m to blade tip. An extension to the Gordonbush Wind Farm comprising 15 no. turbines (12no. x 130m and 3no. x 115m) has been granted consent. An application to vary this consent to 11no. turbines, 149.9m is currently in the process of being determined by the Energy Consents Unit. Around 5km to the south west, lies the operational Kilbraur Wind Farm (19no. 115m turbines) and its extension (8no. 125m turbines).

5.3.18 A comparative exercise of ZTV coverage between the Proposed Development and the turbines in the Gordonbush schemes has been undertaken to understand the potential cumulative effects of the Proposed Development in combination with the other schemes. This in turn has influenced the choice of viewpoint locations, a number of which have been purposefully chosen to replicate those that were included in the LVIA which was submitted with the application to vary the Gordonbush Extension scheme to 149.9m turbines.

Table 5.2: Proposed Assessment Viewpoints

No	Location	OS Grid Ref	Direction	Receptor Type
1	Doll	288433, 903280	South	Residents/ Road Users
2	Lower Brora	290965, 903639	South	Residents/ Road Users/ Recreational
3	A9, North Brora	290506, 904648	South	Residents/ Road Users
4	Beinn Dhorain*	292539, 915656	North-east	Recreational
5	Creag nam Fiadh*	284110, 923700	North	Recreational
6	Hope Hill*	277861, 918871	North-west	Recreational
7	Track to Ben Armine Lodge*	275899, 913789	West	Recreational
8	Brora to Rogart minor road near Sciberscross*	278487, 910447	West	Residents/ Road Users/ Recreational
9	Brora to Rogart minor road near Dalreavoch*	275550, 909090	West	Residents/ Road Users/ Recreational
10	Craggie Beg*	273869, 908142	West	Residents/ Recreational
11	Ben Horn*	280735, 906364	South -west	Recreational
12	Ben Bhraggie*	281355, 901011	South -west	Recreational
13	Viewing Point, on minor road near Skelbo Castle	279283, 895352	South	Recreational / Road Users
14	Dornoch, coastal footpath near Royal Dornoch Golf Club	280729, 889672	South	Residents/ Recreational
15	Portmahomack*	291545, 884832	South	Residents/ Road Users/ Recreational

denotes that the viewpoint replicates a location included in the Gordonbush Extension Variation LVIA.

5.3.19 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 Proposed Development as receptors move through the landscape.

5.3.20 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.

5.3.21 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

5.3.22 For each of the viewpoints, visualisations will be prepared in line with Visualisation Standards for Wind Energy Developments (The Highland Council, July 2016) and Visual Representation of Wind farms – Version 2.2 (SNH, February 2017). There are however a number of matters relating to the visualisations which we would be grateful for further clarification on the approach to be taken. These are set out in the Key Questions section below.

5.4 Baseline Conditions

Landscape Character

5.4.1 Scottish Natural Heritage (SNH) published an updated national set of Landscape Character Types (LCTs) in early 2019. This 2019 national LCT map and associated LCT Descriptions now supersede the earlier 1990s SNH landscape character descriptions and mapping.

5.4.2 The site lies within LCT 135 'Rounded Hills – Caithness and Sutherland'. The 'Key Characteristics' of this area are defined by SNH as follows:

- *'Rolling hills forming broad, subtly rounded summits but with some more pronounced hills also occurring, these often featuring steeper slopes along the coast or where truncated by deep glens.*
- *Hills cut by numerous narrow burns and small lochans lie within dips, corries and on plateau summits.*
- *Predominantly dense heather ground cover and moorland grasses, but also some areas of bog.*
- *Fragments of broadleaf woodland in inaccessible locations.*
- *Scarcely settled with a largely uninhabited interior and widely scattered crofts and farms on lower slopes adjoining straths and farmed landscapes.*
- *Narrow glens and lower hill slopes often rich in archaeology with features such as standing stones, brochs and medieval townships.*
- *Wind farms located in more accessible and generally lower rolling hills, either close to extensive forestry or the high voltage transmission line aligned broadly parallel to the south-east Sutherland coast.*
- *Convex character of hill slopes limiting distant visibility and views of the hill tops when travelling through the landscape.*
- *Views into the interior of the hills very restricted.*

- *Strong sense of wild character can be experienced within the more remote and little modified parts of this landscape'.*

5.4.3 Other national character types covering the landscape in the vicinity of the site include: LCT 134 – 'Sweeping Moorland and Flows - Caithness & Sutherland'; LCT 142 – 'Strath - Caithness & Sutherland'; and LCT 144 – 'Coastal Crofts and Small Farms - Caithness & Sutherland'.

5.4.4 The 'Highland Council Onshore Wind Energy Supplementary Guidance' (November, 2016), did not consider this part of Sutherland within its analysis of the sensitivity of the landscape.

5.4.5 The LVIA will therefore include an assessment of the sensitivity of the landscape character, based on each of the national LCTs, before going on to provide an assessment of the potential for the Proposed Development to result in significant effects on the character of each.

Landscape Designations

5.4.6 The site lies within the 'Loch Fleet, Loch Brora and Glen Loth' Special Landscape Area (SLA). The Highland Council Assessment of Highland Special Landscape Areas (2011) identified this area of 210.4km^2 as follows:

"Location and Extent: Lying along the east coast of Sutherland, this area stretches from the southern slopes of Strath Ullie in the north to Loch Fleet in the south, including areas of coastal shelf and interior moorland and hills"

"Overview: This is an area of rolling moorland hills, punctuated by a series of southeast orientated glens, straths and lochs, and edged to a narrow strip of farmed coastal shelf running along the shoreline. The character of this area is distinguished by its composition of contrasting landscape features – the contrasting landform, landcover and landscape pattern that empathise the distinction of each other"

5.4.7 The Assessment also considered the *'Key Landscape and Visual Characteristics'* and *'Special Qualities'* of the SLA before identifying a series of matters relating to its *'Sensitivity to change'* which included the following:

- *"Additional large scale features could, in combination with the existing wind turbines and overhead electricity line to the west of the SLA, could diminish the perceived scale of the hills and their qualities of wildness and tranquillity.*

- *Additional features within the moorland hills could appear to compromise the simplicity of the existing land cover and landform shape".*

5.4.8 The potential for landscape and visual effects in relation to the SLA will be considered appropriately in the LVIA.

5.4.9 With regard to other landscape designations, the site lies outwith any National Parks or National Scenic Areas (NSAs), with the nearest NSA, Dornoch Firth, lying around 20km away. It also lies outwith Wild Land, with the nearest, Area 35: Ben Klibreck - Armine Forest, lying around 4km away, beyond the exiting Gordonbush Wind Farm. The nearest Gardens and Designed Landscape is Dunrobin Castle, around 10km to the south. Landscape designations in the vicinity of the site are illustrated on Figure 5.2.

Visual Receptors

5.4.10 The principal settlement in the nearby locality surrounding the site is Brora, which lies on the coast, around 9.2km to the south of the site. There would also be the potential for some views from the local road network, including the A9, the A897 and the highland railway as it runs north towards Wick and Thurso, and south to Inverness. It is acknowledged there are also locally promoted walking routes in the vicinity of Brora, including along the coastline, with the beaches north and south of Brora also likely to attract visual receptors.

5.4.11 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 The Highland Council and SNH best practice guidance.

Residential Visual Amenity

5.4.12 A detailed consideration with regard to residential visual amenity will also be given within in the LVIA. However, as there are no residential properties located within 2km of the Proposed Development, it is not proposed that a separate standalone Residential Visual Amenity Study (RVAS) will be undertaken as part of the LVIA.

5.5 Potential Effects

5.5.1 It is proposed that the LVIA will consider the potential effects of the Proposed Development upon:

- individual landscape features and elements;
- landscape character; and
- visual amenity and the people who view the landscape.

5.5.2 The LVIA will considers the effects at three different stages in the lifetime of the Proposed Development:

- during construction of the Proposed Development;
- during the operational lifetime of the Proposed Development; and
- during decommissioning of the Proposed Development.

5.5.3 Effects during the first and third of these phases are considered to be temporary and would have a short duration. Effects associated with the operational phase of the Proposed Development are considered to be long term, reversible effects.

5.6 Potential Mitigation

5.6.1 As discussed in best practice guidance for EIA, mitigation measures may include:

- avoidance of effects;
- reduction in magnitude of effects; and

- compensation for effects (which may include enhancements to offset any adverse effects).

5.6.2 The primary mitigation adopted in relation to landscape and visual matters is likely to be embedded within the design of the Proposed Development and will comprise the consideration given to avoiding and minimising landscape and visual effects during the evolution of the Proposed Development layout. This is sometimes referred to as 'mitigation by design'.

5.7 Questions

5.7.1 The following are what are thought to be the key issues which require consideration by the consultees:

- **Are there any comments on the proposed study areas?**
- **Are there any comments on the proposed list of viewpoint locations?**
- **Are there any further wind farm sites, to those listed in Table 5.1, to consider as part of the cumulative assessment?**
- **It is noted that within 'Visualisation Standards for Wind Energy Developments (July 2016)' the need to provide 'monochrome' images (a black and white photo with red turbines) is set out to be 'if required' by The Highland Council. Can The Highland Council provide confirmation for which viewpoints, if any, this will be required?**
- **It is also noted that there is also a requirement within 'Visualisation Standards for Wind Energy Developments (July 2016)' for any existing cumulative turbines in the view to be digitally removed and re-photomontaged back into the photograph so that they are orientated to face towards the viewer. Can The Highland Council confirm if this will be required if the turbines are already orientated to face towards the viewer in the baseline photograph?**
- **Do you agree that residential visual amenity can be considered within the LVIA and (that for the reasons detailed in 5.4.12) a standalone Residential Visual Amenity Study (RVAS) is not required?**
- **Do you agree that the proposed scope of assessment is appropriate?**

6 Archaeology and Cultural Heritage

6.1 Introduction

6.1.1 This section provides an overview of the Archaeology and Cultural Heritage context for the Proposed Development. It sets out the relevant legislative and policy framework and the guidance relevant to the EIA. The methodology that will be employed in the assessment is set out and an initial description of the baseline is provided.

6.2 Legislation, Policy and Guidance

6.2.1 The assessment will be prepared following the advice and guidance in the following documents:

Legislation

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Buildings and Conservation Areas (Scotland) Act 1997 (as amended by Historic Environment (Amendment) (Scotland) Act 2011);
- Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013; and
- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Planning Policies

- National Planning Framework (NPF 3);
- Scottish Planning Policy (SPP) (2014);
- Historic Environment Policy for Scotland (HEPS) (2019) (HES 2019); and
- Highland-wide Local Development Plan (2012) - Policy 57 Natural, Built and Cultural Heritage.

Guidance

- SNH and Historic Environment Scotland (2018) 'Environmental Impact Assessment Handbook';
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014);
- Designation Policy and Selection Guidance (Historic Environment Scotland, 2019);
- Managing Change in the Historic Environment: Setting (Historic Environment Scotland, 2016);
- The Highland Council 'Standards for Archaeological Work' (2012);
- The Highland Council 'Historic Environment Strategy' (2013) (THC 2013); and
- Planning Advice Note 2/2011: Planning and Archaeology (PAN 2/2011).

6.3 Proposed Scope of Assessment

6.3.1 The EIA Report will include a chapter that will present an assessment of the Proposed Development's potential effects upon archaeology and cultural heritage assets. The assessment will consider the potential for direct (i.e. physical) effects on the cultural heritage within the Proposed Development site, arising from construction activities, and effects upon the settings of heritage assets with statutory and non-statutory designations in the wider landscape surrounding the Proposed Development.

Study Areas

6.3.2 Two study areas will be used for the assessment:

- The Inner Study Area: the Proposed Development site, defined by the site red line boundary, within which turbines and associated infrastructure are proposed, will form the study area for the identification of heritage assets that could receive direct effects arising from the construction of the Proposed Development.
- The Outer Study Area: a wider study area extending 10km from the outermost finalised proposed turbine locations will be used for the identification of cultural heritage assets whose settings may be affected by the Proposed Development (including cumulative effects). Views towards any assets identified as having settings sensitive to change will also be considered, even where no visibility is predicted from the asset. The wider ZTV will also be assessed to identify any designated assets beyond 10km that have settings that may be especially sensitive to the Proposed Development.

Issues Scoped Out of the Assessment

6.3.3 In order to provide a proportionate EIA that focuses on the likely significant effects on archaeology and cultural heritage arising from the Proposed Development it is proposed that the following will be scoped out:

- Impacts on the settings of heritage assets beyond 10km of the Proposed Development will be scoped out, as most assets beyond that distance will be too far distant to have their settings significantly adversely affected by the Proposed Development. An initial appraisal of the blade tip height ZTV (Figure 6.1) has identified no assets beyond 10km that could have their settings adversely affected by the Proposed Development.
- Assessment of impacts on the settings of Category C Listed Buildings beyond 5km will be scoped out as it is considered that, for these locally important designations, beyond that distance their settings will not be significantly adversely affected.

Desk-based Assessment

6.3.4 A detailed desk-based assessment will be carried out, drawing on existing archive records (Highland Historic Environment Record), historic maps, and modern high-resolution aerial photography (GoogleEarth) to identify sites and areas that have archaeological and historic environment potential. The following sources will be consulted:

- Historic Environment Scotland Spatial Data Warehouse: for up-to-date data on the locations and extents of Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory status Garden and Designed Landscapes and Inventory status Historic Battlefields;
- Highland Council Historic Environment Record (HER): for a digital database extract in GIS for all assets within 10km of the Proposed Development site boundary;
- The National Record for the Historic Environment (NRHE) database (Canmore): for any information additional to that contained in the HER;

- Relevant bibliographic references will be consulted to provide background and historic information;
- Map Library of the National Library of Scotland: for Ordnance Survey maps and other historical map resources; and
- Historic Land-Use Assessment Data for Scotland (HLAMap): for information on the historic land use character of the Proposed Development site and the surrounding area.

Field Surveys

6.3.5 A targeted walk-over field survey within the Inner Study Area will be carried out once an initial infrastructure layout has been developed. The field survey will focus on the heritage assets that may be affected by the Proposed Development; in particular, those in proximity to components of the infrastructure and those along the proposed site access. The survey will be undertaken in order to:

- locate and record the baseline character and condition of heritage assets identified through the desk-based assessment;
- identify any others not revealed through the desk-based study;
- identify any area of archaeological potential; and
- assess the heritage value of the heritage assets identified through the desk-based assessment and field survey.

6.3.6 Site visits to heritage assets in the Outer Study Area will be undertaken to assess, with the aid of wireline visualisations, the predicted impact of the Proposed Development on their settings. Site visits will include any assets specifically identified by consultees as requiring assessment and those identified through analysis of the blade tip height ZTV that lie within 5km where it is considered, on the basis of professional judgement, that the impact on their settings could be significant.

6.3.7 The effects of the Proposed Development on heritage assets will be assessed on the basis of their type (direct effects, impacts on setting and cumulative impacts) and nature (adverse or beneficial). The assessment will take into account the value/sensitivity of the heritage asset and its setting and the magnitude of the predicted impact.

- Adverse impacts are those that detract from or reduce cultural significance or special interest of heritage assets.
- Beneficial impacts are those that preserve, enhance or better reveal the cultural significance or special interest of heritage assets.

Assessment Methodology

6.3.8 The assessment of significance of effects will be undertaken using two key criteria: the sensitivity of the cultural heritage asset and the magnitude of the predicted impact, which measures the degree of change to the baseline condition of an asset resulting from the Proposed Development.

Assigning Sensitivity to Heritage Assets

6.3.9 Cultural heritage assets are given weight through the designation process. Designation ensures that sites and places are recognised by law through the planning system and other regulatory processes. The level of protection and how a site or place is managed varies depending on the type of designation and its laws and policies (HES, 2019).

6.3.10 Table 6.1 summarises the relative sensitivity of key cultural heritage assets (and their settings) relevant to the Proposed Development (excluding, in this instance, World Heritage Sites and Marine Resources).

Table 6.1: Sensitivity of Heritage Assets

Sensitivity of Asset	Definition/Criteria
High	Assets valued at an international or national level, including: Scheduled Monuments Category A Listed Buildings Inventory Gardens and Designed Landscapes Inventory Historic Battlefields Non-designated assets that meet the relevant criteria for designation
Medium	Assets valued at a regional level, including: Archaeological sites and areas that have regional value (contributing to the aims of regional research frameworks) Category B Listed Buildings Conservation Areas
Low	Assets valued at a local level, including: Archaeological sites that have local heritage value Category C listed buildings Unlisted historic buildings and townscapes with local (vernacular) characteristics
Negligible	Assets of little or no intrinsic heritage value, including: Artefact find-spots (where the artefacts are no longer in situ and where their provenance is uncertain) Poorly preserved examples of particular types of features (e.g. quarries and gravel pits, dilapidated sheepfolds, etc)

Criteria for Assessing the Significance of Effects

6.3.11 The magnitude of impact (adverse or beneficial) will be assessed in the categories, high, medium, low and negligible and described in Table 6.2.

Table 6.2: Magnitude of Change

Magnitude of Impact	Criteria	
	Adverse	Beneficial
High	Changes to the fabric or setting of a heritage asset resulting in the complete or near complete loss of the asset's cultural significance. Changes that substantially detract from how a heritage asset is understood, appreciated and experienced.	Preservation of a heritage asset in situ where it would otherwise be completely or almost completely lost. Changes that appreciably enhance the cultural significance of a heritage asset and how it is understood, appreciated and experienced.
Medium	Changes to those elements of the fabric or setting of a heritage	Changes to important elements of a heritage asset's fabric or setting,

	asset that contribute to its cultural significance such that this quality is appreciably altered. Changes that appreciably detract from how a heritage asset is understood, appreciated and experienced.	resulting in its cultural significance being preserved (where this would otherwise be lost) or restored. Changes that improve the way in which the heritage asset is understood, appreciated and experienced.
Low	Changes to those elements of the fabric or setting of a heritage asset that contribute to its cultural significance such that this quality is slightly altered. Changes that slightly detract from how a heritage asset is understood, appreciated and experienced.	Changes that result in elements of a heritage asset's fabric or setting detracting from its cultural significance being removed. Changes that result in a slight improvement in the way a heritage asset is understood, appreciated and experienced.
Negligible	Changes to fabric or setting of a heritage asset that leave its cultural significance unchanged and do not affect how it is understood, appreciated and experienced.	

6.3.12 The sensitivity of the asset (Table 6.1) and the magnitude of the predicted impact (Table 6.2) will be used to inform the professional judgement of the potential significance of the resultant effect. Table 6.3 summarises the criteria for assigning significance of effect. Where two outcomes are possible through application of the matrix and where a potentially significant effect may result, professional judgement supported by reasoned justification, will be employed to determine the level of significance.

Table 6.3: Significance of Effect

Magnitude of Impact	**Sensitivity of Asset**			
	High	Medium	Low	Negligible
High	major	major / moderate	moderate / minor	minor
Medium	major / moderate	moderate	minor	minor / negligible
Low	moderate / minor	minor	minor / negligible	minor / negligible
Negligible	minor	minor / Negligible	minor / negligible	negligible

6.3.13 Major and moderate effects are considered to be 'significant' in the context of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations). minor and negligible effects are considered to be 'not significant'.

Assessment of Effects on Setting

6.3.14 Historic Environment Scotland's guidance document, 'Managing Change in the Historic Environment: Setting' (HES 2016), notes that:

"Setting can be important to the way in which historic structures or places are understood, appreciated and experienced. It can often be integral to a historic asset's cultural significance."

"Setting often extends beyond the property boundary or 'curtilage' of an individual historic asset into a broader landscape context".

6.3.15 The guidance also advises that:

"If proposed development is likely to affect the setting of a key historic asset, an objective written assessment should be prepared by the applicant to inform the decision-making process. The conclusions should take into account the significance of the asset and its setting and attempt to quantify the extent of any impact. The methodology and level of information should be tailored to the circumstances of each case".

6.3.16 The guidance recommends that there are three stages in assessing the impact of a development on the setting of a historic asset or place:

- Stage 1: identify the historic assets that might be affected by the proposed development;
- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and
- Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated.

6.3.17 Following this approach, the turbine blade tip and hub height ZTVs for the Proposed Development will be used to identify those heritage assets from which there would be theoretical visibility of one or more of the proposed wind turbines.

- Scheduled Monuments, Category A and B Listed Buildings, Conservation Areas, Inventory Gardens and Designed Landscapes and Inventory Historic Battlefields, where present within the blade tip height ZTV and within 10km of the outermost turbines, will be included in the assessment.
- Category C Listed buildings within the blade tip height ZTV and within 5km of the outermost turbines will be included in the assessment.

6.4 Baseline Conditions

Inner Study Area

6.4.1 Much of the Proposed Development area, in particular the area where it is proposed to site the turbines, is at a high altitude (above 350m), where the archaeological potential is likely to be low or negligible. A building and enclosure (MHG 19520) and two aircraft crash sites, one (MHG 30842) on the upper slopes of Col Bheinn, at 495 m AOD and another on Carn Garbh (MHG 30819), between 400m and 450m AOD, are the only appreciable constraints within the proposed turbine area. A possible shieling hut (MHG 38884) alongside the Kintradwell Burn lies close to a watercourse at 335m AOD and two post medieval settlement sites (MHG13157 and MHG13158) lie between the Kintradwell Burn and the Badenahauglish Burn, between 180m and 325m AOD. A third recorded aircraft crash site (MHG 33851) appears, from the description given, to possibly be a duplicate entry for the identified crash site on Col Bheinn (MHG 30842).

6.4.2 Along the lower slopes of Asc na Grèine and Creagan Mor, above and to the northwest of the A9 there is a spread of prehistoric and post-medieval settlement remains between the Clynmilton Burn near Achrimsdale and Glen Loth at Lothbeg. Prehistoric remains include hut circles and associated field systems at Clynemilton (MHG 9798) and Kintradwell (MHG 9786),

and a souterrain (MHG9779) and broch (MHG 9778) at Kintradwell. The broch is also a Scheduled Monument (Cinn Trolla broch (SM1847)). Post-medieval remains include farmsteads and field systems; such as those at Kintradwell (MHG 13159), Braeval (MHG 10478), Creagan Mor (MHG 9788) and Lothbeg (MHG 9776).

Outer Study Area

6.4.3 There are no Conservation Areas or Historic Battlefields within 10km of the Proposed Development. There is one Inventory Garden and Designed Landscape (Dunrobin Castle) and one Property in Care (Carn Liath) within 10km of the Proposed Development. Initial appraisal of the scoping layout blade tip height ZTV indicates that there will be no visibility of the Proposed Development from Carn Liath and only limited visibility from within Dunrobin Castle Garden and Designed Landscape and no visibility from Dunrobin Castle itself or its proximity.

6.4.4 There are 29 Scheduled Monuments within 10km of the Proposed Development including: Cinn Trolla broch (SM1847); which is within the Proposed Development site boundary, but on the coast side of the A9 road and outwith the scoping layout ZTV. Eight of the Scheduled Monuments are within 5km of the Proposed Development; of these only two have any predicted visibility of the Proposed Development, based on the scoping layout ZTV.

6.4.5 There are 58 Listed Buildings within 10km of the Proposed Development: of which one (Loth Parish Church (LB7149)) is Category A Listed; 35 are Category B Listed; and 22 are Category C Listed. Only three Category B Listed Buildings and two Category C Listed Buildings are within 5km of the Proposed Development.

6.4.6 Beyond 10km, the category B Listed Ben Bhragaidh Monument to First Duke of Sutherland (LB7063), 12.4 km from the Proposed Development, will be included in the assessment for a potential impact on its setting.

6.5 Potential Effects

6.5.1 Potential significant effects would include:

- Direct impacts on any of the settlement remains (prehistoric and post-medieval), of regional / local heritage importance and medium / low sensitivity, that survive along the slopes of Asc na Grèine and Creagan Mor within the Proposed Development site, and which are identified as potential design constraints; and
- Impacts (including cumulative impacts) on the settings of designated heritage assets in the Outer Study Area. A list of proposed visualisation viewpoints is provided

Table 6.4: List of proposed visualisation viewpoints

Asset Name	Designation	NGR	Comment
Kildonan Burn,hut circles & field system (SM2843)	Scheduled Monument	NC 9140 2210	Cumulative wirelines (with Gordonbush)
Duchary Rock, fort (SM1854)	Scheduled Monument	NC 8510 0480	Cumulative wirelines (with Gordonbush & Kilbruar)
Kilbraur, broch 135m SSW of (SM13646)	Scheduled Monument	NC 8229 0987	Cumulative wirelines (with Gordonbush & Kilbruar)
Clach Mhic Mhios, standing stone, Glen Loth 4000m N of Lothbeg Bridge (SM1778)	Scheduled Monument	NC 94040 15082	Cumulative wirelines (with Gordonbush)
Loth Parish Church (LB7149)	Category A Listed	NC 97093 11380	Wireline
Ben Bhragaidh Monument to First Duke of Sutherland (LB7063)	Category B Listed	NC 81355 01011	LVIA viewpoint - Cumulative (with Gordonbush & Kilbruar)

6.6 Potential Mitigation

Design mitigation

- Avoidance of identified areas of constraint during the design of the turbine layout and the onsite infrastructure; and
- Routing of site access from the A9 to avoid areas of constraint, wherever practicable.

Construction Phase mitigation

- Fencing off/marking out areas of constraint for avoidance during the construction phase;
- Archaeological evaluations or set piece excavations where heritage assets cannot be avoided; and
- Watching briefs/archaeological monitoring in archaeologically sensitive areas.

6.7 Questions

6.7.1 **Do you agree with the proposed Study Areas?**

6.7.2 **Do you agree that the sources to be employed in the desk-based assessment are sufficient to establish a reliable baseline?**

6.7.3 **Do you agree that the archaeological potential of the high ground, around the proposed wind turbine development site, is low?**

6.7.4 **Do you agree with the proposed approach to a targeted walk-over survey, focussing on areas of archaeological sensitivity?**

6.7.5 **Do you agree with the proposed methodology for the assessment of effects on Archaeology and Cultural Heritage interests?**

6.7.6 **Do you agree with the proposed list of visualisations intended to accompany the assessment and the type of visualisation proposed in each case?**

6.7.7 **Are there any other particular heritage assets that you would wish to add to the list of visualisations and why?**

7 Ecology and Nature Conservation

7.1 Introduction

7.1.1 The non-avian Ecological Impact Assessment (EcIA) will assess the potential for likely significant effects on features above a certain value during the construction, operational and decommissioning phases of the Proposed Development.

7.1.2 The assessment of the avian baseline and potential impacts will be presented in a separate ornithological chapter (see Chapter 8).

7.1.3 The EcIA will be presented within the Ecology and Nature Conservation chapter of the EIA Report, which will also include the following:

- The legislative, planning and good practise framework of the assessment;
- A summary of consultation responses from key stakeholders;
- Methodology;
- A description of the existing ecology baseline for the Proposed Development and wider ecological study area, including habitat types and evidence of any protected or otherwise notable species, e.g. national and European Protected Species and priority species and habitats listed on the Scottish Biodiversity List (Scottish Government, 2013) or Local Biodiversity Action Plan;
- An assessment of the potential significant ecological effects of the Proposed Development in the presence of standard mitigation;
- Proposals for any additional mitigation or compensation to ameliorate identified potential effects (where appropriate); and
- An assessment of residual effects following the implementation of mitigation.

7.2 Legislation, Policy and Guidance

7.2.1 The ecology assessment will be carried out in accordance with the following legislation:

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora;
- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ("Water Framework Directive");
- Environmental Impact Assessment Directive 2014/52/EU;
- The Wildlife and Countryside Act 1981 (as amended);

- The Protection of Badgers Act 1992 (as amended);
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (''The Habitats Regulations'');
- The Nature Conservation (Scotland) Act 2004 (as amended); and
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended).

7.2.2 In terms of policy, the assessment will review the local, regional and national planning framework including:

- National Planning Framework 3 (Scottish Government, 2014a);
- Scottish Planning Policy (SPP; Scottish Government, 2014b);
- Relevant authority and local structure plans;
- The Scottish Biodiversity List (Scottish Government, 2013); and
- The Highland Biodiversity Action Plan (Highland Environment Forum 2015).

7.2.3 In terms of guidance, the assessment will be undertaken in line with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018), which represent current best practice and are endorsed by key stakeholders. It will also give due regard to other relevant guidance, such as the SEPA guidance on the assessment of groundwater dependent terrestrial ecosystems (GWDTEs) (SEPA, 2017) and the SNH guidance on bats (SNH, 2019).

7.3 Preliminary Consultation with Scottish Natural Heritage (SNH)

7.3.1 We have undertaken consultation with SNH regarding the bat assessment, notably in light of their recent survey guidance (SNH, 2019), which deviates from previous guidance in calling for the exclusive use of full-spectrum (f-s) bat detectors as opposed to other types, e.g. zero-crossing (z-c) detectors. In an email on 8th May 2019, SNH state that while they do not support deviations from the January 2019 guidance of using f-s detectors for bat surveys, they nevertheless accept that in the first year of implementation of the guidance there can be some flexibility over the type of detectors being used in some situations:

"*Although there may be a reduced bat fauna in East Sutherland we do not consider that this justifies the use of z-c rather than f-s detectors. It's equally important to accurately record the level of activity from the species that are there, as it is to detect all the species that may be present. Furthermore, common & soprano pips have both been reassessed in the new guidance as high risk. We therefore do not consider that having a limited range of species is a justification for not using full-spectrum detectors.*

As this is the first year of the guidance implementation, if you are having difficulty sourcing detectors, what would be useful would be to deploy a few full-spectrum detectors alongside the z-c detectors at a subset of locations, so that detectability can be calibrated. So we would strongly recommend investing in some full-spectrum detectors to use alongside some of the z-c detectors this year."

7.3.2 Further details on the approach to bat assessments is provided in sections 7.4.7 to 7.4.12.

7.4 Proposed Scope of Assessment

Desk Study

7.4.1 A comprehensive desk study will be undertaken to collate existing information on statutory nature conservation designations (listed for non-avian biological features) within 10km of the proposed turbine development area and 2km for non-statutory designations. It will also include collation of records of protected or otherwise notable species dating from within the last 10 years and located within 2km of the planning boundary, although this will be extended to 10km for bat roosts. As part of this exercise we will contact the Bat Conservation Trust, Highland Biological Recording Group, Scottish Badgers, and review information from online databases and EIA Reports for other schemes in the local area, e.g. Gordonbush Wind Farm.

Extended National Vegetation Classification (NVC) Survey

7.4.2 A botanical survey, carried out to National Vegetation Classification (NVC) standard, will be completed within the site and a 250m buffer (access permitting). The survey will follow the standard methodology set out in the NVC Users' Handbook (Rodwell, 2006) and plant communities will be identified from representative quadrat samples with reference to the standard community descriptions and constancy tables in Rodwell (1991 *et seq*.). The survey will exclude highly modified habitats, such as conifer plantations and agricultural areas, which will be mapped using the Joint Nature Conservation Committee (JNCC) Phase 1 habitat survey method (JNCC, 2010).

7.4.3 Communities will be evaluated in terms of their nature conservation interest, e.g. through inclusion on the Scottish Biodiversity List (SBL) or the Highland Biodiversity Action Plan (BAP), as well as in terms of potential groundwater dependence (SEPA, 2017).

7.4.4 If the layout of the wind farm results in turbines or borrow pits being proposed within 250m of a potential GWDTE, or other wind farm infrastructure being proposed within 100m of a potential GWDTE, then further assessment will be undertaken to verify if the potential GWDTE is indeed groundwater dependent.

7.4.5 The results of the survey will be shown as both an NVC map of plant communities and a Phase 1 habitat map.

7.4.6 The NVC survey will be 'extended' to assess the potential need for ecological surveys in addition to those described below. For example, although aquatic or fisheries surveys are not included within the scope of assessment, but this will re-evaluate this during the NVC survey.

Bat Surveys

7.4.7 Bat surveys are currently ongoing that are commensurate with a 'low' risk site.

7.4.8 There are no trees or structures within the turbine area, but trees and structure are present along the access track, for which a Preliminary Roost Assessment (PRA) of all trees and structures within 30m will be carried out in line with the guidelines issued by the Bat Conservation Trust (BCT) (Collins, 2016). If potential roost sites are identified, then it may be necessary for additional emergence/re-entry surveys to be undertaken.

7.4.9 The recent SNH bat survey guidance (2019) places more emphasis on static surveys than previous guidance. It is now requested that statics need to be deployed for a minimum of 10

consecutive nights per season (spring, summer and autumn), and this approach is being followed. However, owing to the unreliable nature of weather in this region of Scotland, static units will be deployed for 15 days to increase the likelihood that 10 consecutive days of optimal weather conditions are captured during each static deployment. A weather station has been set up to log temperature and humidity, barometric pressure, wind speed and direction, dew point and rainfall. As per the new SNH guidance (2019), a total of 14 static units are employed in order to cover the proposed turbine locations effectively.

7.4.10 Given the open moorland habitats surrounding the proposed array, with no woodland present, we are not proposing to undertake static detector deployment at height.

7.4.11 The new SNH guidance (2019) reduces the emphasis on transect surveys to assess for onshore wind farm developments. Considering that the turbine array is located solely within the upper open ground of the wider estate, with very few features of potential interest to bats, along with the dangerous nature of conducting transect surveys at night in a remote location with such steep terrain, as well as the limited number of different species of bat found in northern Scotland, we are not proposing to undertake transect surveys.

7.4.12 The survey uses full spectrum detectors alongside z-c detectors to allow the calibration recommended by SNH.

Protected Mammals Survey

7.4.13 A combined survey investigating for signs of protected mammals, including but not restricted to badger (*Meles meles*), otter (*Lutra lutra*), water vole (*Arvicola amphibius*) and pine marten (*Martes martes*), will be carried out across the site and a 50m buffer, although the survey buffer will be increased to 250m for otter due to the larger distance over which potential disturbance impacts can occur. The survey will be based on the standard methods described in Chanin (2003), Strachan *et al*. (2011), and Scottish Badgers (2018). The methods involve searching for field evidence, such as feeding signs, latrines and individual droppings, burrows/resting places, footprints, runways in vegetation and sightings of the animals themselves.

7.4.14 If potential pine marten dens, otter holts, badger setts are recorded, or if evidence is recorded of wildcat (*Felis sylvestris*) or red squirrel (*Sciurus vulgaris*), further targeted survey work could be required (such as camera trapping) to confirm the level of usage of a given feature and to provide the necessary information needed in support of a protected species licence application, should one be required. The scope of any such further surveys would depend on the nature of the evidence recorded and its location within the survey area relative to the emerging layout of the Proposed Development.

Ecological Impact Assessment

7.4.15 In accordance with the CIEEM (2018) guidelines, the Ecology and Nature Conservation chapter for the Proposed Development will summarise the non-avian ecology baseline, with the findings of the survey work detailed in technical reports, which will be appended to the EIA Report. Features then will be evaluated using the CIEEM (2018) criteria, and features of local or higher value that may be susceptible to development at the site will be brought forward for an assessment of impacts during the construction, operational and decommissioning phases, assuming the presence of standard mitigation measures. Additional mitigation may then be identified where any significant impacts are predicted. The potential for cumulative ecological effects will also be assessed, which we consider will

include other wind farm schemes within 10km of the application boundary. Any significant (beneficial or adverse) residual effects will be clearly presented and discussed appropriately.

7.4.16 Although Moray Firth SAC abuts the planning boundary east of the A9 trunk road, the potential for significant effects on the qualifying features (i.e. bottlenose dolphin and subtidal sandbanks) is very unlikely. We therefore do not consider that a Habitats Regulation Assessment (HRA) will be required.

7.5 Baseline Description

7.5.1 Aerial photography suggests that the proposed turbine development area comprises a range of upland habitats, including agricultural grassland, semi-natural grassland, peatland habitats and watercourses, with plantation woodland also occurring along the proposed site access from Kintradwell on the A9. A number of properties, mainly associated farm buildings, are interspersed across the local area, but none is present within 200m of the proposed turbine development area.

7.5.2 Loth Gorge Site of Special Scientific Interest (SSSI) and Ballinreach Coastal Gorges SSSI, both of which are designated for upland birch woodland, are located on the eastern and south-eastern site boundaries, respectively, but neither is within proposed works areas. Other statutory designations for non-avian biological features occur in the local area, including Moray Firth Special Area of Conservation (SAC), which is designated for bottlenose dolphin (*Tursiops truncatus*) and subtidal sandbanks, and which abuts the southern application boundary. Other statutory designations occur in the wider local area.

7.5.3 The site and/or local area is likely to support a range of protected or otherwise notable species, such as otter, water vole and reptiles.

7.6 Potential Effects

7.6.1 The key ecology and nature conservation issues to be considered with respect to the Proposed Development are likely to include the following:

- direct mortality of fauna during construction, operation and decommissioning;
- behavioural changes of fauna during operation;
- habitat loss through land-take;
- fragmentation of existing habitats;
- disturbance during construction and decommissioning; and
- pollution via road drainage and runoff during all development phases.

7.6.2 Additionally, for species relying on aquatic resources potentially affected by watercourse crossing and surface water runoff, the following potential significant effects are also considered:

- point source and diffuse pollution;
- increased sediment loading;
- decreased habitat complexity;
- habitat fragmentation; and

- changes to discharge regime.

7.7 Mitigation and Compensation

7.7.1 If it is considered that mitigation is necessary to reduce any adverse ecological effects, then an integrated mitigation and enhancement package will be proposed which will address ecological effects and which reflects local objectives in terms of biodiversity and the enhancement of environmental character. During the Proposed Development design and EIA process, mitigation measures will follow the recognised hierarchy of avoidance, reduction, enhancement, and compensation.

7.7.2 Proposals will also be outlined for a Habitat Management Plan (HMP) to be implemented during the operational phase of the proposed development if required. The scope of an outline HMP will be defined once baseline surveys are complete and the EcIA has been undertaken.

7.8 Questions

7.8.1 **Do you agree that it is appropriate to scope out HRA?**

7.8.2 **Do you agree that the proposed scope of assessment is appropriate?**

8 Ornithology

8.1 Introduction

8.1.1 This section sets out the proposed approach to the assessment of potential effects on ornithology, during construction, operation and decommissioning of the Proposed Development.

8.1.2 The assessment will be undertaken in line with best practice and relevant European and national legislation, policy and guidance.

8.2 Legislation, Policy and Guidance

8.2.1 The legislation and policies which are directly relevant to the assessment of ornithological effects have been summarised below. Refer to Chapter 4 (Planning Policy Context), for planning policies relevant to the Proposed Development.

8.2.2 The assessment will be undertaken in line with the following European legislation and guidance:

- Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive);
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (Habitats Directive);
- Environmental Impact Assessment Directive 2014/52/EU; and
- European Commission (2010) Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels.

8.2.3 The following national legislation and policy will be considered as part of the assessment:

- Directive 2009/147/EC on the Conservation of Wild Birds (Birds Directive);

- The Nature Conservation (Scotland) Act 2004 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and
- Policy Advice Note PAN 1/2013 – Environmental Impact Assessment (Scottish Government 2013).

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

- Eaton M.A., Aebischer N.J., Brown A.F., Hearn R.D., Lock L., Musgrove A.J., Noble D.G., Stroud D.A. and Gregory R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. British Birds 108, 708–746;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester;
- Scottish Natural Heritage (SNH) (2000). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action;
- SNH (2009). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees;
- SNH joint publication (2019). Good Practice during Wind Farm Construction. Version 4 https://www.nature.scot/sites/default/files/2019-05/Guidance%20-%20Good%20Practice%20during%20wind%20farm%20construction.pdf;
- SNH (2016). Assessing connectivity with Special Protection Areas;
- SNH (2018a). Assessing Significance of Impacts from Onshore Wind Farms Out-with Designated Areas;
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note;
- SNH (2018c). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- Scottish Executive Rural Affairs Department (SERAD) (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ('the Habitats and Birds Directives'). Revised Guidance Updating Scottish Office Circular No 6/1995;
- The Highland Biodiversity Action Plan 2015 - 2020; and
- The Scottish Biodiversity List (https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list).

8.2.5 Surveys will follow the methodologies detailed in the guidance below:

- Gilbert, G., Gibbons, D. W. and Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy;
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh;
- SNH (2007). Black grouse survey methodology; and
- SNH (2014, revised March 2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms.

8.3 Proposed Scope of Assessment

Study Area

8.3.1 The EIA Report will consider the following study areas[2]:

- designated sites – 20km study area (SNH 2016);
- collision modelling – the results of the flight activity surveys will be used to inform collision modelling. A Collision Risk Analysis Area (CRAA) will be created from the turbine points using GIS Delunay triangulation[3] to create a wind farm area which will then be buffered by 500m (as per SNH 2017);
- scarce breeding birds[4] – 2km study area (SNH 2017) with the exception of golden eagle (6km, SNH 2017);
- black grouse – 1.5km study area (SNH 2017);
- breeding upland waders and wintering waders, raptors, owls and wildfowl – 500m study area (SNH 2017);
- cumulative assessment – as per SNH (2018b), the Natural Heritage Zone (NHZ) level is considered practical and appropriate for breeding species of wider countryside interest; and
- in-combination assessment – required as part of the Habitats Regulations Appraisal (HRA) process, SNH (2016) guidance on SPA connectivity will be consulted to identify an appropriate study area on the basis of the SPA species scoped in to the assessment.

[2] Please note 'survey area' is defined as the area covered by each survey type at the time of survey whereas 'study area' is defined as the spatial extent of the consideration of effects on each species at the time of assessment.

[3] Delaunay triangulation is a form of mathematical/computational geometry where a given set of points (in this case the turbine locations) are all joined to create discrete triangles. Further information is available here: https://uk.mathworks.com/help/matlab/math/delaunay-triangulation.html

[4] Scarce breeding birds are those listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and in the case of the Proposed Development consists of any raptor, owl, grebe or diver species listed on either Annex 1 or Schedule 1.

Desk Study

8.3.2 The following data sources will be consulted as part of the assessment:

- Highland Raptor Study Group – provision of historic raptor nest locations and occupancy;
- SNHi Information Service[5] – information on Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs) and Ramsar sites; and
- any relevant Environmental Statements/EIA reports or technical reports from other developments or proposed developments in the local area.

Assessment Methods

8.3.3 The assessment method will follow the process set out in the relevant provisions of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and guidance on implementation of the Birds and Habitats Directive (SERAD 2000 and SNH 2018c).

8.3.4 The ways in which birds may be affected (directly or indirectly) by the construction, operation and decommissioning of the Proposed Development are:

- direct habitat loss through construction of the wind farm (e.g. turbine bases, tracks etc.);
- indirect habitat loss due to birds avoiding the wind farm and its surrounding area. This may occur as a result of disturbance during construction and decommissioning, and maintenance and increased visitor disturbance during operation;
- habitat modification due to associated changes in land cover (e.g. tree felling or effects on hydrology leading to altered suitability for foraging, breeding, etc.);
- barrier effects in which birds avoid the wind farm and are therefore forced to take alternative routes to feeding or roosting grounds;
- death or injury through collision with turbine blades, overhead wires (if any), met masts, or fences (if any) associated with the wind farm; and
- any of the above effects acting cumulatively with those from other wind farm plans and projects (i.e. operational or consented developments and those currently in the planning process).

Methodology for Assessing Ornithological Features

8.3.5 The EIA Report will include a chapter containing an Ornithological Impact Assessment (OIA). This will consider the potential direct, indirect and cumulative effects that the construction and operation of the Proposed Development could have on ornithology. It will also consider the potential effects on statutory designated sites. The OIA will be supported by a technical appendix that will include all outputs from any collision modelling.

8.3.6 Effects on potential Important Ornithological Features (IOFs) (excluding SPAs but including SSSIs) will be assessed in relation to the species' reference population, conservation status,

[5] https://sitelink.nature.scot/home

range and distribution. The assessment of potential effects will follow guidelines published by CIEEM (2018) and SNH (2017, 2018a).

8.3.7 The assessment involves the following process:

- identification of the potential effects of the Proposed Development;
- consideration of the likelihood of occurrence of potential effects where appropriate;
- defining the Nature Conservation Importance (NCI) and conservation status of the bird populations present to determine overall sensitivity;
- establishing the magnitude of the likely effect (both spatial and temporal);
- based on the above information, a judgement is made as to whether or not the identified effect is significant with respect to the EIA Regulations;
- if a potential effect is determined to be significant, measures to mitigate or compensate the effect are suggested where required;
- opportunities for enhancement are considered where appropriate; and
- residual effects after mitigation, compensation or enhancement are reported.

8.3.8 NCI is defined on the basis of the geographic scale (e.g. NHZ), and it is necessary to consider alongside each feature's conservation status, its distribution and its population trend based on available historic records, to provide an overall level of sensitivity.

8.3.9 The significance of potential effects is determined by integrating the sensitivity and magnitude in a reasoned way.

8.3.10 A set of pre-defined significance criteria will be used in assessing the potential effects of the Proposed Development. It is necessary to establish whether there will be any effects which will be sufficient to adversely affect the feature to the extent that its conservation status deteriorates above and beyond that which would be expected should baseline conditions remain (i.e. the 'do nothing' scenario). Furthermore, these predictions will be given with a level of confidence relative to the effect being assessed where required (in line with CIEEM 2018).

Methodology for Assessing Likely Significant Effects on an SPA or Ramsar site

8.3.11 As detailed in Section 8.4, there is potential for connectivity to exist with Natura 2000 designated sites (SPAs and Ramsar sites).

8.3.12 The method for assessing the significance of a likely effect on an SPA or Ramsar site is different from that employed for wider-countryside ornithological interests (detailed above). The Habitats Directive is transposed into domestic legislation by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). Regulation 48 includes a number of steps to be taken by the competent authority before granting consent (these are referred to here as a Habitats Regulations Appraisal, HRA). In order of application, the first four are:

- **Step 1**: consider whether the proposal is directly connected to or necessary for the management of the SPA (Regulation 48(1)(b));

- if not, **Step 2**: consider whether the proposal, alone or in combination, is likely to have a significant effect on the SPA (Regulation 48(1)(a));
- if so, **Step 3**: make an Appropriate Assessment of the implications for the SPA in view of that SPA's conservation objectives (Regulation 48(1)(a)); and
- **Step 4**: consider whether it can be ascertained that the proposal will not adversely affect the integrity of the SPA ("Integrity Test") having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48(5) and 48(6)).

8.3.13 It has already been established that the Proposed Development does not meet the criteria for Step 1.

8.3.14 The assessment on the integrity of the SPA or Ramsar site in relation to the Proposed Development will be presented in ornithology chapter of the EIA Report and the results of baseline surveys and scientific conclusions presented in the chapter will be used to inform the appraisal process, and potentially for the competent authority to conduct an Appropriate Assessment, if required.

Cumulative Effects

8.3.15 An assessment of cumulative effects will be undertaken following published guidance (SNH 2018b). Cumulative effects on each feature relevant to this Proposed Development will be assessed in relation to other projects and activities subject to the EIA process within a relevant search area, and their effects on a relevant reference population; for example, at an NHZ level for breeding species.

Species Scoped Out of the Assessment

8.3.16 On the basis of experience from relevant studies and policy guidance or standards (e.g. SNH 2018a), the following species are likely to be 'scoped out' since significant effects are unlikely:

- common and/or low conservation species not recognised in statute as requiring special conservation measures, e.g. birds on Annex 1 to the EU Birds Directive[6] or Schedule 1 to the Wildlife & Countryside Act 1981 (as amended);
- common and/or low conservation species not included in non-statutory lists (e.g. Red and Amber-listed BoCC species, Eaton *et al.* 2015), showing birds whose populations are at some risk either generally or in parts of their range; and
- passerine species, not generally considered to be at risk from wind farm developments (SNH 2017, 2018), unless being particularly rare or vulnerable at a national level.

[6] Council Directive 2009/147/EC on the conservation of wild birds (the Birds Directive).

8.4 Baseline Conditions

Designated Sites

8.4.1 There are no statutory designations with ornithological features within the site. The desk-based study has identified five SPAs, ten SSSIs (underpinning the SPAs) and two Ramsar sites (associated with the SPAs) within 20km of the site (**Figure 8.1**).

- Caithness and Sutherland Peatlands SPA, 4.4km north west (underpinned[7] by the Coir'an Eoin SSSI, Skinsdale Peatlands SSSI and associated Caithness and Sutherland Peatlands Ramsar), **Table 8.1**;
- Lairg and Strath Brora Lochs SPA, 11.5km west (underpinned by Lairg and Strath Brora Lochs SSSI), **Table 8.2**;
- East Caithness Cliffs SPA, 13.6km north east (underpinned by Berriedale Cliffs SSSI), **Table 8.3**;
- Dornoch Firth and Loch Fleet SPA, 14.8km south west (underpinned[8] by Loch Fleet SSSI, Mound Alderwoods SSSI and associated Dornoch Firth and Loch Fleet Ramsar), **Table 8.4**; and
- Strath Carnaig and Strath Fleet Moors SPA, 18.5km south west (underpinned by Strath Carnaig and Strath Fleet Moors SSSI), **Table 8.5**. In addition, Loch Fleet is a Scottish Wildlife Trust (SWT) Reserve and a National Nature Reserve (NNR).

Table 8.1 – Qualifying Features of Caithness and Sutherland Peatlands SPA (and underpinning Coir'an Eoin SSSI[a], Skinsdale Peatlands SSSI[b] and Caithness and Sutherland Peatlands Ramsar)

Feature	Qualifying Feature Category	Condition	Description
Black-throated diver breeding	SPA	Favourable maintained: June 2018	Breeding population of national importance: 26 pairs (16.3% of UK population).
Common scoter breeding	SPA	Unfavourable declining: June 2013	Breeding population of national importance: 27 pairs (<0.1% of Western Siberia/Western & Northern Europe/North-western Africa population).
Dunlin breeding	SPA, SSSI[b], Ramsar	Favourable maintained: June 2015	Breeding population of international importance: 1,860 pairs (16.9% of Baltic/UK/Ireland population).
Golden eagle breeding	SPA	Favourable maintained: August 2016	Breeding population of national importance: 5 pairs (1.3% of UK population).
Golden plover breeding	SPA, SSSI[ab]	Favourable recovered: June 2015	Breeding population of national importance: 1,064 pairs (4.7% UK population).

[7] Whilst the Grudie Peatlands SSSI and Dunbeath Peatlands SSSI also underpin the Caithness and Sutherland Peatlands SPA, they are over 20km from the Proposed Development and so has not been included.

[8] Whilst the Dornoch Firth SSSI also underpins the Dornoch Firth and Loch Fleet SPA, it is over 20km from the Proposed Development and so has not been included.

Feature	Qualifying Feature Category	Condition	Description
Greenshank breeding	SPA, SSSI[b]	Favourable maintained: June 2015	Breeding population of national importance: 256 pairs (0.4% Europe/Western Africa population).
Hen harrier breeding	SPA	Favourable maintained: June 2016	Breeding population of national importance: 14 pairs (2.8% of UK population).
Merlin breeding	SPA	Favourable maintained: July 2004	Breeding population of national importance: 54 pairs (4.2% of UK population).
Red-throated diver breeding	SPA	Favourable maintained: July 2006	Breeding population of national importance: 89 pairs (9.5% of UK population).
Short-eared owl breeding	SPA	Not assessed	Breeding population of national importance: 30 pairs (3% of UK population).
Wigeon breeding	SPA	Not assessed	Breeding population of national importance: 43 pairs (<0.1% of Western Siberia/North-western/North-eastern Europe population).
Wood sandpiper breeding	SPA	Favourable maintained: June 2004	Breeding population of national importance: 5 pairs (50% of UK population).
Greylag goose breeding	Ramsar	Favourable maintained: June 2018	Breeding population of international importance
Breeding bird assemblage	SSSI[b], Ramsar	Favourable maintained: July 2009	Across the SSSIs and Ramsar the following species are listed in the breeding bird assemblages that are not individually qualifying features: teal, curlew, arctic skua, scaup, wigeon, red grouse, raven, snipe, curlew, buzzard, common sandpiper and dipper.

Table 8.2 – Qualifying features of Lairg and Strath Brora Lochs SPA (and underpinning Lairg and Strath Brora Lochs SSSI)

Feature	Qualifying Feature Category	Condition	Description
Black-throated diver breeding	SPA, SSSI	Favourable maintained: June 2008	Breeding population of European importance: 6 pairs (3.8% of UK population).

Table 8.3 – Qalifying features of East Caithness Cliffs SPA (and underpinning Berriedale Cliffs SSSI)

Feature	Qualifying Feature Category	Condition	Description
Cormorant breeding	SPA	Unfavourable declining: June 2015	Breeding population of national importance: 230 pairs (3% of UK population).

Feature	Qualifying Feature Category	Condition	Description
Fulmar breeding	SPA, SSSI	Favourable maintained: June 2015	Breeding population of national importance: 15,000 pairs (3% of UK population).
Great black-backed gull breeding	SPA	Unfavourable no change: June 2015	Breeding population of national importance: 800 pairs (4% of UK population).
Guillemot breeding	SPA, SSSI	Favourable maintained: June 2015	Breeding population of European and national importance: 106,700 individuals 3.1% of north Atlantic biogeographic population, 10% of UK).
Herring gull breeding	SPA	Unfavourable no change: June 2015	Breeding population of European and national importance: 9,400 pairs (1% of north west European biogeographic population, 6% of UK population).
Kittiwake breeding	SPA, SSSI	Favourable maintained: July 1999	Breeding population of European and national importance: 32,500 pairs (1% of north Atlantic biogeographic population, 7% of UK population).
Peregrine falcon breeding	SPA	Favourable maintained: June 2014	Breeding population of European importance: 6 pairs (0.5% of UK population).
Razorbill breeding	SPA, SSSI	Favourable maintained: June 2015	Breeding population of European and national importance: 15,800 individuals (1.8% of total A. t. islandica biogeographic population, 11% of UK population).
Shag breeding	SPA, SSSI	Unfavourable no change: June 2015	Breeding population of European and national importance: 2,300 pairs (1.8% of north European biogeographic population, 6% of UK population).
Seabird assemblage breeding	SPA, SSSI	Favourable maintained: June 2015	Regularly supports in excess of 20,000 individual seabirds: regularly supports 300,000 individual seabirds.

Table 8.4 – Qualifying features of Dornoch Firth and Loch Fleet SPA (and underpinning Loch Fleet SSSI[c] and Mound Alderwoods SSSI[d] and Dornoch Firth and Loch Fleet Ramsar)

Feature	Qualifying Feature Category	Condition	Description
Bar-tailed godwit non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of national importance: 1998/9 – 2002/3 winter peak mean of 1,092 individuals (1.7% of UK population).
Curlew non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of national importance.
Dunlin non-breeding	SPA, Ramsar	Favourable declining: January 2015	No further information given.
Greylag goose non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of international importance: 1996/7 – 2000/01 winter peak mean of 2,677 individuals (2.6% of Iceland/UK/Ireland population).
Osprey breeding	SPA, Ramsar	Favourable maintained: June 2017	Foraging grounds for a breeding population of European importance: 13 pairs (10.2% UK population).

Feature	Qualifying Feature Category	Condition	Description
Oystercatcher non-breeding	SPA, Ramsar	Favourable maintained: January 2015	No further information given.
Redshank non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of national importance: 1998/9 – 2002/03 winter peak mean of 1,265 individuals (1% UK population).
Scaup non-breeding	SPA, Ramsar	Not assessed	No further information given.
Teal non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of national importance: 1998/9 – 2002/03 winter peak mean of 2,175 individuals (1.1% UK population).
Wigeon non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Wintering population of international importance: 1998/09 – 2002/03 winter peak mean of 14,200 individuals (3.4% of the UK population).
Waterfowl assemblage non-breeding	SPA, Ramsar	Favourable maintained: January 2015	Winter peak mean (1989/90 – 1993/94) of 34,500 waterfowl, comprising of 22,000 wildfowl and 12,500 waders. This includes wintering populations of national importance of scaup and redshank.
Eider non-breeding	SSSI[c]	Favourable recovered: November 2013	Wintering population of national importance: 1% of UK population
Breeding bird assemblage	SSSI[c]	Favourable declining: July 2008	Species breeding on foreshore, dune and saltmarsh habitats: ringed plover, oystercatcher, shelduck, eider, arctic tern, common tern and little tern. Species breeding in pine woodland habitat: osprey, Scottish crossbill, treecreeper and great spotted woodpecker.
Breeding bird assemblage	SSSI[d]	Favourable maintained: May 2004	Red-breasted merganser, teal, water rail, snipe, redshank, grasshopper warbler, cuckoo, sedge warbler and shelduck all breed within the SSSI.

Table 8.5 – Qualifying features of Strath Carnaig and Strath Fleet Moors SPA (and underpinning Strath Carnaig and Strath Fleet Moors SSSI)

Feature	Qualifying Feature Category	Condition	Description
Hen harrier breeding	SPA, SSSI	Favourable declining: July 2013	Breeding population of European importance: mean of 12 breeding pairs between 2002 and 2004 (approximately 2.5% of UK population of 483 pairs).

8.4.2 **Table 8.6** details the relevant species listed on the five SPAs within 20km of the site in relation to recommended connectivity distances (SNH 2016) – the likelihood of true connectivity for any species indicated to have 'potential connectivity' (based only on connectivity distances supplied by SNH 2016) in **Table 8.6** is then considered in paragraphs 8.4.4 to 8.4.6. For the East Caithness Cliffs SPA, only peregrine falcon has been included in **Table 8.6** as all the other species for which the SPA is designated (**Table 8.3**) are considered to be true seabirds and as such the site is at best, of limited importance to these species (in

addition, the site is located inland from the SPA and would not be located within any flyways for these species between the SPA and their offshore feeding areas). For Dornoch Firth and Loch Fleet SPA, only greylag goose and osprey are included in **Table 8.6** as all the other species for which the SPA is designated (**Table 8.4**) are wintering populations of waders and waterfowl and as such the site is at best, of limited importance to these species.

8.4.3 Forging ranges are not provided in SNH (2016) for common scoter, breeding greylag goose, wigeon or wood sandpiper and so approximate foraging ranges have been supplied on the basis of comparative species[9] for which foraging ranges are detailed in the SNH (2016) connectivity guidance.

Table 8.6 – SPA Qualifying Species and Connectivity Likelihood to the Proposed Development (SNH 2016)

SPA Species	SNH (2016) Foraging Range	Caithness and Sutherland Peatlands SPA – 4.4km	Lairg and Strath Brora Lochs SPA – 11.5km	East Caithness Cliffs SPA – 13.6km	Dornoch Firth and Loch Fleet SPA – 14.8km	Strath Carnaig and Strath Fleet Moors SPA – 18.5km
Black-throated diver	10km	Potential connectivity	No connectivity	-	-	-
Common scoter	1km	No connectivity	-	-	-	-
Dunlin	500m	No connectivity	-	-	-	-
Golden eagle	6km	Potential connectivity	-	-	-	-
Golden plover	3km	No connectivity	-	-	-	-
Greenshank	2km	No connectivity	-	-	-	-
Greylag goose (breeding)	15-20km	Potential connectivity	-	-	-	-
Greylag goose (non-breeding)	15-20km	-	-	-	Potential connectivity	-
Hen harrier	2km	No connectivity	-	-	-	No connectivity
Merlin	5km	Potential connectivity	-	-	-	-
Osprey	10km	-	-	-	No connectivity	-
Peregrine falcon	2km	-	-	No connectivity	-	-
Red-throated diver	8km	Potential connectivity	-	-	-	-
Short-eared owl	2km	No connectivity	-	-	-	-

[9] Comparative species are: breeding greylag goose = wintering greylag goose, wood sandpiper = dunlin, common scoter = curlew, and wigeon = red-throated diver

SPA Species	SNH (2016) Foraging Range	Caithness and Sutherland Peatlands SPA – 4.4km	Lairg and Strath Brora Lochs SPA – 11.5km	East Caithness Cliffs SPA – 13.6km	Dornoch Firth and Loch Fleet SPA – 14.8km	Strath Carnaig and Strath Fleet Moors SPA – 18.5km
Wigeon	8km	Potential connectivity	-	-	-	-
Wood sandpiper	500m	No connectivity	-	-	-	-

8.4.4 Considering the information detailed in **Table 8.6** and paragraph 8.4.2, there is considered to be no potential for connectivity between the Proposed Development and the Lairg and Strath Brora Lochs SPA, East Caithness Cliffs SPA or Strath Carnaig and Strath Fleet Moors SPA. Furthermore, whilst the Dornoch Firth and Loch Fleet SPA and Caithness and Sutherland Peatlands SPA is within the foraging range for wintering/breeding greylag goose (15-20km, SNH 2016), considering the upland habitats present within the site (and lack of waterbodies), the site is, at best, of limited importance to foraging greylag goose and consequently there is considered to be no connectivity between the Proposed Development and the greylag goose populations included on the Dornoch Firth and Loch Fleet SPA and the Caithness and Sutherland Peatlands SPA.

8.4.5 Of the remaining species listed on the Caithness and Sutherland Peatlands SPA (**Table 8.1**) and based on the connectivity distances provided by SNH (2016), there is only considered to be potential for connectivity between the Proposed Development and black-throated diver, red-throated diver, wigeon, merlin and golden eagle (**Table 8.6**). When considering the upland habitats present within the site (and lack of waterbodies), the site is not considered to be suitable for nesting or foraging black-throated diver, red-throated diver or wigeon (in addition, the site is not located between the various parts of the SPA and is therefore unlikely to be within any regular flightpaths used by these species) and consequently there is considered to be no connectivity between the Proposed Development and the Caithness and Sutherland Peatlands SPA for these species. There is however, considered to be some potential for connectivity between the Proposed Development and the golden eagle and merlin populations included on the Caithness and Sutherland Peatlands SPA.

8.4.6 In conclusion, only potential effects relating to golden eagle and merlin will be considered in the context of both the regional (NHZ) and Caithness and Sutherland Peatlands SPA populations. Any other species listed on any of the SPAs (and associated SSSIs and Ramsars) that are recorded during the baseline surveys will only be considered in the context of their regional (NHZ) populations.

Field Surveys

8.4.7 The following surveys have been undertaken to date (or will be undertaken by the end of August 2019) for the Proposed Development. The surveys have been undertaken in line with the appropriate guidance (section 8.2.5) and survey areas[2] are detailed below.

- Flight activity (Vantage Point, VP) surveys – four VP locations (**Figure 8.2**), October 2015 to October 2016 and September 2018 to August 2019 (two breeding seasons and two non-breeding seasons). It is acknowledged that the draft scoping layout contains five turbines that are outwith the current viewshed areas (T18, T19, T20, T21

and T22) and should any turbines remain outwith the viewshed areas in the final design, this will be accounted for in the collision modelling.

- Scarce breeding bird[4] surveys, 2km survey area – February to August 2016, February to August 2019.
- Black grouse surveys, 1.5km survey area – April 2016.
- Upland breeding bird surveys, 500m survey area – April to July 2016 and April to July 2019.
- Winter walkover surveys, 500m survey area – November and December 2015, February 2016, November and December 2018 and January and February 2019.

Ornithological Activity

8.4.8 Field surveys have revealed an assemblage of species typical of upland areas in central Scotland.

8.4.9 As of mid-March 2019, 11 Annex 1[6] and/or Schedule 1[10] species have been recorded: golden eagle, golden plover, goshawk, greylag goose, hen harrier, merlin, osprey, peregrine falcon, short-eared owl, white-tailed eagle and whooper swan. Of these species, a golden eagle territory has been identified within the site and hen harrier were recorded breeding outside the 2km survey area.

8.4.10 In addition, three Red listed Birds of Conservation Concern (BoCC, Eaton *et al.* 2015) commonly considered as target species (SNH 2016) have been recorded: curlew, lapwing and herring gull.

8.4.11 Golden eagle was the most frequently recorded raptor and are occuping a territory within the site. As of mid-March 2019, three eyries have been identified within the site, however breeding success is unconfirmed and it is uncertain whether the pair have successfully even laid either summer of surveys (2016 and 2019). A hen harrier territory was located during the 2016 breeding season; however, it was approximately 2.2km east of the site and breeding success at the hen harrier nest is therefore unknown. Goshawk, merlin, osprey, peregrine falcon, short-eared owl and white-tailed eagle were all infrequently recorded within the 2km survey area, with no evidence of breeding.

8.4.12 As of March 2019, flight activity surveys have recorded eight target species, collectively accounting for 128 flightlines (Table 8.7), of which 112 flightlines were recorded at Potential Collision Height (PCH) and may therefore be included in any collision risk modelling, depending on their location in relation to the final turbine layout and the turbine dimensions selected. The bird seconds are calculated for each observation as the product of flight duration and number of individuals. This is then summed per species to give the total bird seconds recorded across the entire surveyed period.

[10] Wildlife & Countryside Act 1981 (as amended).

Table 8.7 – Summary of target species recorded during flight activity surveys, October 2015 to mid-March 2019

Feature	Total Number of Flightlines Recorded	Total Number of Birds Recorded	Total Bird Seconds	Total Flight Seconds at PCH
Golden eagle	78	93	20,112	20,071
Golden plover	25	129	4,859	3,545
Greylag goose	4	186	15,883	14,983
Hen harrier	2	2	149	99
Merlin	9	11	816	756
Peregrine falcon	7	7	688	643
Short-eared owl	2	2	77	45
Whooper swan	1	6	588	588

8.4.13 An initial survey for black grouse during April 2016 did not record any black grouse within the survey area and the habitat was considered to be unsuitable for black grouse.

8.4.14 Upland breeding wader surveys recorded three target wader species (curlew, golden plover and lapwing) and three secondary wader species (dunlin, oystercatcher and snipe) of which golden plover was the only target wader identified to be breeding within the 500m survey area: territory analysis identified 13 to 18 golden plover territories within the 500m survey area.

Key Sensitivities

8.4.15 On the basis of the surveys undertaken at the site to date, golden eagle and golden plover are most likely to be considered in the EIA Report as IOFs. Additional target species may be included depending on collision modelling results (which will be undertaken post design freeze).

8.4.16 In addition, there is potential for connectivity to exist between the site and Caithness and Sutherland Peatlands SPA for golden eagle and merlin (paragraph 8.4.5) and consequently the effects detailed below will also be considered in the context of the HRA process.

8.4.17 Cumulative (and in the context of the HRA process, in-combination) effects will also be considered where relevant for all of the effects detailed below.

8.5 Potential Effects

Construction Impacts and Effects

8.5.1 Based on the available information to date from baseline surveys and the preliminary results from the desk-based study, the following construction and decommissioning effects are likely to be assessed:

- habitat loss/alteration/fragmentation associated with the Proposed Development, including loss of nesting habitat for target species (breeding raptors and waders); and
- disturbance to target species (breeding raptors and waders) associated with construction/decommissioning activities.

Operational Impacts and Effects

8.5.2 Based on the available information to date from baseline surveys and the preliminary results from the desk-based study, the following operational effects are likely to be assessed:

- displacement of target species (raptors and waders) around operational turbines; and
- potential collision risks associated with operational turbines for target species (most likely to be raptors and golden plover).

8.6 Potential Mitigation

8.6.1 Potentially significant effects upon birds will be avoided/minimised where possible within the design process. Good practice during construction and operation of the Proposed Development will also be implemented.

8.6.2 Where unmitigated likely significant effects on IOFs are identified, measures to prevent, reduce and where applicable offset these adverse effects will be proposed.

8.6.3 Standard good practice (SNH 2019) measures will be applied to minimise any potential effects on breeding Schedule 1/Annex 1 species within up to 1km of the Proposed Development, including appropriate mitigation/monitoring and license application/consultation with SNH. This would include (but is not limited to):

- checks for breeding raptors and golden plover by a suitably qualified ornithologist prior to works undertaken between February and July;
- appropriate buffers applied to any breeding attempts located; and
- additional mitigation measures dependent on the outcomes of a risk assessment and site-specific conditions e.g. reduced speed limits and personnel to remain in vehicles along identified sections of tracks.

8.6.4 A Breeding Bird Protection Plan (BBPP), will be produced to ensure that all reasonable precautions are taken to ensure the relevant wildlife legislation is adhered to.

8.7 Questions

8.7.1 **Q8.1: confirmation that there is no connectivity between the site and any designated site, with the exception of the Caithness and Sutherland Peatlands SPA.**

- **Refer to paragraphs 8.4.2 to 8.4.6.**

8.7.2 **Q8.2: do consultees agree that the range of surveys (October 2015 to October 2016 and September 2018 to August 2019) are sufficient and appropriate?**

- **Refer to paragraph 8.4.7.**

8.7.3 **Q8.3: are there any other relevant consultees who should be contacted, or other information sources referenced, with respect to the ornithology assessment?**

- **Refer to paragraph 8.3.2.**

8.7.4 **Q8.4: confirmation of the approach to the ornithological assessment is requested. Do consultees believe that there are further species which need to be considered in the assessment?**

8.7.5 **Q8.5: confirmation that the low conservation value species can be scoped out of the assessment is requested.**

- **Refer to paragraph 8.3.16.**

8.7.6 **Q8.6: do consultees agree that the proposed mitigation is sufficient and appropriate?**

- **Refer to paragraphs 8.6.1 to 8.6.4.**

9 Geology, Hydrology and Hydrogeology

9.1 Introduction

9.1.1 This chapter describes the baseline conditions at the site and outlines the potential effects of the Proposed Development on geology, hydrology and hydrogeology. Proposed surveys and assessment methodologies are outlined to develop mitigation measures to prevent or reduce identified potential effects.

9.2 Legislation, Policy and Guidance

Geology, Peat and Soils

- SEPA Regulatory Position Statement - Developments on Peat (Scottish Environment Protection Agency, 2012).
- Good Practice during Windfarm Construction, Version 3, (Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland & Historic Environment Scotland, September 2015).
- Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Government, January 2017).
- Developments on Peatland - Guidance on the assessment of peat volumes, re-use of excavated peat and the minimisation of waste (Scottish Renewables & SEPA, 2012).
- Floating Roads on Peat - Report into Good Practice in Design, Construction and Use of Floating Roads on Peat with particular reference to Wind Farm Developments in Scotland (Forestry Commission Scotland (FCS) & Scottish Natural Heritage (SNH), 2010).
- Managing Geotechnical Risk: Improving Productivity in UK Building and Construction (Institution of Civil Engineers, 2001).
- Ground Engineering Spoil: Good Management Practice CIRIA Report 179 (CIRIA, 1997).
- Scottish Roads Network Landslides Study Summary Report (Scottish Executive, 2005).
- Guidelines for the Risk Management of Peat Slips on the Construction of Low Volume/Low Cost Roads on Peat (Forestry Commission, 2006).

Hydrology and Hydrogeology

- EC Water Framework Directive (2000/60/EC).

- Scottish Planning Policy (SPP) (Scottish Executive, June 2014).
- Water Environment and Water Services (Scotland) Act 2003.
- Water Environment (Controlled Activities) Regulations 2011.
- Forests and Water Guidelines (Forestry Commission, 2012).
- Land Use Planning System – SEPA Guidance Note 31 (Guidance on Assessing Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems), Version 3, (SEPA, 11/09/2017).
- Control of Water Pollution from Linear Construction Projects – Technical Guidance, C648 (CIRIA, 2006).
- Good Practice during Windfarm Construction, Version 3 (Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland & Historic Environment Scotland, September 2015).
- The SuDS Manual C753 (CIRIA, 2015).
- Environmental Good Practice on Site C692 (CIRIA, 2010).

9.3 Proposed Scope of Assessment

9.3.1 The potential effects from the Proposed Development on ground conditions and the water environment will be assessed by completing a desk study and field investigation followed by an impact assessment, the processes of which are detailed below.

Method of Assessment and Reporting

9.3.2 An initial desk study will be undertaken to determine and confirm the baseline characteristics by reviewing available information relating to soils, geology, hydrology, and hydrogeology such as groundwater resources, licensed and unlicensed groundwater and surface water abstractions, public and private water supplies, surface water flows, flooding, rainfall data, water quality and soil data. This will include review of published geological maps, OS maps, aerial photographs and site-specific data such as site investigation data, geological and hydrogeological reports, digital terrain models (slope plans) and geological literature.

Desk Study

9.3.3 The desk study will identify sensitive features which may potentially be affected by the Proposed Development and will confirm the geological, hydrogeological and hydrological environment.

Field Surveys

9.3.4 The hydrological assessment specialists will liaise closely with the project ecology and geology / geotechnical specialists to ensure that appropriate information is gathered to allow a comprehensive impact assessment to be completed.

9.3.5 A detailed site visit and walkover survey will be undertaken, to:

- verify the information collected during the desk and baseline study;

- undertake a visual assessment of the main surface waters and identify private water supplies;
- identify drainage patterns, areas vulnerable to erosion or sediment deposition, and any pollution risks;
- visit any identified GWDTEs (in consultation with the project ecologists);
- prepare a schedule of potential watercourse crossings;
- inspect rock exposures, establish by probing an estimate overburden thicknesses (a probe is pushed vertically into the ground to refusal and the depth is recorded);
- confirm underlying substrate, based on the type of refusal of the probe (e.g. solid and abrupt refusal-rock, solid but less abrupt refusal with grinding or crunching sound-sand or gravel, rapid and firm refusal-clay, gradual refusal-dense peat or soft clay);
- allow appreciation of the site, determining gradients, possible borrow pits, access routes, ground conditions, etc., and to assess the relative location of all the components of the Proposed Development;
- complete a probing exercise that will identify areas of thick peat that may constrain the Proposed Development (by inserting a probe into the ground and pushing into the peat to refusal then the depth is recorded); and
- confirm the distribution and depth of peat across areas of the site being considered for development.

9.3.6 The desk study and field surveys will be used to identify potential development constraints and be used as part of the site design.

9.3.7 Once the desk study is completed and sensitive soil, geological and water features identified an impact assessment will be undertaken to assess the potential effects on soils, geology and the water environment as a result of the construction, operation and restoration/decommissioning of the Proposed Development.

Assessment of Effects

9.3.8 The purpose of this assessment will be to:

- identify any areas susceptible to peat slide, using peat thickness and DTM data to analyse slopes;
- assist in the micrositing of turbines and tracks in areas of no peat or shallow peat;
- assess potential effects on soils, peat and geology;
- determine what the likely effects of the Proposed Development are on the hydrological regime, including water quality, flow and drainage;
- allow an assessment of potential effects on identified licensed and private water supplies;
- assess potential effects on water (including groundwater) dependent habitats;

- determine suitable mitigation measures to prevent significant hydrological and hydrogeological effects;
- assist in the micrositing of turbines in the least hydrogeologically and hydrologically sensitive areas by applying buffer zones around watercourses and other hydrological features; and
- develop an acceptable code for working on the site that will adopt best practice procedures, effective management and control of onsite activities to reduce or offset any detrimental effects on the geological, hydrogeological and hydrological environment.

9.3.9 A qualitative risk assessment methodology will be used to assess the significance of the potential effects. Two factors will be considered: the sensitivity of the receiving environment and the potential magnitude should that potential impact occur.

9.3.10 This approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the Proposed Development. This approach also allows effort to be focused on reducing risk where the greatest benefit may result.

9.3.11 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment as well as its ability to absorb the effect without perceptible change) and the magnitude of impacts will each be considered through a set of pre-defined criteria.

9.3.12 The sensitivity of the receiving environment together with the magnitude of the effect defines the significance of the effect, which will be categorised into level of significance.

Peat Slope Risk Qualitative Risk Assessment

9.3.13 Peat probing will be completed as part of an initial low resolution 'first pass' survey:

- peat depths within the development area will be obtained using a 100m grid where access is possible (the probing will also provide information of the substrate below the peat);
- a limited (in terms of aerial extent) geomorphological mapping exercise will be undertaken to link the topographic features with the underlying geology and to visit those areas of the site that may be identified as potentially 'at risk from peat slide';
- the thickness of the peat will be established by probing and the underlying sub-strata confirmed by inspection of watercourses;
- the investigation will look at proposed turbine and infrastructure locations for signs of existing or potential peat instability; and
- output from the field survey will comprise a record of investigation locations and summary of peat depths recorded.

9.3.14 If significant peat deposits are proven a preliminary Peat Landslide Hazard and Risk Assessment will be completed using the site survey data and slope analysis (using DTM data), highlighting areas that may be impacted by a peat slide so that appropriate mitigation measures and can be identified.

Consultation

9.3.15 As part of the consultation phase of the project environmental data and views of the Proposed Development will be sought from:

- Ironside Farrar Ltd (Advisors to the Scottish Government with regard to Peat);
- SEPA;
- Scottish Natural Heritage (SNH); and
- The Highland Council.

Matters Scoped Out

9.3.16 At this stage, it is proposed that the following can be scoped out of detailed assessment:

- Detailed Flood Risk Assessment. Published mapping confirms that most of the site is not located in an area identified as being at flood risk. It is proposed, therefore, that a simple screening of potential flooding sources (fluvial, coastal, groundwater, infrastructure etc.) is presented in the EIA Report and measures that would be used to control the rate and quality of runoff will be specified in the EIA Report.

9.4 Baseline Conditions

9.4.1 The site is shown by British Geological Survey (BGS) to be underlain by peat, glacial till and alluvium. Beneath the superficial deposits, bedrock across most of the site comprises Devonian age sedimentary rocks of the Berriedale Sandstone Formation and Neoproterozoic age metasedimentary rocks of the Kildonan Psammite Formation and Kintradwell Boulder Beds.

9.4.2 Areas of peat underlying the site have been classified as 'Class 1' – a priority peatland habitat.

9.4.3 Published mapping confirms there is no underground or surface opencast mining. Except for small borrow pits used for track construction there are no mining or quarrying activities present on site.

9.4.4 The bedrock deposits are classified as low and moderately productive aquifers which would be expected to contain small amounts of groundwater locally. Where present, groundwater may flow in the near surface weathered zone and in secondary fractures.

9.4.5 The SEPA River Basin Management Plan (http://gis.sepa.org.uk/rbmp/) shows the site does not lie within a Drinking Water Protection Zone.

9.4.6 The Stetdale Burn, Kintradwell Burn, Badenhauglish Burn and Loth Burn and their tributaries flow eastward through or near to the site before discharging to the North Sea.

9.4.7 SEPA mapping confirms flood extents associated with the larger watercourses are confined to the watercourse corridors, and floodplain extents are not extensive.

9.4.8 Three Sites of Special Scientific Interest (SSSI) are recorded near or downstream of the site:

- Helmsdale Coast, located immediately south, downstream of the site boundary. Helmsdale Coast SSSI comprises coastal geological features;
- Ballinreach Coastal Gorges located downstream on the south of the site, within the site boundary. Ballinreach Coastal Gorges SSSI is a birch woodland; and

- Loth Gorge located downstream, on the south eastern edge of the site boundary. Loth Gorge SSSI is a birch woodland.

9.5 Potential Effects

9.5.1 A summary of the potential effects on ground conditions and the water environment resulting from construction, operation and decommissioning of a wind farm is provided below. These will be considered in the EIA Report.

Potential Construction Impacts and Effects

- disturbance and loss of deposits of peat;
- disturbance of any residual ground contamination which might be associated with historic land use (such as forestry);
- ground instability (inc. peat slide risk);
- impacts on surface water and groundwater quality from pollution from fuel, oil, concrete or other hazardous substances;
- discharge of sediment-laden runoff to drainage system and watercourses;
- increased flood risk to areas downstream of the site during construction through increased surface run-off;
- changes in groundwater levels from dewatering excavations;
- potential change of groundwater flow paths and contribution to areas of peat and groundwater dependent terrestrial ecosystems (GWDTEs);
- disturbance of watercourse bed and banks from the construction of culverts;
- potential pollution impacts to public and private water supplies; and
- potential blockage of existing forestry drainage channels or culverts during forestry clearance or construction activities.

Potential Operational Impacts and Effects

- increased runoff rates and flood risks, resulting from increases in areas of tracks and hardstanding at turbines;
- changes in natural surface water drainage patterns (which may affect water contribution to areas of peat and GWDTE);
- changes to groundwater levels and groundwater movement;
- longer term impacts on abstraction for water supplies, particularly any supplies dependent on groundwater; and
- pollution impacts on surface water quality from maintenance work.

Potential Decommissioning Impacts and Effects

- Are considered to be similar to potential construction impacts and effects and thus the same potential effects will be considered for the decommissioning phase of the development.

9.6 Potential Mitigation

9.6.1 The Proposed Development will undergo design iterations and evolution in response to constraints identified as part of the baseline studies and field studies so as to avoid and/or minimise potential effects on receptors where possible. This will include geological and hydrological and hydrogeological constraints which include slope stability, deep peat, watercourse locations, areas of potential flooding, private water supplies and groundwater dependent terrestrial ecosystems.

9.6.2 For example, it is expected that the following potential mitigation measures will be included in the design of the Proposed Development:

- a 50m buffer will be applied to watercourses;
- site specific peat probing will be used to identify areas of potential deep peat and these will be avoided;
- a site specific peat landslide and hazard risk assessment will be prepared and areas of potential increased peat slide risk will be avoided; and
- private water supply sources and areas of GWDTE will be avoided.

9.6.3 There is much best practice guidance (see Section 9.2) which has been developed to assist developers minimise the risks associated with wind farm construction and this will be used to develop site specific mitigation measures. Measures will be proposed to control and mitigate, for example, pollution risk (from anthropogenic and geogenic sources), flood risk, watercourse crossings, impacts on surface and groundwater flow paths, and management of peat soils.

9.6.4 Mitigation measures will be specified for all stages of the site life (construction, operation and decommissioning).

9.7 Questions

9.7.1 **Do you agree that it is appropriate to scope out a detailed flood risk assessment?**

9.7.2 **Do you agree that the scope of the proposed assessment is appropriate?**

10 Transport and Access

10.1 Introduction

10.1.1 The Transport and Access Assessment will be conducted by transport consultant, WYG Environment Planning Transport Limited, part of the WYG Group. All staff contributing to the assessment will have undergraduate and/or postgraduate degrees in relevant subjects, have professional transport assessment experience, and hold professional membership of the Chartered Institute of Logistics and Transport. All reporting will be reviewed and approved by Liz Hunter of WYG. A detailed numerical assessment of effects will be

undertaken for the construction phase only as the main transport impacts will be associated with the movement of Heavy Goods Vehicles (HGV) travelling to and from the site during the construction phase of the project.

10.1.2 The Transport and Access Chapter will be supported by a Technical Appendix: Transport Assessment, which would be a standalone document including detailed background information, calculations, drawings and framework traffic management plans.

10.2 Legislation, Policy and Guidance

10.2.1 A full review of the relevant transport planning policies, guidance notes and documentation will be undertaken and will include reference to the following:

- National Planning Framework (NPF, 2014);
- Scottish Planning Policy (SPP, 2014);
- Planning Advice Note (PAN) 75(Scottish Government, 2005);
- Transport Assessment Guidance (Transport Scotland, 2012);
- Guidelines for the Environmental Assessment of Road Traffic, (IEMA, 1993);
- Design Manual for Roads and Bridges, Volume II Environmental Assessment, Section 2 Environmental Assessment (Highways Agency, 2008);
- The Highland-wide Local Development Plan (HwLDP) (THC, 2012); and
- The Highland Council's Local Transport Strategy (THC, 2010).

10.2.2 Chapter 4 of this Scoping Report sets out the planning policy framework that is considered of relevance to undertaking the EIA Report for the Proposed Development. The transport and access assessment will, among other things, reference those topic specific policies or advice notes of relevance to this technical discipline of the EIA Report.

10.3 Proposed Scope of Assessment

10.3.1 The assessment will consider the potential for likely significant effects on receptors using transport routes resulting from increased vehicle movements associated with the construction, operational and decommissioning phases of the Proposed Development.

10.3.2 The construction phase will generate the greatest volume of traffic. The numerical assessments will therefore focus on this phase of development though consideration will be given to both the operational and decommissioning phases.

10.3.3 Receptors are the users of the roads within the transport and traffic study area and the locations through which those roads pass.

10.3.4 The assessment will involve desk study, site visits, consultation, data processing and analysis and interpretation using swept path assessment software, and professional judgement. It will involve the following key stages:

- identify study area;
- determine baselines;
- review the Proposed Development to identify potential effects;

- evaluate significance;
- identify mitigation; and
- assess residual effects.

10.3.5 The IEMA Guidelines document includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement will be used to develop a classification of sensitivity for users based on the characteristics of roads and locations as shown in the table below (Table 10.1).

Table 10.1 Sensitivity of Users

Receptor	Sensitivity			
	Negligible	**Low**	**Medium**	**High**
Users of Roads	Where roads have no adjacent settlements. Includes new strategic trunk roads that would be little affected by additional traffic and suitable for Abnormal Loads and new strategic trunk road junctions capable of accommodating Abnormal Loads.	Where the road is Trunk or A-class, constructed to accommodate general and HGV traffic moving between primary destinations. Includes roads with little or no traffic calming or traffic management measures.	Where the road is a local A or B class road, capable of regular use by HGV traffic. Includes roads where there is some traffic calming or traffic management measures.	Where the road is a minor rural road, not constructed to accommodate frequent use by HGVs. Includes roads with traffic control signals, waiting and loading restrictions, traffic calming measures.
Users of Locations	Where a location includes individual dwellings or scattered settlements with no facilities.	Where a location is a small rural settlement, few community or public facilities or services.	Where a location is an intermediate sized rural settlement, containing some community or public facilities and services.	Where a location is a large rural settlement containing a high number of community and public services and facilities.

10.3.6 The following rules, also taken from the IEMA Guidelines, will be used to determine which links within the transport and traffic study area should be fully assessed:

- Rule 1 - include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles (HGVs) is predicted to increase by more than 30 %).
- Rule 2 - include any other specifically sensitive areas where traffic flows are predicted to increase by 10 % or more.

10.3.7 The IEMA Guidelines identify the key effects that are most important when assessing the magnitude of traffic impacts from an individual development and the levels of magnitude, these being:

- Severance - changes in traffic movements of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' [or minor, moderate and major] changes in severance respectively;
- Driver delay – the likelihood of delays is only considered to be "significant [or major] when the traffic on the network surrounding the development is already at, or close to, the capacity of the system;
- Pedestrian delay - an increase in total traffic of approximately 30% can double the delay experienced by pedestrians attempting to cross a road and would be considered 'substantial' [major];
- Pedestrian amenity - a change in the traffic flow of -50% or +100% would produce a 'substantial' [major] change in pedestrian amenity;
- Fear and intimidation - changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' [or minor, moderate and major] changes in severance respectively; and
- Accidents and safety - professional judgement is used to assess the implications of local circumstances, or factors which may elevate or lessen risks of accidents.

10.3.8 To determine the overall significance of the transport and traffic effects, the results from the receptor sensitivity and effects magnitude assessment will be correlated and classified based on a scale set out in Table 2.4 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) and summarised in the table below (Table 10.2).

Table 10.2 Significance of Effects

Receptor Sensitivity	Magnitude of Change				
	Substantial	**Moderate**	**Slight**	**Negligible**	**None**
High	major	major/ moderate	moderate / minor	minor	none
Medium	major/ moderate	moderate	minor	minor / negligible	none
Low	moderate / minor	minor	minor	minor / negligible	none
Negligible	minor	minor	minor / negligible	negligible	none

10.3.9 In terms of the EIA Regulations, effects would be considered significant where they are assessed to be major, major/moderate or moderate.

10.3.10 The chapter will also assess the potential for significant cumulative effects arising from the addition of the Proposed Development to other cumulative developments, which are the subject of a valid planning application. Operational, under construction and consented developments will be considered as part of the baseline. Traffic flows associated with developments close to the end of their operational life will be captured in existing traffic movement data and therefore form part of the baseline.

10.4 Baseline Conditions

10.4.1 The traffic and transport study area is defined as the lengths of public road that would be used to access the Proposed Development and be most impacted during the construction phase. The study area has been identified through a review of the likely routes between suppliers of equipment and materials and the site and it is considered that it should include:

- A9 between Kintradwell and Helmsdale; and
- A9 between Kintradwell and Invergordon.

10.4.2 Existing daily traffic flows within the study area will be established using data sourced from the Department for Transport (DfT) online database of traffic surveys and new traffic surveys (count and speed) undertaken by Automatic Traffic Counter (ATC). It is proposed that the following data is collected:

- Traffic Count - Department for Transport Count site 30721 – A9 at Culgower;
- Traffic Count - Department for Transport Count site 40791 – A9 at south of Brora;
- Traffic Count - Department for Transport Count site 80003 – A9 north of A949;
- Traffic Count - Department for Transport Count site 80001 – A9 south of Meikle Ferry Roundabout;
- Traffic Count - Department for Transport Count site 20724 – A9 at Invergordon; and
- Traffic Count - 7-day automatic traffic count and speed survey in vicinity of proposed site access junction.

10.4.3 Road traffic accident data will be obtained from the online resource CrashMap.co.uk for the study area roads covering the five years to the end of 2018.

10.4.4 The presence, or otherwise, of walking and cycling routes within the study area and the site, that may be impacted by the Proposed Development will be established through desktop review.

10.4.5 A full route assessment will be undertaken on the proposed access route for the delivery of turbine components to the site to determine its suitability for the movement of abnormal loads, to identify any constraint points where mitigation may be required and to determine the required mitigation. The route assessment will commence at the Port of Invergordon, the anticipated Port of Entry, and continue to the proposed site entrance off the A9 north of Brora.

10.4.6 Base year daily traffic flows for the year construction is anticipated to commence will be estimated by applying the National Road Traffic Forecast (NRTF) high growth factors to existing traffic flows. Applying high growth factors provides a robust assessment as they represent higher than average growth.

10.5 Potential Effects

Construction Impacts and effects

10.5.1 During the construction period, the following traffic will require access to the site:

- Staff transport, either cars or staff minibuses;

- Construction equipment and materials, deliveries of machinery and supplies such as cement; and
- Abnormal loads consisting of the wind turbine sections and heavy lift cranes.

10.5.2 Estimates will be made of the total traffic movements associated with each element of the construction programme and these will be split into average monthly deliveries according to the construction phasing plan. Estimates will be based on information provided by the Applicant and experience developed from other wind farm projects of a similar scale.

10.5.3 To enable comparison of the estimated base traffic flows with total volumes including predicted construction traffic, the monthly construction flows will be converted to average daily flows for each month of the construction period. The peak daily construction traffic flows will be added to the daily base flows and the percentage uplift in this total traffic against base traffic calculated.

10.5.4 An assessment of percentage uplift on each road link within the study area will be made with reference to Rule 1 and 2 of the IEMA Guidelines. Where required, links will be taken forward to an assessment of the predicted magnitude of the impact from the increase in traffic movements with no mitigation in place. The significance of the effect will then be assessed.

10.5.5 For any effects that are found to be significant with no mitigation in place, an evaluation will be undertaken to consider the residual effects after the implementation of the proposed mitigation.

Operational Impacts and Effects

10.5.6 It is likely that during the operation of the site there would be up to two vehicle movements per week for maintenance purposes. Also, there could be occasional abnormal load movements to deliver replacement components in the event of a major component failure.

10.5.7 In terms of the IEMA Guidelines, such a small number of traffic movements and the associated percentage uplift over baseline traffic movements are not significant. Consequently, it is proposed that a detailed numeric assessment of operational effects is scoped out of the EIA assessment.

Decommissioning Impacts and Effects

10.5.8 Prior to decommissioning of the site, a traffic assessment would be undertaken, and appropriate traffic management procedures would be followed.

10.5.9 The decommissioning phase would result in fewer trips on the road network than the construction phase as it is likely that elements of infrastructure such as access tracks and electrical connections would be left in place and components could be broken up on-site to allow transport by reduced numbers of standard HGVs.

10.5.10 As decommissioning would result in fewer vehicle trips on the road network than the construction phase, assuming the baseline has not substantially changed, the significance of any effects would not be greater. Consequently, it is proposed that a detailed numeric assessment of decommissioning effects is scoped out of the EIA assessment.

10.6 Potential Mitigation

10.6.1 Proposed mitigation against the impacts of general construction traffic and to enable the movements of Abnormal Indivisible Loads (AILs) will be identified and discussed. This will

include methods of working that would be introduced through a Construction Traffic Management Plan (CTMP) and a Traffic Management Plan (TMP) relating to the movement of AILs as well as physical measures such as road widening. Frameworks for both plans will be included in the Transport and Access Chapter and Appendix.

10.6.2 The CTMP will promote best practice in many areas such as requiring sheeting of delivery vehicles to reduce dust and stop spillage on public roads, installing wheel wash facilities at the site entrance and installing appropriate traffic management to minimise conflict with general traffic.

10.6.3 Measures specific to the site will also be included such as a commitment for construction traffic to travel through villages at 20mph and managing deliveries to take place outside school drop off and pick up times.

10.6.4 The Traffic Management Plan for the movement of AILs will consider items such as advance warning signage, operation and management of convoys and communication procedures.

10.7 Questions

- **Do you agree that the scope of the proposed assessment is appropriate?**
- **Do consultees agree that it is appropriate to scope out detailed numeric assessments of operational and decommissioning effects from the EIA?**
- **Do consultees agree with the proposed study area?**
- **Do consultees agree with the proposed traffic data count points?**
- **Do consultees agree with the proposed methodology for calculating base traffic flows?**

11 Noise and Vibration

11.1 Introduction

11.1.1 This chapter sets out the proposed approach to the assessment of potential effects from noise and vibration, during construction, operation and decommissioning of the Proposed Development.

11.2 Legislation, Policy and Guidance

11.2.1 The construction noise assessment will be undertaken in accordance with the methodology outlined in British Standard (BS) 5228: Part 1: 2009.

11.2.2 The operational noise assessment will be undertaken in accordance with ETSU-R-97 "The Assessment and Rating of Noise from Wind Farms" (The Working Group on Noise from Wind Turbines, 1996) and the associated document “A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, May 2013” published by the Institute of Acoustics (Cand et al, 2013).

11.3 Proposed Scope of Assessment

Construction Noise

11.3.1 Noise emitted during the construction phase will be temporary and short term in nature and can be minimised through careful construction practices. The effective control of these impacts can be achieved by way of a suitable planning condition. Construction noise can be controlled post consent (should consent be granted) through the use of two legislative instruments which address the effects of environmental noise with regard to construction noise, vibration, and nuisance:

- The Environmental Protection Act 1990 (EPA); and
- The Control of Pollution Act 1974 (CoPA).

11.3.2 The CoPA provides two means of controlling construction noise and vibration:

- Section 60 provides the Local Authority with the power to impose at any time operating conditions on the site.
- Section 61 allows the Applicant to negotiate a set of operating procedures with the Local Authority prior to commencement of site works.

11.3.3 A construction noise assessment will be undertaken to determine the potential noise impacts during the construction phase of the Proposed Development. The construction noise assessment will be undertaken in accordance with the methodology outlined in British Standard (BS) 5228: Part 1: 2009. Impacts will be assessed using criteria contained within BS 5228-1: 2009 and, where appropriate, mitigation measures will be proposed.

11.3.4 An assessment of the potential noise emissions during the decommissioning phases of the Proposed Development will also be undertaken as part of the construction noise assessment. The impacts of the decommissioning phase will be assessed and, where appropriate, mitigation measures will be proposed.

Operational Noise

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

11.3.6 For day-time periods (0700 to 2300 hours), the noise limit is 35-40 dB LA90, or 5 dB (A) above the 'quiet day-time hours' prevailing background noise, whichever is the greater. The actual value within the 35-40 dB(A) range depends on the number of dwellings in the vicinity; the effect of the limit on the energy generated; and the duration and level of exposure.

11.3.7 For night-time periods (2300 to 0700 hours) the noise limit is 43 dB LA90, or 5 dB(A) above the prevailing night-time hours background noise, whichever is the greater.

11.3.8 For single turbines or wind farms with very large separation distances between the turbines and the nearest properties, as is the case with the Proposed Development, a simplified noise condition may be suitable whereby noise is restricted to the minimum ETSU-R-97 level of 35 dB LA90 for wind speeds up to 10 m/s at 10 m height.

The noise levels predicted to be generated by the Proposed Development, in combination with the noise from any nearby consented or existing wind farms, have been compared with this limit to determine whether a simplified ETSU-R-97 assessment, without the need for baseline noise measurements, would be sufficient. **The comparison (Appendix 11.1) showed that the simplified limit is predicted to be met such that background noise measurements would not be deemed necessary in accordance with the guidance.**

11.3.9 ETSU-R-97 details a methodology for establishing noise limits for proposed wind farm developments and these limits should not be exceeded. An assessment undertaken in accordance with ETSU-R-97 and current good practice will be included within the EIA Report. Predicted wind turbine noise levels, calculated using the ISO 9613-2 propagation model in accordance with the recommendations of the Institute of Acoustics Good Practice Guide, will be compared to the limits established in accordance with ETSU-R-97. Achievement of the noise limits will be a key design criterion during the site design process. In order to assess operational noise impacts in accordance with ETSU-R-97, the following steps are required:

- specify the location of the proposed wind turbines;
- identify the locations of the nearest, or most noise sensitive neighbours;
- specify the noise emission characteristics of a candidate wind turbine suitable for the Proposed Development;
- calculate the noise immission levels due to the operation of the Proposed Development as a function of on-site wind speed at the nearest neighbours;
- determine the noise limits in accordance with ETSU-R-97; and
- compare the calculated wind turbine noise levels with the noise limits to assess compliance with ETSU-R-97.

11.3.10 It is considered (given the separation distances) that it is unlikely that vibration from the construction and operation of the Proposed Development would have a significant effect on receptors. It is therefore proposed that vibration is Scoped Out of the EIA.

Cumulative

11.3.11 A cumulative noise assessment is required where there is potential for an increase in noise effects from the operation of two or more wind farms at any property surrounding a development. In this regard, the existing Gordonbush, Kilbraur and Kilbraur Extension schemes along with the consented Gordonbush Extension have been identified as potentially relevant when considering potential cumulative noise effects.

11.3.12 The assessment will be undertaken in accordance with current best practice and the schemes above will be modelled and accounted for as part of the EIA Report.

11.4 Baseline Conditions

11.4.1 The noise character of the area and likely background noise levels are expected to be typical of a rural environment.

11.5 Potential Effects

11.5.1 Noise emissions from modern wind turbines are either mechanical (from machinery housed within the nacelle) or aerodynamic (noise from the movement of the blades through the air

around the horizontal axis). Noise emissions from the mechanical equipment housed within the nacelles has been reduced significantly through technological improvements and noise insulation of the nacelle. As such the characteristic noise from wind turbines is the aerodynamic noise of the air moving over the blades.

11.5.2 Causes of potential noise impacts to be assessed are:

- construction noise due to construction plant and construction traffic; and
- operational noise from the turbines.

11.5.3 Noise emitted during the operational phase of the Proposed Development is not expected to be significant as achievement of the relevant noise limits will form a key part of the site design.

11.5.4 However, the significance of the effects will be assessed[11] and presented as part of the EIA Report.

11.6 Potential Mitigation

11.6.1 Relevant construction mitigation measures will be captured within the site-specific Construction Environmental Management Plan (CEMP).

11.6.2 It is envisaged that site design will ensure relevant noise limits will be achieved.

11.7 Questions

11.7.1 **Do you agree that it is appropriate to scope out vibration from the EIA assessment?**

11.7.2 **Do you agree that it is appropriate to scope out a background noise survey?**

11.7.3 **Do you agree that the scope of the proposed assessment is appropriate?**

12 Aviation

12.1 Introduction

12.1.1 The Applicant has completed an initial appraisal of the potential interactions with aviation and radar signals surrounding the site. This appraisal indicates that there is potential for an impact on the Primary Surveillance Radar at RAF Lossiemouth. Further, formal consultation with the Ministry of Defence will be undertaken.

12.2 Legislation, Policy and Guidance

12.2.1 The main guidance document for wind farm development with potential impact on radars and aviation is CAP 764, CAA Policy and Guidelines on Wind Turbines.

12.3 Proposed Scope of Assessment

12.3.1 Consultation will be undertaken with the following consultees to establish if the Proposed Development will have an effect on their interests:

[11] ETSU-R-97, 'The Assessment of Rating of Noise from Wind Farms', defines a procedure for assessing and rating wind farm noise and is recommended for use by Planning Advice Note 1/2011 'Planning and Noise'.

- Ministry of Defence and Defence Infrastructure Organisation– representing military aviation interests;
- Highlands and Islands Airports Limited (HIAL) – representing civil aviation interests in the Highland area and
- Civil Aviation Authority – national aviation regulator.

12.3.2 The responses of these organisations will guide the scope of the assessment. It is not possible to accurately determine the scope of the assessment, as it is necessary to understand how the Proposed Development interacts with the specific operational procedures and regulations of the specific consultees.

12.4 Baseline Conditions

12.4.1 The initial indication of any potential impacts on radar and aviation is to assess the radar line of sight visibility. This provides a baseline from which to disregard or investigate further any impacts. This assessment has been completed and identified the MOD as the main stakeholder with whom further consultation will be necessary. The impact on operations at Inverness Airport is not expected to be significant but consultation will be conducted with HIAL to ensure this is the case.

12.5 Potential Effects

Construction Impacts and effects

12.5.1 It is not anticipated that the construction phase of the Proposed Development will have any significant effects on aviation or radar receptors. However, the MOD Defence Geographic Centre will be informed of turbine erection dates, turbine locations and tallest crane heights prior to construction so that aviation charts can be updated accordingly to warn aviators of the presence of the wind farm construction activities.

Operational Impacts and Effects

12.5.2 There is potential that the turbines at Kintradwell could create issues to aviation during the operational phase of the project. The two primary effects are:

- Creating a physical obstruction to air traffic; and
- Interference with aviation radar operations.

12.6 Potential Mitigation

12.6.1 There are a number of mitigation options available to alleviate problems caused by wind turbines to aviation and aviation radar. The mitigation solutions range from removal of turbines in problematic areas, to complex technical hardware solutions.

12.6.2 Mitigation solutions are highly specific to the effect in questions. Consultation with relevant consultees is key to establishing the appropriate method of mitigation, if required.

12.7 Questions

12.7.1 **Will the replacement of the RAF Lossiemouth Primary Radar, under Marshall, help or hinder the possibility of identifying an onshore wind farm radar mitigation solution?**

13 Potential Grid Connection

13.1.1 The specific configuration of the grid connection between the wind farm and the grid network is not yet finalised. It is hoped that all grid connection infrastructure will be within the red line boundary of the Proposed Development's S36 application. If this is the case, the potential grid connection options will be described in the EIA Report and consideration of the environmental effects of the indicative grid connection included within the assessment.

13.1.2 If the grid connection between the wind farm and the grid network is not within the red line boundary of the S36 application, the grid connection will be subject to a separate application under Section 37 of the Electricity Act 1989.

13.1.3 The detailed environmental studies and reporting associated with the grid connection shall accompany that application. However, if sufficient detail is available from the Network Operator the EIA Report for the Proposed Development will include consideration of the environmental effects of an indicative grid route corridor.

13.1.4 **Do you agree that the approach with respect to the potential grid connection is appropriate?**

14 Climate Change

14.1.1 A requirement of the Section 36 application is for Applicants to complete the online Carbon Calculator tool. The tool assesses the carbon impact of the Proposed Development by comparing the carbon costs of the wind farm with the carbon savings attributed to the scheme. This generates a carbon payback time for the wind farm to become carbon neutral.

14.1.2 An initial carbon balance of the site will be calculated taking account of issues involving any potential peat removal (if applicable), embedded carbon in wind farm components, and transport, coupled with estimated carbon savings delivered by the renewable electricity generated over the lifetime of the development.

14.1.3 The online carbon calculator assessment will then be completed utilising all information from the carbon balance calculations and the results of the onsite peat probing exercise.

14.1.4 **Do you agree that the scope of the proposed assessment is appropriate?**

15 Other Issues

15.1 Socio-economic, Recreation and Tourism

15.1.1 The socio-economic, recreation and tourism benefits of the Proposed Development will be detailed in the EIA Report and accompanying Planning Statement, with any potential impacts assessed where appropriate within the various technical chapters of the EIA (e.g. LVIA and Archaeology & Cultural Heritage). It is therefore considered that socio-economic, recreation and tourism does not warrant its own chapter within the EIA Report.

15.1.2 **Do you agree that socio-economic, recreation and tourism will be well covered across the EIA and as such does not require its own chapter within the EIA?**

15.2 Television and Telecommunications

Television

15.2.1 Digital television signals are much better at coping with signal reflections than analogue, and digital television pictures do not suffer from ghosting (Ofcom, 2009).

15.2.2 It is anticipated that television reception in the vicinity of the site is provided by transmitters to the south (Rosemarkie and Knockmore)[12]. i.e. the proposed wind turbines are unlikely to sit between the transmitter and receiver.

15.2.3 Consequently, the risk of in interference is considered to be low and as such could be addressed by an appropriately worded condition.

15.2.4 It is therefore proposed that an assessment of potential effects on television is scoped out of the EIA assessment.

Satellite Television Reception

15.2.5 Satellite TV reception is not generally affected by new structures unless the development blocks the 'line-of-sight' between a dish antenna and the satellite in the sky. With satellite signals received from a high elevation, disruption to signals is usually limited to cases where a tall structure is erected very close to a receiver (Ofcom, 2009).

15.2.6 Given the separation distance from neighbouring infrastructure (c.3.4km), it is considered highly unlikely that the Proposed Development would impact on satellite television reception.

15.2.7 It is therefore proposed that an assessment of potential effects on satellite television reception is scoped out of the EIA assessment.

Other Terrestrial Broadcasts

15.2.8 Broadcast radio (FM, AM and DAB digital radio) are transmitted on lower frequencies than those used by terrestrial TV signals. Lower frequency signals tend to pass through obstructions more easily than the higher frequency TV signals, and diffraction effects also become more significant at lower frequencies. Both these factors will tend to lessen the impact of new structures on radio reception (Ofcom, 2009).

15.2.9 It is anticipated that broadcast radio reception in the vicinity of the site is provided by transmitters to the south. i.e. the proposed wind turbines are unlikely to sit between the transmitter and receiver[13].

15.2.10 Consequently, the risk of in interference is considered to be low.

15.2.11 It is therefore proposed that an assessment of potential effects on broadcast radio is scoped out of the EIA assessment.

Fixed Links

15.2.12 Ofcom licenses a large number of fixed wireless services over a wide range of frequencies. These are known as fixed links and are used by licensees for a number of uses. Example uses

[12] https://www.bbc.co.uk/receptionsearch

[13] https://www.bbc.co.uk/receptionsearch

include, remote monitoring of unattended equipment (scanning telemetry), data transfer between business premises, and voice communication.

15.2.13 The wide range of frequencies and distances involved, make it difficult to generalise the impact a development may have on fixed links (Ofcom, 2009).

15.2.14 Any potential effects on fixed links will be sought through formal consultation with Ofcom (Spectrum) and all relevant link operators. Where possible and applicable, the turbines will be designed to take into account the minimum separation distance from identified communication link(s). An assessment will be made as to the significance of potential operational effects and where appropriate, suitable mitigation measures will be discussed.

Questions

15.2.15 **Do you agree that it is appropriate to scope out an assessment of potential effects on television from the EIA?**

15.2.16 **Do you agree that it is appropriate to scope out an assessment of potential effects on satellite television reception from the EIA?**

15.2.17 **Do you agree that it is appropriate to scope out an assessment of potential effects on broadcast radio from the EIA?**

15.2.18 **Do you agree that the approach to television and telecommunications is appropriate?**

15.3 Shadow Flicker

15.3.1 Shadow flicker can occur when the blades of a wind turbine covers the sun for brief moments as they rotate. For an observer viewing this phenomenon through a narrow opening (such as a window from within the affected area) it can create a rapid change in luminance, appearing as if the light is being 'flicked' on and off each time a blade passes in front of the sun.

15.3.2 The affected area is constrained in size and shape by astronomic and geometric parameters, such as the trajectory of the sun and the position and dimensions of the wind turbine. For a fixed observer, the occurrence of shadow flicker from a given wind turbine is generally limited to certain parts of the year and certain times of the affected days. It is possible to predict when, where and for how long shadow flicker could theoretically occur using commercially available computer programs.

15.3.3 The advice sheet from Scottish Government, Onshore Wind Turbines, a web-based guide (Scottish Government, 2014) sets out the potential geographic area which may fall under assessment: *"Where this (shadow flicker) could be a problem, Applicants should provide calculations to quantify effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule ten rotor diameters), 'shadow flicker' should not be a problem."*

15.3.4 Published research by the Department of Energy and Climate Change (DECC), Update of UK Shadow Flicker Evidence Base (DECC, un-dated), evaluates the current international understanding of shadow flicker and confirms an acceptable study area for assessment is ten rotor diameters from each turbine and within 130 degrees either side of north.

15.3.5 The maximum rotor diameter of the proposed turbines would not exceed 136m, so the area where shadow flicker could be a problem extends to a maximum of 1.36km.

15.3.6 With there being no residential properties within 1.36km, it is proposed that shadow flicker is scoped out of the EIA.

15.3.7 **Do you agree that it is appropriate to scope out shadow flicker from the EIA assessment?**

15.4 Ice Throw

15.4.1 Icing in Scotland is likely to be a rare occurrence, with the Icing Map of Europe (WECO, 2000) showing Scotland to be within a light icing area with an annual average of only 2-7 icing days per year.

15.4.2 The risk associated with ice throw affecting members of the public is considered to be very low given the remote location of the Proposed Development.

15.4.3 This is reduced further as turbines are fitted with vibration sensors which shut the turbines down should any imbalance that might be caused by icing be detected.

15.4.4 To further minimise the risk, the following mitigation measures will be taken:

- Service crews will be trained regarding the potential for ice throw.
- Ice risk conditions will be monitored by the wind farm operator.
- Public notices will be displayed at access points alerting members of the public and staff accessing the site of the possible risk of ice throw under certain weather conditions.

15.4.5 It is therefore proposed that ice throw is scoped out of the EIA.

15.4.6 **Do you agree that it is appropriate to scope out ice throw from the EIA assessment?**

15.5 Human Health

15.5.1 The assessment of potential human health effects will be undertaken in the context of residential amenity (i.e. visual impact, noise and shadow flicker where scoped in to the EIA). It is therefore proposed that a specific assessment on potential effects on human health is scoped out of the EIA.

15.5.2 **Do you agree that it is appropriate to scope out human health from the EIA assessment?**

15.6 Risk of Major Accidents and/or Disaster

15.6.1 Given the nature of the Proposed Development, and its remote location, the risk of a major accident or disaster is considered to be extremely low. The Principal Designer would need to ensure a Design Risk Assessment process is followed during the design phase to ensure designers fully assess risks and mitigate to a level deemed as low as reasonably practicable (ALARP) during the design stage as part of the requirements of the Construction (Design and Management) Regulations (2015).

15.6.2 During the operational phase of the Proposed Development, routine maintenance inspections would be completed in order to ensure the safe and compliant operation of all built infrastructure.

15.6.3 It is therefore proposed that an assessment of the risk of major accidents and/or disasters is scoped out of the EIA.

15.6.4 **Do you agree that it is appropriate to scope out risk of major accidents and/or disaster from the EIA assessment?**

15.7 Air Quality

15.7.1 The air quality at this Site is expected to be good due to the rural location, with few pollution sources. The main pollution source is likely to be local emissions from traffic on the A9.

15.7.2 During the construction of the wind farm the movement of vehicles and on-site plant would generate exhaust emissions. Given the short-term nature of the construction period, and the limited area to be developed within the context of the large-scale nature of the site, effects on air quality are likely to be negligible.

15.7.3 Construction activities (such as borrow pit works) have the potential to generate dust during dry spells, which may adversely affect local air quality. Given the scale and nature of construction activities and given the distance between construction areas and the nearest residential properties, it is considered that dust from construction is unlikely to cause a nuisance.

15.7.4 An operational wind farm produces no notable atmospheric emissions. The operation of the wind farm would therefore have no discernible adverse effects on local or national air quality.

15.7.5 Relevant mitigation measures for air quality and pollution control will be captured within the site-specific Construction Environmental Management Plan (CEMP).

15.7.6 It is therefore proposed that an assessment of air quality is scoped out of the EIA.

15.7.7 **Do you agree that it is appropriate to scope out air quality from the EIA assessment?**

15.7.8 **Do you agree that it is appropriate to scope out a dust survey from the EIA assessment?**

15.8 Forestry

15.8.1 There is limited tree coverage on the site, with no forestry in the areas being considered for wind turbines. Consequently, it is not envisaged that significant tree felling will be required.

15.8.2 The turbine transportation route may require the trimming, or felling, of trees to ensure the safe transportation of turbine components. The requirement for this, and the consultation required to ensure relevant approvals, will be detailed in the EIA.

15.8.3 It is therefore proposed that an assessment of forestry is scoped out of the EIA.

15.8.4 **Do you agree that it is appropriate to scope out forestry from the EIA assessment?**

15.9 Waste Strategy

15.9.1 A CEMP will be provided which will document our approach to waste management. The CEMP will be produced in line with THC guidance note *"Construction Environmental Management Process for Large Scale Projects"* (The Highland Council 2010). A borrow pit management and peat management plan will be provided as appendices to the CEMP. It is therefore proposed that waste strategy is scoped out of the EIA.

15.9.2 **Do you agree that it is appropriate to scope out waste strategy from the EIA assessment?**

15.10 Public Access

15.10.1 The potential effects on visual amenity will be fully assessed in the Landscape and Visual Impact chapter of the EIA Report.

15.10.2 The application will be accompanied by an Outdoor Access Management Plan.

15.10.3 The Outdoor Access Management Plan will consider known public access routes in the immediate vicinity of the Proposed Development and outline how public access will be safely managed, and (where practical) maintained, during the construction and operation phase of the development noting the legal obligations placed on duty holders under The Construction (Design and Management) Regulations 2015.

15.10.4 It is therefore considered that public access does not warrant its own chapter in the EIA Report.

15.10.5 **Do you agree that public access does not warrant its own chapter in the EIA Report.?**

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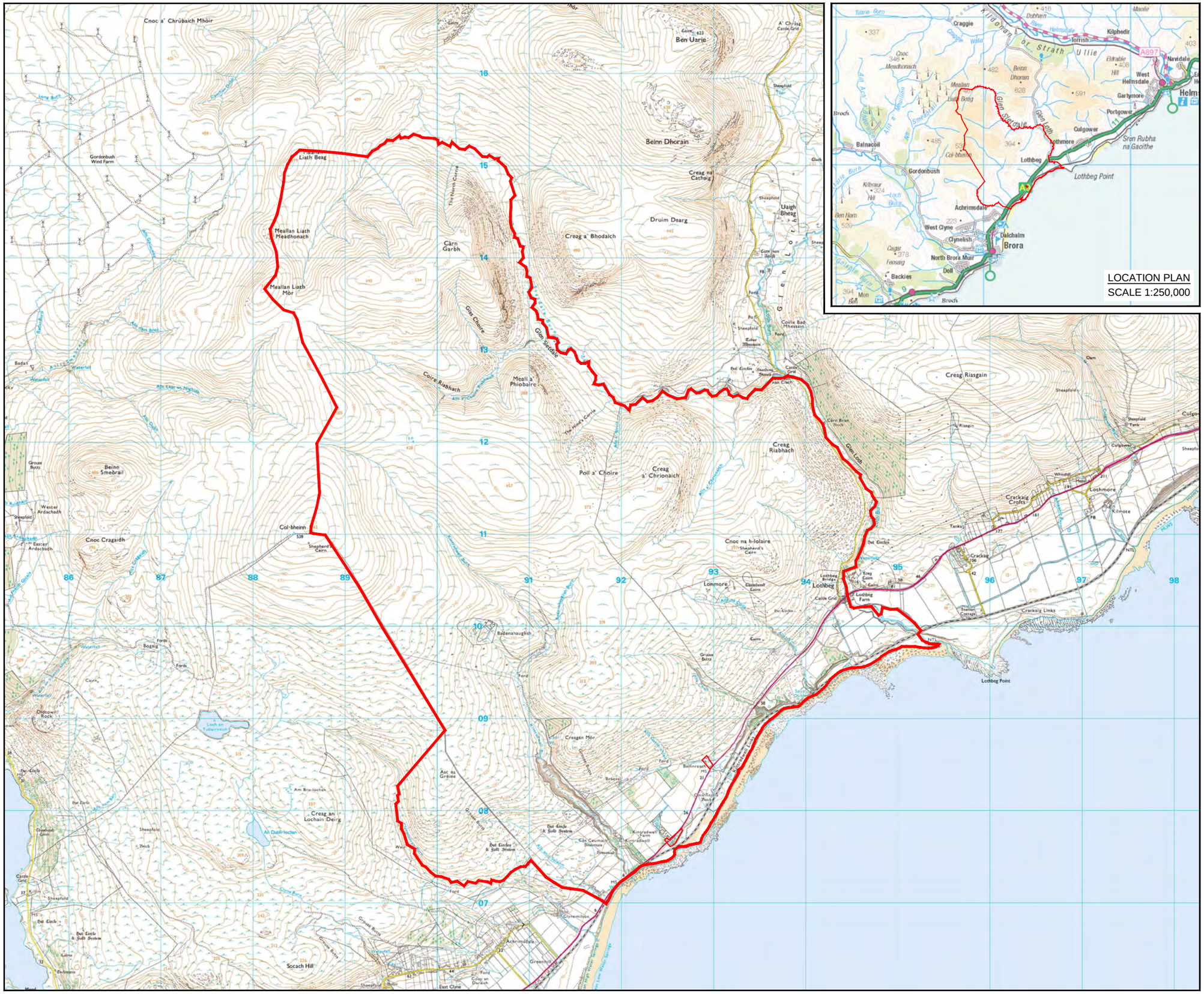

LOCATION PLAN
SCALE 1:250,000

KEY

DEVELOPMENT AREA

SITE LOCATION - NOT TO SCALE

02	CT	JA	JP	16-08-2019	FIGURE 1.1 ADDED
01	CT	JA	JP	14-08-2019	FIRST ISSUE
ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES

LAYOUT DWG	N/A
T-LAYOUT NO.	N/A

DRAWING NUMBER
03501D2505-01

COORDS British National Grid

PURPOSE PRELIMINARY

SCALE 1:40,000

ORIGINAL PLOT SIZE A3

PROJECT TITLE
KINTRADWELL
WIND FARM

DRAWING TITLE
FIGURE 1.1 -
PROPOSED DEVELOPMENT

BEAUFORT COURT, EGG FARM LANE,
KINGS LANGLEY, HERTS WD4 8LR.
TEL +44 (0) 1923 299200
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KEY

T — INDICATIVE TURBINE LOCATIONS

SITE BOUNDARY

TURBINE ID	EASTING	NORTHING
T1	289208	910633
T2	288938	910928
T3	288763	911298
T4	288792	911750
T5	288926	912202
T6	290914	911263
T7	291131	911920
T8	290994	912404
T9	290330	911472
T10	290678	911831
T11	289809	911771
T12	290298	911987
T13	289409	912107
T14	289854	912297
T15	289587	912590
T16	290160	912779
T17	289834	913014
T18	288848	912618
T19	288681	913061
T20	288413	913490
T21	289045	913733
T22	289497	913806

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
01	CT	JA	JP	16-08-2019	FIRST ISSUE

LAYOUT DWG: 03501D0001-01

T-LAYOUT NO.: PSCOktw016

DRAWING NUMBER: 03501D0002-01

COORDS: British National Grid

PURPOSE: PLANNING

SCALE: 1:40,000

ORIGINAL PLOT SIZE: A3

PROJECT TITLE: KINTRADWELL WIND FARM

DRAWING TITLE: FIGURE 1.2 - INDICATIVE TURBINE LAYOUT

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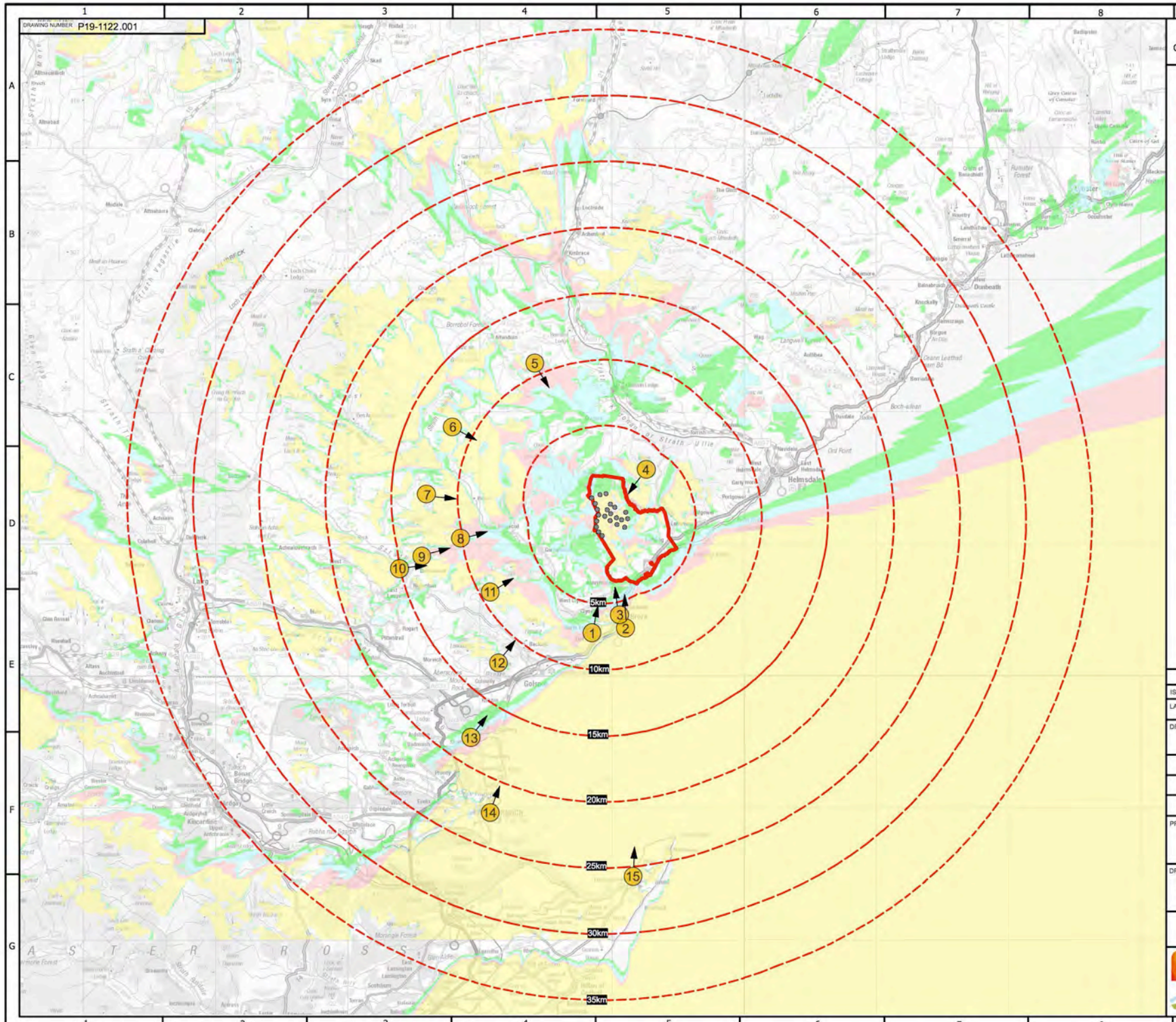

Key

Site Boundary and Proposed Turbines

Study Area Radius

Proposed Viewpoint Locations

Viewpoint locations

1 - Doll
2 - Lower Brora
3 - A9, North Brora
4 - Beinn Dhorain
5 - Creag nam Fiadh
6 - Hope Hill
7 - Track to Ben Armine Lodge
8 - Brora to Rogart minor road near Sciberscross
9 - Brora to Rogart minor road near Dalreavoch
10 - Craggie Beg
11 - Ben Horn
12 - Ben Bhraggie
13 - Viewing Point, on minor road near Skelbo Castle
14 - Dornoch, coastal footpath near Royal Dornoch Golf Club
15 - Portmahomack

ZTV to 149.9m Blade Tip

1 to 5 Turbines Visible

6 to 11 Turbines Visible

12 to 16 Turbines Visible

17 to 22 Turbines Visible

NB The Zone of Theoretical Visiblity (ZTV) image illustrates the theoretical extent of where turbines will be visible from assuming 100% visibility. It is generated using terrain data only and does not take into account any screening that vegetation or the built environment may provide. It is 'as such' a worst case ZTV and the actual extents of visibility are likely to be much less extensive.

N

ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES
1	TH	290719	DT	290719	FIRST ISSUE

LAYOUT DWG	N/A	LAYOUT NO.	N/A
DRAWING NUMBER	Figure 5.1 P19-1122.001		
COORDS	British National Grid		
PURPOSE	Scoping		
SCALE 1:175,000		ORIGINAL PLOT SIZE	A3

PROJECT TITLE

KINTRADWELL
WIND FARM

DRAWING TITLE

BLADE TIP ZONE OF THEORETICAL VISIBILITY (ZTV) WITH PROPOSED VIEWPOINTS

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ITPENERGISED
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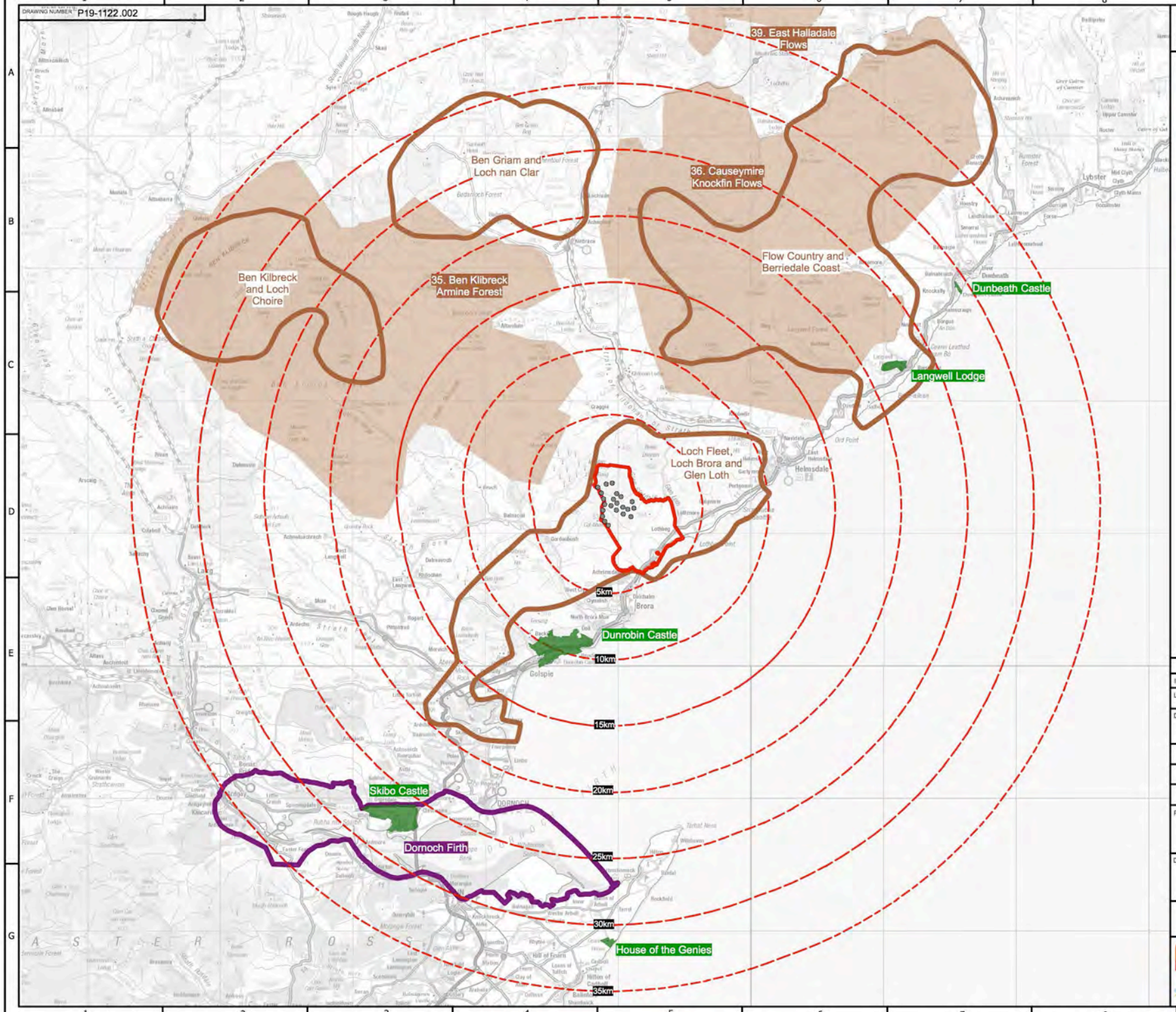

DRAWING NUMBER P19-1122.002

Key

- Site Boundary and Proposed Turbines
- Study Area Radius
- National Scenic Area
- Wild Land Area
- Special Landscape Area
- Garden and Designed Landscape

N

ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES
1	TH	290719	DT	290719	FIRST ISSUE

LAYOUT DWG N/A LAYOUT NO. N/A

DRAWING NUMBER Figure 5.2 P19-1122.002

COORDS British National Grid

PURPOSE Scoping

SCALE 1:280,000 ORIGINAL PLOT SIZE A3

PROJECT TITLE
KINTRADWELL
WIND FARM

DRAWING TITLE
LANDSCAPE DESIGNATIONS

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ITPENERGISED
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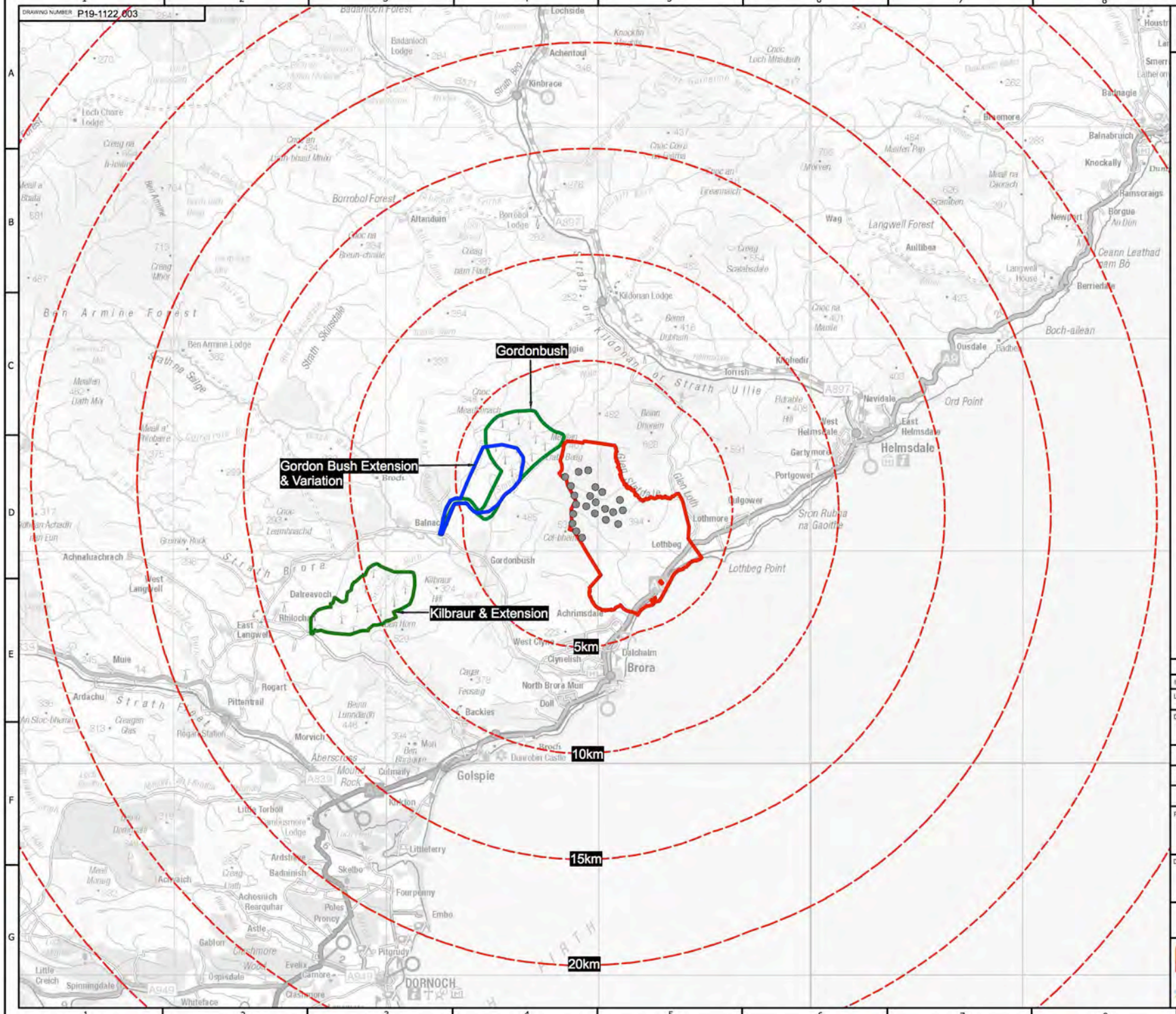

DRAWING NUMBER P19-1122.003

Key

- Site Boundary and Proposed Turbines
- Study Area Radius

Other wind farms within 20km

- Operational
- *Consented / In Planning Scheme

** An extension to the Gordonbush Wind Farm comprising 15 no. turbines (12no. x 130m and 3no. x 115m) has been granted consent. An application to vary this consent to 11no. turbines, 149.9m is currently in the process of being determined by the Energy Consents Unit.*

N

ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES
1	TH	290719	DT	290719	FIRST ISSUE

LAYOUT DWG	N/A	LAYOUT NO.	N/A
DRAWING NUMBER	Figure 5.3 P19-1122.003		
COORDS	British National Grid		
PURPOSE	Scoping		
SCALE 1:175,000		ORIGINAL PLOT SIZE	A3

PROJECT TITLE

KINTRADWELL
WIND FARM

DRAWING TITLE

CUMULATIVE DEVELOPMENTS

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DRAWING NUMBER

Key:

- Scoping Turbine Layout
- 5km Buffer
- Outer Study Area
- 15km Buffer
- Scheduled Monument
- Category A Listed Building
- Category B Listed Building
- Category C Listed Building
- Garden and Designed Landscape
- Property in Care

Number of turbines theoretically visible from the tip

- 1 to 5
- 6 to 11
- 12 to 16
- 17 to 22

1	DRAWN	DATE	APPD	DATE	FIRST ISSUE
ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES

LAYOUT DWG: N/A
LAYOUT NO.: N/A

DRAWING NUMBER: 6.1

COORDS: British National Grid

PURPOSE: Scoping

SCALE: 1:160,000
ORIGINAL PLOT SIZE: A3

PROJECT TITLE:
Kintradwell
Wind Farm

DRAWING TITLE:
CULTURAL HERITAGE SCOPING:
DESIGNATED HERITAGE ASSETS

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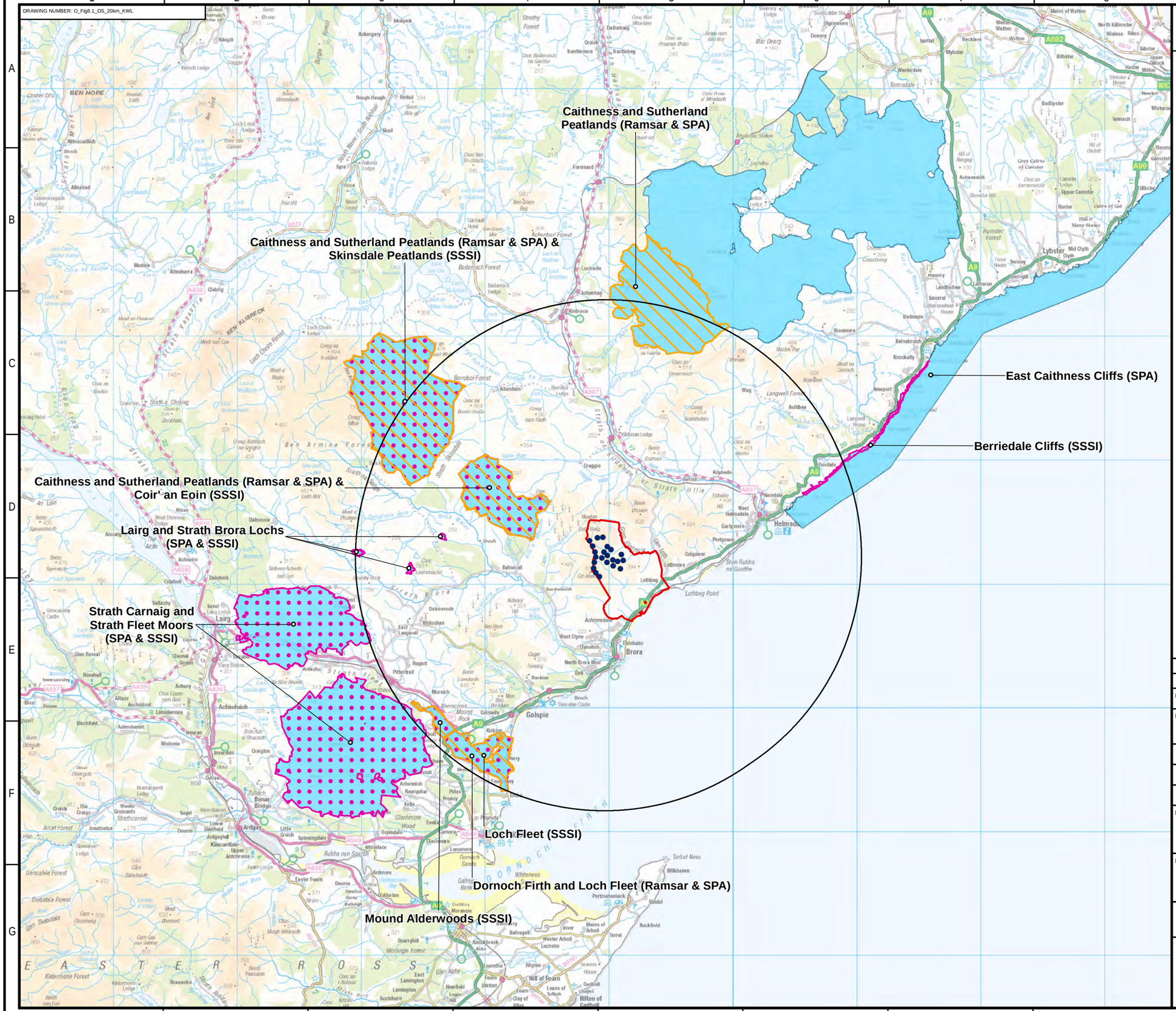
DRAWING NUMBER: O_Fig8.1_DS_20km_KWL



Legend:

- Site Boundary
- Proposed Turbine Location
- 20 km Distance Band
- Ramsar Site
- Site of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)

1	KMS	02/08/19	LNF	02/08/19	FIRST ISSUE
ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES

LAYOUT DWG: N/A
LAYOUT NO.: N/A

DRAWING NUMBER: O_Fig8.1_DS_20km_KWL

COORDS: British National Grid

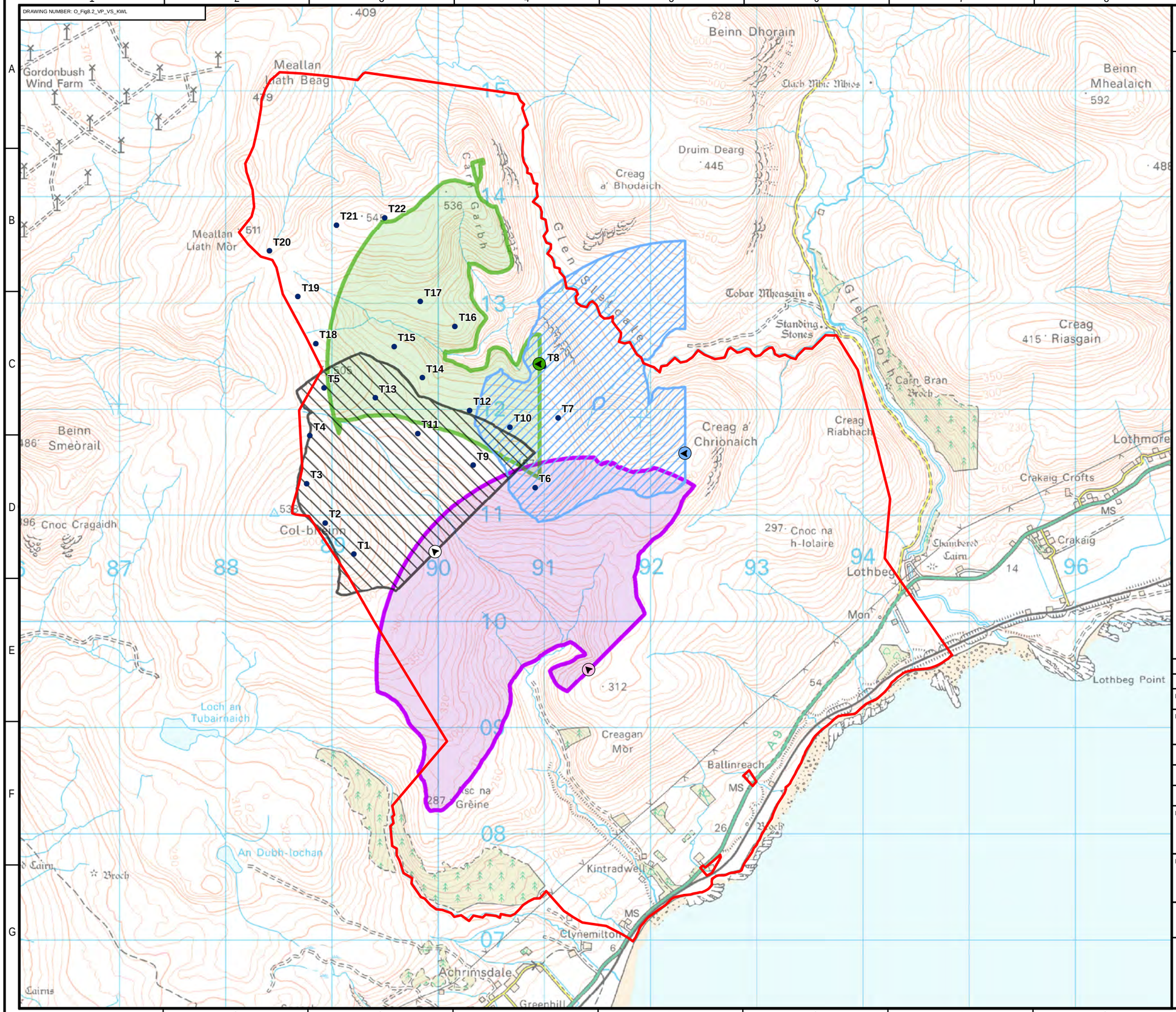
PURPOSE: Scoping

SCALE: 1:300,000
ORIGINAL PLOT SIZE: A3

PROJECT TITLE: Kintradwell Wind Farm

DRAWING TITLE: Ornithological Designated Sites within 20 km

DRAWING NUMBER: O_Fig8.2_VP_VS_KWL



Legend:

- Site Boundary
- Proposed Turbine Location

Vantage points

- 1
- 2
- 3
- 4

Viewsheds

- 1
- 2
- 3
- 4

ISSUE	DRAWN	DATE	APPD	DATE	REVISION NOTES
1	ATA	29/07/19	LNF	29/07/19	FIRST ISSUE

LAYOUT DWG	N/A	LAYOUT NO.	N/A
DRAWING NUMBER	O_Fig8.2_VP_VS_KWL		
COORDS	British National Grid		
PURPOSE	Scoping		
SCALE	1:35,000	ORIGINAL PLOT SIZE	A3
PROJECT TITLE	Kintradwell Wind Farm		
DRAWING TITLE	Vantage Points and Viewsheds		

Planned Acoustic Assessment of the Proposed Kintradwell Wind Farm

Author: Andrew Birchby

Date: 2 August 2019

Ref: 03501-000396

Revision History

Issue	Date	Author	Nature And Location Of Change
01	2 August 2019	Andrew Birchby	First Created

CONTENTS

1.0 INTRODUCTION

The aim of this document is to propose a suitable methodology to assess the acoustic impact of the proposed Kintradwell wind farm.

2.0 METHODOLOGY

The framework most commonly used within the UK for assessing the impact of noise from wind farms is the Department of Trade and Industry's 'The Assessment and Rating of Noise from Wind Farms', hereafter referred to as 'ETSU-R-97' [1]. The methodology described in this document was developed by a working group comprised of a cross section of interested persons including, amongst others, environmental health officers, wind farm operators and independent acoustic experts. It provides a robust basis for assessing the acoustic impact of a wind farm and has been applied at the vast majority of wind farms currently operating in the UK.

The ETSU-R-97 document is endorsed for use in assessing and rating noise from wind energy developments in Scotland by web-based Scottish Government Planning Advice (in addition to developments in England by the National Planning Policy Framework (NPPF), in Northern Ireland by PPS 18 and in Wales by TAN 8) and is therefore recommended for use for the proposed Kintradwell wind farm.

In accordance with the recommendations of ETSU-R-97, the acceptance of the proposed wind farm is established by comparing the noise levels produced by the operation of the proposed wind turbines with appropriate noise limits at nearby residential properties.

The assessment shall follow the procedure outlined in the Good Practice Guide [2], issued by the Institute of Acoustics in May 2013, which provides guidance on all aspects of the use of ETSU-R-97.

2.1 Wind Turbines

The turbine type for the proposed Kintradwell wind farm has not yet been finalised. For the purposes of the assessment a candidate machine shall be proposed which is likely to be acoustically similar to the final turbine selected for use. Acoustic emission data will be taken from the most relevant, reliable and up to date source available.

2.2 Noise Propagation Model

Whilst there are several sound propagation models available, here RES will use the ISO 9613 Part 2 model [3]. The specific interpretation of the ISO 9613 Part 2 propagation model used corresponds to the methodology recommended by a group of independent acousticians experienced in wind farm noise issues in an article published in the Institute of Acoustics Bulletin in February 2009 [4] which was reaffirmed in the subsequent Good Practice Guide [2].

The model takes account of:

- attenuation due to geometric spreading
- atmospheric absorption
- ground effects
- barrier effects

The predicted noise level is changed from the L_{Aeq} to the L_{A90} descriptor by the use of an adjustment factor of -2 dB(A), as specified by ETSU-R-97.

2.3 Noise Limit

The general principle of ETSU-R-97 is that noise limits should be based on existing background noise levels (reflecting the variation in background noise with wind speed) except for very low background noise levels, in which case a fixed limit is applied. However, ETSU-R-97 goes on to state that for wind farms with very large separation distances between the turbines and the nearest properties a simplified noise condition may be suitable:

"if the noise is limited to an $L_{A90,10min}$ of 35 dB(A) up to wind speeds of 10 m/s at 10 m height, then these conditions alone would offer sufficient protection of amenity, and background noise surveys would be unnecessary" [1]

From the noise footprint detailed in Figure 1 it can be seen that this is the case for the proposed Kintradwell wind farm, where the minimum separation distance between a proposed turbine location and nearby properties is greater than 3 km. Figure 2 indicates that the predicted noise levels remain below 35 dB(A) in the cumulative scenario with the existing Gordonbush, Kilbraur and Kilbraur Extension schemes along with the consented Gordonbush Extsnsion project. As such it is proposed that a simplified limit of 35 dB(A) is appropriate for use in the acoustic impact assessment.

Figure 1 Predicted Preliminary Noise Footprint for the Proposed Kintradwell Wind Farm

Turbine locations are indicative only. The footprint shows the $L_{A90,\ 10min}$ at the wind speed corresponding to the maximum predicted noise level calculated using the interpretation of the ISO 9613-2 propagation model recommended by the Institute of Acoustics Good Practice Guide. Grid intervals are 1km.

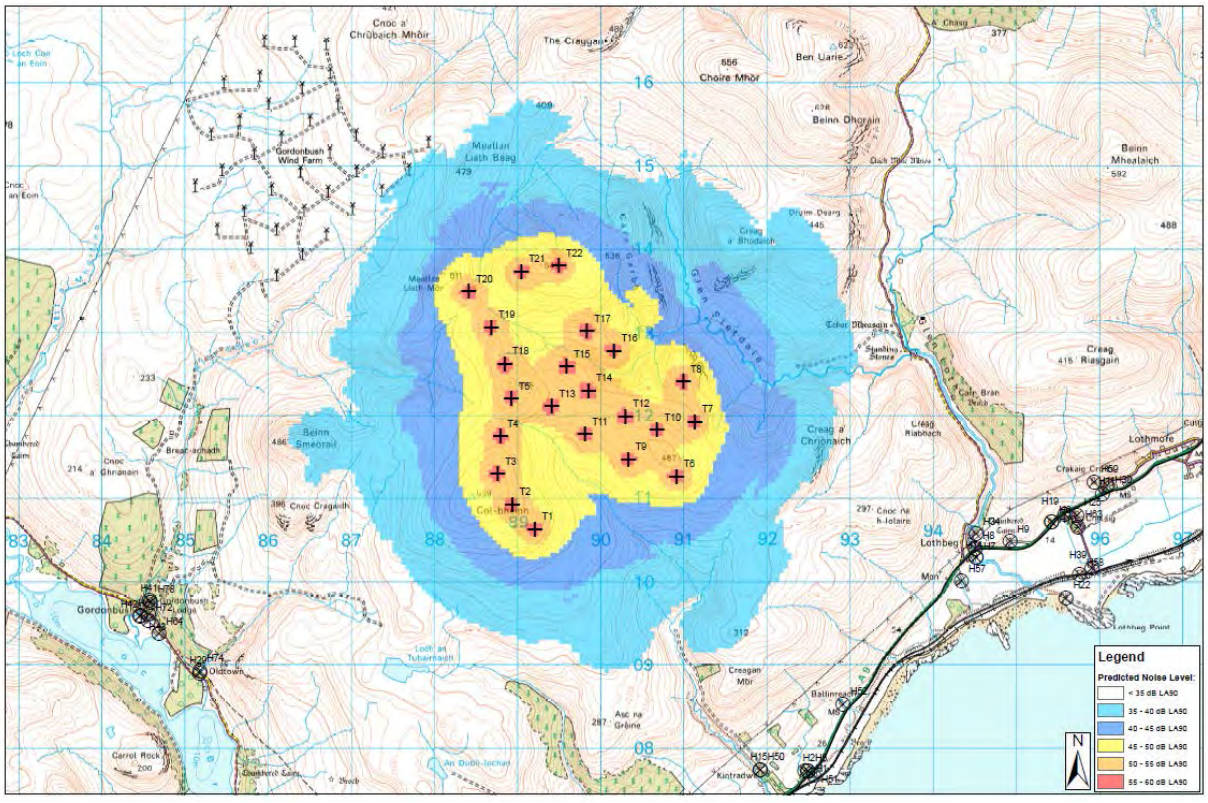
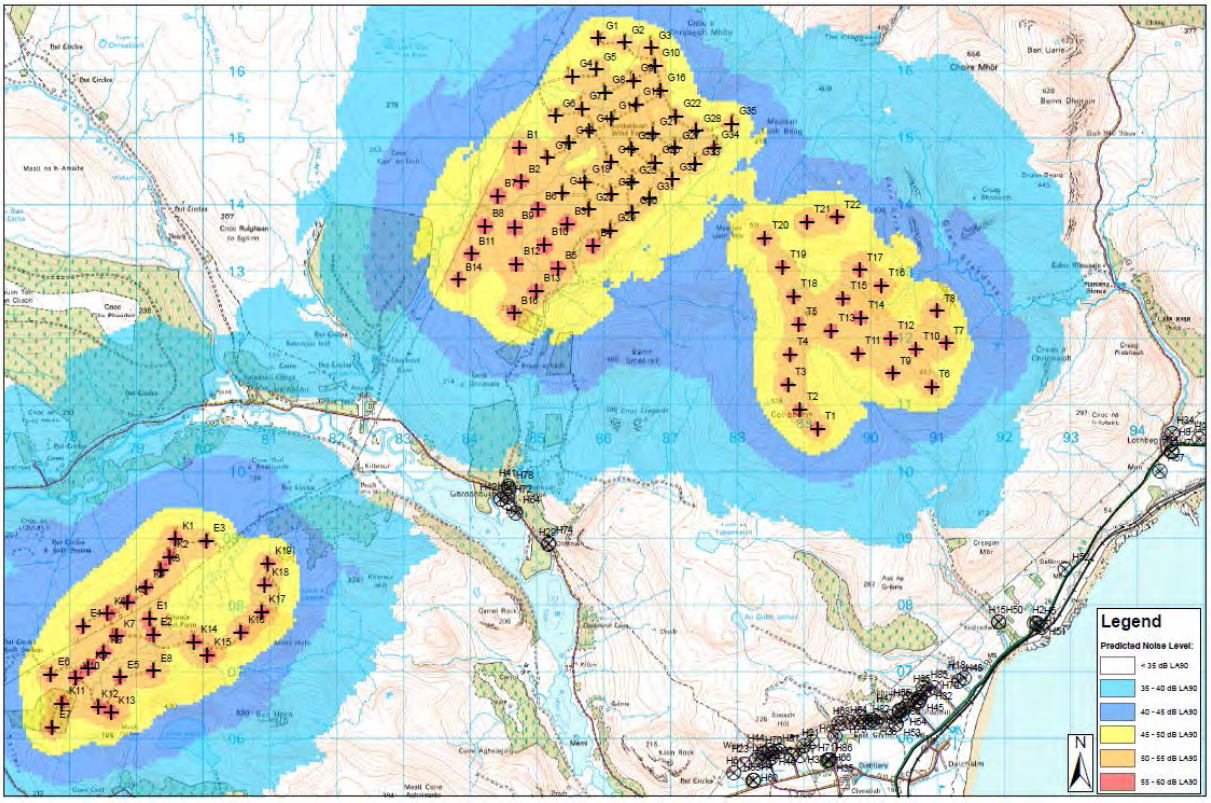


Figure 2 Predicted Cumulative Noise Footprint

Turbine locations are indicative only. The footprint shows the $L_{A90,\ 10min}$ at the wind speed corresponding to the maximum predicted noise level calculated using the interpretation of the ISO 9613-2 propagation model recommended by the Institute of Acoustics Good Practice Guide. Grid intervals are 1km. Turbines prefixed 'T' are the proposed Kintradwell wind farm, those prefixed 'G' are the existing Gordonbush scheme, those prefixed 'B' are the consented Gordonbush Extension scheme, those prefixed 'K' are the existing Kilbraur scheme and prefixed 'E' are the existing Kilbraur Extension scheme.



2.4 *Assessment*

The acceptability of the proposed wind farm shall be assessed by comparison of the predicted noise levels at each dwelling to the simplified 35 dB(A) noise limit.

2.5 *Cumulative Assessment*

An acoustic assessment of the cumulative impact of the proposed Kintradwell wind farm with the existing Gordonbush, Kilbraur and Kilbraur Extension schemes along with the consented Gordonbush Extsnsion project shall also be carried out by comparing the cumulative predicted noise levels at each dwelling to the simplified 35 dB(A) noise limit.

3.0 CONCLUSIONS

It is planned to undertake an assessment of the acoustic impact of the proposed Kintradwell wind farm conforming to the requirements set out in ETSU-R-97 and described within this report.

4.0 REFERENCES

[1] ETSU, "The Assessment and Rating of Noise from Wind Farms", The Working Group on Noise from Wind Turbines, ETSU Report for the DTI, ETSU-R-97, September 1996

[2] Institute of Acoustics, "A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise", May 2013

[3] ISO 9613-2:1996, "Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation", International Organisation for Standardisation

[4] Institute of Acoustics Bulletin volume 34, no 2 "Prediction and Assessment of Wind Turbine Noise", signed by Dr A Bullmore and M Jiggins (Hoare Lea Acoustics), Dr A McKenzie and M Hayes (Hayes McKenzie Partnership), D Bowdler (New Acoustics), R Davis (RD Associates) & Dr G Leventhall

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