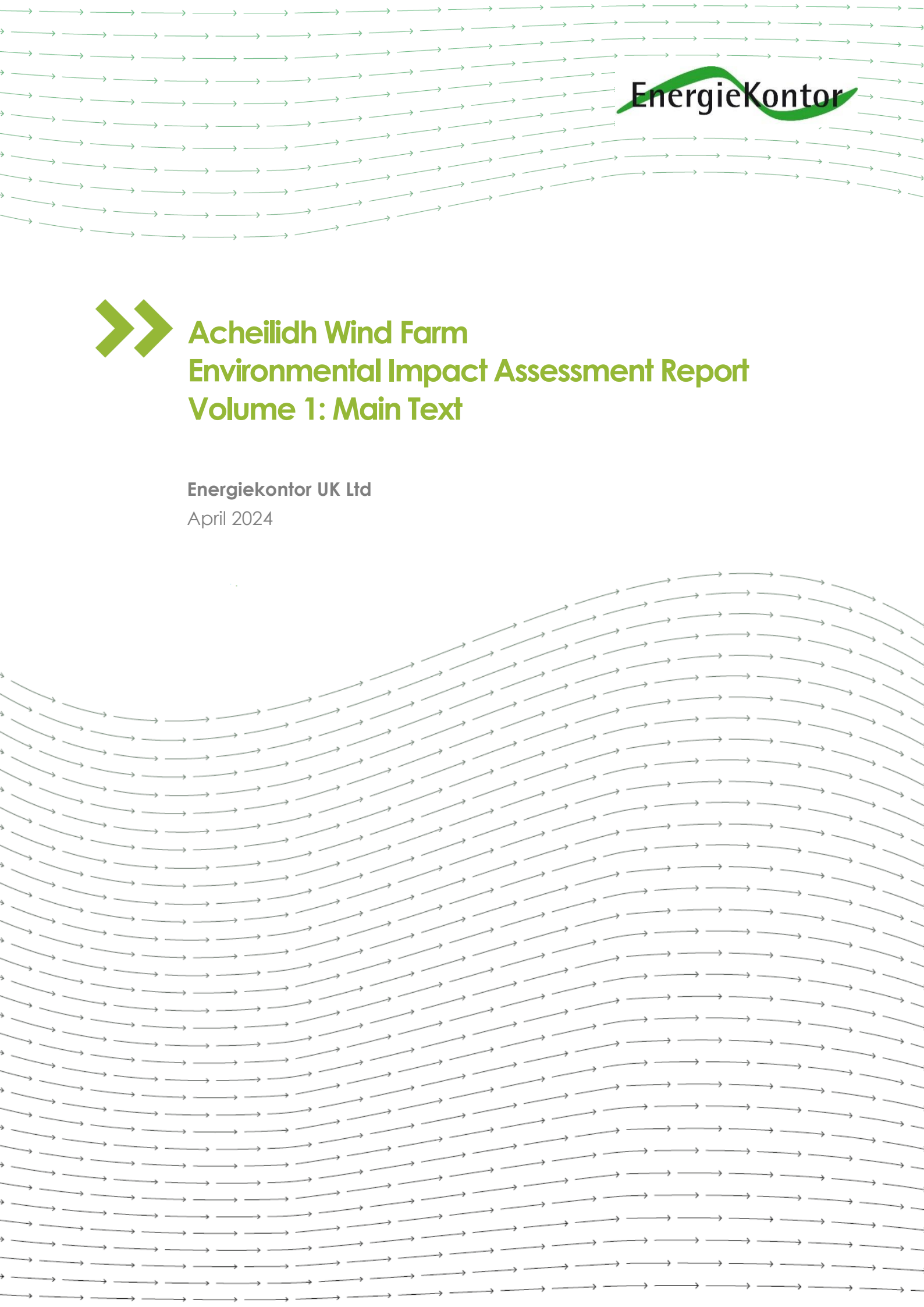




Acheilidh Wind Farm Environmental Impact Assessment Report Volume 1: Main Text

Energiekontor UK Ltd

April 2024



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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 1: Introduction

April 2024

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Table 1.1: EIA Project Team

1 INTRODUCTION

Introduction

- 1.1 This Environmental Impact Assessment Report (EIA Report) is being submitted in support of an application by Energiekontor UK Ltd (the Applicant) for consent under Section 36 of The Electricity Act 1989 to install and operate a wind farm comprising 12 turbines and associated infrastructure on land approximately 7.6km to the south-east of Lairg and 8km to the west of Pittentrail ('the proposed development').
- 1.2 As the proposed development has a generating capacity exceeding 50MW, consent is provided under Section 36 of the Electricity Act 1989 however deemed planning consent would also be awarded under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended). The Applicant in this instance requests that there is a ten-year consent implementation period (instead of the usual three).
- 1.3 The site location is contained within Figure 1.1, and full description of the proposed development is contained within Chapter 3: Project Description. For the purposes of this EIA Report, candidate turbines of 200m and 230m to blade tip have been assessed which would provide an associated capacity of approximately 79.2MW with an additional 5MW of battery storage capacity.
- 1.4 The approach to EIA Methodology can be understood within Chapter 2 of this Volume, whilst the Design Evolution of the proposed development is contained within Chapter 4. The planning and renewable energy policy context continues to evolve, and a current snapshot is provided within Chapter 5, with an analysis of the planning and policy compliance kept separate to this EIA Report, within a standalone Planning Statement.
- 1.5 This chapter sets out details with regards to the Applicant, the aims of this EIA Report, its structure, and the brief context to the rest of its content.

The Applicant – Energiekontor UK Ltd

- 1.6 Energiekontor UK Ltd (EK) is a renewable energy development company, formed in 1999.
- 1.7 It develops small to medium-sized onshore wind and solar farms throughout the United Kingdom. The company operates seven existing wind farms in the UK and has obtained planning consent for a further five projects. Energiekontor also has several other wind and solar projects at various stages of the development process throughout the UK.
- 1.8 Energiekontor UK Ltd is part of the Energiekontor Group. The parent company, Energiekontor AG, was established in 1990 in Bremerhaven in Northern Germany. It has since grown to become one of the leading wind energy companies in Europe and is active in Germany, France, Portugal, the USA, and the UK. The company has obtained consent and built 118 onshore wind farms in Europe and commenced construction of the first 'no-subsidy' wind farm in the UK, Withernwick II in East Riding, Yorkshire.

Purpose of the EIA

- 1.9 The EIA Report includes a description of the Proposed Development, the location of the development, and its design evolution; summarises the findings of a comprehensive study of potential environmental effects; and, where adverse effects are identified, measures to avoid, reduce, or remedy such effects are described. At the time of the assessment for the proposed development, the EIA Report considers the likely significant effects (both beneficial and adverse) on the environment, identified in the EIA, during the construction, operational and decommissioning phases. In addition, any likely significant cumulative effects with other developments have also been considered within this EIA Report.

Structure of the EIA

- 1.10 The EIA Report for the proposed development is presented in the following volumes:
- Volume 1: Main Text, comprising Chapters 1 – 15, contain the main environmental assessment text and provides an assessment of the likely significant effects as per the requirements of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations');
 - Volume 2: Figures, containing the primary graphics, maps, drawings, and illustrations to accompany Volume 1;
 - Volume 3: NatureScot Visualisations consist of the visualisations prepared to NatureScot guidance and provided for visual assessment to accompany Chapter 6: Landscape and Visual and Chapter 7: Cultural Heritage;
 - Volume 4: Technical Appendices present a volume of appendices to complement Volume 1, including technical reports, supplementary assessments, and results of fieldwork; and
 - Volume 5: THC Visualisations consist of the visualisations prepared in line with THC methodology and provided for visual assessment to accompany Chapter 6: Landscape and Visual and Chapter 7: Cultural Heritage.
- 1.11 The EIA Report should also be read in context with the following standalone documents:
- EIA Non-Technical Summary (NTS) which summarises the main findings of the EIA Report in accessible language;
 - Planning Statement, which provides an assessment of policy compliance in relation to the Development Plan and other important material policy considerations;
 - Pre-Application Consultation Report (PAC Report) which sets out the approach and results of public engagement; and
 - Design and Access Statement (DAS) which illustrates the approach to design and access.
- 1.12 Volume 1 of the EIA Report contains the following introductory and technical chapters:
- Chapter 1: Introduction;
 - Chapter 2: EIA Methodology;
 - Chapter 3: Project Description;

- Chapter 4: Design Evolution;
- Chapter 5: Renewable Energy and Planning Policy;
- Chapter 6: Landscape and Visual;
- Chapter 7: Cultural Heritage;
- Chapter 8: Geology, Hydrology and Hydrogeology;
- Chapter 9: Ecology;
- Chapter 10: Ornithology;
- Chapter 11: Noise;
- Chapter 12: Transport and Access;
- Chapter 13: Socio-economics and Tourism;
- Chapter 14: Other Issues, and;
- Chapter 15: Schedule of Mitigation

The EIA Team

- 1.13 The EIA Report has been compiled by Energiekontor however sub-consultants have carried out the assessment of specialist topics and provided input into the EIA. The members of the EIA Team and their associated roles are set out within Table 1.1.

Table 1.1: EIA Project Team

Chapter Number	Topic	Organisation
1 - 5	Introduction EIA Methodology Project Description Design Evolution Renewable Energy and Planning Policy	Energiekontor UK Ltd
6	Landscape and Visual	WSP E&IS UK Ltd
7	Cultural Heritage	WSP E&IS UK Ltd
8	Geology, Hydrology and Peat	RPS
9	Ecology	Wildlife Consulting
10	Ornithology	Wildlife Consulting
11	Noise	Greencat Renewables
12	Traffic and Transport	Systra
13	Socio-economics and Tourism	Greencat Renewables
14	Other Issues	Energiekontor UK Ltd
15	Schedule of Mitigation	Energiekontor UK Ltd

1.14 Regulation 5 (5) (a-b) of the Regulations states:

*“In order to ensure the completeness and quality of the EIA report—
(a) the developer must ensure that the EIA report is prepared by competent experts; and
(b) the EIA report must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.”*

The Proposed Development

1.15 The Proposed Development, illustrated in EIA Volume 2, Figure 3.1, is fully described within Chapter 3: Project Description, however a summary is provided below:

- 12 turbines;
- Associated turbine compound areas including foundations and hardstanding areas for erecting cranes at each turbine location;
- On-site tracks connecting each turbine;
- Extension of the consented Lairg II on-site access track to connect Lairg II and the Proposed Development;
- Two watercourse crossings, as set out in EIA Volume 4, Technical Appendix 8.1;
- An energy storage compound to store batteries with a 5MW capacity which would be within the construction compound footprint;
- Underground cables linking the turbines to the substation;
- Up to three borrow pits for the extraction of stone on-site (indicated on Figure 3.1 as borrow pit search areas);
- A temporary construction compound including provision for onsite concrete batching; and
- An on-site substation to provide a grid connection;
- Habitat Management provisions as proposed within EIA Volume 4, Technical Appendix 9.3.

1.16 The red line boundary provided within Figure 1.1 within Volume 2 of this EIA Report is referred to as ‘the site boundary’, whilst everything within that boundary is referred to as ‘the Site’ and occupies approximately 2,078 hectares (ha).

Scoping

1.17 Pursuant to the provisions of Section 12 of the EIA Regulations, the Applicant submitted a request for a Scoping Opinion from the ECU on the 27th of June 2022, (Ref ECU00004528). The Scoping report was submitted under the name ‘Lairg III Wind Farm’ however following consultation with the community, the name was changed to Acheilidh Wind Farm.

1.18 This request was accompanied by an EIA Scoping Report which set out a description of the location of the development, the nature and purpose of the development and its likely significant effects on the environment.

- 1.19 A Scoping Opinion was received from Scottish Ministers in October 2022. Details on comments raised by consultees and how they have been addressed within the EIA are set out within Chapters 6 – 14.

Contacts for Further Information and Consultation

- 1.20 In line with Part 4 of The Electricity (Applications for Consent) Regulations 1990, notification of the application for consent under section 36 will be placed in the following publications:
- One or more local newspapers circulating in the locality in which the land to which the application relates is situated (for two successive weeks);
 - The Edinburgh Gazette, and;
 - One or more national newspapers.
- 1.21 Hard copies of the EIA Report can be viewed at the following locations:
- Lairg Library, The Main St, Lairg IV27 4DD
- 1.22 Copies of the full EIA Report and its associated standalone documents can be found on the Energy Consents Unit website by searching for Acheilidh Wind Farm. In addition, updates including a link to the case file are provided at the following web address: <https://www.energiekontor.co.uk/our-projects/acheilidh>
- 1.23 Alternatively, the Project Manager can be contacted for copies, as appropriate. There is no charge for provision of electronic documents or hard copies of the Non-Technical Summary on request.
- 1.24 Full printed copies can also be requested. Due to the size and cost of printed documents, charges for these are as follows:
- Volume 1 – Main Text: £50
 - Volume 2 - Figures: £300
 - Volume 3 – NatureScot Visualisations: £500
 - Volume 4 – Technical Appendices: £200
 - Volume 5 – THC Visualisations: £500
- 1.25 Requests should be made to Lauren Mallon, Project Manager, Energiekontor UK Ltd, lauren.mallon@energiekontor.com
- 1.26 Any representations to the application may be submitted:
- via the Energy Consents Unit website at: www.energyconsents.scot/Register.aspx;
 - by email to the Scottish Government Energy Consents Unit mailbox at representations@gov.scot; or
 - by post to the Scottish Government, Energy Consents Unit, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 2: EIA Methodology

April 2024

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2 EIA METHODOLOGY

Introduction

2.1 This chapter of the Environmental Impact Assessment Report (EIA Report) provides a detailed account of the Environmental Impact Assessment (EIA) methodology. The following key information is included:

- Description of the EIA process;
- Approach taken to the assessment of the Proposed Development and the technical studies undertaken;
- Approach to determining scale and significance of effects, and the basis upon which predictions were made (e.g., professional knowledge and judgment, initial studies, desktop exercises, preliminary survey work); and
- Guidelines, methods, and techniques used in the process of determining significance of effects;
- Subject specific methodology is outlined in each of the technical chapters; Chapters 6 through to 14.

EIA Process

2.2 EIA involves the compilation, evaluation, and presentation of any potentially significant (both positive and negative) environmental effects resulting from a proposed development, to assist the decision-making authority (in this case the Scottish Ministers via the Energy Consents Unit) when considering and determining an application. Early identification of potentially adverse environmental effects also leads to the identification and incorporation of appropriate mitigation measures into the project design to avoid, reduce, and if possible, remedy identified significant adverse environmental effects.

2.3 The main activities in the EIA process can be summarised as follows:

- Definition of the project to be assessed;
- Description of the 'baseline' environment (i.e., the conditions that are likely to prevail before commencement of the project);
- Definition of the scope of the assessment;
- Scoping and consultation with interested parties;
- Optimisation of the Proposed Development based on consultation and design;
- Prediction of the likely environmental effects of the Proposed Development;
- Evaluation of these effects in terms of their likely significance;
- Description of the nature and effectiveness of measures / design evolution which could be adopted in order to mitigate likely significant adverse effects, and the way in which these measures are to be monitored to measure effectiveness;
- Identification of residual effects;
- Submission of EIA Report and publicity;

- Review of adequacy of environmental information by Energy Consents Unit, The Highland Council, and statutory consultees; and
- Determination of application based on the EIA Report content and other relevant documentation supporting the application.

2.4 The information that a developer is required to submit as part of the EIA process is specified in Regulation 5 and Schedule 4 of the EIA Regulations, and includes at least:

- A description of the development comprising information on the site, design, size, and other relevant features of the development;
- A description of the likely significant effects of the development on the environment;
- A description of the features of the development and any measures envisaged in order to avoid, prevent, or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by the developer, which are relevant to the development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
- A non-technical summary of the above information; and
- Any other information specified in schedule 4 relevant to the specific characteristics of the development and to the environmental features likely to be affected.

2.5 Regulation 5 states that in order to ensure the completeness and quality of the EIA Report,

“(a) the developer must ensure that the EIA report is prepared by competent experts; and

(b) the EIA report must be accompanied by a statement from the developer outlining the relevant expertise or qualifications of such experts.”

2.6 A statement of competency, setting out the qualifications and experience of the lead EIA Report coordinators/chapter authors is provided in Chapter 1, and Chapters 6 to 14.

2.7 The scoping, preparation and production of this EIA Report has been conducted in accordance with the latest Government Regulations and published good practice guidance including:

- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Planning Circular 1/2017: Environmental Impact Assessment Regulations 2017;
- Environmental Impact Assessment Guide to Delivering Quality Development (Institute of Environmental Management and Assessment, 2016);
- Delivering Proportionate EIA (Institute of Environmental Management and Assessment, 2017) and;
- A handbook on environmental impact assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland, Version 5 (Scottish Natural Heritage and Historic Environment Scotland, 2018)

Approach to Technical Studies Undertaken

- 2.8 The EIA studies commenced at an early stage in the evolution of the Proposed Development. At the outset, with the objective of avoiding or minimising potential environmental effects, the findings of these baseline environmental studies played an important role in the design evolution of the Proposed Development (further details are contained within Chapter 4: Design Evolution). These studies defined the environmental sensitivities and constraints associated with the Proposed Development, the Site, and its surroundings.
- 2.9 The technical EIA studies have been undertaken in accordance with relevant guidelines and procedures. The majority of this guidance is specific to EIA topics and is therefore referenced within the individual assessment chapters, as necessary.
- 2.10 The majority of assessments involved consultations with statutory and non-statutory bodies, desk-based research, site inspections and surveys, impact prediction and input of mitigation to the design, where appropriate.
- 2.11 The content and conclusions of the EIA Report, which includes a clear, reasoned description of any likely significant adverse or beneficial effects of the Proposed Development, are based on a comprehensive assessment undertaken with all information available at the time of writing. Further details of the structure and content of the EIA Report assessment chapters is presented below.

Structure of EIA Report Technical Chapters

- 2.12 Each technical EIA Report chapter follows the sub-heading structure set out below where possible to ensure that the final document is transparent, consistent, and accessible:
- Introduction and overview;
 - Legislation (where relevant), Policy and Guidance;
 - Stakeholder Consultation (where relevant);
 - Assessment Methodology and Significance Criteria;
 - Baseline Conditions;
 - Identification and Evaluation of Key Effects;
 - Cumulative Effects and Interaction of Effects;
 - Mitigation Measures and Monitoring;
 - Residual Effects;
 - Summary;
 - References; and
 - Each chapter sub-heading is explained in further detail below.

Introduction and Overview

- 2.13 This introduces the assessment discipline and explains its purpose in the context of the Proposed Development, the nature of receptors to be considered, and how the Proposed Development might cause changes to baseline conditions.

- 2.14 The introduction includes a statement of competence from the author of the chapter.

Legislation, Policy, and Guidance

- 2.15 This section includes a brief summary of policies of relevance to the environmental discipline and assessment. Where applicable, relevant legislation and assessment guidance is summarised.

Consultation

- 2.16 A wide range of stakeholders have been consulted on the Proposed Development, and the feedback received has been incorporated into the iterative design process described in Chapter 4: Design Evolution. Further information can be found in the relevant chapters.

Assessment Methodology & Significance Criteria

- 2.17 This section provides an explanation of the methods used in undertaking the assessment with reference to published standards, guidance, and best practice.
- 2.18 The application of significance criteria used is discussed within this section.
- 2.19 Assessment limitations are also set out within this section.

Baseline Conditions

- 2.20 This section includes the following:
- a description of the environment as it currently is and as it is expected to change if the Proposed Development were not to proceed (i.e., 'do-nothing' scenario);
 - baseline conditions set in context and that of the surroundings of the particular subject area to be affected; and
 - A description addressing the projected climate change and how likely the baseline is to change as a consequence of climate change.

Identification and Evaluation of Key Effects

- 2.21 The candidate turbine is set out within the Chapter 3: Project Description. The turbine and associated infrastructure requirements have been used as a candidate in the assessments. The final turbine chosen will be dependent upon what is available within the maximum parameters assessed in the EIA Report.
- 2.22 The EIA Regulations require consideration, throughout assessments, of all likely significant environmental effects; direct / indirect; secondary; cumulative; positive / negative; short / medium / long-term; or permanent / temporary. In terms of how likely these potential significant environmental effects are to arise; the following is considered:
- Direct effects are readily identified because of the physical connection between some element of the Proposed Development and an affected receptor;

- Indirect effects require some additional pathway for the effect to arise, for example, a listed building may not be directly affected by any elements of a development, but, if a proposed development changed the hydrology of the surrounding area, this may affect the archaeological preservation of the listed building, and therefore would be considered an indirect effect;
- Secondary effects would typically require pathway connections, for example, an effect on receptor population A could have a secondary effect on receptor population B, if B was itself dependant on A in some way, as, for example, a food source; and
- Cumulative effects would be those that the Proposed Development may have in combination with other wind farms which are at application stage, consented, under construction or operational (i.e., the incremental effects resulting from the Proposed Development if all other wind farms are assumed to be constructed/operated). These are commonly known as 'inter' cumulative effects. Interrelated effects (otherwise known as 'intra' cumulative effects) are separate discrete effects which may interact and combine to affect a single receptor i.e., noise and dust.
- Likely significant environmental effects are considered in terms of their character, either beneficial (representing environmental gain) or adverse. There may also be cases where it is appropriate to identify the occurrence of change, but to note that the potential change is either neutral, and neither specifically beneficial nor adverse. The likelihood of the effect occurring is also considered, being unlikely, uncertain, or likely to occur.
- Likely significant environmental effects are also considered in terms of their duration. Effects can typically be:
 - Temporary – these effects are likely to last for a period of a few days to a few months; they will be related to a particular activity and will cease immediately or soon after the activity ceases;
 - Short-term – this would normally be considered to be between a period of a few months to a few years depending on the effect being discussed and the environment's ability to recover from an effect;
 - Long-term – this would typically be a period of between a few years and the life of the Proposed Development; and
 - Permanent – this would typically mean an effect resulting in an irreversible change in the environment.

2.23 It is important that levels of effect are clearly defined on the basis of their significance. The approach taken in this EIA Report emphasises the use of professional judgement within a structure that combines receptor sensitivity (or importance) with magnitude of change arising from the Proposed Development to define significance of effect.

2.24 The EIA Regulations recognise that developments will affect environmental elements to differing degrees and not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that have 'potential to be significantly affected by the development (Schedule 4(4)). Those that are not deemed to have an effect can therefore be scoped out of the assessments.

- 2.25 The EIA Regulations do not define significance and it is, therefore, necessary to state how this will be defined for the Proposed Development. In certain circumstances it is possible for disciplines to use quantitative assessment methodology to predict effects / values that can be compared against published thresholds or indicative criteria. However, it is not always possible to use quantitative measurements/values and such some assessments rely on professional judgement, past experience or other evidence. This could be reference to the development description, available information about potential changes that are expected to be caused by the Proposed Development, and the receptors that may be affected.
- 2.26 Professional judgement (in combination with any published guidance) is used to assess the interaction of a receptor's sensitivity to change, and the magnitude of potential changes caused by the development to identify a level of effect. The Assessment methodology and Significance Criteria section within each Chapter provides an overview of how the assessment has been conducted for each discipline, and where any deviations from the methodology described above occurs.
- 2.27 For some of the topics that are assessed in this EIA Report there is published guidance about significance evaluation. Where such topic-specific guidance exists (even in draft) it will be used to inform the development of the significance evaluation methodologies used. For other topics, a **major or moderate** level of effect is generally of most importance to the decision-maker and these effects are considered **significant** in terms of the EIA Regulations. Where the level of effect is **minor or less**, these are generally **not significant** in terms of the EIA Regulations.
- 2.28 The temporal scope of the EIA will cover the period from commencement of the first phase of development (construction), through to operational phase (operation), up to the completion of operations and restoration of the Site (decommissioning). For ease of reporting the temporal scope will generally be considered in relation to the following key stages of the development:
- Construction – effects may arise from the construction activities themselves or from the temporary occupation of land. The effects are often temporary and of limited duration, although, there is the potential for construction activities to create permanent change;
 - Operation – effects are typically long-term (subject to any future decommissioning), though may also be related to operational emissions or effects that will stop if the operation stops; and
 - Decommissioning – effects may arise from the decommission activities themselves or from the temporary occupation of land. The effects would often be temporary and of limited duration and additional permanent change (unless associated with restoration) would normally be unlikely.
- 2.29 In its broadest sense, the spatial scope of an EIA is the area over which changes to the environment may occur as a consequence of the development. In practice, the EIA focuses on those areas where these changes may result in likely significant effects on the environment.

- 2.30 As such, the spatial scope varies between the environmental topics assessed. For example, effects upon the landscape resource and visual effects are assessed within a much larger zone from the site boundary when compared to ecological related effects.
- 2.31 As part of the application, a micro-siting allowance of 100m will be sought to allow all turbines and infrastructure to be moved within a 100m radius should ground conditions or other factors justify this. For completeness, each assessment has given consideration as to the likely effects of moving onsite infrastructure to this extent.

Cumulative Effects and Interaction of Effects

- 2.32 As required by the EIA Regulations, it is also important to consider the possible effects that a proposal may have in combination with existing, consented, or other proposed developments or activities. Likely cumulative effects have been defined as the likely effects that the Proposed Development may have in combination with other wind farms which are at application stage, consented, under construction or operational (i.e., the incremental effects resulting from the Proposed Development if all other wind farms are assumed to be constructed/operated).
- 2.33 Where relevant the approach to the cumulative effect assessments varies across technical disciplines and a rationale as to the scope of this assessment is provided in each chapter.
- 2.34 For the purposes of the EIA Report, the potential effects of the Proposed Development are considered in terms of effects on each of the discrete topic areas. In reality, topic areas such as ecology and hydrology are interrelated, and could combine to result in a significant effect on a given receptor. Schedule 4 of the EIA Regulations states that the EIA Report should include an assessment of *"the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development"*, and these are addressed within each of the EIA report chapters where relevant.

Mitigation Measures and Monitoring

- 2.35 There is much debate amongst practitioners and legal reviewers regarding pre-mitigation and post-mitigation assessments of effects. One crucial point of discussion is whether changes in design constitute mitigation or not. The approach taken here is that the pre-mitigation assessment of effects takes account of scheme design changes that relate to the number / location and scale of scheme elements, and it also takes account of the adoption of standard guidelines. The post-mitigation assessment takes further account of specific / additional controls on the method of construction or operation. In most cases these should only relate to circumstances where a potentially significant effect is being reduced.
- 2.36 The development of mitigation measures to avoid, reduce or compensate for significant adverse environmental effects of a project is an intrinsic part of the EIA process. These measures can relate to site construction or the completed development i.e., measures to be undertaken during the operation of the development through appropriate site management or through the introduction of specific design elements.

2.37 This section of the EIA Report chapter describes the measures which would be implemented to avoid or ameliorate likely adverse effects and enhance the likely beneficial effects of the Proposed Development.

2.38 In many cases mitigation measures are inherent within the Proposed Development (either through design or operation), whereby likely significant adverse effects are avoided. However, not all effects can be avoided and there are mitigation measures to reduce these. Standard good practice measures employed during construction, for example, may also be considered to provide in-built mitigation and this is stated in the topic assessments where relevant. Any further survey requirements and monitoring required to gauge the effectiveness of proposed mitigation measures will be included where relevant. In such instances, these are proposed within the relevant technical chapter.

Residual Effects

2.39 This section describes the remaining effects of the Proposed Development assuming implementation of the proposed mitigation measures.

References

2.40 This section provides a detailed record of all data sources consulted and guidance used to inform the assessment.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 3: Project Description

April 2024

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3 PROJECT DESCRIPTION

Introduction

- 3.1 This chapter provides an outline description of the Proposed Development, the Site, and its surroundings. Details of the construction, operational and decommissioning phases of the Proposed Development are also considered in this chapter.
- 3.2 Details of the iterative design process that resulted in the final design as set out in this chapter are detailed in Chapter 4 and describes the key considerations and constraints that have influenced the layout of the Proposed Development and the evolution of the design.
- 3.3 The Proposed Development will consist of the construction, 35-year operation and subsequent decommissioning of up to 12 wind turbines along with ancillary infrastructure as described within this chapter.

The Site and Its Surroundings

- 3.4 The Site, shown in EIAR Volume 2, Figure 3.1, is located approximately 7.6km south-east of Lairg and 8km to the west of Pittentrail¹ and lies within the administrative boundary of the Highland Council.
- 3.5 The Site spans an area of approximately 2,078 hectares and is situated within the Caithness and Sutherland area in the Highlands. The Site is primarily open moorland used for livestock grazing by local crofting associations and areas of native woodland plantations. The Site boundary partially includes the consented Lairg II Wind Farm to facilitate access to the Site via the A836 for the delivery of turbine components.
- 3.6 The topography of the Site reaches a high point of 336m Above Ordnance Datum (AOD) at An Stoc-bheinn in the north and then slopes down towards the shores of Loch Cracail Mor and Loch Cracail Beag to the east. The topography then rises again towards Meall na Tulchainn (286m AOD) in the south. The northern boundary is formed partially by the Far North Railway Line which connects Inverness to Thurso and Wick as well as the A839 which travels from the Mound in the east and terminates in Lairg to the west. The closest trunk road is the A9 which terminates in Scrabster.
- 3.7 Within 5km of the site boundary, the settlements of Pittentrail, Muie, Rogart, Little Rogart are located to the east/ north-east of the site whilst the settlement of Lairg lies to the north-west. Other settlements outwith 5km include Rhilochan, Knockarthur, East Langwell and West Langwell.
- 3.8 A number of watercourses cross the Site. This includes Allt Loch na Soabhaidhe which drains the site from north to south by and associated drainage channels. Another watercourse, Feith Buidhe, travels from west to east joining Allt Loch na Soabhaidhe and eventually drain into Loch na Soabhaidhe Other watercourses which lie within the Site

¹ When measured from the centre point of the Site

boundary include Allt Ach' na h-Uaighe. There is a total of five lochans contained within the Site, namely Loch Cracail Mor, Loch Cracail Beag, Loch na Soabhaidhe, Lochan na Faolaig and Am Bru Lochan.

- 3.9 The Site sits between two component areas of the Strath Carnaig and Strath Fleet Moors Site of Scientific Interest (SSI) and Special Protection Area (SPA), designated for Hen Harrier. The designation lies partially within the Site boundary to the north and immediately bounds the Site to the south.

Description of Proposed Development

- 3.10 The Proposed Development is illustrated on Figure 3.1 and would consist of the following principal components:
- 12 turbines;
 - Associated turbine compound areas including foundations and hardstanding areas for erecting cranes at each turbine location;
 - On-site tracks connecting each turbine;
 - Extension of the consented Lairg II on-site access track to connect Lairg II and the Proposed Development;
 - Two watercourse crossings, as set out in EIA Volume 4, Technical Appendix 8.1;
 - An energy storage compound to store batteries with a 5MW capacity which would be within the construction compound footprint;
 - Underground cables linking the turbines to the substation;
 - Up to three borrow pits for the extraction of stone on-site (indicated on Figure 3.1 as borrow pit search areas);
 - A temporary construction compound including provision for onsite concrete batching; and
 - An on-site 132kV substation to provide a grid connection;
 - Habitat Management provisions as proposed within EIA Volume 4, Technical Appendix 9.3
- 3.11 The Proposed Development would be time-limited to 35 years from the first date of final commission. The construction phase would last approximately 18 months and decommissioning would last approximately six months.
- 3.12 Deemed planning permission is sought to permit a period of ten years between the date of the Decision Notice and expiry of consent (should works not be commenced) rather than the usual three years.
- 3.13 The proposed development would provide approximately 79.2MW of installed capacity (depending on the turbine model chosen) in addition to 5MW of battery storage capacity. It is estimated by the Applicant that this installed capacity could generate approximately 279,731MWh of renewable electricity each year which would be expected to power the

equivalent of approximately 80,800 homes on average each year², or provide 1.55 million full battery charges for electric vehicles per year³.

- 3.14 The planning application includes an allowance for micro-siting of the wind farm infrastructure. If planning permission is granted, the Applicant will commission detailed ground investigations and geotechnical surveys to determine the ground conditions. A 100m micro-siting allowance is sought for the wind turbines (with restrictions in place to safeguard constraint buffers as applicable), and all other new elements of the Proposed Development.
- 3.15 The construction and decommissioning of the wind turbines, ancillary equipment and on-site infrastructure are described in more detail in the following sections of this chapter and within Chapter 4: Design Evolution. The principal elements include:
- **Wind turbines** – 12 wind turbines (see Figure 3.2a and 3.2b for typical wind turbine elevations). The co-ordinates of the turbines are given in Table 3.1 below;
 - **Turbine foundations** – The foundations of the turbines could be either reinforced concrete gravity structures or piled foundations. This would be dependent on the ground and hydrological conditions at the turbine location which would also determine the overall size of the support structure. Typical foundations for the size of turbine proposed are shown in Figure 3.3;
 - **Site access** – The Site will be accessed via the road to Torroble which connects to the A836 near to the Lairg railway station, approximately 4km south of Lairg village. It is considered that a large majority of HGV and light goods traffic will travel to the Site via the A9, A839 and then A836.
 - **Crane hardstandings** – To provide a level and firm base for the cranes at the location of each turbine and would be surfaced with coarse aggregate. The dimensions and layout for a typical crane hardstanding layout are shown in Figure 3.7 and would occupy an area of approximately 0.72 hectares (ha), however this is dependent on the turbine model chosen;
 - **Site tracks** – A total of 7.22km new tracks to provide access for construction and maintenance vehicles from the Site access to the substation and wind turbines. These would be constructed at the commencement of the construction phase and would remain in-situ following decommissioning. They would have a running width of approximately 5m, the final width dependant on turbine supplier requirements. The tracks would feature local widening on corners and would be surfaced with coarse aggregate (see Figure 3.4 for typical track cross sections). Site tracks include new sections of track and upgrading of existing access tracks. New sections of track across areas of peat deeper than 1m would be floated, comprising a total of approximately 2.15km. Turning heads would also be required;
 - **High voltage and control cables** – To form power and control circuits linking each turbine to the on-site substation, cables would be placed in trenches (dimensions to be determined by the ground conditions but typically 0.5m wide by 1m deep) routed alongside the tracks (see Figure 3.8 for typical cable trench construction details);

² Based on an average annual UK domestic electricity consumption figure of 3,462KWh as set out in the BEIS publication "Energy Consumption in the UK" December 2023.

³ Based on a large electric vehicle requiring 180kWh for a full charge.

- **Borrow Pits** – As a source of material for the creation of other ground infrastructure. The borrow pit search area locations are identified in Figure 3.1;
- **Energy Storage Compound** - The energy storage equipment would be housed within ISO shipping containers with a 2.4m high palisade fence in a compound 17.5m by 32m. Battery containers will be positioned a minimum of 2.5m apart to facilitate access to all sides. Battery energy storage equipment will be factory assembled and delivered to site in standard 12.2m long x 2.4m wide ISO shipping containers. A plan and elevation are presented as figures 3.11 and 3.12. Figure 3.1 shows the construction compound area that this would be housed within;
- **Construction compound/storage area** – The compound to facilitate construction of the Proposed Development, which would also provide a storage area for plant and materials and is temporary during the construction phase (see Figure 3.6 for a typical compound design);
- **Substation / switchgear housing building** – A 90mx90m space would be required for the construction of a 132kV substation (subject to a future planning application).

Wind Turbines

- 3.16 Turbines would be of tubular steel construction, finished in a typical off-white matt colour and comprise three blades. The final turbine choice would be made post-consent during the procurement phase, but for the purposes of this EIA Report, representative candidate turbines with a 155m rotor diameter. Hub height and tip heights of the turbines are set out within Table 3.1.
- 3.17 Turbine co-ordinates, subject to a maximum of 100m micro-siting dependent upon localised constraints, are as follows within Table 3.1.

Table 3.1: Proposed Wind Turbine Coordinates (subject to a 100m micro-siting allowance)

Turbine	Easting	Northing	Tip Height (m)	Hub Height (m)
1	263973	902805	200	122.5
2	263681	902382	200	122.5
3	264309	902110	230	152.5
4	264935	902130	200	122.5
5	263913	901667	230	152.5
6	264701	901684	230	152.5
7	263626	901297	230	152.5
8	264584	901195	200	122.5
9	263574	900836	200	122.5
10	264289	900768	230	152.5
11	264523	900288	230	152.5
12	263902	900405	200	122.5

- 3.18 To carry the power generated to the local electricity network, each turbine would require a transformer to step up to a high voltage. Transformers will be internal to the turbine.
- 3.19 Monitoring and controlling the performance of the wind turbines would be achieved by way of a sophisticated Supervisory Control and Data Acquisition (SCADA) system. The SCADA system would gather data from all the turbines and provide the facility to control them from a remote location. Communication cables connecting to each turbine would be buried in the electrical cable trenches to facilitate this.

Wind Turbine Foundations

- 3.20 The first task in constructing each wind turbine foundation would be to remove any mineral soil to the perimeter of the proposed foundation excavation. The underlying subsoil would then be excavated to the required foundation depth, normally by conventional construction equipment. Excavated materials would be set aside for re-use as backfill around the foundation following completion of construction. Detailed method statements for materials handling would be prepared in accordance with conditions imposed by The Highland Council (THC) on the granting of a planning consent.
- 3.21 The foundation formation would then be prepared to receive concrete blinding by placing timber shuttering around the edge of the excavation. Concrete blinding would be poured on the foundation formation to level the area in preparation for fixing the steel reinforcement bars. The blinding would be a weak mix of concrete with low slump and would normally be placed fairly dry. Little if any loss of cement would therefore occur during placement of the lean-mix levelling layer.
- 3.22 A bottom mat of reinforcement would be placed on the weak mix concrete blinding. Additional reinforcement would be fixed to the bottom mat to form the main reinforcement cage for the foundation. Starter bars would then be fixed to the main cage to form the up stand, which would support the bottom tower section. Temporary shuttering would be placed on the reinforcement cage to ensure that there would be sufficient concrete cover to the top layer of steel. Side shuttering would also be positioned around the cage to form the sides of the concrete slab and to prevent loss of concrete and cement paste into the ground.
- 3.23 Concrete would then be poured to form the main slab either by a concrete pump or by being placed in small hoppers / skips that would be lifted over the area being concreted and then tipped. Conventional concrete lorries of approximately 8m³ capacity would be used for each foundation. During the pour, the concrete would be compacted using poker vibrators. As the concrete placements are completed, the temporary shuttering on the top steel would be removed, and the concrete tamped and floated to a smooth finish.
- 3.24 A curing compound is often used to stop the concrete drying out too quickly (which can lead to hairline cracking of the top surface). This is sprayed onto the surface concrete. Plastic sheeting or hessian may also be used to assist with curing of the concrete if considered appropriate. This reduces evaporation of water at the surface of the concrete and assists in preventing shrinkage of cracking material.

Wind Turbine Delivery and Erection

- 3.25 The Site will be accessed via the road to Torroble which connects to the A836 near to the Lairg railway station, approximately 4km south of Lairg village. It is considered that the delivery of turbine components will travel to the Site via the A9, A839 and then A836. Delivery of the turbine components would be undertaken by specialist contractors using purpose-built vehicles, as described in more detail in Chapter 11: Traffic and Transport.
- 3.26 Mechanical installation would comprise the delivery and erection of turbine components at the turbine locations. Erection of the turbine components is normally undertaken by the turbine supplier using specialist heavy lifting subcontractors and cranes.
- 3.27 The connection of the tower to the foundation would be made by using holding down bolts or with a short cylindrical steel section embedded in the foundation slab. The choice of holding down system would depend on the wind turbine supplier. The sequence of construction of the connection between the tower and foundation depends on which system is used.
- 3.28 For a holding down bolt solution, the upstand foundation anchor bolt assembly would be placed, along with additional reinforcement in the upstand following completion of the base slab. At this stage, partial backfilling of the foundation would be undertaken to aid access to the turbine location during the rest of the foundation construction. Once the upstand reinforcement and anchor bolt assembly are complete, timber or steel shutters would be placed to form the upstand of the turbine foundation.
- 3.29 If the tower is connected to the foundation by a steel cylindrical section, then the upstand reinforcement and holding down bolts would not be required. For this holding down solution, there would be only one phase of concrete pour because the embedded section would form a permanent shuttering for the mass concrete inside it.
- 3.30 Electrical ducts would then be placed through the shuttering and reinforcement (for the holding down bolt solution), or the steel cylinder. These would include conduits for the high and low voltage cables and earthing tapes. The configuration of the ducts and the earthing tape would depend on the turbine model being used and the nature of the electrical layouts. The holding down bolts are held in place within the shuttering by a template which would be fixed to the shuttering. Concrete would then be poured to form the foundation upstand. The upstand concrete would be compacted with poker vibrators in a similar way to that described for the base slab.
- 3.31 The wind turbine earthing ring and tails would then be placed within the backfill. In some cases, earthing rods would be needed around the foundations. The need for these would depend on the ground conditions at the Site. If required, they would be installed as self-boring rods, drilled into the ground, in contact with the weathered rock. The depth of the rods would depend on the electrical characteristics of the ground. Once the earthing ring is completed, the cable ducts would be extended to the edge of the foundation and backfilling to the top of the upstand would commence.

- 3.32 The wind turbine foundation would then be backfilled. Weathered rock material from the foundation excavation would be used for the bulk of the backfill. It would then be placed in thin layers and compacted mechanically.
- 3.33 The bottom section of the wind turbine tower would be placed over the foundation bolts and fixed to the foundation. Cementitious grout would be placed between the bottom flange of the tower and the foundation. The grout would be retained in position by temporary formwork, which would prevent it from spilling outside the foundation. The material would be allowed to cure, and the nuts would be tightened to pre-tension the bolts.
- 3.34 The area around each turbine tower and over the turbine foundations would be reinstated by using topsoil stripped during the foundation construction excavation and other surplus excavated material.

Wind Turbine Transformers

- 3.35 In order to carry the power generated to the local electricity network each turbine would require a transformer to step up to a high voltage. Turbine transformers can either be located within the nacelle, within the turbine tower or adjacent to the base of each tower, depending on the wind turbine model selected and the supplier's specification.

Crane Hardstandings and Outrigger Pads

- 3.36 At the location of each turbine foundation, a hardstanding would be constructed to provide support for the cranes used for turbine erection. These hardstandings could also be used for storing turbine components, such as the nacelle, until they are installed. When not being used for turbine erection, the crane hardstanding may also be used as passing places at each turbine location where appropriate.
- 3.37 The size of turbines proposed for this project would normally require the use of a main crane of up to 1,000 tonnes capacity. A smaller tail crane would also be used to aid lifting of the larger components.
- 3.38 The layout of the hardstandings for this project is shown on Figure 3.7. Each hardstanding would cover an area of approximately 35m wide by 55m long, although dimensions may vary with turbine selection and manufacturer requirements.
- 3.39 The hardstandings would be constructed using the same criteria and methods as those used for the site tracks. The thickness of stone fills in these areas is normally similar to the site track construction but may be increased due to the axle loading from the cranes. This would depend on the characteristics of the vehicles used for the erection of the turbines.
- 3.40 The precise design of the crane hardstandings would be determined by the ground conditions at the turbine locations in a similar way to the design of the site tracks described above. The crane hardstanding would be of cut design.
- 3.41 On completion of construction, the hardstanding areas at each turbine location would be retained but allowed to re-vegetate naturally. Their retention is so that they are available

for use in the event of a major component replacement during the operation of the wind farm and for decommissioning.

Site Tracks

- 3.42 In summary, the Proposed Development requires approximately 7.22km of new tracks, which comprises:
- The construction of approximately 5.07km of new cut track
 - The construction of approximately 2.15km of new floating track.
- 3.43 The proposed development will also use the wind farm tracks which will be constructed as part of the consented Lairg II Wind Farm which have a total length of 3.5km.
- 3.44 Where new sections of access track are required, whether cut or floating, these would have a running surface of approximately 5m with local widening at bends. The actual running width would be dependent on eventual turbine selection and manufacturer requirements. The routing of new access tracks has also been designed to minimise track length, reduce impacts upon the native woodland plantation and to avoid environmental and technical constraints such as watercourse crossings and critical slope angles where practical to do so.
- 3.45 The construction of new cut tracks would involve the stripping and storage of topsoil and peat deposits. Geotextile membranes would only be installed if required. Mineral soil and subsoil excavated during cut track construction would be set aside for re-use in site reinstatement at a later date. The crushed stone track would be laid to a nominal depth of up to 450mm and aggregates required for the access tracks would be obtained from the on-site borrow pits as well as local suppliers. The tracks would incorporate swales to attenuate surface water flow in accordance with sustainable drainage principles.
- 3.46 All surface drainage will be controlled with regards to surface flow and sediment to ensure no untreated discharge to watercourses, even under heavy rain conditions. All drainage management mitigation will be carefully monitored daily by the Environmental Clerk of Works and suitably trained site staff.
- 3.47 In order to prevent any fine, in-situ clayey, subsoil material from migrating into the free draining granular fill of the site track, a geotextile layer may need to be laid on the underlying subsoil beneath the site tracks. The fill would be placed to a depth corresponding approximately to the original ground level. This would be levelled and compacted by compaction equipment and by the construction traffic that uses the track for access to the various parts of the Site.
- 3.48 Cross drains would be designed to divert the water at various points along the track alignment and to transmit it underneath the track. As far as is practicably possible, any water collected would be re-distributed to replicate the original surface / sub-surface flows.

- 3.49 On completion of construction, the remaining excavated mineral soil and subsoil would be levelled alongside the access tracks. A typical new track cross section is shown on Figure 3.4.
- 3.50 Micrositing of 100m is sought for tracks as well as turbine positions in order to optimise post-Ground Investigation design and avoid any unforeseen constraints and minimise cut and fill.

Floating Tracks

- 3.51 Where new tracks are proposed across areas of peat deeper than 1m, floating construction techniques would be used. Generally, the process would incorporate an approximately 7m to 8m wide strip of geogrid laid on the surface of the turf. A layer of approximately 700mm to 1000mm of crushed stone would then be laid on the geogrid to form the track, with the edges of the track forming steep batter slopes raised above the soft surface. The track would incorporate an upper layer of approximately 250mm hard-wearing rock and the geogrid system, which would be designed for floating road construction, would aim to limit the potential for tracks to penetrate the ground.
- 3.52 The access tracks would be retained throughout the operational life of the Proposed Development to enable maintenance of the turbines.

Watercourse Crossings

- 3.53 A total of two new watercourse crossings will be required as part of the construction of the site tracks. EIA Volume 4, Technical Appendix 8.1 sets out a watercourse crossing inventory where requirements for each crossing are discussed in detail. The locations of these crossings can be viewed on Figure 3.1 within Volume 2 of this EIA Report whilst Figure 3.5 sets out a typical watercourse crossing.

High Voltage Cabling

- 3.54 The turbines would be interconnected using armoured underground cables placed in trenches forming a power circuit within the Site. The underground cables would be taken into the on-site substation where the electrical control equipment would interface with the local distribution network.
- 3.55 The design of the high voltage (HV) cable trenches would be a function of the electrical rating of the cables, the ground conditions and the depth of protection required for the cables. The electrical rating and the ground conditions would provide data to assess the thermal performance of the cables. This would determine the likely spacing between each electrical circuit and therefore the width of the trench. Typical cable trench construction details are shown in Figure 3.8.
- 3.56 Cable trenches would be excavated using conventional construction equipment. The mineral soil would be dug out and set aside for re-use in the reinstatement of the trenches. The trench would then be excavated to the required overall depth. Subsoil material from the excavation would be temporarily stockpiled alongside the trench but kept separate

from any mineral soil. Detailed method statements for materials handling would be prepared in accordance with a restoration and management plan.

- 3.57 The cable would be placed on a bed of previously dug stone free excavated soil material. The trench would then be backfilled with excavated subsoil taken from the temporary stockpile alongside the trench and the top of the excavation reinstated with topsoil. Cable tiles or a warning marker tape would be laid in the trench during backfilling at a pre-specified depth. Any surplus excavated material would be stockpiled at an agreed location and used later in the reinstatement of the Site.

Borrow Pits and Concrete Requirements

- 3.58 Up to three borrow pits would be utilised as a source of aggregate for the construction of the Proposed Development infrastructure, including access tracks, hardstandings, turbine foundations etc. The final location of the three borrow pits within the search areas (shown in Figure 3.1) will be confirmed following final geological investigation.

Energy Storage Compound

- 3.59 Prior to the commissioning of the wind turbines activities the Energy Storage Compound will be constructed using the western side of the temporary construction compound. Figure 3.11 shows a typical energy storage compound plan.
- 3.60 Battery energy storage compound would be factory assembled and delivered to site in standard 12.2m long x 2.4m wide ISO shipping containers. Each container will be positioned on cast in-situ concrete foundations of approximately 1m² area, located at each corner of the container and centrally. The level of the foundations will be finished approximately 100mm above finished ground level to assist with drainage and air flow beneath the shipping container.
- 3.61 Battery containers will be positioned a minimum of 2.5m apart to facilitate access to all sides. Dependent upon design and manufacturer's requirements, access may be necessary from the sides of containers as well as from each end. Each container would house batteries with an energy density range of 1MWh – 3MWh.
- 3.62 A Power Conversion System (PCS) container, of similar dimensions to the battery containers, would be located adjacent to each battery storage container. The contents of the container would be factory assembled and tested. Foundations for PCS containers would be similar to the battery containers. A transformer, located either within the PCS container or externally, would transform the LV to EHV or HV voltages depending on the voltage of the point of connection to the local network, or vice versa. The battery and PCS containers would be connected via underground cables. If the unit transformer is located externally, underground cables will connect the PCS and transformer. Underground cables would take power to and from the proposed wind farm control building.
- 3.63 Switchgear, communications, and protection equipment would be located within the proposed wind farm control building, located to the east. The battery containers, PCS and transformer(s) will be located within a secure compound fenced with steel palisade fencing 2.4m high. A standard double width gate would facilitate personnel and vehicle

access into the compound. The compound would be surfaced with crushed aggregate, suitably compacted in layers, and incorporating geotextile / geomembrane where necessary. The depth of the aggregate will be dependent upon the underlying geology and suitable to support all anticipated loadings with minimal deflection / rutting.

Construction Compound/ Storage Area

- 3.64 The construction compound would be installed as soon as possible at the start of the construction phase, which would be the hub of construction operations.
- 3.65 The construction compound would be approximately 40 x 45m and incorporated into a total area of 100m by 50m; the remaining space being used for overnight storage of plant vehicles and general storage. The indicative location, shown in Figure 3.1, takes account of the local terrain and its distance from watercourses, and further survey works would examine the efficacy of this location.
- 3.66 Space would be provided for 'portacabin' style site offices; welfare and mess facilities; secure containers for tool and equipment storage; an area for the storage of various materials and small components with bunding as required; and car parking areas. The compound would be secured by means of a perimeter fence and lockable gates if deemed necessary.
- 3.67 On completion of construction, the site compound would be removed, and the area reinstated to its former condition in accordance with an approved method statement.

Site Substation

- 3.68 The proposed development will potentially require a 90m by 90m, 132kV substation compound, as depicted in Figure 3.1. Within this there would be a requirement for a wind farm substation compound of 45m by 20m, with a separate compound belonging to SSE Networks which would be provided to their own specifications.
- 3.69 Wind farm substation buildings are typically of conventional masonry construction, on concrete foundations with a pitched roof constructed of trussed rafters finished in slates or tiles. A security slab of reinforced concrete can be incorporated into the roof construction. In most cases, cable ducts and trenches are formed in the slab of the building. The trenches can be up to 1.5m deep depending on the electrical requirements and the layout of the Site, and also on whether the switchgear in the control building utilises top or bottom entry cables. A typical substation building is illustrated on Figure 3.9.
- 3.70 The substation would house the switchgear and control equipment needed for the grid connection and would also provide some secure storage space that may occasionally be required for the wind farm. A typical substation floor and roof plan is illustrated in Figure 3.10. The building would not be permanently manned as the wind farm would be controlled remotely from a central control facility.

Grid Connection

- 3.71 An off-site grid connection would be required to take the power generated from the wind turbines into the local electricity distribution network. The final details of the grid connection including the precise route and an assessment of any impacts on the environment would be determined by the District Network Operator (DNO) at a later date and may be subject to a separate design and consent process.

Forestry

- 3.72 The Site contains two woodland creation sites. Loch Cracial Woodland, which was planted in 2014, covers an area of 134.23ha and is situated to the east of Loch Cracail Mor while Acheilidh Woodland, located on the north-eastern slopes of An Stoc Bheinn (planted in 2020) covers an area of 182.35ha.
- 3.73 The woodlands have both designed open ground and other land within the fenced area. Designed open ground is defined as designed areas left unplanted as part of good forest practice. The purpose of designed open ground is to improve:
- Woodland design;
 - Enhance environmental / conservation value, and
 - Assist general woodland management.
- 3.74 Unplantable “Other Land” includes:
- Existing roads;
 - Scree;
 - Rock outcrops;
 - Small lochs, and
 - Extensive areas of deep peat (>50 cm deep)

Habitat Management

- 3.75 Habitat management proposals are required to provide enhancement of the natural environment during operation of the proposed development. These are fully described and explained within Technical Appendix 9.3 within a draft Habitat Management Plan (HMP). In outline, the measures include:
- Restoration of degraded peatland across the Site;
 - Creation of riparian woodland habitats;
 - An outline Deer Management Plan;
 - Measures to protect and enhance raptors and bats.

Commissioning of Mechanical and Electrical Equipment

- 3.76 The turbine supplier normally undertakes the testing and commissioning of a wind farm. It involves a series of tests on the high voltage electrical network, the electrical equipment

in the turbines and control building and the SCADA system. No construction activities are required, and it only entails the use of small vehicles.

Pre-Construction Works

- 3.77 A detailed Construction Method Statement (CMS) would be produced by the construction contractors and agreed with THC prior to the commencement of works. The CMS will typically include:
- A description of construction methods;
 - Pollution prevention measures, including dust, emissions, drainage design and materials management;
 - Water quality management and monitoring;
 - Mitigation measures;
 - Management of construction traffic (typically addressed separately in a traffic management plan);
 - Noise and vibration management; and
 - Public liaison.
- 3.78 Prior to commencement of construction, detailed Site surveys would be undertaken to provide data for the final design of the civil and electrical engineering infrastructure for the Proposed Development. These would comprise detailed topographical and geotechnical surveys.
- 3.79 The geotechnical survey would incorporate the excavation and sampling of trial holes at each turbine location and possibly boreholes to obtain information about the underlying strata. This data will determine the need to microsite any infrastructure within the 100m tolerance.
- 3.80 All of the above will take cognisance of best practice guidance and be agreed with THC, the Scottish Environment Protection Agency (SEPA), and other interested parties.

Temporary Highway Works

- 3.81 Prior to construction, some off-site access works would be required including the temporary removal or relocation of street furniture, pruning/removal/replanting of shrubs/trees, and road widening. The detail of these enabling works would be provided in a detailed Traffic Management Plan, likely to be required by a condition to the planning permission.

Construction Works and Construction Programme

- 3.82 Construction works include:
- Temporary highway modifications to enable vehicles to access the Site from the strategic and local highway network;
 - Creation of the new site access point;

- Construction of new permanent site tracks and upgrading of existing tracks;
- Installation of construction compound / storage area for Site office facilities and storage of materials and components;
- The excavation of borrow pits within identified search areas and extraction of aggregate for new tracks and hardstandings;
- Installation of hardstandings and outrigger pads for the support of the cranes that would be used for the erection of the turbines;
- Construction of foundations for the support of the turbine structures;
- Wind turbine delivery and erection;
- Installation of transformers in separate housings alongside each wind turbine (if required);
- Installation of on-site High Voltage (HV) cabling, communication cabling and earthing underground adjacent to access tracks;
- Installation of Supervisory Control and Data Acquisition (SCADA) system;
- Construction of substation;
- Construction of Energy Storage Compound
- Commissioning of Site mechanical and electrical equipment; and
- Reinstatement, landscaping, removal of temporary site offices, reseeding verges, borrow pit and areas around turbine bases.

3.83 It is estimated that the construction of the Proposed Development would take 18 months and would consist of the operations set out below in Table 3.2 and described later in this chapter.

3.84 The programme of construction deliveries shown in Table 3.2 has taken into account all that is currently known about the Site and Proposed Development. The precise duration and timing of each activity may be modified, as necessary, to take into account the findings of the pre-construction works and surveys. The use of construction method statements through a planning condition will provide the detail design and time frames.

Table 3.2: Indicative programme of construction activities (in months)

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Site Mobilisation																		
Access junction and grading of access slope																		
Construction of main construction compound																		
Excavation of borrow pits																		
Track and turbine compound construction																		
132kV Substation construction																		
Excavating trenches and laying electrical and communication cabling																		
Turbine delivery and installation																		
Energy Storage Compound																		
Turbine fit out, restoration and grid connection																		
Turbine commissioning																		

- 3.85 The works would mainly follow the order detailed above, but many would be carried out concurrently to reduce the overall length of the construction programme. There would be construction phasing, with civil engineering works progressing in some areas whilst turbines are being erected elsewhere. To minimise disruption to land use, site restoration would be undertaken as early as possible in development areas.
- 3.86 Should planning permission be granted then, it is likely that construction hours would be restricted via means of a planning condition imposed by THC as part of the consent.
- 3.87 At this stage it is proposed that construction activities on site shall only take place between the hours of 07:00 to 18:00 on Monday to Friday inclusive and 08:00 to 14:00 hours on Saturday, with no construction works on Sundays or Bank Holidays, unless otherwise agreed with THC.
- 3.88 Outside of these hours, there may be a requirement to take advantage of low wind speeds for the erection of turbines. In addition, turbine erection works cannot suddenly cease; in the event of a delay or complication it may be necessary to continue works beyond normal hours until they can end safely. Other activities that may take place outside these hours are limited to emergency works and dust suppression, unless otherwise agreed in writing by THC.
- 3.89 It is proposed that the delivery of any construction materials or equipment, other than turbine blades, nacelles, and towers, shall be restricted to the above hours, unless otherwise agreed in writing by THC.
- 3.90 Depending on the time of year and the stage of the construction programme, temporary lighting may be required at the temporary compound and substation during working hours. It is not proposed that the lighting will be on outside of working hours unless essential construction work outside normal working hours is required.

Reinstatement and Removal of Temporary Works

- 3.91 On completion of construction, all temporary fencing and the temporary construction compound would be removed from Site and all areas disturbed by the works would be reinstated. Reinstatement works would be subject to a Construction Method Statement to be approved by THC.

Other Construction Considerations

- 3.92 All construction activities will be managed within the requirements of the Construction (Design and Management) Regulations 2015 and will not conflict with the Health and Safety at Work etc. Act 1974. The design of the Development has taken full account of these regulations.
- 3.93 Best practice waste management guidelines and relevant regulations will be complied with as part of the construction programme. A Site Waste Management Plan (SWMP) will be prepared as part of the post-consent CEMP.

Wind Farm Operation

Operational Timescales and Decommissioning

- 3.94 Following construction and commissioning, the Proposed Development would be operational and generating electricity for a period of approximately 35 years, after which it would be decommissioned and removed, or alternatively, a further planning application could be made to extend the period of operation.
- 3.95 If a further application is not submitted, decommissioning would involve the total removal of above-ground infrastructure. This would involve retention of existing access tracks for estate operations. Reinstatement of the Site would be carried out in accordance with an approved method statement. A decommissioning bond would be agreed with THC, and this is expected to be enforced by way of an appropriately worded planning condition.

Maintenance

- 3.96 Wind farm maintenance would be carried out by the turbine supplier and later by suitably qualified contractors to carry out regular inspections and maintenance activities.
- 3.97 Routine maintenance and servicing would necessitate monthly visits to the Site by a maintenance crew (if necessary), typically two persons in a small van or similar sized vehicle. Maintenance staff would be able to park on the crane pad for each turbine and would utilise access tracks for maintenance visits to the substation.
- 3.98 Routine servicing would include the performance of tasks such as maintaining bolts to the required torque, adjustment of blades and inspection of welds in the tower. In addition, oil sampling and testing from the main gearbox would be required and oil and components replaced at regular intervals.
- 3.99 In the event of any unexpected breakdowns on-site, such as the failure of a generator, appropriate maintenance works would be carried out as soon as practicable. The replacement of major components may require a crane and heavy transport vehicles.
- 3.100 On-going track maintenance, if required, would generally be undertaken in the summer months when tracks are dry. Safe access for maintenance purposes would be maintained all year round.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 4: Design Evolution

April 2024

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4 DESIGN EVOLUTION

Introduction

- 4.1 This chapter describes the site selection process used to identify the suitability of the Site. This chapter also provides details on the overarching design strategy employed through the design evolution as well as detailing how, and why the turbine layout and associated infrastructure has been modified during the iterative EIA process, culminating in the proposed development described in EIA Volume 1, Chapter 3: Project Description.

Site Selection Methodology and Alternatives

- 4.2 The overall approach to wind farm site selection is to identify areas of land where the siting of a wind farm would result in minimal environmental effects, be free from overriding technical constraints, and be economically viable. This involves:
- A review of the planning context for renewables in Scotland and at the local authority level.
 - A desktop based Geographical Information System (GIS) constraints analysis.
 - Analysis of wind speed data.
 - Consideration of proximity to potential electricity connection points; and
 - A review of suitable site access points and related transportation issues.
- 4.3 In reviewing the option of alternatives, the Proposed Development is the result of GIS 'sieve' mapping, whereby alternate areas for development have been scoped out as less suitable. This chapter describes this initial selection process, as well as the underlying design strategy and iterative design process which demonstrates the alternate plans considered before arriving at the proposed layout illustrated in Figure 3.1.

Review of Planning Context

- 4.4 Information on the planning context for renewables in the local planning authority of The Highland Council (THC) was reviewed as part of the site search exercise, focusing on the relevant Development Plans, national policy, and other relevant material considerations. This exercise also highlighted any pertinent guidance or planning policies pertaining to THC which were applicable to the Proposed Development.

GIS Constraints Mapping

- 4.5 A GIS 'sieve mapping' exercise was carried out in order to further inform the search process. This involved identifying and mapping constraints to wind farm development to identify potential sites. The various constraints considered as part of the site selection exercise for the Proposed Development included but were not limited to:
- Radio and microwave signal – using known constraints to identify areas which could be affected by existing radio and microwave signals;

- Aviation interests – including local licensed aerodromes and visibility to radars, both military and civilian;
- Hydrological, geological and hydrogeological constraints – including effects on groundwater, water resources and local geology;
- Landscape designations – including National Parks, special landscape areas, and local landscape designations;
- Ecological designations – including Ramsar sites, Special Protection Areas, Special Areas of Conservation and Sites of Special Scientific Interest;
- Cultural heritage designations – including Gardens and Designed Landscapes, Registered Battlefields, World Heritage Sites, Listed Buildings, Properties in Care, Conservation Areas and Scheduled Ancient Monuments;
- Potential Grid Connection points - the capacity of the local grid network to accept the likely output from a proposed wind farm is critical to the technical feasibility of a development. The connection voltage and the distance from the wind farm can have a significant effect on the commercial feasibility of a development proposal; and
- The pattern of settlement – with buffers provided around residential properties and settlements.

Wind Speed Data

- 4.6 The predicted wind resource in any given location is an important consideration in identifying potentially suitable wind farm sites. The electricity that can be generated by a wind farm is directly linked to wind speed. Wind speed generally increases with height above ground level and the amount of electricity generated increases disproportionately with increases in wind speed. This in turn affects the carbon emission savings and the commercial viability of a site. Potential wind farm sites are therefore reviewed in relation to a number of publicly available data sources in the first instance, including the NOABL wind speed database¹.

Access Suitability

- 4.7 A desktop exercise was undertaken to ensure that appropriate access was available for the transportation of wind turbine components. The proposed route to Site would also use an established delivery route which has been proposed for the consented, neighbouring Lairg II Wind Farm. Full details are provided in EIA Volume 1, Chapter 12: Traffic and Transport.

Selection of the Site

- 4.8 Following a site search based on this methodology and criteria, the Site was selected due to a number of factors, including:

¹ The NOABL wind speed database was created by the Department of Trade and Industry and provides annual mean wind speeds on a kilometre grid square basis.

- Energy capture – software modelling indicates that the Site offers a strong wind resource with few obstacles or areas of pronounced topography close enough to interrupt wind flow;
- Environmental designations – the Strath Carnaig and Strath Fleet Moors SSSI and SPA lies partially within the Site Boundary however through careful siting and design, a sufficient distance from this designation has been maintained.
- Landscape – The site is located approximately 8km north of the Dornoch Firth NSA. This was recognised at an early stage of the design process, with efforts being made throughout the design evolution to minimise visual effects of the proposed development from the NSA.
- Residential separation distances – the Site is able to provide separation distances in excess of 1.2km from the nearest non-involved and uninhabited residential property while having potential for a high installed capacity. Through siting and design, the turbines have been situated in excess of 2km from inhabited residential properties.
- Transport infrastructure – the Site benefits from suitable access for turbine component delivery; and
- Grid connection – the Applicant has consulted with the Network Operator to accommodate the electricity generated by the Proposed Development.

Design Strategy

- 4.9 The overall design layout principle of the Proposed Development has been to achieve a coherent and compact design, which minimises direct and indirect adverse effects on the local and wider landscape, while balancing commercial considerations and maximising energy production. Figures 3.1 and 4.5 show the final design layout submitted as part of this application.
- 4.10 A key consideration for the Proposed Development was due to its expansive moorland was considered suitable to accommodate the scale of the proposed development. The site boundary, whilst larger than turbine envelope, was drawn to allow flexibility in layout, infrastructure and for potential habitat management if required.
- 4.11 The undulating nature of the site and relatively simple landform was also used to produce a cohesive design at an appropriate scale and extent which is partially visually screened by An Stoc-bheinn (336m Above Ordnance Datum (AOD)) to the north and Meall na Tulchainn (268m AOD), which lies to the south of the Site boundary. In addition to the specific characteristics of the Site informing the overall strategy, some general design principles were also applied. This included:
- The avoidance of overlapping or 'stacked' turbines, where possible, through careful placement in order to form a well-spaced group or array when viewed from the receiving landscape including key design viewpoints.
 - The avoidance of outlying turbines which appear separate or stand apart within the landscape in order to reduce the lateral spread of the Proposed Development.
 - The selection of an appropriate turbine height which respect the scale of the receiving landscape and achieves a balanced composition when viewed from the

surrounding landscape whilst recognising that current wind turbine technology has progressed with larger turbines required for greater energy efficiency.

- The development of a layout which relates well to other existing and proposed wind farms within the local area, as well as being coherent in isolation.

Design Evolution

- 4.12 The design process took place over a number of months and the Proposed Development has been progressively revised and refined during this time to take account of the information arising from pre-application consultation with stakeholders, and the findings of the EIA. As a result, the design and EIA process has been highly iterative and all aspects of the final design, including the location of the wind turbines, crane hardstandings, the site access, layout of the access tracks, the locations of the substation and construction compound have been influenced by various technical, environmental, and planning considerations.
- 4.13 The design of the Proposed Development has been optimised to produce a project which balances the use of land available with the overall impact of the development. This is based on the following technical, economic, and environmental considerations:
- Ground conditions and existing land use: the layout design minimises the impact to areas of peat. Watercourses and critical slope gradients have also been avoided where possible;
 - Residential properties: a residential buffer / stand-off distance of at least 1km from residential properties has been included;
 - Distance between turbines: to minimise the turbulent interaction between turbines they should be spaced in a suitable manner to minimise wind wake effects;
 - Environmental constraints: The assessment chapters of this EIA Report discuss these considerations and issues; and
 - Landscape and visual amenity: Chapter 6 of this EIA Report covers this in depth. The design of the Proposed Development seeks to match the turbines with the scale of the landscape. Due to the location of the site, the landscape and visual aspects of the proposal were key in designing the turbine locations and heights. Computer modelling was used as a tool to aid design and 3D model/ wireframes were generated for views from key locations around the Site.
- 4.14 The positioning of the turbines, through the design, has been continually altered to account for the proximity of constraints as these have been assessed, and as EIA studies have progressed. Views from the tenanted crofters have been taken into consideration when developing infrastructure design and turbine placement to ensure the proposed development is in keeping with existing land use and crofting activities.
- 4.15 Stakeholder consultation has been based on both the milestone iterations detailed below, and a number of other designs between principal iteration stages. The principal iterations are shown in Figures 4.1, 4.2, 4.3, 4.4 and 4.5.

Layout 1: EIA Scoping

- 4.16 The first design iteration consisted of 20 wind turbines of up to 230m in height to blade tip as illustrated in Figure 4.1. This layout was the basis for the Scoping Report submitted in June 2022 with the resultant Scoping Opinion provided by Scottish Ministers in October 2022. The Scoping layout presented a theoretical maximum number of turbines which could be accommodated on site and took account of the following environmental and technical constraints:
- Application of a 50m buffer from watercourses;
 - Application of a 1.2km residential buffer;
 - Ornithological considerations relating to Black and Red Throated Diver
 - Class 1 and 2 Priority Peatland
- 4.17 At this stage of the project, a key focus of this design was to determine landscape suitability whilst considering the initial buildability of the turbine locations.

Layout 2: Post Scoping Layout

- 4.18 Illustrated in Figure 4.2, the Second Iteration comprised 17 turbines wind turbines of up to 200m to blade tip and was presented to the local community at a community council meeting².
- 4.19 The layout maintained the buffers around watercourses and residential properties and took account of ecological and ornithological onsite constraints. Following the survey works undertaken within the site boundary, the layout was amended to avoid areas of deep peat where possible.
- 4.20 A total of three turbines were removed from the design. This included the deletion of T2 depicted on Layout 1: EIA Scoping (Figure 4.1), which had been placed on the eastern slopes of An-Stoc bheinn, in order to reduce visibility from the A839 and the wider Strath Fleet landscape. Turbine 8 was also deleted following further consideration of Phase 1 peat probing results which indicated that the surrounding peat was greater than 2m and as such was determined to be an unacceptable location for turbine placement. The final deletion arose due to an increase in spacing between the turbines to reduce stacking from key design viewpoints and reduce wake effect.
- 4.21 The angle of the slopes within the site boundary were also taken into consideration for construction purposes. This also meant that turbines were placed on areas of lower elevation around the southern slopes of An-Stoc bheinn to improve visual screening.

Layout 3: Round 1 Public Exhibition Layout

- 4.22 Illustrated in Figure 4.3, Layout 3 comprised 12 wind turbines of up to 230m to blade tip and was presented at the public exhibition held on the 19th of January 2023 in Rogart Hall. Layout 3 was based on the feedback received as part of the scoping process,

² Energiekontor UK Ltd attended the Rogart Community Council held on the 7th of November 2022

meetings undertaken with consultees and further environmental survey with the following considerations used to inform changes to the layout:

- Peatland habitats;
- Ecological considerations such as GWDTE;
- Ornithological interests;
- Landscape and visual effects

- 4.23 Turbine numbers were further reduced due to an increase in turbine spacing. The deletion of turbines to the south of the Site were a result of the application of a 1.2km buffer from the abandoned Garvary Cottage to safeguard potential future visual amenity and noise levels. The removal of turbines also improved views and turbine composition to the south when viewed from Dornoch Firth National Scenic Area (NSA).
- 4.24 The reduction of the proposed development from 17 to 12 turbines required a review of key design viewpoints which revealed an increase to 230m could be accommodated within the receiving landscape due to the coherent design created through careful turbine placement. This increase in turbine tip height to 230m promoted an increase in energy yield for the proposed development.
- 4.25 The infrastructure design for this layout was developed at this stage. Access tracks were used to join turbine positions and turbine compounds followed contours and avoided gradients of greater than 12% in line with turbine manufacturer guidance and to minimise incursion into peat wherever practicable. Tracks were also designed for the turning radius of an up to 80m blade. The infrastructure design also sought to reduce the visual impact of onsite tracks, as well as considering other constraints such as watercourses with a 50m watercourse buffer applied except for watercourse crossings.
- 4.26 In addition to this, the infrastructure sought to connect the consented Lairg II wind farm with the proposed development to avoid the creation of new access tracks for turbine delivery and construction traffic, reducing infrastructure whilst maximising energy production. By connecting to the consented Lairg II wind farm, the proposed development will utilise an established access junction however amendments will be required.
- 4.27 The substation compound was located on relatively flat land whilst maintaining a topple distance buffer of rotor diameter +10% from the turbines. The main construction compound (and eventual location for battery storage) was placed on similar nearby ground (see Figure 3.1)

Layout 4: Round 2 Public Exhibition Layout

- 4.28 Following consultation with the tenanted crofters, a significant revision of turbine infrastructure took place to minimise impacts upon native woodland within the Site boundary. This included the amendment of turbine locations (specifically T5 and T7) track realignment and the re-orientation of crane pads into designed open ground to reduce the amount of felling required.

- 4.29 The placement of Turbine T1, previously located in the south-east of the Site (see Figure 4.3) also underwent significant infrastructure amendments to avoid impacts upon peatland habitats. Following ecological survey works, a GWDTE was identified in the south-east of the site and a 250m GWDTE buffer was applied. Whilst this buffer was maintained, exploratory Phase 2 peat probing revealed that peat depths within this area of the Site were deemed unacceptable for development, and this was further confirmed upon consultation during a design workshop with SEPA.
- 4.30 To avoid impacts upon deep peat, the location of T11 was moved to the south of Lochan na Folaig with a search area produced to determine peat depth. A suitable location was found within the area of exploration and T11 was placed on peat <1m. The movement of turbines and subsequent track re-alignment also resulted in the reduction of on-site tracks, further reducing the footprint of the development.
- 4.31 Comments from the community and stakeholders coupled with further design work resulted in half of the proposed turbines being reduced to 200m with wirelines and photomontages produced to assess the visual effects from several locations. The turbines reduced in height included T1, T2, T4, T8, T9 and T12 which were considered to be the perimeter turbines. These were lowered to reduce turbine visibility along the A839 and created a more cohesive layout with a reduced lateral spread when viewed from the Dornoch Firth NSA. The reduced tip heights for T1 and T2 led to a slight reduction in turbine visibility from Strath Fleet.
- 4.32 A decision was taken to retain heights of 230m for the remaining turbines due to some being sufficiently screened by topography and their internal position within the Site. The retention of the higher tip heights improved the overall lateral composition of the proposed development, particularly from key design viewpoints. Consideration was also given to the design of the neighbouring Garvary wind farm in order to avoid creating two distinctive design patterns in the landscape whilst respecting site-specific constraints.

Layout 5: Pre-Application Layout

- 4.33 As set out in Figure 4.5, the turbine positions remain the same as depicted in the previous layout, following consultation with the tenanted crofters a significant revision was carried out to the on-site tracks linking to T1 and T2. Changes to infrastructure also included the re-orientation of crane hardstandings for T5 to further minimise felling of native woodland.
- 4.34 To reduce impacts upon native woodland, on-site tracks were placed outside of the native woodland area. The changes made to the proposed infrastructure reduced felling from 5.77 hectares (ha) to 1.31ha as well as reducing potential breaches within the fence line of the plantation to limit impacts associated with deer.
- 4.35 The re-routing of these tracks also resulted in the deletion of a watercourse crossing and a loaded turning head, reducing the number of watercourse crossings from four to three and further minimising the footprint of the development.

Layout 6: Application Layout

- 4.36 The layout, set out in Figure 4.6, which forms the basis of this EIA represents the culmination of specialist input on LVIA, ecology, ornithology, hydrology, peat, and other matters.
- 4.37 Following the presentation of the revised layout, further feedback was provided by the tenanted crofters. As a result of the feedback provided, all turbines and infrastructure were subsequently removed from the native woodland plantation, resulting in no felling requirements associated with the proposed development. The retention of the forestry has meant that the native woodland plantation, comprising species such as Scots Pine and birch will continue to mature and remain unaffected throughout the lifetime of the project.
- 4.38 The design changes were also carefully considered from key design viewpoints and sought to maintain the design principles seen in the previous layouts. From the design changes made, when viewed from the Dornoch Firth NSA, specifically Viewpoint 12: B9176 Struie Layby presents a more compact composition with T9 being moved closer into the turbine array and, subsequently avoided being backclothed by the Lone Mountains. This was previously raised during consultation with THC and as such, the design has been amended to take this into consideration. This can also be demonstrated at Viewpoint 2, where the turbine array has a reduced lateral spread whilst avoiding turbine stacking. Despite the changes made to the layout, the key design principles set out in the sections above have been reflected
- 4.39 The application layout has seen the movement of Turbines 1, 2, 3, 4, 5, 7, 9, 11 and 12 whilst the position of Turbines 6, 8 and 10 remain unchanged from the previous layout. The tip heights across the site also remain unchanged. Additional peat probing data was gathered in order to determine peat depths for the relocated turbines with turbines being placed in peat less than 1m and an NVC survey was carried out to complete the ecological data for the assessment.
- 4.40 The substation, temporary construction compound and battery storage have also moved to the north of the site and one of the borrow pit search areas relocated to their former position. These changes were made to reduce the distance to potential grid connection points and reduce the length of track in order to reach the construction compound. The relocated substation also falls outwith the topple distance buffer. The movement of the infrastructure has created opportunities for visual screening of the substation and energy storage compound as the trees mature over the proposed 35-year operational period. In addition, the realignment of tracks has led to a further reduction in track length to 7.22km and also has resulted in the deletion of a watercourse crossing with the proposed development now having a total of two.
- 4.41 As a result of turbine movement, a revised aviation lighting strategy was also agreed with the CAA with the requirement for six turbines to be lit.

Summary of Design Evolution

- 4.42 The wind farm layout in its proposed form takes account of stakeholder feedback received during pre-application discussions as well as environmental and technical constraints identified throughout the site selection and iterative design process. In designing a layout which is simple in composition and restrained in size, the final design results in a development which takes into account the constraints associated with the site.
- 4.43 Alternatives were considered during this process and addressed as described above. The proposed development was then frozen and taken forward for Environmental Impact Assessment as is discussed within this Volume.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 5: Renewable Energy and Planning Policy

April 2024

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5 RENEWABLE ENERGY AND PLANNING POLICY

Introduction

- 5.1 This chapter provides an outline of the national and local planning policies, guidance and other material considerations that are considered to be relevant in underpinning the EIA Report for the proposed development.
- 5.2 To maintain the impartiality of the Environmental Impact Assessment Report (EIA Report), this chapter does not assess whether the Proposed Development would comply with the identified policies. A separate Planning Statement which assesses the conformity of the Proposed Development with the Development Plan and other material considerations is also submitted as part of the planning application. The Planning Statement is separate from the EIA Report.
- 5.3 Whilst this EIA Report relates to an application for consent under Section 36 of the Electricity Act 1989 ('the Electricity Act'), deemed planning consent is also sought under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended) (the TCPA).
- 5.4 While the Development Plan is the starting point for the decision-making process, it must be considered in the context of both the policy hierarchy (governed by Scottish Government policy) which in turn is informed by the wider suite of Scottish, UK and international policy and law relating to renewable energy development and climate change.
- 5.5 This review of the relevant policy and material considerations therefore adopts the following structure:

The Development Plan

- National Planning Framework 4 (NPF4, 2023)
- The Highland-wide Local Development Plan (2012);
- The Caithness and Sutherland Local Development Plan (CaSPlan (2018); and
- Onshore Wind Energy: Supplementary Guidance (2016) with addendum, Dec 2017).

Material Planning Considerations

- Scottish and UK Renewable energy and climate change legislation and policy.

Planning Policy

The Development Plan

National Planning Framework 4

- 5.6 Formally adopted in February 2023, NPF4 now forms part of the Development Plan alongside the LDP.
- 5.7 A key provision legislated within section 13 of the Planning (Scotland) Act 2019 is that Section 24 of the Town and Country Planning (Scotland) Act 1997 is now amended to state that in the event of any incompatibility between a provision of NPF4 and the provision of an LDP, then whichever of them is later will prevail.
- 5.8 NPF 4 states that the global climate emergency has resulted in the need for reductions in greenhouse gas emissions and changes required to adapt to future impacts of climate change. NPF4 further states that while significant steps have been taken towards the decarbonisation of energy and land use, choices remain on how Scotland can sustainably utilise national assets.
- 5.9 This is reinforced by Scotland's Climate Change Plan, backed by legislation, which has set the approach to achieving net zero emissions by 2045, however significant progress towards this goal must be met by 2030.
- 5.10 NPF4 provides clear policy and legislative support for renewables and specifically onshore wind energy as a principle, in order to reach our Net Zero obligations by 2045 as set out in law.
- 5.11 The Scottish Government is clear and unequivocal about the requirement for new onshore wind generation through legislation and policy.
- 5.12 The inclusion of 'Strategic Renewable Electricity Generation and Transmission Infrastructure' as a 'national development' demonstrates the importance that the Scottish Government places upon the increase in onshore renewable generation. Annex B of NPF4 provides a statement of need. This states that *"a large and rapid increase in electricity generation from renewable sources will be essential for Scotland to meet its Net Zero emissions targets."*
- 5.13 Wind farms in excess of 50MW generating capacity will comprise national development. The proposed development exceeds this threshold and therefore be classed as a national development. Page 97 of NPF4 sets out that national developments are described as *"significant developments of national importance that will help to deliver the spatial strategy"*. It adds that *"their designation means that the principle for development does not need to be agreed in later consenting processes."*
- 5.14 In conclusion, there is and remains a clear support at a national level for the further development of renewable and low carbon technologies however greater emphasis has been placed on the pace at which these technologies are rolled out. It is then appropriate to examine the contents of particular policies of NPF4.

- 5.15 **Policy 1: Tackling the climate and nature crises** acts as an overarching policy which in turn filters into each individual policy detailed within NPF4, stating that when considering all development proposals, significant weight should be given to the global climate and nature crises, in order to ensure that they are recognised as a priority in all plans and decisions.
- 5.16 The intent behind Policy 1 is to encourage, promote and facilitate development that addresses the global climate emergency and nature crisis. The proposed development inherently seeks to address the climate crisis by providing low carbon energy and reduces greenhouse gas emissions by contributing to a more sustainable energy mix across Scotland.
- 5.17 Therefore, NPF4 introduces a key, prominent policy which states that the global climate emergency is a priority and significant weight must be attached to this. Onshore wind, as a national development, accords fully with the aspirations of this policy and can draw immediate and full support.
- 5.18 **Policy 2: Climate change and Mitigation** aims to encourage, promote, and facilitate development that minimises emissions and adapts to the current and future impacts of climate change. Policy 2 states:
- a) Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible.*
 - b) Development proposals will be sited and designed to adapt to current and future risks from climate change.*
 - c) Development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change will be supported.*
- 5.19 **Policy 3: Biodiversity** requires that “development proposals contribute to the enhancement of biodiversity, including where relevant restoring degraded habitats and building and strengthening nature networks”, integrating “nature-based solutions where possible”.
- 5.20 **Policy 4: Natural Places** of NPF4 reinforces the need for the protection, restoration and enhancement of natural assets making best use of nature-based solutions. Part a) of this policy states that development proposals which would have an unacceptable impact upon the natural environment by virtue of type, location or scale will not be supported.
- 5.21 Criteria is provided for proposals that impact upon European or national designations, such as SACs, SPAs, National Parks, National Scenic Areas, SSSIs, Ramsar sites. Part d) discusses impacts upon local designations and states where a site is designated as a “local nature conservation site or landscape area in the LDP, it will only be supported where development will not have significant adverse effects on the integrity of the area and qualities for which it has been identified.” Part ii) of d) states the second criteria for support, which is where “any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits or at least local importance.”
- 5.22 Part e) states that the precautionary principle is to be applied.

5.23 Part f) states that development proposals that are likely to have an adverse effect upon species protected by legislation will only be supported where it meets the statutory test.

5.24 **Policy 5: Soils** focuses on the protection of carbon-rich soils, the restoration of peatlands and the minimisation of disturbance to soils from development with wording as follows:

Development proposals on peatland, carbon-rich soils and priority peatland habitat will only be supported for:

- i) Essential infrastructure and there are a specific locational need and no other suitable site;*
- ii) The generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emission reductions targets;*
- iii) Small-scale development directly linked to a rural business, farm, or croft;*
- iv) Supporting a fragile community in a rural or island area; or*
- v) Restoration of peatland habitats.*

5.25 The design of the proposed development has aimed to maximise the most amount of renewable energy with the least amount of infrastructure possible. By applying this principle, the proposed development layout, including turbines and associated infrastructure, has been designed to avoid the areas of deep peat identified, wherever possible, and areas where peat landslide may occur.

5.26 **Policy 6: Forestry, Woodland, and Trees** states under part c) that proposals involving woodland removal will “only be supported where they achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal”.

5.27 **Policy 7: Historic Assets and Places** details under part a) that “development proposals with a potentially significant impact on historic assets or places will be accompanied by an assessment which is based on an understanding of the cultural significance of the historic asset and/or place”. Part h) is also useful and relevant, where it is stated the development proposals affecting scheduled monuments will only be supported “where i) direct impacts on the scheduled monument are avoided, ii) significant adverse effects on the integrity of the setting are avoided or iii) exceptional circumstances have been demonstrated to justify the impact on a scheduled monument and its setting and impacts on the monument or its setting have been minimised”.

5.28 The key policy pertaining to energy is **Policy 11: Energy**, which contains the intent to ‘encourage, promote, and facilitate all forms of renewable energy development onshore and offshore. This includes energy generation, storage, new and replacement transmission and distribution infrastructure and emerging low-carbon and zero emissions technologies including hydrogen and carbon capture utilisation and storage (CCUS).’

5.29 At a local level, the policy also states that Local Development Plans (LDPs) should seek to realise their areas’ full potential for electricity and heat from renewable, low carbon and zero emission sources by identifying a range of opportunities for energy development.

5.30 Policy 11 a) sets out that development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported, which include:

- i) wind farms including repowering, extending, expanding, and extending the life of existing wind farms;*
- ii) enabling works, such as grid transmission and distribution infrastructure;*
- iii) energy storage, such as battery storage and pumped storage hydro;*
- iv) small scale renewable energy generation technology;*
- v) solar arrays;*
- vi) proposals associated with negative emissions technologies and carbon capture; and*
- vii) proposals including co-location of these technologies.*

5.31 Policy 11 reiterates support for renewable and low carbon technologies, however there is a clear and direct reference to onshore wind farms, recognising this form of energy generation as a key component to achieving the outcomes of Policy 11 as well as wider overarching climate change policy and legislation which aim to expand renewable, low-carbon and zero emissions technologies at a national level.

5.32 While repowering, extensions and expansions are also supported, the creation of new onshore wind development must be supported to ensure there is a continued pipeline of new onshore wind farm schemes, such as the proposed development, which can be revisited for future repowering, extension, and expansion. In addition, the policy also includes support for battery storage which has been included as part of the development with 5MW of storage proposed.

5.33 Policy 11 (e) provides further information on the topics which should be addressed as part of renewable, low-carbon and zero emissions technologies. It states that:

In addition, project design and mitigation will demonstrate how the following impacts are addressed:

- i) impacts on communities and individual dwellings, including, residential amenity, visual impact, noise, and shadow flicker;*
- ii) significant landscape and visual impacts, recognising that such impacts are to be expected for some forms of renewable energy. Where impacts are localised and/ or appropriate design mitigation has been applied, they will generally be considered to be acceptable;*
- iii) public access, including impact on long distance walking and cycling routes and scenic routes;*
- iv) impacts on aviation and defence interests including seismological recording;*
- v) impacts on telecommunications and broadcasting installations, particularly ensuring that transmission links are not compromised;*
- vi) impacts on road traffic and on adjacent trunk roads, including during construction;*
- vii) impacts on historic environment;*

- viii) *effects on hydrology, the water environment and flood risk;*
- ix) *biodiversity including impacts on birds;*
- x) *impacts on trees, woods, and forests;*
- xi) *proposals for the decommissioning of developments, including ancillary infrastructure, and site restoration;*
- xii) *the quality of site restoration plans including the measures in place to safeguard or guarantee availability of finances to effectively implement those plans; and*
- xiii) *cumulative impacts.*

5.34 Throughout the EIA Report, each topic listed within Policy 11 (e) has been fully assessed.

5.35 Policy 11 states that “in considering these impacts, significant weight will be placed on the contribution of the proposal to renewable energy generation targets and on greenhouse gas emission targets”.

5.36 A key point of policy is that Policy 11e) ii) recognises that where some landscape and visual impacts are to be expected, localised impacts and/ or the application of appropriate design mitigation has been employed, then effects are considered to be acceptable.

Highland-wide Local Development Plan

5.37 The Highland-wide Development Plan (HwLDP) was adopted in 2012 and sets out the general planning policies for the Highland Council area. The HwLDP should be read in conjunction with any Local plans which are still in place. The HwLDP is in the process of being reviewed however is at an early stage with the Main Issues Report the subject of consultation in 2016. Further progress has been postponed. Key consideration is therefore given to the existing plan and at this stage, limited weight can be given to the replacement plan.

5.38 The leading policy of the HwLDP which relates to Renewable Energy Development is **Policy 67: Renewable Energy Development.**

5.39 THC sets out their position in relation to renewable energy developments through this policy and supporting text. THC recognise the benefits associated with renewable energy developments and will seek to enter into agreements with developers on behalf of local communities for environmental and socio-economic purposes. THC acknowledge that socio-economic impacts that are related to the nature and scale of renewable energy development will be a material consideration in the assessment or determination of planning applications.

5.40 Policy 67 states that renewable energy developments should relate well to the source needed for its operation and that THC will consider:

- The contribution of the proposed development towards meeting renewable energy generation targets; and

- Any positive or negative impacts it is likely to have on the local; and national economy.
- 5.41 The policy confirms that proposals will also be assessed against other policies of the Development Plan, the Highland Renewable Energy Strategy and the Onshore Wind Energy Supplementary Guidance and Planning Guidelines and will have regard to other material considerations, including proposals able to demonstrate significant benefits such as by making effective use of existing and proposed infrastructure or facilities. The Highland Council's Supplementary Guidance forms part of the development plan for THC and supplements the key principles of the Development Plan.
- 5.42 THC will support proposals where they are satisfied that they are located, sited, and designed such that they will not be significantly detrimental overall. Either individually or cumulatively with other developments having regard in particular to any of the significant effects on the following:
- Natural, built, and cultural heritage features;
 - Species and habitats;
 - Visual impact and impact on the landscape character of the surrounding area (reflecting the scale and character of the landscape seeking to minimise landscape and visual impact, subject to any other considerations);
 - Amenity at sensitive locations (including residential properties, workplaces, recognised visitor sites);
 - Safety and amenity of (regularly) occupied properties and grounds in relation to noise, ice throw, shadow flicker and shadow throw;
 - Ground and surface water, aquatic ecosystems, and fisheries;
 - Aviation, defence, or emergency service operations, including flight activity, navigation and surveillance systems and associated infrastructure or on aircraft flight paths or MoD low-flying areas;
 - Other communications installations or the quality of radio or TV reception;
 - The amenity of users of any Core Path or other established public access for walking, cycling or horse riding;
 - Tourism and recreation interests; and
 - Land based traffic and transport interests.
- 5.43 Policy 67 includes a requirement that seeks the removal of the development and associated equipment typically restoration of the site.
- 5.44 Proposals for the extension of existing renewable energy facilities will be assessed against the same criteria and material considerations as apply to proposals for new facilities. In all cases, if consent is granted, THC will approve appropriate conditions relating to the removal of the development and associated equipment and to the restoration of the site, whenever the consent expires, other than in circumstances where fresh consent has been secured to extend the life of the project, or the project ceases to operate for a specific period

5.45 The Onshore Wind Energy Supplementary Guidance (THC 2016) replaced parts of the Highland Renewable Energy Strategy (THC 2016). It identifies areas to be afforded protection from wind farms; other areas with constraints; and broad areas of search for wind farms (as per the Scottish Planning Policy (2014) document that guided it). It sets out criteria for the consideration of proposals. It seeks to ensure that developers are aware of the key constraints to such development and encourage them to take those constraints into account at the outset of the preparation of proposals. It seeks to steer proposals, especially those for larger wind farms, away from the most constrained areas and ideally towards the least constrained areas and areas of particular opportunity. It also sets out criteria which will apply to the consideration of proposals irrespective of size and where they are located, enabling proposals to be considered on their merits. It seeks submission as part of the planning application of key information required for the assessment of proposals and provide certainty for all concerned about how applications will be considered by THC.

5.46 Other relevant policies within the HwLDP are detailed below, listed by the general EIA topic applicable.

Landscape and Visual / Design

5.47 **HwLDP Policy 28: Sustainable Design** states that “The Council will support development which promote and enhance the social, economic and environmental wellbeing of the people of Highland”.

5.48 The policy notes that the impact of proposals on individual and community residential amenity will be considered. Reference is also made to sensitive siting considerations as well as the impact on various resources including habitats, Freshwater systems, Species, Landscape, Cultural Heritage, and Scenery.

5.49 **HwLDP Policy 29: Design Quality and Place-making** details that “Applicants should demonstrate sensitivity and respect towards the local distinctiveness of the landscape”.

5.50 **HwLDP Policy 30: Physical Constraints** states that ‘Developers must consider whether their proposals would be located within areas of constraints as set out in Physical Constraints: Supplementary Guidance. The main principles of the guidance are:

- to provide developers with up-to-date information regarding physical constraints to development in Highland; and
- to ensure proposed developments do not adversely affect human health and safety or pose risk to safeguarded sites.

5.51 Where a development is affected by any of the constraints detailed within the guidance, developers must demonstrate compatibility with the constraint or outline appropriate mitigation measures to be provided.’

5.52 **HwLDP Policy 36: Development in the Wider Countryside** for the purpose of this policy is defined as ‘outwith Settlement Development Areas’ and proposals will be assessed for the extent to which they are acceptable in relation to a number of criteria including

siting and design, compatibility with landscape character, capacity, and development which would address drainage constraints.

- 5.53 **HwLDP Policy 61: Landscape** advises that “New developments should be designed to reflect the landscape characteristics and special qualities identified in the Landscape Character Assessment of the area in which they propose”.
- 5.54 This will include consideration of the appropriate scale, form, pattern, and construction materials, as well as the potential cumulative effect of developments where this may be an issue.’

Ecology and Ornithology

- 5.55 **Policy 51: Trees and Woodland** states that trees, woodland, and hedges will be protected and where appropriate a woodland management plan will be required to secure management of an existing resource. Where required, additional tree/hedge planting will be requested to compensate removal, as per the requirements of THC’s Trees, Woodland, and Development Supplementary Guidance.
- 5.56 **Policy 58: Protected Species** details that ‘Where there is good reason to believe that a protected species may be present on site or may be affected by a proposed development, we will require a survey to be carried out to establish any such presence and if necessary, a mitigation plan to avoid or minimise any impacts on the species, before determining the application.
- 5.57 Development that is likely to have an adverse effect, individually and/or cumulatively, on European Protected Species will only be permitted where:
- There is no satisfactory alternative;
 - The development is required for preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment; and
 - The development will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.
 - Development that is likely to have an adverse effect, individually and/or cumulatively, on protected bird species will only be permitted where:
 - There is no other satisfactory solution; and
 - The development is required in the interests of public health or public safety.
- 5.58 This will include but is not limited to avoiding adverse effects, individually and/or cumulatively, on the populations of the following priority protected bird species:
- Species listed in Annex 1 of the EC Birds Directive;
 - Regularly occurring migratory species listed in Annex II of the Birds Directive;
 - Species listed in Schedule 1 of the Wildlife and Countryside Act 1981 as amended; and
 - Birds of conservation concern.

- 5.59 Development that is likely to have an adverse effect, individually and/or cumulatively on other protected animals and plants will only be permitted where the development is required for preserving public health or public safety.'
- 5.60 **Policy 59: Other Important Species** stipulates that "The Council will have regard to the presence of and any adverse effects of development proposals, either individually and/or cumulatively, on the Other Important Species which are included in the lists below, if these are not already protected by other legislation or by nature conservation site designations:
- *Species listed in Annexes II and V of the EC Habitats Directive;*
 - *Priority species listed in the UK and Local Biodiversity Action Plans;*
 - *Species included on the Scottish Biodiversity List.*
- 5.61 THC will use conditions and agreements to ensure detrimental effect on these species is avoided."
- 5.62 **Policy 60: Other Important Habitats** states that 'The Council will seek to safeguard the integrity of features of the landscape which are of major importance because of their linear and continuous structure or combination as habitat "stepping stones" for the movement of wild fauna and flora (Article 10 Features). The Council will also seek to create new habitats which are supportive of this concept.
- 5.63 The Council will have regard to the value of the following Other Important Habitats, where not protected by nature conservation site designations (such as natural water courses), in the assessment of any development proposals which may affect them either individually and/or cumulatively:
- Habitats listed in Annex I of the EC Habitats Directive;
 - Habitats of priority and protected bird species (see Glossary);
 - Priority habitats listed in the UK and Local Biodiversity Action Plans;
 - Habitats included on the Scottish Biodiversity List.
- 5.64 THC will use conditions and agreements to ensure that significant harm to the ecological function and integrity of Article 10 Features and Other Important Habitats is avoided. Where it is judged that the reasons in favour of a development clearly outweigh the desirability of retaining those important habitats, THC will seek to put in place satisfactory mitigation measures, including where appropriate consideration of compensatory habitat creation.'

Geology, Hydrology and Soils

- 5.65 **Policy 55: Peat and Soils** states that development proposals should demonstrate how they have avoided unnecessary disturbance, degradation or erosion of peat and soils.
- 5.66 **Policy 63: Water Environment** states that 'The council will support proposals that do not compromise the objectives of the Water Framework Directive (2000/60/EC), aimed at the protection and improvement of Scotland's water environment'.

- 5.67 **Policy 64: Flood Risk** requires development proposals within or bordering medium to high-risk flood risk areas will need to demonstrate compliance with Scottish Planning Policy through the submission of suitable information which may take the form of a Flood Risk Assessment.
- 5.68 **Policy 66: Surface Water Drainage** requires that 'All proposed development must be drained by Sustainable Drainage Systems (SuDS) designed in accordance with The SuDS Manual (CIRIA C697) and, where appropriate, the Sewers for Scotland Manual 2nd Edition. Planning applications should be submitted with information in accordance with Planning Advice Note 69: Planning and Building Standards Advice on Flooding paragraphs 23 and 24. Each drainage scheme design must be accompanied by particulars of proposals for ensuring long-term maintenance of the scheme.'
- 5.69 **Policy 72: Pollution** states that 'Proposals should demonstrate the level of impact that they may have on the environment with regard to these types of pollution and if the impact is likely to be significant then how it could be mitigated'.

Cultural Heritage

- 5.70 **Policy 57: Natural, Built and Cultural Heritage** sets out a number of considerations which development proposals will have to take into account in order to ensure the protection heritage features. These features fall into three categories:
1. Local/regional importance: development must not have an unacceptable impact on the natural environment, amenity, and heritage resource;
 2. National importance: any significant adverse effects must be clearly outweighed by social or economic benefits of national importance; and
 3. International importance: Where THC are unable to ascertain that a proposal will not adversely affect the integrity of a site, it will only be allowed if there is no alternative solution and that there are 'imperative' reasons of overriding public interest. The policy states 'Where a priority habitat or species (as defined in Annex 1 of the Habitats Directive) would be affected, development in such circumstances will only be allowed if the reasons for overriding public interest relate to human health, public safety, beneficial consequences of primary importance for the environment, or other reasons subject to the opinion of the European Commission (via Scottish Ministers). Where we are unable to ascertain that a proposal will not adversely affect the integrity of a site, the proposal will not be in accordance with the development plan within the meaning of Section 25(1) of the Town and Country Planning (Scotland) Act 1997'.

Other Issues

- 5.71 **Policy 77 Public Access** states that 'Where a proposal affects a route included in a Core Paths Plan or an access point to water, or significantly affects wider access rights, then The Council will require it to either:
- retain the existing path or water access point while maintaining or enhancing its amenity value; or

- ensure alternative access provision that is no less attractive, is safe and convenient for public use, and does not damage or disturb species or habitats.

5.72 For a proposal classified as a Major Development, the Council will require the developer to submit an Access Plan. This should show the existing public, non-motorised public access footpaths, bridleways, and cycleways on the site, together with proposed public access provision, both during construction and after completion of the development (including links to existing path networks and to the surrounding area, and access point to water).'

The Caithness and Sutherland Local Development Plan

5.73 The CaSPlan was adopted by THC in August 2018 and sets out the policies and land allocations to guide development in the area over a 20-year period.

5.74 The CaSPlan sets out a strategic vision for the area and includes a number of development allocations. The CaSPlan does not include any specific designations or planning policies relating to onshore wind energy developments or the Site.

5.75 The CaSPlan is not accompanied by any relevant appropriate supplementary guidance.

Onshore Wind Energy: Supplementary Guidance (2016)

5.76 In addition to the local development plans, The Highland Council have issued the "Onshore Wind Energy: Supplementary Guidance, November 2016" and "Addendum Supplementary Guidance: Part 2b Highland Strategic Capacity December 2017", hereafter referred to as the "Supplementary Guidance", which set out how Highland Council will manage onshore wind energy development proposals in line with Section 22 of the Town and Country Planning (Scotland) Act 1997 as amended by the Planning etc. (Scotland) Act 2006.

Landscape and Visual

5.77 The EIA Report should illustrate the design process undertaken to avoid and mitigate any significant adverse landscape and visual effects. The following key aspects (as listed in paragraph 4.11 of the SG) may be relevant in the assessment of a proposal and should be considered when preparing an application:

- The capacity of the local landscape character (as defined within a Landscape Character Assessment) to accommodate the proposal;
- Special Landscape Areas;
- National Parks or National Scenic Areas and mapped wild land areas;
- Settlement and residential buildings – developments should not be 2 km from either, unless proper consideration for any adverse effects can demonstrated, and those effects minimised or mitigated; and
- Impact to important public views – e.g. popular viewpoints, road network, tourist routes, public footpaths, core paths and other recognised visitor locations.

5.78 As stated in Paragraph 4.14 of the SG, “where effects are unavoidable, appropriate mitigation will be required to overcome or otherwise minimise impacts. For example, this may include:

- Careful siting of turbines to seek to reduce overall impact of the scheme;
- Amending turbine configurations, including hub height, rotor diameter, and blade rotation speed;
- Adjusting the number of turbines;
- Considering turbine colour, including any variation from the typical off-white/ pale grey colours;
- Design and arrangement of any lighting required to minimise its impact;
- Undergrounding of any power lines connecting individual turbines to any on-site sub-station;
- Undergrounding or sensitive treatment of those power lines connecting any wind farm sub- station to the electricity distribution system;
- Arrangements for any transformers for individual turbines (the Council expects these to be accommodated and enclosed within the turbine mast in order to reduce the landscape and visual impact of the development);
- Length, route, visibility, methods, and materials used in the construction of access tracks.”

5.79 The Supplementary Guidance also states that the following criteria detailed in Table 5.1 “do not set absolute requirements, but rather seek to ensure developers are aware of key potential constraints to development.”

Table 5.1: Landscape & Visual Criteria in Section 4 of the Supplementary Guidance.

Criteria	Measure	Development Threshold
Criterion 1: Relationship between Settlements/Key locations and wider landscape respected.	The extent to which the proposal contributes to perception of settlements or key locations being encircled by wind energy development	Turbines are not visually prominent in the majority of views within or from settlements/Key Locations or from the majority of its access routes.
Criterion 2: Key Gateway locations and routes are respected.	The extent to which the proposal reduces or detracts from the transitional experience of key Gateway Locations and routes.	Wind Turbines or other infrastructure do not overwhelm or otherwise detract from landscape characteristics which contribute the distinctive transitional experience found at key gateway locations and routes
Criterion 3: Valued natural and cultural landmarks are respected	The extent to which the proposal affects the fabric and setting of valued natural and cultural landmarks	The development does not by its presence, diminish the prominence of the landmark or diminish its relationship to its setting.
Criterion 4: The amenity of key recreational routes and	The extent to which the proposal affects the amenity of	Wind Turbines or other infrastructure do not

Criteria	Measure	Development Threshold
ways is respected.	key recreational routes and ways (e.g. Core Paths, Munros and Corbetts, Long Distance Routes etc.)	overwhelm or otherwise significantly detract from the visual appeal of key routes and ways
Criterion 5: The amenity of transport routes is respected	The extent to which the proposal affects the amenity of transport routes (tourist routes as well as rail, ferry routes and local road access)	Wind Turbines or other infrastructure do not overwhelm or otherwise significantly detract from the visual appeal of transport routes
Criterion 6: The existing pattern of Wind Energy Development is respected	The degree to which the proposal fits with the existing pattern of nearby wind energy development, considerations include: ▪ Turbine height and proportions, ▪ density and spacing of turbines within developments, ▪ density and spacing of developments, ▪ typical relationship of development to the landscape. ▪ previously instituted mitigation measures ▪ Planning Authority stated aims for development of area	The proposal contributes positively to existing pattern or objectives for development in the area.
Criterion 7: The need for separation between developments and/or clusters is respected	The extent to which the proposal maintains or affects the spaces between existing developments and/or clusters	The proposal maintains appropriate and effective separation between developments and/or clusters
Criterion 8: The perception of landscape scale and distance is respected	The extent to which the proposal maintains or affects receptors' existing perception of landscape scale and distance.	The proposal maintains the apparent landscape scale and/or distance in the receptors' perception.
Criterion 9: Landscape setting of nearby wind energy developments is respected	The extent to which the landscape setting of nearby wind energy developments is affected by the proposal.	Proposal relates well to the existing landscape setting and does not increase the perceived visual prominence of surrounding wind turbines.
Criterion 10: Distinctiveness of Landscape character is respected	The extent to which a proposal affects the distinction between neighbouring landscape character types, in areas where the variety of character is important to the appreciation of the landscape.	Integrity and variety of Landscape Character Areas are maintained.

Public Access

- 5.80 The Supplementary Guidance (THC, 2016) states that all proposals should seek to avoid significant adverse impacts on the quality and quantity of public access including any impact on a route included in a Core Paths Plan, an access point to water, wider access rights or Rights of Way as provided by the Scottish Rights of Way Society (refer to Chapter 13 of this EIAR, Socio Economic & Tourism Assessment).
- 5.81 THC encourage the improvement of path networks and creation of new access opportunities. THC also encourage the erection of information boards at entrances to sites to make members of the public aware of relevant information and any potential risks.
- 5.82 Should any negative impacts upon public access be identified through the EIA process then appropriate mitigation should be undertaken, including the following:
- “Retention of any existing path or water access point while maintaining or enhancing its amenity value; or
 - Alternative access provision maintaining the same level of amenity, safety, and convenience for public use.”
- 5.83 An Access Plan illustrating the existing public, non-motorised public access footpaths, bridleways and cycleways on the site, together with proposed public access provision, both during construction and after completion of the development (including links to existing path networks and to the surrounding area, and access points to water) should be provided for any Major Development.
- 5.84 The right of responsible access must be maintained during construction. Reference should be made to the SNH’s Guidance for the Preparation of an Outdoor Access Plan (SNH, 2010) and The Land Reform (Scotland) Act 2003.

Noise Assessment

- 5.85 Noise assessments submitted in support of applications for large wind turbines (rotor diameter >16m) should be undertaken in accordance with ETSU-R-97 and the Institute of Acoustics “Good Practice Guide”. The Noise Assessment for the proposed development can be found in Chapter 11.
- 5.86 Assessment of proposals by THC will focus on the following key principles:
- a) “Highland Council's expectation is that all proposals will seek to achieve noise limits at sensitive locations that are at the lower end of the range indicated in national guidance, and we may seek limits lower than that in certain circumstances. This is because, in effect, national guidance addresses an average and therefore does not account for Highland's generally lower level of background noise. For example, Highland has a generally low density of development and less noise-generating industry and transport infrastructure, with certain features like motorways not present. The specific limit will depend on area specific factors and applicants are strongly encouraged to engage with the Council at the earliest opportunity to discuss noise limits of their proposal.

- b) Further to the above, the selection of proxy background monitoring locations should also reflect this approach. Monitoring locations should be chosen which have very similar characteristics to the properties they will represent. Where such locations do not exist or cannot be used, the expectation is that monitoring locations with the lowest background levels will be chosen to represent other properties. Applicants are advised to liaise with the Council to discuss monitoring locations prior to installation of equipment.
- c) Where noise from more than one wind turbine development may have a cumulative impact at any noise sensitive location, applicants must ensure this is adequately assessed in accordance with best practice, which includes consideration of both predicted and consented levels.
- d) Research into amplitude modulation is ongoing and currently there is no accepted best practice for measuring, monitoring, or setting limits. Should any such guidance become available, Highland Council will expect developers to follow its recommendations."

Natural and Historic Environment

5.87 To comply with the supplementary guidance, developments should:

- Provide sufficient information to enable the Council to carry out an appropriate assessment to determine whether significant effects are likely;
- Consider Special Landscape Areas within the Highlands where relevant;
- Demonstrate there will be no impact to the natural environment resources of Highland;
- Avoid significant adverse effects on the siting, context or setting of historic environment assets;
- Seek to avoid any adverse impacts on species protected within the HwLDP. This includes those in Schedule 2 and 4 of the Conservation (Natural Habitats. &c.) Regulations 1994 as amended (European Protect Species); and
- Consider impacts to the wider natural heritage beyond designated areas, including.

Operational Efficiency of Other Communications

5.88 The siting of wind turbines must have regard to radio, TV, telecoms, and other communication systems.

5.89 Developments shall be assessed by consultation with relevant operators.

5.90 Planning conditions or legal agreements may require developers to correct any electromagnetic interference at their own expense. The Joint Radio Company should be contacted for joint screening for telemetry or microwave links in use by either electricity or gas utilities.

Operational Efficiency of Wind Energy Developments

5.91 Existing and consented wind farms' operational efficiency should not be compromised by adjacent development proposals. For example:

- where a new adjacent wind farm proposal could reduce the wind resource of the existing or consented scheme;
- where a new adjacent proposal for another type of use, for example a large industrial building, could reduce the wind resource of the existing or consented scheme; or
- where there is an allocated development site for another type of use (e.g. an allocated housing site in an adopted Local Development Plan) that may have the potential to limit the efficiency of the proposal (e.g. by requiring mitigation).

5.92 Mitigation measures should be proposed only as a last resort as this has potential to adversely impact on the efficiency of the scheme.

5.93 To find out more about the location of windfarm developments and proposals, applicants should refer to the Highland Windmap and the Council's ePlanning webpages.

Water Environment

5.94 The Proposed Development should consider the requirements of the Water Framework Directive and show how no significant adverse effects will occur individually or cumulatively on the water environment.

5.95 There should remain a minimum buffer of 50m between any works and the water environment.

5.96 Where impacts on the water environment cannot be avoided, developers will be expected to demonstrate how these impacts will be mitigated. The water environment includes ground water, surface water (including water supplies), and groundwater dependent terrestrial ecosystems. The measures proposed to protect the environment during construction should be included in a Construction Environmental Management Plan and a detailed Schedule of Mitigation (SoM). SEPA's Planning Guidance on Windfarm Developments (39) provides detailed advice.

5.97 SEPA, Scottish Water and other relevant should be consulted prior to submission of the planning application to discuss their proposals and to ensure they meet necessary requirements. This opportunity may be available through the 'Pre-application Advice' service The Highland Council provides.

Peat

5.98 Geotechnical and hydrological information regarding peat should be provided. Including the risk of landscape and identify the presence of peat on site.

5.99 The following key factors will be taken into account by THC where a proposed development has potential to affect peat and should be included within the Peat Management Plan (PMP) and CEMP Plans:

- Site investigation should begin early in the EIA design process. Where peat is found to be present on site, geotechnical and hydrological information, including information

on the risk of landslide and peat slide related to the development should be provided.

- Peat survey and site assessment should inform the siting and design of wind turbines and all associated infrastructure. Through this assessment, impacts on peat should be avoided, for example, by careful siting of the windfarm components to avoid deep peat, and avoid altering hydrological regimes. The information gathered for such site options should be clear, concise and shows detailed mapping of peat depth and all proposed development activities together (e.g. Turbines, access tracks and proposed borrow pits), as well as details of the basic peatland characteristics.
- The 'carbon rich soils, deep peat and priority peatland habitat (CPP)' map produced by SNH should be taken into consideration. Classes 1 & 2 on that map are a Group 2 constraint in the Spatial Framework, a nationally important mapped environmental asset. The map indicates where the resource is likely to be found and should be used to guide development away from the most sensitive resources. Therefore, if a proposal is brought forward in an area identified as CPP, and it is found that the development will be located on carbon rich soils, deep peat or priority peatland habitat, it is unlikely to be supported unless it can be demonstrated through the Environmental Impact Assessment process that any significant effects on the qualities of the area(s) can be substantially overcome through siting and design or by suitable mitigation. Impacts must consider all stages from project inception to wind farm operation and decommissioning.
- Mitigation of effects on peat and mapped CPP may include construction methods such as the use of floating tracks or piling for turbine foundations. It may also take the form of habitat restoration or habitat improvements, which may be achieved in areas of the site not being developed, and possibly on other peatland sites. Proposed restoration and improvements should be presented in a draft Habitat Management Plan that provides sufficient information to demonstrate how proposals will be implemented and managed.
- When considering applications, The Highland Council will expect to receive clear information about the whole life carbon balance of the proposal. This can be undertaken, for example, by using a 'Carbon Calculator.' Schemes applying under Section 36 of the Electricity Act (1989) are required to use the carbon calculator."

Safety and Amenity at Sensitive Locations

5.100 Highland Council 'consider all residential buildings to be particularly sensitive to wind energy development' and so developers are expected to 'clearly demonstrate how potential impacts on amenity have been avoided or mitigated against' if the development is within 2km of residential buildings and settlements. Developments should also consider:

- Landscape and Visual Impacts-All proposals should seek to avoid or mitigate impacts on landscape and visual amenity. The principles guide assessment of these issues is set out in the 'Landscape and Visual Effects' section of the Supplementary Guidance;
- Noise – a full assessment should be completed using the recommended methodology;

- Shadow Flicker – THC recommend that developments are located at least 11 rotor diameters from nearby residential properties;
- Safety – Turbines should be located at least a distance equal to twice the height of the turbine to blade tip from public roads and railways; and
- Mitigation by conditions- THC may impose planning conditions to ensure adequate mitigation of impacts on amenity at sensitive locations. Scottish Government's planning advice discusses these matters further and provides further guidance and assessment methods.

Tourism and Recreation

5.101 Consideration must be given to how a development will influence tourism and recreation within the local area (and this is covered in Chapter 13 of this EIAR). As a result, the following factors will be taken into consideration by THC when assessing the proposed development:

- a) Relevant research into the potential effects of wind farms on tourism and recreation (for example, Scottish Government's commissioned report into the economic impacts of wind farms on Scottish tourism and Visit Scotland's Wind Farm Consumer Research (2011));
- b) The potential for socio-economic benefits to be derived from development proposals, for example, evidence of community benefit discussions. Further information can be found in the section on 'Socio-economic benefits of onshore wind development';
- c) The potential for effects on industries for which Highland's landscape is important - for example tourism and recreation; and
- d) The potential for secondary effects for tourism and recreation, such as a change in land use that causes adverse effects, for example, a change from forestry to a wind farm, or where there are potential benefits like improved public access in the area.

Airport, Defence and Emergency Service Operations

5.102 All proposals should seek to avoid significant adverse effects, individually and cumulatively, on airport, defence, or emergency service operations. This includes flight activity; navigation and surveillance systems; and associated infrastructure. This is covered in Chapter 13 of this EIAR.

5.103 The following factors should be taken into consideration by developers when designing and siting the proposed development:

- MOD Safeguarding Extents;
- Health and Safety Executive Safeguarding Zones;
- NATS En Route Plc Safeguarding Maps;
- Department of Trade and Industry 'Wind Energy and Aviation Interest – Interim Guidance';
- Airport Safeguarding Surfaces; and

- Private Airfields.

Traffic and Transport

- 5.104 The Supplementary Guidance suggests that development sites should be ideally 'chosen where the road network has suitable alignment, width and strength to carry abnormal loads and the construction traffic associated with the scale of the development proposed.'
- 5.105 Proposals for the use of the public roads and mitigation works will require the approval of the Roads Authority. Developers will be required to enter into a Section 96 (Roads Scotland Act) agreement with the Council to cover damage to the public roads by construction traffic and may be required to provide a bond as surety. Developers should consider measures to reduce the impact of construction traffic on the road network.
- 5.106 The passage of abnormal loads required for the transport of turbine components can be problematic and should be given very early consideration in the planning of projects.
- 5.107 A Transport Assessment was carried out to establish the transport impacts of the construction traffic associated with the development, the suitability of the existing road network, the impact on existing road users and adjacent communities, and the requirement for any mitigation works. Where trunk roads are to be used for transporting abnormal loads, a trunk roads assessment should be undertaken in consultation with Transport Scotland, further guidance is available from the Transport Scotland website. Equally, where temporary or permanent mitigation is proposed to the trunk road network will require to be discussed and agreed with Transport Scotland.

Electricity and Gas Infrastructure

- 5.108 An appropriate separation distance should be maintained between the proposed development and electricity transmission underground cables, overhead lines, and underground gas transmission pipelines. Developers are advised to consult the relevant grid company for further advice on whether the work they are intending to undertake has the potential to affect their infrastructure. Developers are also strongly advised that they should obtain their written consent prior to submission of the planning application, this will help to provide a fuller understanding of the constraints present and how the development will overcome them.

Borrow Pits

- 5.109 Aggregate and other mineral resources required for a proposal should be sourced from local quarries, rather than creating borrow pits on-site.
- 5.110 On-site borrow pits may be used where it can be clearly demonstrated that there are significant environmental or economic benefits compared to obtaining material from local quarries. Where on-site borrow pits are proposed, information should be provided about what potential environmental impacts may arise if material sourced from borrow pits is found not to be suitable for all required construction activities.

Construction Environmental Management Plans

- 5.111 Major developments and developments subject to Environmental Impact Assessment should follow a robust project environmental management process, following the approach set out in the Council's Guidance Note for construction environmental management plans.
- 5.112 The Highland Council encourage early consultation regarding construction plans.

Restoration Bonds

- 5.113 Robust financial guarantees secured either by bond of caution (Bond) or by irrevocable letter of credit (LoC) from an appropriate bank should in place over the lifespan of the proposed project. Parent Company Guarantees will not be accepted. These will be reviewed by THC to ensure that the value of bond is sufficient to restore the site at the end of the permission.
- 5.114 Applicants should be clear from the outset about any elements of their proposed scheme that they intend to retain once the site is restored so that these can be factored into any assessments.
- 5.115 Further information about restoration and decommissioning are included in the following guidance:
- Heads of Planning Scotland Position Statement on the Operation of Financial Mechanisms to Secure;
 - Decommissioning, Restoration and Aftercare of Development Sites;
 - Siting and Designing Wind Farms in the Landscape (66) Decommissioning and Restoration Plans for onshore wind farms; and
- 5.116 Planning for development: What to consider and include in Habitat Management Plans (68) SNH Commissioned Report 591: Research and guidance on restoration and decommissioning of onshore wind farms.

Other Material Considerations

- 5.117 This section sets out the most relevant material policy considerations at the time of writing and includes national planning policy in Scotland, the latest developments in Scottish and UK Government policy.

UK Renewable Energy Policy and Legislation

- 5.118 The UK Government is legally committed to the delivery of a reduction in emissions to 'net zero' by 2050 (with the Scottish Government committing to 2045).
- 5.119 This section identifies recent shifts in UK-wide Renewable Energy Policy to accommodate this and summarises some key documents including:
- The CCC Annual Report to UK Parliament (June 2020);

- National Audit Office report 'Achieving Net Zero' (December 2020);
- The UK's Sixth Carbon Budget (December 2020);
- The UK Energy White Paper (December 2020); and
- The UK Net Zero Strategy (October 2021).

- 5.120 The CCC published a landmark report entitled 'Net Zero – UK's Contribution to Stopping Global Warming' in May 2019. The foreword sets out that "the CCC has reviewed the latest scientific evidence on climate change, including last year's IPCC special report on global warming of 1.50C and considered the appropriate role of the UK in the global challenge to limit future temperature increases." It adds, "Net Zero is a more fundamental aim than previous targets. By reducing emissions produced in the UK to zero, we also end our contribution to rising global temperatures."
- 5.121 The report makes recommendations for the UK economy including a new tougher emissions target of net zero green gases by 2050, therefore ending the UK's contribution to global warming within 30 years. This replaces the previous target of an 80% reduction by 2050 from a 1990 baseline and accords with the obligations under the Paris Agreement.
- 5.122 The report makes clear that at a UK level "current policy is insufficient for even the existing targets."
- 5.123 In June 2019, the Prime Minister Theresa May brought forward legislation to turn Net Zero into law, and the UK became the first major economy in the world to pass legislation to end its global warming contribution by 2050. The target is now legally binding via the provisions of the Climate Change Act 2008 (2050 Target Amendment) Order 2019.
- 5.124 The CCC Annual Report to Parliament (2020) offered an update on the progress towards Net Zero following adoption of the Net Zero Target.
- 5.125 The report states that in terms of building a resilient post-Covid economy, "success requires that net zero emissions and improved climate resilience are integral," whilst investments towards achieving net zero will "help create jobs and stimulate economic recovery, whilst changing the course of UK emissions and improving our resilience to climate change."
- 5.126 The National Audit Office offered an update report 'Achieving Net Zero' in December 2020 regarding progress on achieving Net Zero following the change to legislation in June 2019.
- 5.127 Key points from the report include that reducing emissions to achieve net zero will require wide ranging changes to the UK economy including further investment in renewable energy, changes "unprecedented in their overall scale."
- 5.128 Page 22 of the report sets out that a national fourfold increase in renewable energy capacity is needed.

- 5.129 The CCC set out the Sixth UK-wide carbon budget in December 2020 with recommendations from 2033 to 2037. This sets out the path the UK must follow to achieve Net Zero by 2050.
- 5.130 A key point includes the CCC's clear statement that new demand for electricity will mean that demand will rise 50% by 2035 and perhaps doubling or trebling by 2050.
- 5.131 The UK Energy White Paper in December 2020 set out a major shift in UK policy and highlights the importance of renewable forms of electricity. Page 38 states that a key objective is to “*accelerate the deployment of clean electricity generation through the 2020s*”.
- 5.132 The UK Government then published the UK Net Zero Strategy in October 2021 which sets out the long-term pathway to net zero by 2050, setting out the UK Government's plans to reduce emissions from each sector of the economy. It sets out within page 103 that the Government will support sustained deployment of low carbon generation and that there is a need to continue to drive rapid deployment of renewables.

Scottish Renewable Energy Policy

- 5.133 A climate emergency was declared in Scotland in 2019 by both the Scottish Government and the Highland Council.
- 5.134 When it was enacted, the Climate Change (Scotland) Act 2009 set world leading greenhouse gas emissions reduction targets, including a target to reduce emissions by 80% by 2050. However, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amends the 2009 Act and sets even more ambitious targets – which reflect the recommendations of the Committee on Climate Change (CCC) for a net zero greenhouse gas (GHG) emissions target by 2045 at the latest, with challenging interim stages – a 75% reduction target by 2030 and 90% by 2040.
- 5.135 This section identifies recent shifts in Scottish Renewable Energy Policy and summarises some key documents including:
- The Scottish Energy Strategy (2017)
 - Draft Energy Strategy and Just Transition Plan (2023)
 - The Committee on Climate Change (CCC) advice to the Scottish Government on recovery from the Covid-19 crisis (May 2020);
 - The recommendations from the Scottish Government's Advisory Group on Economic Recovery (June 2020);
 - The Report from the Climate Emergency Response Group (CERG) 'Eight Policy Packages for Scotland's Green Recovery' (July 2020);
 - The Update to the Climate Change Plan (December 2020);
 - The Scottish Energy Strategy Position Statement (March 2021);
 - Scottish Government's 'Bute House Agreement' (August 2021);
 - Scottish Government Programme for Government 2021 – 2022;
 - The Onshore Wind Policy Statement (2022); and

- Onshore Wind Sector Deal (2023).

- 5.136 The Scottish Energy Strategy 2017 sets out the Scottish Government's overarching position on many forms of energy, including onshore wind. Specifically, it states that *"onshore wind must continue to play a vital role in Scotland's future" ... "which can be done in a way which is compatible with Scotland's magnificent landscapes."* The Energy Strategy is currently being updated, with a draft Energy Strategy accompanying the Just Transition Plan in early 2023. These reiterate the findings of the Onshore Wind Policy Statement and aim to drive Scotland towards Net Zero by 20245, with a clear focus on the delivery of 12GW of new installed capacity by 2030.
- 5.137 The Draft Energy Strategy and Just Transition Plan (2023) states that we need to transform the way Scotland generates, transports, and uses energy, in order to realise climate change ambitions. The requirement for an additional 12GW of onshore wind is a key policy facet of this document.
- 5.138 The CCC advice to the Scottish Government in May 2020 came after the Scottish Government approached the CCC requesting advice on a green recovery for Scotland in light of the Covid 19 pandemic. Within its response, the CCC sets out that *"reducing greenhouse gas emissions and adapting to climate change should be integral to any recovery package."* The CCC also note that many of the large infrastructure programmes are *"critical to preparing for climate change and achieving net zero emissions."* Reference is specifically made to onshore wind as part of the large infrastructure required, and the CCC add that *"acceleration of these projects should take priority."*
- 5.139 The Scottish Government's Advisory Group on Economic Recovery was formed to provide input to Government on Scotland's economic recovery post-Covid 19. The report provided to the Government in June 2020 recognises that there is a need to *"grasp the tremendous opportunities for a green recovery which such a transition offers", and that the net zero imperative presents "an increased and urgent challenge for existing policy, planning and licencing frameworks to identify and consent suitable projects with a sufficient level of impact in the light of the climate emergency"*.
- 5.140 Shortly following the Economic Advisory Group's Report, the Report of the Climate Emergency Response Group (CERG) to the Scottish Government was published in July 2020, titled 'Eight Packages for Scotland's Green Recovery'. The CERG Report states that it *"encourages the Scottish Government to embrace these policy packages as key components of its economic recovery plan for a fairer and greener Scotland," and that these should be reflected in key policy milestones. It states that green recovery must be investment led, and the Scottish Government must create "an attractive policy environment for investors, resulting in a stronger business case for a climate neutral economy."* The Report concludes with the view that *"Scotland's response to Covid-19 is a massive opportunity to catapult and prioritise a just transition to a net carbon economy"*.
- 5.141 In December 2020, the Scottish Government published an update to the Climate Change Plan, covering the period 2018 to 2032, and responding to the new requirement in Scotland to meet net zero by 2045. Page 9 in particular sets out the strategic goal of

achieving “decarbonisation across the whole energy system, including electricity, transport, industry and buildings” and “integrating climate change action into all of the decisions we make across Government”.

- 5.142 The Update sets out the intention to prepare an Energy Strategy in 2021 and an updated Electricity Generation Policy Statement by 2022. Page 19 refers to a 2032 ‘pathway’ whereby decisions take account of benefits across all energy sectors as well as economic and social benefits they create across Scotland. By 2032 it is intended that we will generate at least the equivalent of 50% of our energy from renewable sources. It is stated on page 18, importantly, that *“there will be a substantial increase in renewable generation, particularly through new offshore and onshore wind capacity”*.
- 5.143 The planning and consenting systems are recognised (p78) as remaining a *“critical enabler of rapid renewables deployment in Scotland”*. The Climate Change Plan Update expects that renewable energy generation is expected to increase substantially between now and 2032 with an expectation of the development of between 11 and 16GW of new capacity to meet a rapidly increasing electricity demand.
- 5.144 The Scottish Energy Strategy Position Statement (March 2021) reinforces the consistent theme of the Scottish Government's support for a green, fair, and resilient economy. Onshore renewables are addressed within section 8 of the Statement where it is reported that *“the continued growth of Scotland’s renewable energy industry is fundamental to enable us to achieve our ambition of creating sustainable jobs as we transition to net zero”*. It adds that the Scottish Government *“is committed to supporting the increase of onshore wind in the right places to help meet the target of net zero.”*
- 5.145 On 20th August 2021, the SNP-led Scottish Government and the Scottish Green Party signed the Bute House Agreement which represents a formal co-operation agreement for the next five years of Government. Page 12 of this agreement the Government set out that *“the climate emergency means we need to use the limited powers we have to accelerate the decarbonisation of our energy system...our plans will see a significant increase in electricity demand for heating and transport. To accommodate this, we will support the continued and accelerated deployment of renewable energy.”*
- 5.146 In order to achieve this, subject to consultation the Government and Green Party state they aim to deliver *“an additional 8 to 12 GW of installed onshore wind by 2030, supported by changes to the planning system needed to permit the growth of this essential zero carbon sector”*.
- 5.147 The Scottish Government's Programme for Government 2021-2022 followed the Bute House Agreement and is titled *“A Fairer, Greener Scotland”*. It is the intention of the Government that all applications over 50MW have ‘National Development’ status which if adopted would give further importance and status to Section 36 applications. The Programme again re-iterates the importance of securing a further 8 to 12 GW of onshore wind capacity by 2030.
- 5.148 The Onshore Wind Policy Statement (OWPS, 2022) replaces the previous version published in 2017 and makes it explicitly clear that seeking greater security of supply and lower cost electricity are now key drivers alongside the need to deal with the climate

emergency. It requires a minimum installed capacity of 20GW of onshore wind by 2030, with an additional 12GW installed between 2023 and 2030.

- 5.149 The OWPS states that deployment of onshore wind is “mission critical for meeting our climate targets” as an “affordable and reliable source of electricity generation.”
- 5.150 The Onshore Wind Sector Deal, published in September 2023, provides a framework of commitments between Scottish Government and the onshore wind sector in order to support the rapid development and deployment of onshore wind, including the identification of barriers and potential solutions and actions to, for example, decrease consenting times. It is very clear that the Scottish Government wishes to see quicker deployment of onshore wind and is actively supporting the sector to do so.

Summary

- 5.151 This chapter outlines the key national and local planning policies, guidance and other material considerations that are relevant to the proposed development, and which inform the EIA Report and design.
- 5.152 To maintain the impartiality of the EIA Report, the chapter does not assess whether the proposed development would comply with the identified policies. A separate Planning Statement which assesses the compliance of the proposed development with the Development Plan and other material considerations is also submitted as part of the application. The Planning Statement is separate from the EIA Report.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 6: Landscape and Visual

April 2024

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6 LANDSCAPE AND VISUAL

Introduction

- 6.1 This Chapter assesses the landscape and visual effects of the proposed development. It should be read with reference to the Project Description in EIA Volume 1, Chapter 3. All additional material relating to this chapter can be found in Volumes 2, 3, 4 and 5 which includes the figures, visualisations, and appendices respectively.
- 6.2 Landscape and Visual Impact Assessment (LVIA) is one of the key components of the EIA for wind farms due to the introduction of tall elements into the landscape. The proposed development has been considered against the requirements of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. In addition, reliance has been placed on relevant planning policy as discussed in Chapter 5, noting the adoption of the Scottish Government's National Planning Framework 4 (NPF4) in February 2023.
- 6.3 The LVIA and cumulative assessment (CLVIA) reported in this chapter has been produced by chartered landscape architects at WSP who have worked on a number of wind farm LVIA's within this area and have over 50 years' experience of undertaking LVIA's between them. The objective of this assessment has been to determine the landscape and visual effects of the proposed development on the existing landscape resource and visual amenity. The following landscape and visual receptors have been assessed:
- Landscape character, key characteristics, and elements;
 - Designated landscapes and Wild Land Areas; and
 - Views and visual amenity experienced by residents, tourists, visitors, recreational and transport users.
- 6.4 The Site is located approximately 7.6km southeast of Lairg and 8km west of Pittentrail within an undesignated area of *Rounded Hills - Caithness and Sutherland* landscape character.
- 6.5 In summary, the proposed development (Figure 3.1) comprises up to 12 wind turbines, with six turbines (T1, T2, T4, T8, T9 and T12) up to a maximum blade tip height of 200m and the remaining six turbines (T3, T5, T6, T7, T10 and T11) up to a maximum blade tip height of 230m, and associated infrastructure including visible aviation warning lighting on T1, T2, T4, T8, T9 and T11. Infrastructure associated with the proposed development includes one site entrance (via the consented Lairg II Wind Farm), internal access tracks and hardstanding areas, crane pads, up to three borrow pits, and one group of compounds comprising: the on-site substation (with underground cables linking the turbines to the substation); an energy storage compound; and an adjacent temporary construction compound.
- 6.6 The assessment process has encompassed time-limited periods for the construction, operation, and decommissioning of the proposed development, the latter of which entails a reversal of many of the landscape and visual effects. Although the operation period for the proposed development is for the duration of 35 years (described in the assessment as

'long-term' and reversible), it has been assessed in the same manner as permanent development.

Chapter Structure

- 6.7 The chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 6.1: Methodology and Glossary;
 - Technical Appendix 6.2: Viewpoint Analysis; and
 - Technical Appendix 6.3: Night-time Assessment.
- 6.8 Figures illustrating this chapter are contained within Volume 2 and 3 and include plans and visualisations of the proposed development, the latter of which are presented to accord with the NatureScot (NS) guidance¹. Further figures illustrating plans and visualisations in support of the Night-time Assessment are contained in Volume 4 whilst visualisations presented to accord with the Highland Council (THC) guidance² are contained within Volume 5.
- 6.9 Other key relevant chapters include Chapter 3: Project Description, Chapter 4: Design Evolution, Chapter 5: Renewable Energy and Planning Policy, Chapter 7: Cultural Heritage and Chapter 13: Socio-Economics and Tourism.

Variations and Micro-siting

- 6.10 Post consent, the location of the proposed 12 turbines would be subject to micro-siting of up to 100m. Viewpoint analysis confirms that a horizontal micro-siting allowance of up to 100m is unlikely to significantly alter the ZTV pattern or change the overall results of the LVIA with the exception of the outer turbines. Any horizontal micro-siting allowance of up to 100m remains subject to the existing site constraints which, in practice, would notably limit this movement within the site area.
- 6.11 Variations to the turbine dimensions, within the overall maximum blade tip heights, could affect the overall appearance and proportion of the turbines and each option would need to be considered on a case-by-case basis. Although unlikely, increases to the turbine hub height (smaller rotor diameter) within the overall blade tip height and micro-siting may alter the number of aviation warning lights that are visible from some locations and consequently alter the night-time assessment.

Landscape Planning Policy and Guidance

- 6.12 The LVIA process has taken account of relevant legislation, national and local planning requirements in relation to wind farm development, as described in Chapter 5: Renewable Energy and Planning Policy, and the Planning Statement which accompanies this Section 36 Application. This includes NPF4 (Scottish Government, 2023), the Highland-wide Local Development Plan (LDP) (2012) and Caithness and Sutherland LDP (CaSPlan) (2018).

¹ Scottish Natural Heritage (2017). Visual Representation of Wind Farms: Good Practice Guidance, Version 2.2

² Highland Council (2016). Visualisation Standards for Wind Energy Developments.

Further information on strategic landscape planning guidance from Scottish Natural Heritage (SNH) / NS³ and The Highland Council (THC) is provided here.

Legislation and National Planning Policy

6.13 The proposed development being greater than 50MW, falls within Section 36 of the Electricity Act 1989 and the Schedule 9 requirement to have “regard to the desirability of preserving natural beauty” and to provide reasonable mitigation as follows:

- “(a) shall have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and
- (b) shall do what they reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.”

National Planning Framework 4

6.14 NPF4 was adopted by the Scottish Ministers on 13th February 2023, following approval by the Scottish Parliament in January 2023. This replaces NPF3 and Scottish Planning Policy (SPP). NPF4 now forms part of the statutory development plan for any area in Scotland.

6.15 NPF4 Annex B sets out statements of need for national development and provides that onshore electricity generation from renewables exceeding 50 megawatts (MW) capacity is strategically important, accordingly classifying it as a national development (category 3: Strategic Renewable Electricity Generation and Transmission Infrastructure). Inclusion as a national development establishes the general need for renewable projects of strategic scale across Scotland.

6.16 NPF4 supports development which helps to meet Scotland's greenhouse gas emissions targets and states “The global climate emergency and the nature crisis have formed the foundations for the spatial strategy as a whole. The regional priorities share opportunities and challenges for reducing emissions and adapting to the long-term impacts of climate change, in a way which protects and enhances our natural environment (page 8).”

6.17 Relevant landscape policies in NPF4 include:

- Policy 1 Tackling the Climate and Nature crisis;
- Policy 3 Biodiversity;
- Policy 4 Natural places;
- Policy 6 Forestry, woodland and trees; and
- Policy 11 Energy.

6.18 Policy 4 advises that where development proposals affect National Scenic Areas (NSA) they will only be supported where:

³ Previously Scottish Natural Heritage (SNH).

- *"i. The objectives of designation and the overall integrity of the areas will not be compromised; or*
- *ii. Any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance.*

6.19 In the case of locally designated landscape areas in the LDP, development will only be supported where:

- *i. Development will not have significant adverse effects on the integrity of the area or the qualities for which it has been identified; or*
- *ii. Any significant adverse effects on the integrity of the area are clearly outweighed by social, environmental or economic benefits of at least local importance.*

6.20 In relation to the project design and LVIA, Policy 11, 'e' advises that *"In addition, project design and mitigation will demonstrate how the following impacts are addressed:*

- *...ii. significant landscape and visual impacts, recognising that such impacts are to be expected for some forms of renewable energy. Where impacts are localised and/or appropriate design mitigation has been applied, they will generally be considered to be acceptable;*
- *iii. public access, including impact on long distance walking and cycling routes and scenic routes; ...*
- *x. impacts on trees, woods and forests;*
- *xi. proposals for the decommissioning of developments, including ancillary infrastructure, and site restoration; ... and*
- *xiii. cumulative impacts."*

Highland Council Planning Policy

6.21 At a local planning policy level, the Highland-wide Local Development Plan (HwLDP) (2012) and in particular Policy 67: Renewable Energy Development and THC's Onshore Wind Energy Supplementary Guidance (2016)⁴ (OWESG) are relevant. Policy 67 provides support for proposals which are *"located, sited and designed such that they will not be significantly detrimental overall"*. The policy details the following landscape related criteria against which wind energy developments will be assessed:

- *"... natural, built and cultural heritage features;*
- *visual impact and impact on the landscape character of the surrounding area (the design and location of the proposal should reflect the scale and character of the landscape and seek to minimise landscape and visual impact, subject to any other considerations);*
- *amenity at sensitive locations, including residential properties, workplaces and recognised visitor sites (in or outwith a settlement boundary);*

⁴ Accessed online at <https://www.highland.gov.uk/onshorewind>

- the amenity of users of any Core Path or other established public access for walking, cycling or horse riding; and
- tourism and recreation interests."

6.22 Other policies noted include Policy 36: Development in the wider countryside; Policy 57: Natural Built and Cultural Heritage; Policy 61: Landscape; Policy 77: Public Access; and Policy 78: Long Distance Routes.

Supplementary Guidance: Onshore Wind Energy

6.23 THC's 'Onshore Wind Energy Supplementary Guidance' (OWESG) was adopted by the Council in November 2016 and now forms part of the Development Plan. The Guidance makes it clear at the outset that sections related to various land use planning topics are informative and not exhaustive, and proposals will continue to be assessed by all relevant policies in the HwLDP.

6.24 THC's OWESG, paragraphs 4.10-17 advises that wind farm development "should seek to avoid significant adverse landscape and visual effects individually and cumulatively". Whilst the avoidance of significant effects is sought through the design process it should be noted that significant adverse landscape and visual effects as a result of wind farm development cannot be avoided due to the scale and height of wind turbines. In this respect, paragraph 4.14 of the OWESG advises that "where effects are unavoidable, appropriate mitigation will be required to overcome or otherwise minimise impacts. For example, this may include:

- a) Careful siting of turbines to seek to reduce overall impact of the scheme;
- b) Amending turbine configurations, including hub height, rotor diameter, and blade rotation speed;
- c) Adjusting the number of turbines;
- d) Considering turbine colour, including any variation from the typical off-white / pale grey colours;
- e) Design and arrangement of any lighting required to minimise its impact;
- f) Undergrounding of any power lines connecting individual turbines to any on-site sub-station;
- g) Undergrounding or sensitive treatment of those power lines connecting any wind farm sub- station to the electricity distribution system;
- h) Arrangements for any transformers for individual turbines (the Council expects these to be accommodated and enclosed within the turbine mast in order to reduce the landscape and visual impact of the development);
- i) Length, route, visibility and methods and materials used in the construction of access tracks."

6.25 Whilst all of the above have been considered and included as part of the embedded mitigation for the proposed development, it should be noted that in respect of bullets g) and h), the grid connection would be determined by the Network Operator at a later date and may be subject to a separate design and consent process.

6.26 Key considerations are set out in the OWESG as follows:

- **Siting and Design of Wind Farms** - THC are looking for sensitively sited and designed development that safeguards important high-quality landscapes. Developers are expected to explain the detailed design of site access and other infrastructure and illustrate the evolution of the wind farm design (as set out in the Design Access Statement). Reference should be made to SNH's guidance *Siting and Design Windfarms in the Landscape*, Version 3a, (Aug 2017);
- **Landscape and Visual Effects** - THC advise that development should seek to limit significant adverse effects, although it should be noted that no wind farm development can reasonably avoid significant landscape and visual effects. Key aspects that may be relevant to the assessment include the Dornoch Firth NSA, Special Landscape Areas (SLA), the capacity of the local landscape character (as defined by Landscape Character Assessment) and important public views from viewpoints, roads/ core paths / tourist routes and related attractions. Wild Land Areas (WLA) have been excluded from the LVIA with the agreement of NS;
- **Residential Amenity** - There are no inhabited residential properties within 2km of the proposed turbines and in accordance with the Landscape Institute guidance⁵, a Residential Visual Amenity Assessment (RVAA) is not required;
- **Mitigation** - Where feasible, appropriate mitigation should be demonstrated in response to significant adverse effects. This may involve further design evolution, altering the height, number, layout or colour of the proposed turbines and amendments to the associated infrastructure, for example; and
- **Visualisations** - THC expects developers to follow its guidance⁶ on the production of visualisations supporting their application.

6.27 Finally, THC have set out ten Criteria within their OWESG to be used as a “*framework and focus for assessing proposals*.” The criteria do not set absolute requirements but seek to ensure that developers are aware of key constraints to development. An assessment of the proposed development against the ten Criteria is set out within the Planning Statement.

Consultation

6.28 As part of the scoping exercise, a consultation exercise was undertaken to inform the scope of any design and assessment work required as part of this EIA. Consultation relevant to the LVIA assessment was undertaken with THC and NS who commented on aspects of methodology, sources of information, viewpoint selection, scope of assessment and cumulative development. Post-scoping consultation was undertaken via a Technical Note (TN) issued to THC and NS on 14th December 2022 to further agree the LVIA viewpoints and several aspects of the assessment, which was confirmed through subsequent email correspondence. A summary of these consultation responses is provided in Table 6.1. A design workshop was also held via Teams with THC on 1st February 2023.

⁵ Residential Visual Amenity Assessment, Landscape Institute Technical Guidance Note 02/19,

⁶ Visualisation Standards for Wind Energy Developments, Highland Council, July 2016.

Table 6.1: Summary of Landscape Related Consultation

Date Received	Consultation Response(s)	How and where is this addressed?
NatureScot (NS)		
Scoping Opinion – 15th August 2022	Content with the approach to assess 4 of the 7 special landscape qualities (SLQs) of the Dornoch Firth NSA, and the assessment should focus on the design and scale of the proposed development in relation to the landscape qualities and how they have been described.	Noted. The assessment of the proposed development on the SLQs of the Dornoch Firth NSA is undertaken in paragraphs 6.211-6.261.
	Share wirelines from Dornoch Bridge and Tain beachfront	This was shared through post-scoping consultation as part of the Technical Note issued on 14th December 2022.
	WLA35: Ben Klibreck – Armine Forest Given the distance of the proposed development from WLAs and the existing effects from turbines in the area, the additional effects from the proposed development may not be significant.	Noted. Subsequent email correspondence (22nd February 2023) with NS confirmed that a Wild Land Assessment can be scoped out.
	Aviation Lighting – Reference made to Annex 1 of the pre-application and scoping advice guidance document. Opportunity to agree a final selection of viewpoints in consultation with Highland Council.	Noted. This has been referred to and considered in the assessment reported in Technical Appendix 6.3 whilst the full aviation lighting report can be found in Technical Appendix 14.2. Subsequent email correspondence (31st January 2023 and 22nd February 2023) with NS confirmed the final selection of viewpoints.
22nd February 2023	Content for assessment of the Ben Klibreck – Armine Forest WLA to be scoped out.	Noted.
	Given the predicted visibility of the proposed development shown in the wireline from Tain Waterfront, we advise that this is included as a viewpoint in the assessment.	Included as Viewpoint 16: Tain Waterfront, located in EIAR Volume 3.

Date Received	Consultation Response(s)	How and where is this addressed?
Highland Council (THC)		
Scoping Opinion – 16th September 2022	The LVIA should conform with the overall methodology set out in GLVIA 3.	The LVIA has been undertaken in accordance with best practice guidance including GLVIA 3.
	Photomontages should follow the Council's Visualisations Standards.	Volume 5 includes photomontages in accordance with the Council's Visualisation Standards.
	Cumulative Study Area should extend up to 45km.	Included in EIAR Volume 2
	Assessment to include impact of on-site borrow pits and access roads.	Included in the assessment.
	Final list of viewpoints should be agreed with the Council.	Agreed with THC through subsequent email correspondence on 11 th January 2023.
	Struie Viewpoint should be a designed Viewpoint.	Included as part of the iterative design process which is set out in the Design and Access Statement as well as Chapter 4: Design Evolution
	Content with a 45km Study Area.	Noted
	Impacts on the national cycle network, long distance trails, North Coast 500 and the Cromarty and Nigg Ferry to be assessed. Impacts from the A835 and minor routes between Dingwall, Muir of Ord and Beaully to the south to be included, and surrounding settlements.	Cromarty to Nigg Ferry, A835 and minor routes between Dingwall and Muir of Ord and Beaully are all outwith the ZTV. Effects on the other recreational routes and surrounding settlements overlapped by the ZTV have been included in the assessment.
	Assessment of the proposed development against the Council's OWESG to be included.	Included in the Planning Statement.
	Effects on the special landscape qualities of the Special Landscape Areas are assessed in the LVIA.	Impacts on the special qualities of the Loch Fleet, Loch Brora and Glen Loth Special Landscape Area have been included. Other SLAs, all beyond 20km have been scoped out as set out in paragraph 6.85.
	Impacts on aviation lighting should be included as part of the LVIA.	Included. A night-time assessment has been included in Technical Appendix 6.3.
	Impacts on the qualities of Wild Land should be undertaken.	A Wild Land Assessment has been scoped out of the LVIA following subsequent email correspondence with NS on 22nd February 2023 and adoption of NPF4. However, a high-level assessment on WLA35 has been included at the request of THC (see further below).

Date Received	Consultation Response(s)	How and where is this addressed?
11th January 2023	Welcome additional viewpoints from Lairg Cemetery, Gruids and Ben More Assynt	Noted
	Request additional viewpoints from Strath Oykel in the vicinity of Strath Oykel Bridge	Included as Viewpoint 17: A837 Strath Oykel, located in Volume 5
	Content for the original VP3 along the A839 near Lairg to be removed.	Noted
	Night-time viewpoint to include Lairg Cemetery	Included
	Include aviation lighting from other consented and proposed wind farms in the night-time assessment	Included in Volume 4, Technical Appendix 6.3
	Include aviation lighting as part of the landscape and visual impact assessment.	Included in Volume 4, Technical Appendix 6.3
22 nd February 2023 – Design Workshop Feedback	Notes on Design Viewpoints presented in the Workshop	Noted
	Explore different height options including turbine scale and consistency of hub and tip heights.	The design evolution has been included in Chapter 4 which discusses the different height options considered.
	Ensure visuals are detailed enough so landscape features and scale markers within views are visible to allow a proper assessment of the development's impact on scale and scale perception of the landscape.	The visualisations have been produced to accord with both NS and THC Visualisation Guidance Documents.
	The visibility of the northernmost turbines of the proposed development spills over into Strath Fleet, which is currently largely free of noticeable turbine development. Acheilidh would introduce turbines in westward views along the Strath and would therefore be a marked change to the baseline of this Landscape Character Area.	The effects on the Strath Fleet LCT are assessed in Table 6.8 and views from Strath Fleet (Viewpoints 1 and 5) are assessed in Technical Appendix 6.2.

Date Received	Consultation Response(s)	How and where is this addressed?
	We still require a WLA impact assessment even if it is limited to a high-level assessment. We are not convinced that the proposal's visibility within the Ben Klibreck – Armine Forest WLA (35) is as limited as stated.	A high-level assessment on WLA 35 has been included in Table 6.11 despite NS agreeing to scope out all Wild Land Areas following adoption of NPF 4.
	Ensure turbine bases and crane pads are not visible from lower lying Straths and transport routes.	The proposed development has been sensitively designed to ensure that the turbine bases and crane pads are not visible from the lower Lying Straths and the majority of the main transport routes. This is evident in views from the A839 (Viewpoints 1, 5 and 8), A836 (Viewpoints 3, 7, 11 and 13), A9 (Viewpoint 15), A837 (Viewpoint 17) and A838.
	Pull back turbines to reduce or eliminate perceptible visibility from within Strath Fleet, particularly Turbines, 1, 2, 3, and 4 further from the A839 public road or remove them from the scheme.	Following the THC Design Workshop, turbines 1-4 have been pulled back further to reduce the overall visibility from the A839 along Strath Fleet (Viewpoints 1 and 5).
Rogart Community Council		
Scoping Opinion	Knockarthur, Rhilochan and Little Rogart to be included	Additional photomontages from these locations were provided to the Community Council during the public consultation stage.
Scotways		
Scoping Opinion – 15 August 2022	Heritage Path HP189: Rogart Drove Road to be included.	This route is beyond 10km from the proposed development and is largely outwith the ZTV as illustrated in EIAR Volume 2, Figure 6.11b. It is therefore excluded from the assessment.

Assessment Methodology and Significance

- 6.29 The assessment methodology is set out in Technical Appendix 6.1 in Volume 4 which includes a glossary of terms and abbreviations used in this Chapter.

Evaluation of Significance

- 6.30 In accordance with the relevant EIA Regulations, it is important to determine whether the effects, assessed as a result of the proposed development, are likely to be significant. Significant landscape and visual effects will be highlighted in bold in the text and in most cases, relate to effects that result in a '**Substantial**', '**Major**' or a '**Major to Moderate**' effect as indicated in Table 6.2 (and shaded dark grey). 'Moderate' levels of effect (shaded grey) can also be assessed as significant, subject to the assessor's professional opinion, which should be clearly explained as part of the assessment. White or un-shaded boxes in Table 6.2 indicate a non-significant effect.
- 6.31 In those instances where there would be no effect, the magnitude has been recorded as 'Zero' and the level of effect as 'None' or 'No View'. Intermediate levels of magnitude and levels of effect are also used in the LVIA and are shown in Table 6.2 in italics, for example High – Medium magnitude or Substantial to Major level of effect.

Table 6.2 Evaluation of Landscape and Visual Effects

Magnitude of Change	Landscape and Visual Sensitivity			
	High	Medium	Low	Very Low
High	Substantial	Major	Moderate	Not used
High - Medium	Substantial to Major	Major to Moderate	Moderate to Minor	
Medium	Major	Moderate	Minor	
Medium - Low	Major to Moderate	Moderate to Minor	Minor	
Low	Moderate	Minor	Negligible	
Low – Very Low	Moderate to Minor	Negligible	Negligible	
Very Low	Minor	Negligible	Negligible	
Zero	None / No View/ No View			

- 6.32 In accordance with the EIA Regulations the type or nature of effect is also described in terms of whether it is direct or indirect; its duration (temporary / permanent or reversible) cumulative; and whether the effect is positive, neutral or negative.

Viewpoint Selection

- 6.33 The viewpoints selected for the assessment have been agreed with NS and THC through scoping and further consultation as noted in Table 6.1.
- 6.34 A total of 21 viewpoints listed in Table 6.3 have been taken forward to the assessment stage. These viewpoints are assessed and reported in Technical Appendix 6.2. A summary of the viewpoint analysis is set out in Table 6.5.

- 6.35 All of the viewpoint locations are illustrated on Figures 6.2 – 6.6, and the visualisations are illustrated as photographs, wirelines and photomontages as agreed through consultation. The figures accord with NS guidance *Visual Representation of Wind Farms: Good Practice Guidance* (2017) and Highland Council guidance *Visualisation Standards of Wind Energy Developments* (2016). The viewpoint locations were photographed between August 2022 to November 2023. The visualisations illustrate the proposed turbines and where visible the proposed access tracks and associated infrastructure within 10km. Viewpoints 1-15 are illustrated as photomontages whilst viewpoints 16-21 are illustrated with baseline photographs and wirelines given their distance of over 20km. NS advises that beyond 20km the visibility of turbines in the printed photomontages is difficult to see or reproduce realistically.
- 6.36 Viewpoint analysis has also been used for the night-time assessment which included four of the day-time viewpoint locations. The Night-time Assessment is reported in Appendix 6.3.

Table 6.3 Viewpoint Selection

VP No	Viewpoint Name	Distance to nearest turbine (m)	View Direction	Visual Receptor
1*	A839 near Acheilidh	2,482	South-west	Representative of views experienced by road users along Strath Fleet, north of Acheilidh.
2	Lochbuie Road	2,992	North	Illustrative of views experienced by road users along the minor road near Loch Buidhe between Bonar Bridge and the A9.
3*	Bridge near A836 between Lairg and Invershin	5,275	East	Specific view from a layby (bridge) experienced by road users along the A836 (Moray Firth Tourist Route).
4	The Ord, Lairg	7,040	South-east	Specific view at a high point, west of Lairg experienced by walkers / visitors. Also located on Core Path SU14.03 and waymarked heritage trail.
5	A839 near Rovie Lodge	6,733	South-west	Illustrative of first views experienced by westbound road users and nearby residents along Strath Fleet.
6*	Lairg Cemetery	7,412	South-east	Specific view experienced by cemetery users from outside Lairg Cemetery.
7	A836 Lairg between Pier and Power Station	7,491	South-east	Illustrative of views experienced by road users along the A836 on the approach into Lairg (also overlapped with the Sustrans Cycle Route 1).
8	Gruids	7,625	South-east	Illustrative of view experienced by road users along the A839 west of Gruids.

VP No	Viewpoint Name	Distance to nearest turbine (m)	View Direction	Visual Receptor
9	West Langwell	8,293	South-west	Representative of views from the elevated crofting community of West Langwell on the northern side of Strath Fleet.
10	A839 Rosehall – Lairg	9,876	East	Illustrative of views from a high point along the A839 near Braemore Wood between Rosehall and Lairg.
11	A836 Wester Fearn	11,813	North-east	Represents views experienced by road users and those along Moray Firth Tourist Route and Sustrans Cycle Route 1.
12*	B9176 Struie Layby	14,531	North	Specific view experienced by visitors to signposted viewpoint along the B9176 within the Dornoch Firth NSA (Moray Firth Tourist Route).
13	A836 Rhian Bridge	15,647	South-east	Illustrative of views experienced by road users and Sustrans Cycle Route 1.
14	Ben Bhraggie	16,219	West	Specific view experienced by walkers from near summit of Ben Bhraggie.
15*	A9 Dornoch Bridge / NC 500	18,145	North-west	Specific view experienced by road users / visitors of the NC 500 on a layby on the Dornoch Bridge.
16	Tain Waterfront	22,690	North-west	Representative of views experienced by residents / visitors at Tain Waterfront.
17	A837 Strath Oykel	23,623	East	Illustrative of views experienced by road users of the A837 along Strath Oykel.
18	Càrn Chuinneag	23,633	North-east	Specific view experienced by walkers from hill summit.
19	Ben Klibreck	27,646	South-east	Specific view experienced by walkers from hill summit.
20	Portmahomack	31,183	North-west	Representative of views experienced by residents at Portmahomack.
21	Ben More Assynt	36,468	South-east	Specific view experienced by walkers from hill summit.

*Illustrated night-time viewpoint

Cumulative Wind Energy Development

- 6.37 Drawing from NS guidance⁷, the baseline of all other cumulative wind energy development, above 50m to blade tip height, within the 45km Study Area has been collated. This includes all existing and consented wind energy development, and planning applications. Single turbines below 50m to blade tip height have been excluded. In accordance with the same NS guidance, projects at scoping or pre-planning stage have not been included unless they are in close proximity to the proposed development and therefore of notable relevance. At the time of writing, there is one scoping stage wind farm within 10km, Balblair, which has been included in the viewpoint wirelines but not included in the cumulative assessment.
- 6.38 The baseline of other wind energy development within the LVIA Study Area has also taken into account THC's wind farm database, Scottish Government Energy Consents Unit (ECU) and other wind energy developer sources, up until a working 'cut off' date of 1st April 2024.
- 6.39 It is to be noted that planning permission for the consented Braemore Wind Farm lapsed on 27th October 2022. As of 1st April 2024, as far as the Applicant is aware, neither the ECU nor THC have received any indication of an intention to initiate development or address planning conditions on the site, and Braemore Wind Farm is therefore excluded from the cumulative assessment.
- 6.40 In total, 29 other wind energy developments are included in the assessment as listed in Table 6.4 and illustrated in Figure 6.12. As of 1st April 2024, this includes 15 existing wind farms, nine consented developments and five applications in the Study Area. The most relevant wind energy developments to the CLVIA include those sites within 10km and in particular the existing Lairg Wind Farm, the consented Lairg II Wind Farm, and the Garvary application. Notably, all of the wind farm development within 10km and the majority beyond this distance (up to 30km) to the west, north and east are located within the *Rounded Hills - Caithness & Sutherland Landscape Character Type (LCT)*.
- 6.41 The cumulative assessment has considered the cumulative landscape and visual effects of the proposed development in addition to, and in combination with, the other wind energy development included in Table 6.4 in accordance with the methodology set out in Technical Appendix 6.1.

Table 6.4 Wind Energy Development Included in the CLVIA

Reference ⁸	Name	Distance (m) ⁹	Number of turbines	Blade tip Height (m)	Host Landscape Character Type
EXISTING WIND ENERGY DEVELOPMENTS WITHIN 45KM					

⁷ Guidance: Assessing the Cumulative Landscape and Visual Impacts of Onshore Wind Energy Developments, NatureScot (March 2021).

⁸ The reference number in the table relates to that used in the figures.

⁹ Measured from the nearest turbine of each wind energy development

Reference ⁸	Name	Distance (m) ⁹	Number of turbines	Blade tip Height (m)	Host Landscape Character Type
E01	Lairg	2,752	3	99.5	Rounded Hills - Caithness & Sutherland
E02	Achany	10,664	19	100	Rounded Hills - Caithness & Sutherland
E03	Rosehall	13,435	19	90	Rounded Hills - Caithness & Sutherland
E04	Kilbraur Extension	13,520	8	125	Rounded Hills and Moorland Slopes - Ross & Cromarty Rounded Mountain Massif
E05	Kilbraur	13,671	19	115	Sweeping Moorland and Flows Rounded Hills - Caithness & Sutherland
E06	Beinn nan Oighrean	18,326	2	99.5	Rounded Hills and Moorland Slopes - Ross & Cromarty
E07	Beinn Tharsuinn	18,550	17	80	Rounded Hills and Moorland Slopes - Ross & Cromarty
E08	Coire na Cloiche	20,299	13	99.5	Rounded Hills and Moorland Slopes - Ross & Cromarty
E09	Gordonbush Extension	22,477	11	149.9	Sweeping Moorland and Flows Rounded Hills - Caithness & Sutherland

Reference ⁸	Name	Distance (m) ⁹	Number of turbines	Blade tip Height (m)	Host Landscape Character Type
E10	Gordonbush	23,721	35	107	Sweeping Moorland and Flows Rounded Hills - Caithness & Sutherland
E11	Creag Riabhach	26,900	22	125	Rounded Hills - Caithness & Sutherland Sweeping Moorland and Flows
E12	Novar	28,972	34	61	Rounded Mountain Massif
E13	Novar Extension	29,494	16	100.5	Rounded Mountain Massif
E14	Corriemoillie	43,530	17	125	Rounded Hills and Moorland Slopes - Ross & Cromarty
E15	Lochluichart Extension	44,820	6	125	Rounded Mountain Massif
CONSENTED WIND ENERGY DEVELOPMENT WITHIN 45KM					
C01	Lairg II	2,094	10	200	Rounded Hills - Caithness & Sutherland
C02	Strath Tirry	12,870	4	135	Sweeping Moorland and Flows Strath – Caithness and Sutherland
C03	Chleansaid	13,273	16	180 / 200	Rounded Hills - Caithness & Sutherland Sweeping Moorland and

Reference ⁸	Name	Distance (m) ⁹	Number of turbines	Blade tip Height (m)	Host Landscape Character Type
					Flows - Caithness & Sutherland
C04	Achany Extension	17,366	18	149.9	Rounded Hills - Caithness & Sutherland
C05	Meall Buidhe	17,993	8	144.5/149.9	Rounded Hills - Caithness & Sutherland
C06	Strathrory	21,833	7	149.9 / 160 / 180	Rounded Hills and Moorland Slopes - Ross & Cromarty
C07	Sallachy	26,365	9	149.9	Rounded Hills - Caithness & Sutherland
C08	Kirkan	41,822	17	175	Rounded Hills and Moorland Slopes - Ross & Cromarty
C09	Lochluichart Extension II	43,527	5	149.9	Rounded Mountain Massif Rounded Hills and Moorland Slopes - Ross & Cromarty
APPLICATION WIND ENERGY DEVELOPMENT WITHIN 45KM					
A01	Garvary	1,006	25	180	Rounded Hills - Caithness & Sutherland
A02	Shinness	17,267	16	200	Sweeping Moorland and Flows - Caithness & Sutherland

Reference ⁸	Name	Distance (m) ⁹	Number of turbines	Blade tip Height (m)	Host Landscape Character Type
A03	Strath Oykel	18,175	11	200	Rounded Hills - Caithness & Sutherland
A04	Creag Riabhach Extension	26,685	3	149.5	Sweeping Moorland and Flows – Caithness & Sutherland
A05	Abhainn Dubh	34,388	13	149.9	Rounded Hills and Moorland Slopes – Ross & Cromarty
SCOPING WIND ENERGY DEVELOPMENT WITHIN 10KM					
S01	Balblair	3,541	9	180	Rounded Hills - Caithness & Sutherland

Zone of Theoretical Visibility and Viewpoint Analysis

- 6.42 As a prelude to the main assessment, the Zone of Theoretical Visibility (ZTV) and viewpoint analysis is used to further define the scope of the assessment process. In particular, a significance threshold indicating the distance from the proposed development, where significant effects may be likely, has been identified. This has been used to focus the baseline information and detailed reporting of the assessment in this chapter.

ZTV and Cumulative ZTV Analysis

- 6.43 The Zone of Theoretical Visibility (ZTV) analysis is used to assist the design and further define the scope of the assessment process. The ZTVs have been calculated using ReSoft © WindFarm computer software to produce an area of potential visibility of any part of the proposed turbines, calculated to turbine blade-tip and hub-height, or selected infrastructure. The ZTV does not however take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field and as such provides the limits of the visual assessment Study Area. As a result, there may be roads, tracks and footpaths in the wider setting which, although shown as falling within the ZTV, have restricted viewing opportunities since they are heavily screened or filtered by banks, walls and vegetation. The ZTVs therefore provide a starting point in the assessment process and accordingly tend to over-estimate the potential visibility of the proposed turbines.
- 6.44 A number of ZTV maps have been provided as follows:

- Figure 6.2: illustrates the ZTV calculated to blade tip at 1:350,000 scale across the 45km Study Area and provides an overview of the theoretical extent of visibility with viewpoint locations;
- Figure 6.3: illustrates the ZTV calculated to hub height at 1:350,000 scale across the 45km Study Area and provides an overview of the theoretical extent of visibility with viewpoint locations;
- Figure 6.4a: illustrates the central section of the blade tip ZTV, shown in more detail at 1:85,000 scale, showing the area within 10km of the proposed development with viewpoint locations;
- Figure 6.4b: illustrates the central section of the blade tip ZTV, with forestry excluded shown at 1:85,000 scale, showing the area within 10km of the proposed development with viewpoint locations;
- Figure 6.5: (A0 fold-out) illustrates the ZTV calculated to blade tip at 1:115,000 scale across the 45km Study Area and includes viewpoint locations; and
- Figure 6.6: (A0 fold-out) illustrates the central 20km area of the ZTV calculated to blade tip at 1:50,000 scale across the Study Area and includes viewpoint locations.

6.45 Further cumulative ZTV maps are also illustrated in Figures 6.13-17, indicating the extent of theoretical cumulative visibility in relation to the proposed development, and other relevant existing and consented wind farms, and wind farm applications. The cumulative developments have been grouped according to their planning status or geographical location. All of the cumulative ZTVs assume bare ground and are calculated to blade tip height, indicating the maximum theoretical visibility of other wind farms within the ZTV footprint of the proposed development. The cumulative ZTVs do not therefore illustrate the complete ZTV for other cumulative wind energy development, which is likely to be visible from other locations where the proposed development is not visible.

ZTV Analysis: proposed development

6.46 The ZTV pattern for the proposed development reflects the underlying landform within the 45km Study Area and the percentages of theoretical visibility cover are summarised as follows:

- Total ZTV (to blade tip) coverage accounts for 29.25% of the Study Area;
- Total ZTV (to hub height) coverage accounts for 24.94% of the Study Area;
- Total ZTV (to blade tip) coverage accounts for 48.40% within 10km of the proposed development, excluding woodland / forestry; and
- Total ZTV (to hub height) coverage accounts for 40.82% within 10km of the proposed development, excluding woodland / forestry.

6.47 The blade tip ZTV coverage (Figures 6.2, 6.5 and 6.6) for the proposed development is limited, accounting for less than a third of the total Study Area. There is extensive forestry cover within the Study Area, in particular within 10km which clads the surrounding hills and valley slopes in all directions but notably to the west along Achany Glen, southeast on low-lying hills, and to the north at Strath Tirry which would provide further screening of the proposed development from receptors in these locations as illustrated by the ZTV in Figure 6.4b.

- 6.48 ZTV cover generally reflects the underlying topography in the Study Area. The proposed turbines would be located on open moorland within an area of low-lying hills between Strath Fleet (running to the north and east), and Achany Glen (running to the west and southwest). To the south, the low-lying hills continue towards the Dornoch Firth which forms an expansive waterbody contained by both the low-lying hills to the north and further hills south. In the wider Study Area to the south and southwest, the low-lying hills transition to more elevated hill ranges. To the west beyond Achany Glen, undulating upland areas are further bisected by straths and glens, most notably Strath Oykel and Glen Cassley. To the northwest, extensive, relatively low-lying moorland extends from Loch Shin across Strath Tirry before the landform once again rises towards Ben Armine Forest to the north. Ben Klibreck appears as a distinctive isolated Munro in this landscape. To the northeast, the low-lying hills continue, and to the east the hills fall towards the coastline and extensive seascape.
- 6.49 ZTV coverage within 10km of the proposed development is indicated on much of the elevated areas between Strath Fleet and Achany Glen, becoming patchy to the south and southeast due to a series of more elevated summits as the expanse of low-lying hills continues and falls towards the Dornoch Firth. Theoretical visibility also falls away at Strath Fleet but continues again on the facing valley sides and elevated upland areas beyond the valleys to the north and northwest. Similarly, to the west and northwest, theoretical visibility breaks at Achany Glen and continues on the facing slopes of the glen and low-lying uplands beyond, as well as the expansive waterbody of Loch Shin.
- 6.50 Beyond 10km, theoretical visibility becomes fragmented and patchy and is mostly indicated to the south, southwest, west, northwest, and northeast of the Study Area. To the south and southwest, theoretical visibility is indicated on the upland areas beyond Dornoch Firth, with breaks in the theoretical visibility in low-lying valleys at Strathcarron and the Kyle of Sutherland. To the west, theoretical visibility is increasingly patchy and is indicated on elevated slopes and summits. To the northwest, theoretical visibility continues across Loch Shin and the extensive shallow valley at Strath Tirry. To the northeast, theoretical visibility is patchy on the facing lowland hills around Strath Brora.
- 6.51 ZTV coverage becomes sparser beyond 20km and is most evident along the coastline at Portmahomack and on scattered hill summits and sloping land orientated towards the proposed development that is not otherwise screened by intervening mountains. The views from these areas are experienced as part of much wider panoramas and 360° views. There is very sparse ZTV coverage to the south and south-west of the Study Area.

Viewpoint and Cumulative Viewpoint Analysis

- 6.52 The viewpoint analysis has been conducted from 21 viewpoint locations as illustrated in Figures 6.2-6.6. Each of these viewpoints are illustrated as baseline photographs and visualisations (wirelines and / or photomontages) in Figures 6.18-6.38. The figures accord with Scottish Natural Heritage, *Visual Representation of Wind Farms: Good Practice Guidance*, Version 2.2, February 2017 and the Highland Council, *Visualisation Standards for Wind Energy Developments*, July 2016.
- 6.53 The outer distance from the proposed development, within which significant effects may be likely has been identified by the viewpoint analysis of the proposed development.

Further, cumulative viewpoint analysis has identified a likely threshold for significant cumulative visual effects that would result from the proposed development, in addition to, or in combination with other existing and consented wind energy developments and applications.

- 6.54 Cumulative wind farm development included within the 45km Study Area that would be theoretically visible from each viewpoint has been illustrated in the wirelines.

Potential for significant effects: proposed development

- 6.55 The viewpoint analysis indicates that significant visual effects are likely to affect limited locations within approximately 9.5km distance from the proposed development (subject to a clear view of the proposed turbines, landform and vegetation screening), as indicated by Viewpoints 1, 2, 4, 5, 8, 9 and 10 inclusively. The greatest magnitude of change is visible at Viewpoint 2 (all other viewpoints are assessed as Medium magnitude or less). It may however be noted that the visual composition of the proposed development in Viewpoint 2 presents as a simple and cohesive wind farm set within a landscape where there is a strong visual rationale for its location, beyond existing pylons and adjacent to a consented cluster of wind farm development comprising Lairg and Lairg II, and the application Garvary Wind Farm.
- 6.56 A further potentially significant effect has been identified as a precaution in the south at approximately 14.5km from the nearest turbine as illustrated by Viewpoint 12: B9176 Struie Layby. It is, however, important to note that whilst the view from Viewpoint 12 in isolation has the potential to be significant in visual terms, the effects on the integrity of the Dornoch Firth National Scenic Area (NSA) would be Not Significant. A detailed assessment on the SLQs and integrity of the NSA is set out further in this chapter.
- 6.57 The effects on Viewpoints 2, 4, 9 and 12 would also be cumulative and further cumulative analysis provided below. There would be no significant visual effects from the southwest, southeast, north and east of the proposed development.

Potential for significant cumulative effects

- 6.58 In total 19 of the 21 of the viewpoints involve the cumulative visibility of other wind farms, in particular the existing Lairg, the consented Lairg II Wind Farm and the application Garvary Wind Farm which are all located within approximately 2km distance from the proposed development creating a cluster of wind farm development. Other wind farms beyond this distance are also frequently visible from some of the assessment viewpoints, although often to a negligible degree except at Viewpoints 13, 19 and 21.
- 6.59 The proposed development would contribute to a significant, cumulative visual effect at four of the assessment viewpoints (Viewpoints 2, 4, 9 and 12). No cumulative wind farms are visible from Viewpoints 1 and 5 along Strath Fleet. There would be no significant cumulative visual effects as a result of the proposed development from Viewpoints 8 and 10 (and from all receptors in the west) as the proposed development would be barely noticeable beyond the consented Lairg and application Garvary wind farms, both of which would significantly affect these locations. The viewpoint assessment also identifies five other viewpoints (3, 6, 13, 19 and 21) that are significantly affected as a result of other

existing, consented, or other application wind farms within the Study Area and not the proposed development.

- 6.60 In most instances, the overlapping of the proposed development within other wind farm developments (notably Lairg, Lairg II and or Garvary from Viewpoints 4, 8, 9, and 10 for example) or the visibility of wind farm development in the same / similar sector of the view serves to slightly reduce the additional cumulative effect of the proposed development in comparison to the assessment on a 'solus' or primary basis.
- 6.61 Importantly these levels of effect are indicative of a visual effect on a particular viewpoint location, and they should not be assumed to translate into visual effects on the overall visual experience, as each of the viewpoints have been specifically located where the sensitivity of the receptor and/ or the views of the proposed development would be greatest. In this sense they are not always typical or representative.
- 6.62 As a precaution, the visual assessment has considered all of those receptors within 10km north, east and west of the proposed development, within 15km south of the proposed development and national level receptors within 45km.

Potential for significant night-time visual effects

- 6.63 A night-time assessment of the effects of the aviation warning lights is provided in Technical Appendix 6.3 and supported by Figures 6.3.A – 6.3.J. The Lighting Strategy for the proposed development has been approved by the CAA and requires six of the turbines to be lit (T1, T2, T4, T8, T9 and T11).
- 6.64 The night-time viewpoint assessment, contained in Technical Appendix 6.3 concludes that allowing for the embedded mitigation, none of the viewpoints would be significantly affected by the proposed aviation warning lights operating at either of the two lighting intensities:
- The aviation warning lights would operate at 2000 cd during periods of poor visibility (<5km from the lit turbines). The Wind Farm Aviation Lighting and Mitigation Report (set out in EIA Volume 4, Technical Appendix 14.2) suggests that conditions of poor visibility (<5km from the lit turbines) would occur for approximately 4% of the time. The lower lying viewpoint / receptor elevation means that the perceived light intensity would vary between 265cd – 75cd from Strath Fleet; and
 - Otherwise, the aviation warning lights would operate at 200 cd (reduced to 10%). Technical Appendix 14.2 suggests that this would occur approximately 96% of the time. The lower lying viewpoint / receptor elevation means that the perceived light intensity would vary between 27cd – 8cd, appearing barely perceptible from Strath Fleet.

Interpretation of Viewpoint Analysis Summary Tables

- 6.65 The information set out in Table 6.5 provides a summary of the viewpoint analysis of the effects of the proposed development on an independent or 'standalone' basis. This part of the assessment helps to define the contribution the proposed development would make to any subsequent cumulative assessments ('in addition to' or 'in combination with')

other wind farms). It is also relevant to the latter half of the operational period for the proposed development, when the consented periods of operation for other wind farms would expire and they would be decommissioned, assuming no extensions to the operating periods or re-powering schemes are granted.

6.66 The information set out in Table 6.5 provides a summary of the cumulative viewpoint analysis and sets out the effects of proposed development 'in addition' to and 'in combination' with other existing, consented and application wind energy developments in accordance with the methodology in Technical Appendix 6.1 as follows:

6.67 The summary tables list the names of the viewpoints and include the following information:

- Proposed development: Assessed on an individual basis (the LVIA)
This part of the assessment takes account of other existing forms of wind farm development that may be present in the landscape, whilst recognising that their influence on landscape character is likely to be time limited. It does not consider the additional or combined cumulative effects and only reports on the effect of the proposed development alone.
- Scenario 1: Existing + Consented + the proposed development
The additional and combined cumulative effects of the baseline, including the existing and consented wind energy developments with the proposed development are reported.
- Scenario 2: Existing + Consented + Applications + the proposed development
The additional and combined cumulative effects of the baseline, including existing and consented wind energy developments and applications with the proposed development are reported.

6.68 Further information on Table 6.5 is provided in Technical Appendix 6.2.

Table 6.5 Summary of Viewpoint Analysis

Viewpoint No. and Title	FoV* (Field of view)	Distance to nearest turbine (m)	Viewpoint Analysis: proposed development (12 turbines up to 200 / 230m to blade tip)			Cumulative Viewpoint Analysis: proposed development (PD**) and other wind farms					
			Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect (PD)	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect (PD)	Scenario 2: Combined Level of Effect
1. A839 near Acheilidh	32°	2,482	High	Medium-Low	Major to Moderate	Zero	No cumulative effect		Zero	No cumulative effect	
2. Lochbuie Road	23°	2,992	Medium	High (High-Medium)	Major (Major to Moderate)	Low	Major (Major to Moderate)	Major (Major to Moderate) (PD)	High	Major (Major to Moderate)	Major (Major to Moderate) (PD, Garvary)
3. Bridge near A836 between Lairg and Invershin	9°	5,275	High	Very Low	Negligible	High	Negligible	Substantial (Lairg II)	High	Negligible	Substantial (Lairg II and Garvary)
4. The Ord, Lairg	17°	7,040	High	Medium	Major	High - Medium	Moderate	Substantial to Major (Lairg, Lairg II, Chleasaid, PD)	High - Medium	Moderate to Minor	Substantial to Major (Lairg, Lairg II, Chleasaid, Shinness and Garvary)
5. A839 near Rovie Lodge	11°	6,733	High	Low	Moderate	Zero	No cumulative effect		Zero	No cumulative effect	
6. Lairg Cemetery	11°	7,412	High	Very Low	Minor to Negligible	High - Medium	Minor to Negligible	Substantial to Major (Lairg, Lairg II)	High - Medium	Minor to Negligible	Substantial to Major (Lairg, Lairg II, Garvary)
7. A836 Lairg between Pier and Power Station	11°	7,491	High-Medium	Low-Very Low (winter) Very Low (summer)	Moderate to Minor (winter) Minor to Negligible (summer)	Low	Moderate to Minor (Minor to Negligible)	Moderate to Minor	Very Low	Moderate to Minor (Minor to Negligible)	Moderate to Minor

Viewpoint No. and Title	FoV* (Field of view)	Distance to nearest turbine (m)	Viewpoint Analysis: proposed development (12 turbines up to 200 / 230m to blade tip)			Cumulative Viewpoint Analysis: proposed development (PD**) and other wind farms					
			Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect (PD)	<u>Scenario 1:</u> Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect (PD)	<u>Scenario 2:</u> Combined Level of Effect
8. Gruids	18°	7,625	High (walkers) Medium (road users)	Medium (Medium- Low)	Major (Major to Moderate) (walkers) Moderate (Moderate to Minor) (road users)	High - Medium	Moderate	Substantial to Major (Lairg, Lairg II)	High - Medium	Moderate to Minor	Substantial to Major (Lairg, Lairg II, Garvary)
9. West Langwell	13°	8,293	High	Medium	Major	Medium - Low	Major	Major (Lairg II, PD)	Medium - Low	Major to Moderate	Major to Moderate (Lairg II, Garvary, PD)
10. A839 Rosehall - Lairg	14°	9,876	Medium	Medium	Moderate	Medium	Moderate to Minor	Moderate (Achany, Lairg, Lairg II)	Medium	Minor to Negligible	Moderate (Achany, Lairg, Lairg II, Garvary)
11. A836 Wester Fearn	6°	11,813	High	Very Low (Low- Very Low)	Minor (Moderate to Minor)	Very Low	Minor (Moderate to Minor)	Minor (Moderate to Minor)	Very Low	Minor (Moderate to Minor)	Minor (Moderate to Minor)
12. B9176 Struie Layby	6°	14,531	High	Low	Moderate	Very Low	Moderate	Moderate (PD)	Low	Moderate	Major to Moderate (PD and Garvary)
13. A836 Rhian Bridge	7°	15,647	High- Medium	Low	Moderate to Minor	High	Minor	Substantial to Major (Strath Tirry, Chleansaid)	High- Medium	Minor	Substantial to Major (Strath Tirry, Chleansaid, Shinness)
14. Ben Bhraggie	9°	16,219	High	Low	Moderate	Low	Moderate	Moderate	Low	Moderate to Minor	Moderate

Viewpoint No. and Title	FoV* (Field of view)	Distance to nearest turbine (m)	Viewpoint Analysis: proposed development (12 turbines up to 200 / 230m to blade tip)			Cumulative Viewpoint Analysis: proposed development (PD**) and other wind farms					
			Sensitivity	Magnitude	Level of Effect:	Magnitude (Existing and Consented)	Additional Level of Effect (PD)	Scenario 1: Combined Level of Effect	Magnitude (Applications)	Additional Level of Effect (PD)	Scenario 2: Combined Level of Effect
15. A9 Dornoch Bridge / NC 500	5°	18,145	High	Low-Very Low	Moderate to Minor	Very Low	Moderate to Minor	Moderate to Minor	Very Low	Moderate to Minor	Moderate to Minor
16. Tain Waterfront	5°	22,690	High	Very Low	Minor	Zero	No cumulative effect		Very Low	Minor	Minor
17. A837 Strath Oykel	7°	23,623	Medium	Low-Very Low	Minor	Low-Very Low	Minor to Negligible	Minor	Low	Negligible	Minor
18. Càrn Chuinneag	6°	23,633	High	Low-Very Low	Moderate to Minor	Low	Moderate to Minor	Moderate	Low-Very Low	Minor	Moderate
19. Ben Klibreck	4°	27,646	High	Very Low	Minor	High	Minor	Substantial (Creag Riabhach)	Low	Minor	Substantial (Creag Riabhach + Ext, Shinness)
20. Portmahomack	4°	31,183	High	Very Low	Minor	Very Low	Minor	Minor	Very Low	Minor	Minor
21. Ben More Assynt	4°	36,468	High	Very Low	Minor	Medium -Low	Minor to Negligible	Major to Moderate (Sallachy)	Low-Very Low	Negligible	Major to Moderate (Sallachy)

Note: Significant effects resulting from the proposed development are indicated in bold text and shaded dark grey.

* Field of View

** Proposed Development

Baseline of Landscape Receptors

- 6.69 Information on the existing landscape resource or baseline conditions included in this assessment has been collected from local development plans, OS maps, and relevant literature, as well as information gathered from field surveys. This baseline information is set out as an inventory of the existing landscape resource and focuses on those landscape receptors with most potential to be significantly affected.
- 6.70 The baseline inventory includes the following landscape receptors:
- Landscape Character; and
 - Landscape Planning Designations and WLAs.
- 6.71 The viewpoint analysis indicates that significant visual effects are likely to affect limited locations within approximately 9.5km distance from the proposed development (subject to a clear view of the proposed turbines, landform and vegetation screening), as indicated by Viewpoints 1, 2, 4, 5, 8, 9 and 10 inclusively. A further potentially significant effect has been identified as a precaution in the south at approximately 14.5km from the nearest turbine as illustrated by Viewpoint 12: B9176 Struie Layby. Taking a precautionary approach, the assessment has focused on those local landscape receptors, overlapped by the blade tip ZTV within 10km of the proposed development to the north, east and west and within 15km to the south of the proposed development and nationally important landscape planning designations within the wider LVIA Study Area. Receptors that would not be significantly affected have been excluded from the assessment with appropriate reasoning provided as part of the baseline analysis.
- 6.72 Site survey and viewpoint analysis also indicates that landscape effects, likely to result from other activities and infrastructure associated with the proposed development during its construction and decommissioning would be largely limited to the host *Rounded Hills – Caithness and Sutherland* LCT.

Baseline Landscape Character

- 6.73 Landscape across Scotland is classified into different types of landscape character (LCTs) by NS in their Landscape Assessment (2019)¹⁰. The assessment divides the landscape into broad LCTs, which are illustrated within the Study Area in Figures 6.7 and 6.8.
- 6.74 Primarily, four LCTs within 10km are overlapped by the blade tip ZTV for the proposed development as follows, and are included in the assessment:
- 135 - Rounded Hills – Caithness and Sutherland LCT:
 - South of Strath Fleet Landscape Character Area (LCA) (the host landscape); and
 - North of Strath Fleet LCA.
 - Other LCAs of the Rounded Hills LCT are excluded from the assessment due to intervening distance, limited visibility, and the likelihood that the proposed development would be visible beyond other existing and consented wind farms

¹⁰ NatureScot National Landscape Character Assessment (2019).

located closer to these LCAs. The key characteristics and overall landscape character of these LCAs would not be significantly affected by the proposed development.

- 142 - Strath – Caithness and Sutherland LCT:
 - Strath Fleet LCA.
 - Other LCAs of the Strath LCT are excluded from the assessment due to intervening distance, very limited to no visibility, and the likelihood that the proposed development would be visible beyond other existing and consented wind farms located closer to these LCAs. The key characteristics and overall landscape character of these LCAs would not be significantly affected by the proposed development.
- 145 – Farmed and Forested Slopes with Crofting LCT:
 - Lairg LCA.
 - Other LCAs of the Farmed and Forested Slopes with Crofting LCT are excluded from the assessment due to intervening distance, and very limited to no visibility of the proposed development. The key characteristics and overall landscape character of these LCAs would not be significantly affected by the proposed development.
- 134 – Sweeping Moorland and Flows – Caithness and Sutherland LCT:
 - North of Lairg and Strath Fleet LCA.

6.75 The host landscape character of the *Rounded Hills – Caithness and Sutherland* LCT (south of Strath Fleet LCA) would be directly affected by the proposed development. Moving away from the Site, other areas of landscape character could be indirectly affected by views of the proposed development (notably the turbines) and through effects on their key perceptual characteristics and qualities such as 'wildness' or 'naturalness'.

6.76 Within the wider 45km Study Area, a small number of areas of landscape character which are designated at a national level as part of the Dornoch Firth NSA are overlapped by the blade tip ZTV for the proposed development and included in the assessment as follows. Some of these LCTs are also located between 10-15km south of the proposed development:

- 145 – Farmed and Forested Slopes with Crofting LCT – Kincardine LCA;
- 330 - Rounded Hills and Moorland Slopes - Ross & Cromarty LCT – Easter Fearn LCA;
- 343 – Coastal Shelf LCT – Ardmere, Edderton and Whiteness Sands LCAs;
- 140 – Sandy Beaches and Dunes LCT – Dornoch Sands LCA;
- 146 – Coastal Farmland and Woodlands LCT.

6.77 There are LCTs within other nationally designated NSAs including the Assynt – Coigach NSA and five WLAs in the Study Area that are overlapped by the blade tip ZTV. However, effects on the Assynt – Coigach NSA and the five WLAs have been excluded from the assessment as agreed with NS, and therefore the LCTs within these areas are also excluded on this basis.

Baseline Pattern of Wind Farm Development

6.78 Wind farm development is now a landscape characteristic of many areas of Scotland including the Highlands. Wind farms are referenced in SNH's most recent 2019 Landscape Character Assessment and are noted as a feature of the host LCT.

6.79 There are currently approximately five loose, and relatively sparse, clusters of wind farm development within the Study Area (Figure 6.12) and the baseline pattern of wind farm development is a pattern that has emerged in recent decades and may continue to evolve. As noted in Table 6.3, all of the existing and consented wind farms are largely located within 'uplands' whilst avoiding the high mountains and low-lying straths and coast. The main clusters of development are described as follows:

- **Lairg and Lairg II:** This 'central' cluster occupies the intermediate upland, whilst avoiding the straths, the higher mountains and WLAs. The turbines are located within the *Rounded Hills – Caithness and Sutherland* LCT. The application Garvary Wind Farm, if consented, would also supplement this cluster;
- **Achany, Rosehall, Achany Extension (plus Meall Buidhe):** This cluster occupies the intermediate upland, whilst avoiding the straths, the higher mountains and WLAs. The turbines are located within the *Rounded Hills – Caithness and Sutherland* LCT. The consented Achany Extension and Meall Buidhe wind farms would also supplement this cluster. The application Strath Oykel Wind Farm, if consented, would also supplement this cluster;
- **Beinn Tharsuinn, Coire na Cloiche, Novar and Strathrory:** This cluster in Easter Ross is set back from the straths and firths of Cromarty and Dornoch, whilst also avoiding the higher mountains and WLAs. Novar is set apart (approximately 7km) but forms part of this group when viewed from more distant locations or from the coastal firths. The consented Strathrory Wind Farm would also supplement this cluster;
- **Kilbraur and Gordonbush:** This cluster of wind farm development is set back approximately 10km and parallel from the coast, also avoiding the straths, coastline and the higher mountains; and
- **Corriemoillie, Lochluichart and Kirkan:** This cluster of wind farm development is located in central Ross and occupies the *Rounded Hills and Moorland Slopes* and *Rounded Mountain Massif* LCTs between the A835 and the A832, avoiding the higher mountains and wild land to the west. The consented Kirkan and Lochluichart Extension II wind farms would also supplement this cluster.

6.80 The existing Creag Riabhach Wind Farm and consented Sallachy, Strath Tirry and Chleansaid wind farms form a loose cluster, roughly equidistant from each other to the north-west of the Study Area, set within the *Sweeping Moorland and Flows* and *Rounded Hills - Caithness & Sutherland* LCTs.

6.81 The proposed development would most closely associate with the Lairg and Lairg II cluster and is comparable to other inland clusters in that it is set back from the straths and avoids the higher mountains. In common with other existing and consented wind farm development, it is located within the *Rounded Hills - Caithness and Sutherland* LCT.

Baseline Planning Designations

6.82 Landscape planning designations and WLAs within the 45km Study Area are illustrated in Figure 6.9a. They include seven local and three national level landscape planning designations and eight WLAs.

- 6.83 The proposed development is not located within any landscape designations or WLAs, the Site and surrounding landscape being undesignated. Therefore, there can be **no** physical or direct impacts on landscape designations or WLAs within the Study Area.
- 6.84 Landscape designations and WLAs may however be indirectly affected by development beyond their boundaries that may otherwise affect the designation's Special Landscape Qualities (SLQs), including views and perceptual qualities, for which they are valued and designated. The following landscape designations are included in the assessment:
- Dornoch Firth NSA (NSA 40 as per Figure 6.9a); and
 - Loch Fleet, Loch Brora and Glen Loth SLA (SLA 9 as per Figure 6.9a).
- 6.85 The other designated landscapes (NSAs and SLAs illustrated in Figure 6.9a) are excluded from the assessment as agreed through consultation. This is because of the limited ZTV coverage within these areas and the likelihood that the integrity and SLQs would not be significantly affected by views of the proposed development.

Wild Land Areas

- 6.86 NS agreed to scope out the assessment on all WLAs within the Study Area, as reported in Table 6.1. However, at the request of THC, a high-level assessment on the wild land qualities of the Ben Klibreck – Armine Forest WLA (WLA 35) has been included in the assessment. The remaining WLAs are excluded from the assessment.

Gardens and Designed Landscapes

- 6.87 Gardens and Designed Landscapes (GDLs) are considered under visual receptors as a visitor or tourist attraction and are also assessed in Chapter 7: Cultural Heritage.

Baseline of Visual Receptors

- 6.88 The visual assessment draws upon the ZTV, site visits and viewpoint analysis and assesses the potential visual effects on views and visual amenity likely to be experienced by receptors (people) within the landscape as follows:
- Views from residential properties and settlements;
 - Views experienced whilst travelling through the landscape (road / rail / ferry users, walkers, horse riders and cyclists for example); and
 - Views from tourist and recreational destinations.
- 6.89 The viewpoint analysis indicates that significant visual effects are likely to affect limited locations within approximately 9.5km distance from the proposed development (subject to a clear view of the proposed turbines, landform and vegetative screening), as indicated by Viewpoints 1, 2, 4, 5, 8, 9 and 10 inclusively. A further potentially significant effect has been identified as a precaution in the south at approximately 14.5km from the nearest turbine as illustrated by Viewpoint 12: B9176 Struie Layby. Taking a precautionary approach, the assessment has focused on those visual receptors, overlapped by the blade tip ZTV within 10km of the proposed development to the north, east and west and within 15km to the south of the proposed development, in order to assess the likely

significant visual effects. Within the wider Study Area, the assessment has considered receptors of national importance such as Scotland's Great Trails, Sustrans Cycle Routes and popular hill walking summits (Corbetts), also overlapped by the blade tip ZTV. Receptors that would not be significantly affected have been excluded from the assessment with appropriate reasoning provided as part of the baseline analysis.

Visual Receptors: Settlements and Residential Properties

- 6.90 The assessment of visual effects likely to be experienced from settlements includes consideration of residential areas, the public realm, and public open spaces within the settlement boundaries that would be frequented by people. Settlements and 'Growing Settlements' included in the assessment are those defined in the HwLDP and CaSPlan.
- 6.91 Lairg is the only settlement defined by the CaSPlan within 10km that is overlapped by the blade tip ZTV and included in the assessment. It is located approximately 7.6km from the proposed development¹¹.
- 6.92 Rosehall and Invershin are two 'Growing Settlements' within 10km as defined by the CaSPlan and HwLDP. Both are outwith the ZTV and would have No View of the proposed development. Other settlements beyond 10km, including Bonar Bridge, Ardgay, Golspie, Brora, Helmsdale, Dornoch, Edderton, Tain (Viewpoint 16) and Portnahomack (Viewpoint 20), are either outwith the ZTV or have very limited (Negligible) visibility of the proposed development and are therefore excluded from the assessment.
- 6.93 There are no inhabited residential properties within 2km of the proposed turbines and, in accordance with the Landscape Institute guidance¹², a Residential Visual Amenity Assessment (RVAA) is excluded from the assessment.

Visual Receptors: Transport Routes

- 6.94 Transport routes within 10km of the proposed development that are overlapped by the blade tip ZTV are listed as follows and included in the assessment:
- A839 - Rosehall to Lairg and along Strath Fleet (The Strath Fleet overlaps with the Moray Firth Tourist Route);
 - A836 – Altnaharra – Lairg – Bonar Bridge – Ardgay – Edderton - Tain (overlapped by the Inverness to John O'Groats Sustrans Network);
 - Minor road: Lochbuie – between Bonar Bridge and Loch Fleet, via Loch Buidhe;
 - Minor roads within Strath Fleet including a short section of road connecting properties at Muie;
 - Minor roads connecting Rogart and East and West Langwell; and
 - The Far North (Inverness to Wick) Railway Line.

¹¹ Measured from the centre point of the Site

¹² Residential Visual Amenity Assessment, Landscape Institute Technical Guidance Note 02/19,

- 6.95 In addition, 'A' class roads beyond 10km distance from the proposed development that are overlapped by the ZTV have been included in the assessment as a precaution. These include:
- A838 – to the north of Loch Shin; and
 - A837 – along Strath Oykel.
- 6.96 The B9176 from the A836 near Easter Fearn to just past the northernmost 'Struie Viewpoint' in the Dornoch Firth is also overlapped by the Moray Firth Tourist Route. Additionally, the A9 overlaps with the North Coast 500 Tourist Route within the wider Study Area. Both are included in the assessment under recreational routes. It should be noted that there are two Struie Viewpoint laybys on the B9176: Moray Firth Tourist Route. The southernmost of these views east towards Dornoch (Grid Ref: 266044, 883350) is outwith the ZTV and would have no view of the proposed development. The northernmost Struie Viewpoint layby is illustrated by Viewpoint 12.
- 6.97 The minor road between Achnahamat and Culrain, 8km to the southwest of the proposed development has been scoped out of the assessment as a result of the limited ZTV coverage and site survey revealing roadside vegetation. Where visible, the proposed development would appear as blade tips beyond landform and there would be no significant visual effects.

Visual Receptors: Recreational Routes

- 6.98 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers, cyclists, and others) on recreational routes within the Study Area. The recreational routes include Core Paths, Heritage Paths and Scottish Hill Tracks which have been assessed within 10km of the proposed development and Sustrans Cycle routes. National level long distance routes such as Scotland's Great Trails are assessed within the wider 45km Study Area.

Local Recreational Routes within 10km

- 6.99 Core Path Plans were created in response to a requirement of the Land Reform (Scotland) Act 2003 to provide a statutory right of non-motorised access to most land and inland water. They aim to establish and designate a reasonable network of paths and waterways, with individual paths chosen because they meet at least one objective from a range of purposes, including linking communities, providing access to places of interest, and for recreation.
- 6.100 Core Paths (sourced from THC Core Path Plan and Caithness and Sutherland Amended Core Path Plan) within 10km (as illustrated in EIA Volume 2, Figure 6.11a/b) that are overlapped by the blade tip ZTV are included in the assessment as follows:
- Core Paths around Lairg (SU16.01, SU16.02, SU16.03, and SU16.06);
 - Core Paths around the communities of Rogart and Tressady (SU20.01, SU20.05 and SU20.04, SU20.06 and SU20.07, SU20.08 and SU20.09, and SU20.03);
 - Gruids Wood Core Paths (SU16.08 and SU16.09); and

- Core Paths around Culrain (SU08.02, SU08.03, and SU03.01).
- 6.101 Other local recreational routes within 10km of the proposed development, which are overlapped by the ZTV and included in the assessment are listed as follows:
- Scottish Hill Track 318: Aultguish Inn to Ardgay (Dornoch Firth).
- 6.102 The Dalchork Forest Trails are used for horse riding and cycling in the area of forestry approximately 8km to the northwest of the proposed development. Comparison of the hub height and blade tip ZTVs, wirelines and site visits confirm that visibility from the forest trails in this area would be largely limited to blade tips and / or no visibility as well as being subject to further forestry screening. Significant visual effects are therefore unlikely, and this receptor has been excluded from the assessment.
- 6.103 All remaining routes within 10km (including other Core paths and the Heritage Path: Rogart Drove Road) are outwith the ZTV and would have No View of the proposed development.
- 6.104 Between 10-15km to the south of the proposed development, the Badvoon Forest Core Path is routed through forestry and would have No View of the proposed development. The Core Paths at Spinningdale and east of Loch Migdale are outwith the ZTV. The majority of the Struie Hill Core Path is outwith the ZTV except at the summit and is therefore included in the recreational and tourist destinations assessment as a precaution.
- 6.105 Overlapping road, walking and cycling routes have not been 'double counted' and are assessed as one receptor where they occur with the national level receptor taking precedence in the assessment.

National Recreational Routes (Scotland's Great Trails and National Cycle and Tourist Routes) within 45km

- 6.106 National and other long-distance recreational routes within 45km of the proposed development (as illustrated in Figure 6.10) that are overlapped by the blade tip ZTV are included in the assessment and listed as follows:
- Moray Firth Tourist Route (overlapped with A839, A836 and B9176);
 - Inverness to John O'Groats Sustrans Network (overlapped with the A836 – Tain to Altnaharra);
 - Sustrans Cycle Route 1 (Inverness to Tain);
 - North Coast 500 (overlapped with A9); and
 - John o'Groats Trail.
- 6.107 The remaining routes including the Cape Wrath Trail are outwith the ZTV and would have No View of the proposed development.

Visual Receptors: Recreational and Tourist Destinations

- 6.108 Recreational and tourist / visitor attractions relevant to the LVIA include those features that appear as prominent landmarks or landscape features, and locations associated with passive recreation such as walking, where there is a clear relationship between the feature

/ destination and an appreciation of the landscape. Gardens and Designed Landscapes (GDL) are included where these are open to the public, as well as National Trust gardens / land and Historic Environment Scotland visitor sites which are overlapped by the blade tip ZTV. Some of these locations are also referred to in the Chapter 7: Cultural Heritage and the Chapter 13: Socio-economics. The assessment excludes locations for team sports and other recreational / tourist destinations where the focus of activity is not on the landscape or is indoors – for example museums, libraries, and gift shops.

6.109 Recreational and tourist / visitor attractions that are overlapped by the blade tip ZTV (Figure 6.11a/b) within 10km (and 15km south) of the proposed development and included in the assessment are listed as follows:

- Ferrycroft Visitor Centre;
- The Ord (Viewpoint 4);
- Carbisdale Castle; and
- Struie Hill.

6.110 The Princess Cairn is located 11.7 km to the southeast of the proposed development and has also been included in the assessment as a precaution.

6.111 Other attractions such as Lairg Caravan Park, Falls of Shin Visitor Centre, Invershin Castle, and Dun Creich Fort are outwith the ZTV and would have no view of the proposed development. The vast majority of Loch Migdale and Dounie Wood are also largely outwith the ZTV and there would also be almost no visibility of the proposed development from either of these locations.

Gardens and Designed Landscapes

6.112 Within the wider LVIA Study Area, there are eight GDLs from the Historic Environment Scotland inventory. Dunrobin Castle, Brahan, Cromarty House, Ardrross Castle, Novar, Balnagown Castle and Skibo Castle are all outwith the ZTV. House of The Geanies is located over 32km distance and although it has blade tip ZTV coverage, the intervening distance and surrounding mature woodland would render any visual effects as non-significant. It has therefore been excluded from further assessment. The setting of GDLs is assessed separately under Cultural Heritage in Chapter 7 of this EIA Report.

Hills and Mountains

6.113 The assessment recognises that a range of recreational / tourist activities may be undertaken within the hills and moorlands including but not limited to, stalking / hunting / fishing, climbing / mountaineering, paragliding, horse riding, and mountain biking. The assessment has focused on the walker as the main receptor activity whose attention is likely to be most focused on the landscape and an appreciation of their surroundings.

6.114 There are no Munros or Corbetts within 10km (and 15km south) of the proposed development. However, local hills in the area are walked and these include The Ord and Struie Hill assessed previously under recreational and tourist / visitor attractions.

6.115 In the wider 45km Study Area, there are 10 Munros and nine Corbetts. The closest Munros have been included in the assessment and illustrated as follows:

- Corbetts:
 - Càrn Chuinneag (Viewpoint 18);
- Munros:
 - Ben Klibreck (Viewpoint 19); and
 - Ben More Assynt (Viewpoint 21).

6.116 The remaining mountains are well over 30km in distance and those that are overlapped by the ZTV would not be significantly affected by the proposed development and have been excluded from further assessment.

Predicted Future Baseline

6.117 The proposed development would cover a period of approximately 37 years (including construction, operation and decommissioning). The approximate time periods associated with the proposed development, and whether they are predominantly long-term or short-term are listed as follows:

- Construction: up to 18 months (short-term);
- Operation: up to 35 years (long-term and reversible); and
- Decommissioning: up to 6 months (short-term).

6.118 The LVIA also recognises that some elements of the proposed development such as borrow pits and access tracks will be permanent and remain beyond the construction and decommissioning period, although subject to mitigation in respect of the borrow pits, whilst access tracks may re-vegetate over time if left un-used. Although 'long-term', the operation period of up to 35 years is assessed as though it were permanent, whilst noting that the effects of the proposed turbines would be reversible once decommissioned.

6.119 The LVIA considers that during this period of 37 years, the predicted future baseline and evolution of landscape and visual receptors is unlikely to change significantly under the current regime of landscape and forestry management and maintenance. However, land management, and consequently landscape character, is dependent on a number of economic and environmental factors including the future effects of climate change and human adaptation which are difficult to predict at a local level and not a matter for this assessment. It is however likely that mitigation and adaptation in response to changing climate and biodiversity pressures will continue to have an influence on this area in the form of increased renewable energy and other environmental changes which are likely to alter the landscape baseline as follows:

- Change resulting from an increased reliance on renewable energy, including wind farm development; and
- Change to current levels of forestry and woodland, which may increase.

6.120 Change to the future baseline of other large scale wind energy development closest to the proposed development, which can be reasonably predicted, is set out in Table 6.6.

Lairg and Achany wind farms would be decommissioned approximately 22-23 years prior to the end of the proposed development. However, Lairg II would be decommissioned around the same time as the proposed development if it is built in the same year as noted below. This information has been noted in addition to the baseline cumulative assessment where relevant.

Table 6.6 Future Baseline of other Wind Energy Development within 10km

Name and reference	Year of Commissioning / construction completed	Operational period for the proposed development						
		0-5 Yrs	6-10 Yrs	11-15 Yrs	16-20 Yrs	21-25 Yrs	26-30 Yrs	30-35 Yrs
Acheilidh Wind Farm		Proposed operational period of 35 years						
E01. Lairg	2012	Operational 2012 to 2037						
E02. Achany	2017	Operational 2017 to 2038						
Relevant Consented Wind Energy Developments								
C01. Lairg II	2021	Consented in 2021. Operation Period of 35 years – up to 2060. Likely to be built at the same time as the proposed development, if consented in 2024.						

Mitigation Inherent in the proposed development

- 6.121 There are two clear factors to be considered in the design of wind farms. The first of these is the landscape that will receive the wind farm development, and the second is the design of the wind farm, made up of a series of wind turbines which are inherently tall, modern, and striking features.
- 6.122 The design of the proposed development is explained in the Design and Access Statement and Chapter 4 with a project description including the associated infrastructure detailed in Chapter 3. Landscape related aspects of the design and mitigation are described in more detail in this section. The layout of the proposed development and its various infrastructure components are shown in Figure 3.1.

Design Statement

- 6.123 The inherent nature of wind turbines as tall, modern structures means that the form of the wind farm as a whole is important. The appearance of the wind farm as an object or composition in the landscape has been a key factor in generating the layout. In this respect the design evolution has taken account of the following guidance:
- *SNH Guidance on Siting and Designing Windfarms, Version 3a, 2017*, which aims to achieve a simple, rational and cohesive design that, to a reasonable degree, avoids overlapping turbines and gaps within the visual composition; and

- Landscape constraints, opportunities and guidance for wind farm development within the *Rounded Hills – Caithness and Sutherland LCT*, described by the NS *Landscape Character Assessment*, 2019, the relevant policies of the HwLDP and THC's OWESG (2016).
- 6.124 As set out in Chapter 4, *"The overall design layout principle of the proposed development has been to achieve a coherent and compact design, which minimises direct and indirect adverse effects on the local and wider landscape, while balancing commercial considerations and maximising energy production."* The design evolution has aimed to reduce landscape, visual and cumulative effects and to respect the landscape characteristics identified in the in the NS *Landscape Character Assessment*, 2019, including consideration of the appropriate scale, form, pattern and construction materials, as well as the potential cumulative effect of other wind farm developments (including height and rotation relative to other existing wind farms).
- 6.125 A key consideration for the proposed development was the landscape character and expansive scale and simplicity of the host moorland (*Rounded Hills – Caithness and Sutherland LCT*) which has a reduced susceptibility to large turbines in comparison to other smaller scale and complex landscape character types. As set out in Chapter 4, the visual composition and layout design was guided by the following general design principles:
- *"The avoidance of overlapping or 'stacked' turbines through careful placement, where possible in order to form a well-spaced group or array when viewed from the receiving landscape including key design viewpoints;*
 - *The avoidance of outlying turbines which appear separate or stand apart within the landscape in order to reduce the lateral spread of the proposed development;*
 - *The selection of an appropriate turbine height which respect the scale of the receiving landscape and achieves a balanced composition when viewed from the surrounding landscape whilst recognising that current wind turbine technology has progressed with larger turbines required for greater energy efficiency;*
 - *The development of a layout which relates well to other existing and proposed wind farms within the local area, as well as being coherent in isolation."*
- 6.126 Whilst it may not be possible for the general design principles to be fully achieved (for example it is not possible to avoid all turbine overlap), the establishment of these general principles as part of the design process is important in order to demonstrate appropriate mitigation. Notably, the design process evolved through five stages or interim layouts and collectively the following landscape mitigation was achieved:
- The initial 20 turbine layout was established by taking account of a 1.5km buffer from the nearest inhabited residential properties (increased to 2km) with the site location being removed from landscape designations.
 - The layout has 'pulled back' some of the turbines from the north where they would be more visible from the A839 and Strath Fleet;
 - Eight turbines were removed from the original layout and the turbine height was selected in response to the landscape scale, character and 'fit' with other wind farm development, with the turbine height of six turbines set at 230m and the remaining six turbines at 200m to blade tip;

- Special attention was paid to the visual composition of the turbines and the cumulative appearance of the proposed development alongside the Garvary application from Viewpoint 12: B9176 Struie Layby in the NSA. This has ensured the turbine composition would appear as a simple, cohesive, and ordered layout when viewed from the NSA viewpoint;
- Design consideration was also given to the cumulative design of the neighbouring wind farms including Lairg, Lairg II and Garvary which create one 'wind farm group' or cluster; and
- Design revision of turbine placement and infrastructure was undertaken to eliminate impacts upon native woodland within the Site boundary.

6.127 The design process also took account of consultation advice and feedback from two public exhibitions and a design workshop with THC on 1st February 2023. Computer modelling was used as a tool to aid the design process and a 3D model / wireframes were generated for views from key locations around the Site at each stage.

Design Analysis of the Proposed Development

6.128 Considering the final layout (the proposed development), the following landscape analysis has been undertaken which considers the proposed development in its landscape context as viewed from the surrounding area and viewpoints.

6.129 Within 15km, the site area and the proposed development is surrounded to the north, west and south by the valleys of Strath Fleet, Achany Glen and Strath Oykel / Kyles of Sutherland which contain most of the main visual receptors, including the main roads (notably the A839 to the north and the A836 to the west and south). Taking account of the main viewpoints in these areas it should be noted that the proposed development would frequently be partly screened by combinations of landform, roadside vegetation and other existing or consented wind farm development (Lairg and Lairg II) with the Garvary application contributing further to this. From this perspective, the proposed development is the 'least visible' of the Lairg and Garvary group of wind farms as follows:

- Largely screened by landform / vegetation: Viewpoints 1, 3, 5, 6, 7, 11, and 13; and
- Appearing beyond other wind farm development: Viewpoints 4, 8 and 10.

6.130 As a result, there are few locations where the proposed development can be seen at close range and / or without the partial screening of landform / vegetation or other wind farms. One such location is represented by Viewpoint 2: Lochbuie Road where the proposed development would be seen from closer distance as the minor road crosses an area of uninhabited *Rounded Hills – Caithness and Sutherland* LCT: *South of Strath Fleet* LCA. From this area the visual composition of the proposed development would appear as a simple and cohesive wind farm set within a landscape where there is a strong visual rationale for its location, beyond existing pylons and adjacent to a cluster of wind farm development comprising the existing and consented Lairg and Lairg II and the Garvary application.

6.131 The proposed development would generally appear as part of a wider group or cluster of wind farm development that includes the existing Lairg Wind Farm, the consented Lairg II

Wind Farm and the Garvary application. It is possible that either one or both Lairg II and Garvary will be constructed, and the existing Lairg Wind Farm will be decommissioned in 2037. Two broad cumulative scenarios have therefore been considered in respect of Viewpoints 4, 8 and 10 as follows:

- Scenario 1: Lairg and Lairg II

Where the proposed development appears beyond other wind farm development, there is generally a reasonable match in terms of turbine scale with the existing Lairg and Lairg II wind farms in respect of Viewpoints 4, 8 and 10. Where there is an overlap or partial overlap, proposed development also appears to integrate well with Lairg and Lairg II by tending to 'fill the gaps' between the Lairg and Lairg II turbines.

- Scenario 2: Garvary Application

With the addition of the proposed development to a baseline that includes Garvary, there is a noticeable increase in turbine numbers, density, stacking and complexity from Viewpoints 4, 8 and 10, although this relates more to the Garvary composition and its combination with Lairg II rather than the more limited overlap between Garvary and the proposed development in these viewpoints.

6.132 Consequently, the proposed development has a reduced landscape and visual impact from most viewpoints and cumulative effects viewed from Viewpoints 4, 8, and 10 tend to result more from other wind farm development which appears to the fore of the proposed development. In those more limited locations where the proposed development is more visible, appropriate mitigation has been employed to reduce visual effects (as in the case of Viewpoint 1 in Strath Fleet and Viewpoint 12 in the NSA).

6.133 Taking account of this design analysis, the following observations may be made in response to the THC design workshop:

- Viewpoints 1: A839 near Acheilidh and 5: A839 near Rovie Lodge – THC's main concern stems from the character of Strath Fleet as the only Strath in the wider area that appears to be generally free from the influence of turbines. Compared to the design workshop layout, the turbines have been 'pushed back' and the number of visible turbine hubs in Viewpoint 1 has been reduced from five to three, although there was only a slight change to Viewpoint 5. As a result, significant visual effects on views from Strath Fleet are likely to be limited and the majority of the Strath is outwith the ZTV. This aspect of the assessment is reported further in the landscape character assessment of Strath Fleet and the visual assessment of the A839 in this chapter;
- Viewpoint 3: Bridge near A836 between Lairg and Invershin – THC were concerned that in the absence of Garvary the proposed development would 'significantly extend the horizontal spread' of turbines in the landscape. Since the design workshop, the visibility of the proposed development from this viewpoint has reduced further (Very Low magnitude), resulting in a Negligible effect that would not be significant and should mitigate THC's concerns. Garvary would remain the most prominent scheme from this location;
- Viewpoint 4: The Ord, Lairg – THC expressed concern about the potential for the proposed development to 'significantly extend the horizontal spread' of turbines in the landscape and result in contrasting turbine densities across the cluster. The design workshop wireline did not include the Lairg and Lairg II wind farms and when these

are added the proposed development would appear behind these wind farms and would not therefore extend the horizontal spread of turbines. Where there is an overlap or partial overlap, the proposed development also appears to integrate well by tending to 'fill the gaps' between the Lairg and Lairg II turbines. With the addition of the proposed development to a baseline that includes Garvary there is a noticeable increase in turbine density, although this relates more to the Garvary composition and its combination with Lairg II rather than the more limited overlap between Garvary and the proposed development in this viewpoint;

- Viewpoint 6: Lairg Cemetery - THC were concerned that the proposed turbines may appear similar in size to the Lairg II turbines although they would be more distant. Since the design workshop the landform screening of the proposed turbines has increased and mature woodland cover in this area largely screens views of the turbines, resulting in a Minor to Negligible effect that would not be significant and should mitigate THC's concerns;
- Viewpoint 7: A836 Lairg between Pier and Power Station - THC were concerned about a contrast in scale between the proposed turbines and Lairg. As above, since the design workshop the landform screening of the proposed turbines has increased, and mature roadside trees / woodland largely screens views of the turbines which should mitigate THC's concerns;
- Viewpoint 8: Gruids – As noted in response to Viewpoint 4, THC expressed concern about contrasting turbine densities and also noted a difference in turbine proportion when compared to Garvary with the blades of the proposed turbines appearing proportionally shorter. The proposed development would appear behind the Lairg II and / or Garvary wind farms and would have a limited contribution to turbine density and visual impact which largely results from Lairg II and Garvary. Differences in turbine proportion would also be less visible due to this overlap;
- Viewpoint 12: B9176 Struie Layby – THC noted a cohesive composition from this viewpoint had been achieved. However, they commented that the location of the proposed development may affect the perception of scale and distance and result in more focus on the proposed development in comparison to the neighbouring Garvary application. After examining the photomontages as well as the wirelines, this point is debatable as both wind farms would appear equally visible from this viewpoint and are a similar distance from the viewpoint (the proposed development being approximately 500m further away). Both wind farms also flank Ben Klibreck which is visible in the far distance. An assessment of the viewpoint and the Dornoch Firth NSA is provided in the landscape section of this chapter;
- Viewpoint 16: Tain Waterfront – THC note that the proposed development would be 'less challenging' to the NSA although they commented that the removal of turbine hubs from the wireline would be beneficial. Whilst there is no notable change to the turbine composition from this viewpoint, at 22.6km distance the visual effect would not be significant; and
- Viewpoint 20: Ben More Assynt – THC noted the contrasting scale compared to the three Lairg turbines, but a similar observation could be made in respect of either Lairg II and / or Garvary and numerous other wind farm developments of varying heights are visible in the wider view. At 31.2km distance the visual effects would not be significant.

- 6.134 THC also provide some preliminary comments on the 10 Criteria within their OWESG. They concluded that Criteria 1: in relation to effects on settlements was respected but expressed concerns in relation to Criteria 6-9 regarding the existing pattern of wind farm development. Considering the design of the proposed development and its relationship to the baseline cluster of wind farm development which includes Lairg, Lairg II and Garvary, it is considered that these criteria are generally respected. This conclusion takes account of various cumulative design scenarios that consider combinations of Lairg, Lairg II, Garvary and the proposed development and the tendency for the proposed development to take on a more subdued visual role in this group, often appearing beyond other developments.
- 6.135 THC have interpreted Criteria 2 and 10 as related to the lack of wind farm development visible from Strath Fleet. Further design evolution has reduced the effects on this Strath such that the 'non-wind farm' character of the majority of Strath Fleet would be preserved.
- 6.136 No judgements were made in respect of Criteria 3, 4 and 5 although THC noted that assessment of the NSA, Ben Klibreck, The Ord and a series of transport and recreational routes would be required. All of these receptors have been assessed in this Chapter.

Landscape Specific Mitigation

Construction Mitigation

- 6.137 The outline Construction Environmental Management Plan (CEMP) includes measures to mitigate adverse landscape and visual effects during construction such as the restriction of construction traffic to designated routes, to avoid damage to the road corridor such as the creation of wheel ruts and ensure these are cleared-up and reinstated. Peat and topsoil will be handled in accordance with an Outline Peat Management Plan, set out in Technical Appendix 8.2 (PMP).
- 6.138 There would be regular environmental monitoring and reporting to ensure the removal, reinstatement, and clear up of the temporary construction compound / laydown areas and any related construction arisings / redundant material.
- 6.139 A Site Restoration Plan will be submitted for approval by THC before construction begins. The key elements will include the reinstatement of the borrow pit working areas, construction compound, laydown areas and cable trenches. Site tracks would be 'softened' with shoulders graded with excavated subsoil or peat and completed with the original topsoil or turfs where available.
- 6.140 The temporary construction compound and laydown areas will be fully re-instated with stored turfs or excavated soil and / or re-planted to accord with the Site Restoration Plan.

New Site Access and Internal Access Tracks

- 6.141 A total of approximately 7.22km of new wind farm access tracks would be constructed. Temporary passing places would also be provided every 500m (as required). The tracks would feature local widening on corners and would be surfaced with coarse aggregate

(see Figure 3.4 for typical track cross sections). New sections of track across areas of peat deeper than 1m would be floated, comprising a total of approximately 2.15km.

- 6.142 Limited sections of the wind farm access tracks would be most visible from Viewpoints 2, 8, 9 and 10 within 10km and are illustrated in Figure 6.19, 6.25, 6.26 and 6.27. These are the only viewpoints within 10km where, apart from the turbines, any other associated infrastructure would be visible. These low levels of visibility of the Site infrastructure confirm minimal landscape and visual effects on the surrounding receptors.
- 6.143 On completion of Site construction, the Site entrance and access tracks would be cleared of any construction signage and left in a tidy and co-ordinated condition with verges restored and field boundary fencing neatly tied into new gates / access details.

Wind Turbines

- 6.144 A total of 12 wind turbines are proposed with six turbines at a blade tip height of up to 200m and the remaining six at a blade tip height of up to 230m, each with an associated crane pad. The turbines would be a uniform, semi-matte grey colour (no company logos or advertising) to reduce their contrast with the background sky and minimise their reflectivity.
- 6.145 The proposed turbines would all rotate in the same direction and at a slow and predictable speed of approximately 5 revolutions per minute (rpm) up to a maximum of approximately 17.5rpm. The 33kV switchboard/transformer required for each turbine will most likely be located within the turbine tower, but subject to final manufacturer's design, this equipment may also be located within its own adjacent stand-alone kiosk measuring approximately 3m by 2m by 3m high. These would each be colour-coordinated with the substation building and associated battery energy storage containers to have a low contrast with the surrounding landscape and best match the existing forestry colours.
- 6.146 Aviation warning lights would be required and a lighting strategy to provide mitigation of the potential landscape and visual effects at night is proposed. An assessment of the night-time effects is reported in Technical Appendix 6.3.

Temporary Construction Compound

- 6.147 During the construction period, a temporary construction compound (40m x 45m) including laydown area (100m x 50m) would be required as shown on Figure 3.1. The location has been selected partly because it has low landscape sensitivity and would not be visible from surrounding receptors, primarily due to intervening landform.
- 6.148 The areas would be prepared by stripping soil, laying down a geotextile material and then a working surface of stone. The stripped soil would be stored adjacent to the compound for subsequent use in reinstatement works at the end of the construction period. The site compound and laydown area would be fully re-instated with stored turfs or excavated soil and / or re-seeded to match the local contours and the existing vegetation.

Borrow Pits

- 6.149 Up to three borrow pit search areas have been identified, as described in Chapter 3 and shown as borrow pit search areas in Figure 3.1. It is anticipated that further detail regarding the location and specifications of any on-site borrow pits will be provided post-consent, following completion of detailed ground investigation and technical studies. The borrow pit search area locations have a low landscape sensitivity and very limited visibility from the surrounding area.
- 6.150 Upon completion, the borrow pit would be restored and a detailed reinstatement programme developed, drawing upon the advice of a landscape architect and implemented in agreement with THC, SEPA and NS. This will ensure that proposed reinstatement materials and techniques are suitable and may identify appropriate environmental enhancement opportunities. It is anticipated that steep faces would be backfilled and/ or re-profiled to match the surrounding topography, and disturbed surfaces would be covered with soil and re-seeded / re-turfed or left as exposed rock outcrops.

Substation

- 6.151 The main substation building, and compound (90m by 90m, 132kV substation compound) would have very low visibility from the surrounding areas, primarily due to the surrounding landform. The Substation compound is illustrated indicatively in Figure 3.10 and would typically include two single-storey, pitched roofed buildings comprising the network operator building and the wind farm control building, with switchgear infrastructure and car parking. The Substation compound would also be enclosed by a 2.7m high security fence. The colour of the building would be selected to have a low contrast with the surrounding uplands.

Electrical Cables and Grid Connection

- 6.152 All on-site electrical cables linking the turbines, substation and route to grid connection would be underground and buried within a trench alongside the internal access tracks.
- 6.153 The grid connection point would be determined by the local Distribution Network Operator (Scottish and Southern Energy (SSE)) and would be subject to a separate application.

Energy Storage Compound

- 6.154 An Energy Storage Compound would be constructed within the western side of the temporary construction compound area. The Energy Storage Compound would contain up to 5 ISO shipping containers (12.2m x 2.4) housing batteries. A Power Conversion System (PCS) container, similar to the dimensions of the battery containers would be located adjacent to each battery storage container. To maintain the amenity and simplicity of the Rounded Hills, the colour of the associated battery containers and PCS would be co-ordinated with that of the substation to have a low contrast with the surrounding landscape. These would also be enclosed by a 2.4m high perimeter fence with a low visibility style and colour. It would have very low visibility from the surrounding areas, primarily due to the screening effects of the surrounding landform.

Operational Mitigation

- 6.155 The operation of the proposed development would cover a period of 35 years and include site management to ensure the adequate maintenance of site facilities and landscape features, such as access tracks, field boundaries, gates, and signage.

Decommissioning

- 6.156 The proposed development would be decommissioned at the end of its operational period which is expected to take up to approximately 6 months. In accordance with Chapter 3, all visible, above ground structures (turbines, ESC and substation) would be removed upon decommissioning, thereby rendering the vast majority of the landscape and visual effects as reversible. Subject to landowner requirements, the main operational site entrance and some of the internal access tracks would remain as permanent features, with redundant areas and crane hard standings removed and restored in accordance with industry guidance. A Site Decommissioning Plan will set out environmental protection measures and restoration principles which will be implemented. This Plan will be agreed with THC.

Residual Landscape Effects

- 6.157 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows.

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."

- 6.158 These effects are assessed by considering the landscape sensitivity (value and susceptibility) against the magnitude of change. The type of effect can also be described as temporary or permanent, direct or indirect, cumulative and positive, neutral, or negative.
- 6.159 The residual landscape effects, assessed here, are those effects remaining after all of the proposed design mitigation has been taken into account. An assessment of the cumulative landscape effects, taking account of other existing and consented wind farm development and any current wind farm applications, as set out in Table 6.4 has been undertaken according to the methodology detailed in Technical Appendix 6.1.
- 6.160 The effects of the proposed aviation warning lights of the proposed development on the LCTs are reported in Technical Appendix 6.3 and a summary of that assessment is provided as part of this Chapter.

Landscape Effects on Rounded Hills – Caithness and Sutherland LCT

- 6.161 The 'host' landscape for the proposed development is the *Rounded Hills – Caithness and Sutherland LCT* (number 135 on Figures 6.7-8 and in the NS 2019 Landscape Character Assessment). This area comprises broad hills with rounded summits, generally lying around 400 - 500 metres high.
- 6.162 There are a number of units of the *Rounded Hills – Caithness and Sutherland LCT* covering a relatively large area to the west, centre, north, north-east and east of the Study Area and making it a relatively common LCT regionally. Within 10km, the LCT covers the majority of the area as illustrated in Figure 6.8. Due to its extensive coverage, the LCT has been sub-divided into two smaller landscape character areas (LCAs) to enable more detailed assessment of the effects of the proposed development. These follow the natural division formed by Strath Fleet and are defined in the baseline as:
- South of Strath Fleet LCA (the host landscape); and
 - North of Strath Fleet LCA.
- 6.163 Other LCAs of the *Rounded Hills – Caithness and Sutherland LCT* are excluded from the assessment due to intervening distance, limited visibility, and the presence of other wind farms within these LCAs. This latter concern would mean that the proposed development would appear visible beyond other existing and consented wind farms, diluting any influence or effect on landscape character likely to result from the proposed development. As a result, the key characteristics and overall landscape character of these LCAs would not be significantly affected by the proposed development. Examples include the area of *Rounded Hills* to the west of Achany Glen, and southwest of the Kyles of Sutherland.
- 6.164 The landscape character of the *Rounded Hills – Caithness and Sutherland LCT* is described within the NS 2019 Landscape Character Assessment as follows:
- "...occurs extensively across Caithness and Sutherland where, in south-eastern Sutherland it forms higher and more defined rounded hills adjacent to the lower and more gently undulating and lower-lying Sweeping Moorland and Flows. It also extends into Ross and Cromarty to the south of Loch Shin and the Dornoch Firth."*
- 6.165 The key characteristics of the *Rounded Hills – Caithness and Sutherland LCT* are described by NS 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."*

6.166 As acknowledged in the key characteristics, wind farm development is a feature of this LCT. Within 10km, landscape character is influenced by existing wind farms including Lairg and Achany. Consented wind farms include Lairg II, as illustrated in Figure 6.8. Within the wider Study Area, there are a further five existing wind farms (Rosehall, Kilbraur and its Extension, Creag Riabhach and Gordonbush) and three consented wind farms (Achany Extension, Meall Buidhe, and Sallachy) within or partially within the LCT, as illustrated in Figure 6.7.

6.167 It is noted that the proposed development would be situated on low-lying hills within an area of extensive uplands interspersed with surrounding blocks of coniferous forestry and would therefore follow the established pattern of wind farm development within the LCT.

Rounded Hills – Caithness and Sutherland LCT (135): South of Strath Fleet LCA

6.168 The proposed turbines and associated infrastructure would be located on gently undulating slopes of the upland area between the western extent of Strath Fleet and Achany Glen. To the southwest, south and southeast of the proposed turbines, the undulating landform continues towards the Kyle of Sutherland and Dornoch Firth where the landform loses elevation, and the character changes to the adjoining *Strath and Farmed and Forested Slopes with Crofting* LCTs. Similarly, to the northeast, north and northwest the LCA boundary is formed at the upper edges of Strath Fleet and the edge of the farmed and crofted slopes at Achany Glen as it opens out at Loch Shin. Within 10km, low summits in combination with straths and lochs (for example Strath Tollaidh, Strath Carnaig, Loch an Lagain, and Loch Laro) form enclosed areas with limited visibility from lower lying valley floors or lochs. Extensive coniferous forestry is also located to the southeast of the LCA around Beinn Domhnaill (347m AOD), and at the boundaries of the LCA to the west, southwest, south, southeast and east which further limits both the potential for visibility and the numbers of likely visual receptors or people within these areas. To the north there is more limited access from Strath Fleet.

6.169 Site surveys have confirmed that the landscape character of the proposed development Site and surrounding area is fairly typical of the *Rounded Hills – Caithness and Sutherland*

LCT and displays many of the key characteristics described in the NS landscape character description, noted previously.

- 6.170 In terms of other wind farm development, the Site is located approximately 2.3km distance from the Lairg Wind Farm, approximately 10km from Achany Wind Farm and approximately 1.8km distance from the consented Lairg II Wind Farm. Generally, existing and consented wind farm developments are present in most quadrants of the wider 45km Study Area.

Landscape Sensitivity of the Development Site and the Rounded Hills – Caithness and Sutherland: South of Strath Fleet LCA

- 6.171 The landscape assessment has been undertaken in accordance with GLVIA 3 and the methodology and glossary set out in Technical Appendix 6.1. GLVIA 3, paragraph 5.39 advises that “*Landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape. ... it is specific to the particular project or development that is being proposed and to the location in question.*”
- 6.172 Landscape susceptibility according to the GLVIA3, glossary means “*the ability of the landscape to accommodate the development without undue consequences for maintenance of the baseline situation and / or the achievement of landscape planning policies and strategies*”.
- 6.173 There is currently no Landscape Capacity Study covering this area, although many of the key characteristics of the *Rounded Hills – Caithness and Sutherland* LCT indicate a reduced sensitivity to wind farm development whilst some of its valued aspects such as the ‘*Strong sense of wild character ... within the more remote and little modified parts of this landscape*’ indicate an increased sensitivity. The assessment conducted here is specific to this wind farm proposal and the proposed Site (*Rounded Hills – Caithness and Sutherland: South of Strath Fleet LCA*) which encompasses an area of between Strath Fleet to the north and Achany Glen to the west.

Landscape Susceptibility

- 6.174 A range of landscape criteria or indicators of susceptibility to wind energy development have been considered, as set out in Table 6.7. They indicate that the Site area has a Medium to Low susceptibility in respect of its physical criteria; a Medium susceptibility in respect of perceptual criteria; and an overall Medium susceptibility in respect of the visual criteria. An overall susceptibility of *Medium* is concluded, due mainly to the large landscape scale, simple unenclosed land cover, limited settlement, and the visual influence of other wind farm development. Other criteria with regard to sensitivity relate to the simple skyline and the rationale and wind-swept nature of the Site. Taken alone, these factors would indicate a lower susceptibility, but this has been increased to medium to take account of the proximity to the *Strath* LCT of Strath Fleet which has a higher sensitivity to wind farm development. Other criteria with regard to sensitivity relate to the presence of forestry plantations around the Site, other wind farm development in this area and the wind-swept nature of the Site.

Table 6.7: Rounded Hills – Caithness and Sutherland: South of Strath Fleet LCA: Landscape Susceptibility

Landscape Attributes	Characteristics that are less susceptible to wind farms			Characteristics that are more susceptible to wind farms	
	Low	Medium – Low	Medium	High - Medium	High
Physical Characteristics:					
Scale	Larger scale landscapes and landform which may be more able to accommodate large scale wind turbines			Smaller scale well defined landforms which may become dominated or overwhelmed by wind turbines	
		✓			
Landform and Topography	Simple upland plateau, gently rolling or flat landscapes as the turbines may be less easily scaled against the landform			Complex landforms with well-defined changes in level including ridges, steep sloping hillsides and narrow valleys.	
		✓			
Land Cover	Large scale simple and homogenous land cover including moorland, grass lands, and large forestry plantations, where the simplicity of the land cover may complement turbines			Complex and diverse land cover including a diversity of arable fields, grassland, trees / hedges / woodland, open water of a small scale that turbines may dominate.	
	✓				
Pattern	Unenclosed land or rectilinear field patterns which may complement the modern aesthetic of turbines.			Irregular small-scale patchwork or medieval field patterns where turbines may overwhelm the scale and landscape pattern.	
	✓				
Settlement pattern	Sparse or no settlement with relatively few visual receptors and scale indicators.			Populated areas and lowlands with larger numbers of visual receptors and small-scale indicators.	
		✓			
Other Development	Large scale industrial, infrastructure and mineral extraction land uses detracting from the overall landscape sensitivity and value. Landscapes with vertical masts, pylons and turbines.			Rural / traditional forms of development including parks, gardens, and monuments enhancing the overall landscape sensitivity and value.	
			✓		
Change and Movement	Busy major roads and other areas of significant mechanised movement where the movement of turbine blades may be in character.			No roads or only quiet country lanes where turbine blade movement could be eye catching.	
			✓		
Perceptual Characteristics:					
Wildness and Naturalness	Area not valued for wildness as a key characteristic or special quality.			Area valued for wildness as a key characteristic or special quality.	
		✓			
Remoteness	Area that feels closer to people and human activities. Conversely, a remote Area not valued for wildness or tranquillity			Area that feels remote from people and human activities. Conversely, landscapes that are settled / built up would have a higher number of visual receptors.	

Landscape Attributes	Characteristics that are less susceptible to wind farms			Characteristics that are more susceptible to wind farms	
	Low	Medium – Low	Medium	High - Medium	High
	would have a lower number of visual receptors.				
		✓			
Rational / Windswept	Open and exposed landscapes where turbines, though more visible, may be logically located on windswept locations.			Enclosed or sheltered landform likely to be of a smaller scale and limited rational for turbine locations.	
		✓			
Visual Characteristics:					
Openness and Enclosure	Enclosed landscape with limited opportunities for long range views.			Open landscapes with opportunities for long range views.	
			✓		
Skyline	Broad simple skylines lacking in distinctive or 'landmark' topography.			Skylines which are an important and noticeable component in the landscape with 'landmark' topography.	
		✓			
Landmarks	Landscapes with no sensitive features where turbines might detract from settings			Landscapes with landmarks and features such as church spires and prominent listed buildings where turbines might compete as landscape foci and detract from settings	
		✓			
Surrounding Context	Self-contained landscape with limited relationship with adjacent areas.			Landscapes that are closely connected to the adjacent / surrounding areas in terms of similar character or visual backdrop.	
				✓	
Overall Susceptibility			Medium		

Landscape Value

- 6.175 The Site is not located within a designated landscape and would have limited visibility from designated landscapes in the wider area. The closest designated landscape is the nationally designated *Dornoch Firth* NSA which is ~8.3km distance from the nearest proposed turbine. The nearest WLAs are located ~10km distance to the northwest and northeast. The Site has limited public access and recreational use. Despite the lack of designation, the landscape is in a reasonable condition in terms of its representativeness, landscape interest, perceptual and scenic quality, and is considered to be of *Medium* local value.

Overall Sensitivity

- 6.176 Considering the assessment of Medium susceptibility and the Medium value in respect of the undesignated Development Site and surrounding area, the overall sensitivity of the

Rounded Hills – Caithness and Sutherland LCT: South of Strath Fleet LCA to the proposed development is assessed as *Medium*.

- 6.177 The landscape elements on the Site—mainly moorland vegetation—are not sensitive in landscape terms (Low).
- 6.178 The other LCA of the *Rounded Hills – Caithness and Sutherland LCT* within approximately 10km is assessed in Table 6.8.

Landscape Effects during Construction

- 6.179 The 18-month construction phase would result in localised direct landscape effects on the Site and its component landscape elements of moorland vegetation. During this period there would be dynamic and progressive change to the landscape involving new and upgraded access track creation, movement of people and construction vehicles, plant and machinery, localised establishment of compounds, deliveries and site storage, excavation of borrow pits and localised construction of turbine foundations.
- 6.180 Effects on landscape elements, mainly the moorland vegetation (Low sensitivity) would be limited. Although the construction works would affect localised areas, progressing from *Zero to High* magnitude of change, towards the completion of the proposed development, the likely landscape effects on the fabric and constituent elements of the landscape (moorland vegetation) would range from **Negligible to Moderate** and would be Not Significant.
- 6.181 In terms of the likely effects on landscape character, the magnitude of change during the construction phase would range progressively from *Zero to High*, primarily as a result of the turbine construction and related infrastructure, including the creation of new access tracks, construction compounds, substation and battery storage, and borrow pits. Overall, the landscape effects on the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet LCA* would range from **None** (at the start of the construction phase) increasing to **Major** and Significant upon completion, due in particular to the nature of construction activity (contrasting colours, movement of plant and people). The geographical extent of significant effects would be limited to areas within the Site itself extending out to approximately 2km north (the limits of this LCT in that direction) and up to approximately 3-3.5km east and south from the proposed turbines (beyond which the theoretical visibility becomes patchy due to the presence of straths and glens in combination with low hill summits and areas of forestry). There would be no significant effects to the west due to the presence of the existing Lairg and consented Lairg II wind farms which already have an influence on this part of the LCT. Any potential landscape effects resulting from the proposed development would overlap with these developments and their effects on the existing LCT. Because of the localised nature of this effect and the intervening landform and some forestry, the wider *Rounded Hills – Caithness and Sutherland: South of Strath Fleet LCA* would not be significantly affected in overall terms.

Landscape Effects during Operation

- 6.182 During operation, the completed wind farm would gain a more 'settled' appearance when compared to the same area during the construction period. Although significant,

the landscape effects would continue throughout the operational period mainly as a result of the proposed turbines and less as a result of the associated infrastructure.

- 6.183 Most of the key characteristics of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA are physical in nature, and these would not be affected or altered by the proposed development during operation. It is worth noting that this LCT is already influenced by the presence of the existing Lairg Wind Farm (and consented Lairg II Wind Farm) to the west of the LCA. The proposed development would however introduce a new development, extending the influence of wind farm development across an extensive area of low upland hills between the settled areas within Strath Fleet to the north and northeast, and Achany Glen to the west and near the A839, away from the ‘*more remote and little modified parts of this landscape*’ as identified in the NS landscape character description.

- 6.184 The proposed turbines would be located on low upland hills which are set back from Strath Fleet and Achany Glen and contained by a series of low-lying summits when viewed from low-lying areas such as the valley floors. This containment also limits the overall visibility from the *Dornoch Firth* NSA to the south / south-east where ZTV coverage is limited to the north facing slopes along the southern edge of the NSA and some open stretches of water to the southeast of the NSA. The magnitude of change would be High (subject to localised screening from landform and forestry), and the geographical extent would extend approximately 2km north (the limits of this LCT in that direction) and up to approximately 3-3.5km east and south from the proposed turbines as indicated by the ZTV. There would be no significant effects to the west due to the presence of the existing Lairg and consented Lairg II wind farms which already have an influence on this part of the LCT.

- 6.185 The duration of these effects would be long term (35 years and assessed as permanent) although it should be noted that the effects would be largely reversed as a result of decommissioning (assessed separately).

- 6.186 As a result of the Medium sensitivity and the High magnitude of change, the level of effect on part of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA would be **Major** and significant, extending over a limited area up to approximately 2km north and up to approximately 3-3.5km east and south from the proposed turbines as indicated by the ZTV. The effects would not be significant in terms of the overall landscape character and the nature of these effects would be long-term, direct and negative due primarily to the height and scale of the wind turbines and their effect on the perceptual qualities of this landscape. There would be no significant effects to the west due to the influence of the existing Lairg and consented Lairg II wind farms which already have an influence on this part of the LCT.

- 6.187 This level of effect, and geographical extent, is to be expected for large-scale wind farm development and significant effects on the host landscape are unavoidable. The proposed development has undergone a series of design iterations and mitigation to reduce the landscape and visual effects is embedded into the proposed development.

- 6.188 Beyond 2-3.5km, inter-visibility with the turbines becomes patchy due to landform and is restricted by forestry and the magnitude of change on the remaining areas of this part of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA would reduce to

between Medium and Zero leading to a **Moderate** effect or less that would not be significant in overall terms due to the large scale of this landscape. The nature of all these effects would be long-term (reversible) direct, and negative.

Cumulative Assessment: proposed development, Existing and Consented Wind Farms

- 6.189 The existing Lairg Wind Farm and consented Lairg II Wind Farm already have a direct effect on part of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA and an indirect effect on the remaining areas of *Rounded Hills – Caithness and Sutherland* within 10km. There is also intervisibility with the existing Achany and Rosehall, and Kilbraur wind farms, located in another unit of *Rounded Hills – Caithness and Sutherland* LCT, just beyond 10km to the west and east.
- 6.190 The proposed development would be most associated with the wind farm development at Lairg and Lairg II wind farms. There would be locally significant effects on landscape character within 2-3.5km of the proposed turbines as noted previously. Figure 6.13 indicates that cumulative visibility of Lairg, Lairg II and the proposed development would be limited to the west and northwest of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA with some theoretical visibility to the centre on facing slopes of Strath Oykel / Kyle of Sutherland within this LCA.
- 6.191 The additional cumulative effect of adding the proposed development to the existing and consented wind farm baseline would be slightly reduced by the presence of these wind farms, although still significant (**Moderate**). The nature of these effects would be long-term (reversible) direct, cumulative and negative.
- 6.192 The combined cumulative magnitude would be High, extending to within 2-3.5km distance from the proposed development, leading to a **Major** and combined significant cumulative effect as a result of Lairg, Lairg II and the proposed development. Unless consent is granted to extend operation, Lairg Wind Farm would be decommissioned in approximately 12 years, reducing this cumulative effect. However, cumulative effects would remain as a result of the proposed development, and the consented Lairg II Wind Farm. Other existing and consented wind farm development has a Low, direct magnitude of change on this LCA, characterising the western views towards other areas of *Rounded Hills – Caithness and Sutherland* LCT. The nature of these effects would be long-term (reversible) direct, cumulative and negative.

Cumulative Assessment: proposed development, Existing, Consented and Application Wind Farms

- 6.193 The Garvary application Wind Farm would be located within the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA to the west and southwest of the proposed development at approximately 0.9km distance. This would adjoin the consented Lairg II and the existing Lairg wind farm to form a cluster of windfarm development in the western part of the LCA. The proposed development would add to this cluster of wind farm development within the LCA and would thereby retain the pattern of wind farm development towards the northwest of the LCA. Figure 6.13 indicates that there would be very few additional areas of theoretical visibility within the LCA as a result of the addition

of the proposed development (indicated in blue). The clustering within one geographic area of the LCA in combination with the separation from the cluster of wind farm development (Rosehall, Achany, Meall Buidhe and Achany Extension wind farms) in the adjoining area of *Rounded Hills – Caithness and Sutherland* LCT to the west would enforce the existing perception of the LCA, and the wider LCT as a 'landscape with views of wind farms' as defined by NS – although there would be a greater density of turbines in views.

- 6.194 The combined or overall cumulative effect would remain significant (**Major**) on part of the *Rounded Hills – Caithness and Sutherland: South of Strath Fleet* LCA within 2-3.5km of Lairg, Lairg II, Garvary and the proposed development. Unless consent is granted to extend their operation, Lairg Wind Farm would be decommissioned in approximately 12 years, reducing this cumulative effect. However, cumulative effects would remain as a result of the proposed development, and the consented Lairg II Wind Farm and the Garvary application. The additional cumulative effect of the proposed development would be reduced to **Moderate to Minor** and Not Significant by the presence of other existing and consented development, and the Garvary application (Medium - Low magnitude). The nature of these effects would be temporary to long-term (reversible), cumulative, direct and negative.
- 6.195 The probability of these effects occurring would range from certain (in terms of existing development) to uncertain (in respect of wind farm development at application stage).

Landscape Effects During Decommissioning

- 6.196 During decommissioning, the Site would return to a 'construction site' for a temporary period and the level of effect would be variable over the site and according to the phase of activity. In overall terms, the magnitude would reduce from operational levels to Very Low with the removal of the turbines and associated above ground infrastructure (excepting on-site access tracks). The residual landscape effect would be **Negligible** and Not Significant. All other wind farm operations would have ceased under the terms of their respective planning conditions for operation and the residual cumulative effects post decommissioning are also likely to be Negligible. The nature of these effects would be permanent, direct, and positive to neutral when compared to the pre-existing landscape of the local area.

Effects of Reduced Intensity Aviation Warning Lights

- 6.197 No significant night-time landscape effects have been assessed in Technical Appendix 6.3 as a result of the proposed aviation warning lights which includes a Lighting Strategy to provide mitigation.

Indirect Effects on the Surrounding Landscape Character

- 6.198 As described in paragraphs 6.73-76, apart from the host LCT, eight other LCTs are assessed in detail in Table 6.8.
- 6.199 The effects on surrounding landscape character would be limited to effects on the key visual or perceptual characteristics of these landscapes, resulting from views of the proposed turbines and associated development where visible. The assessment considers

the likely change to landscape character and as such it is different from the visual assessment of particular views, experienced by people.

- 6.200 In summary, a small area of *Strath – Caithness and Sutherland LCT: Strath Fleet LCA* between 2km and up to 3-3.5km around Muie and Ardachu in the central western part of the LCA would be significantly affected by the proposed development. None of the other LCTs would be significantly affected in terms of their landscape character, although there would be significant visual effects on the views from some of these areas.

Table 6.8 Indirect Effects on Surrounding Landscape Character

Landscape Character Type and Area	Assessment
Landscape Character within 10km	
135 – Rounded Hills – Caithness and Sutherland LCT	
North of Strath Fleet LCA	The <i>Rounded Hills – Caithness and Sutherland LCT: North of Strath Fleet LCA</i> is a relatively small area of the LCT located across Strath Fleet to the north of the host LCA, between Strath Fleet and an area of sweeping moorland and is defined at its western boundary by farmed and crofted slopes near the settlement of Lairg. The <i>North of Strath Fleet LCA</i> is typical of the key characteristics of the <i>Rounded Hills – Caithness and Sutherland LCT</i> outlined for the host LCT above. The LCA comprises the upper slopes and hill summits to the north of Strath Fleet which form a low-lying ridgeline of between 247m AOD and 323m AOD, and a gently undulating upland area that quickly transitions to sweeping moorlands to the north. Vegetation comprises areas of open moorland and large areas of coniferous forestry to the west, with some mixed woodland towards the centre of the LCA. The LCA is not overlapped by any landscape designations indicating a Medium landscape value. The susceptibility to change from the introduction of the proposed development is Medium due to the large scale of the LCA and influence of existing neighbouring wind farm development (Lairg, and to a lesser extent, Rosehall and Achany). The overall sensitivity is therefore considered to be <i>Medium</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA, although the nearest proposed turbine would be located approximately 3km to the south. Theoretical visibility within this area, is patchy, occurring along the elevated southern edge and again towards the northern edge of the LCA, although the influence of wind farm development from Lairg, Rosehall and Achany is also present. None of the key characteristics of this LCT would be notably affected by the proposed development. The magnitude of change would range from <i>Medium-Low to Zero</i> and the level of effect Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms located within this LCA. Lairg and the consented Lairg II wind farms would be located across Strath Fleet forming a small wind farm cluster at approximately at 2.5km and 3.5km respectively (both <i>Medium-Low to Zero</i> magnitude). Rosehall and Achany wind farms are located across Achany Glen to the southwest at distances over approximately 8km (nearest turbine) (both <i>Very Low to Zero</i> magnitude). Kilbraur is located to the northeast at over 5km distance (<i>Low to Zero</i> magnitude). The additional effect of the proposed development would reduce to Minor to None and Not

Landscape Character Type and Area	Assessment
	Significant. The combined landscape effect would remain Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> There are no application wind farm developments within this LCA. Other applications which would have an influence on this LCA include Garvary which would be located across Strath Fleet, approximately 4.5km distance from the LCA at its closest point (Low to Zero magnitude). The additional effect of the proposed development would reduce to Minor to None and Not Significant due to the presence of the Lairg, Lairg II and Garvary cluster. The combined landscape effect would remain Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
142 - Strath – Caithness and Sutherland LCT	
Strath Fleet LCA	<i>Strath Fleet LCA</i> is located to the north of the proposed development at between ~1.8 – 10km from the proposed turbines. Within 10km, the <i>Strath Fleet LCA</i> follows the River Fleet between the northeast of Tomich on the A839 and continues south-east and eastwards through Rogart to Morvich. The <i>Strath Fleet LCA</i> is typical of the key characteristics of <i>Strath – Caithness and Sutherland LCT</i>. Key characteristics of the Strath Fleet as described by NS include the River Fleet meandering across the flood plain, traced by riparian woodland; smooth pastures, enclosed by wire fencing; settlement at Rogart and scattered along the strath sides; the A839 aligned along the edge of the floodplain with views frequently focused along the strath and / or contained by landform. The straths often have a sheltered aspect allowing improved pasture, mixed and broadleaf woodland and settlement to occur. There are often a number of historic or archaeological features associated with past and present settlement. The eastern tip of the Strath is overlapped by the <i>Loch Fleet, Loch Brora and Glen Loth SLA</i> and the A839 is promoted as part of the Moray Firth Tourist Route indicating a High value. This LCA has a High - Medium susceptibility to views of wind turbines due to its small scale and partly settled character which has limited visibility of other wind farms (Lairg and Kilbraur) from some locations. Views from within this landscape tend to be focused along the length of the strath and contained by enclosing landform, such that turbine visibility on the skyline, in line with the Strath may be particularly noticeable. Overall, the sensitivity of Strath Fleet to the proposed development is <i>High-Medium</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA and the physical characteristics of the Strath would remain unchanged by the introduction of the proposed development. The nearest turbine would be located approximately 1.8km to the south. Whilst ZTV coverage indicates theoretical visibility of up to 4-6 turbines across the central and western areas of this LCA, much of this area is subject to further screening from trees and woodland within the Strath, along the river and roadside of the A839. Due to the length and partially wooded / forested nature of the glen, potential effects from the proposed development would vary as the distance, screening and perceived scale of the turbines in the landscape changes. Where visible the turbines would appear as a new feature at the head of the valley or along the valley sides. The turbine blade rotation would also be visible. Roadside vegetation and farm buildings / properties, in places would further screen the proposed turbines. Views from the Strath are illustrated in Viewpoints 1 and 5 in Figures 6.18, and 6.22. Where visible the turbines would appear as a new feature, mitigated slightly by the intervening distance. The magnitude of change on the landscape character would range from Medium where the turbines would be

Landscape Character Type and Area	Assessment
	from 2km to up to approximately 3-3.5km around Muie and Ardachu (central western part of the LCA) reducing to Low and Very Low with increased distance. The influence of the proposed turbines would be slightly reduced by screening from localised landform and areas of tree cover. The level of effect would range from Major to Moderate and Significant (affecting an area of the Strath between 2km and up to 3-3.5km distance from the proposed development around Muie and Ardachu reducing to Moderate to Minor, to None and Not Significant with increased distance. Due to the overall varied visibility of the turbines from within this LCT, it is not considered that the proposed development would significantly alter the key characteristics of this landscape overall. The nature of these effects would be long-term (reversible), indirect and negative. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms located within this LCA. Lairg would be visible from the western edges of the LCA and has some influence on this part of the LCA (Low to Zero magnitude). There would be some filtered visibility of Achany and Rosehall wind farms and the consented Meall Buidhe at the western edge of the LCA (all Very Low to Zero magnitude). Kilbraur would be visible from central and eastern parts of the LCA (Low-Very Low to Zero magnitude). The additional effect of the proposed development would remain Major to Moderate and Significant (between 2km and up to 3-3.5km distance from the proposed development, around Muie and Ardachu, within the central western part of the LCA) reducing to Moderate to Minor, to None and Not Significant with increased distance. The combined effect would also range from Major to Moderate and Significant (due to the proposed development) to Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> There are no application wind farm developments within this LCA. Garvary would be located adjacent to the proposed development at ~4.5km at its closest point but would only be partially visible from elevated areas of the strath sides (Very Low to Zero magnitude). The additional effect of the proposed development would remain Major to Moderate and Significant (between 2km and up to 3-3.5km distance from the proposed development, around Muie and Ardachu, within the central western part of the LCA) reducing to Moderate to Minor, to None and Not Significant with increased distance. The combined effect would also range from Major to Moderate and Significant (due to the proposed development) to Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
145 – Farmed and Forested Slopes with Crofting LCT: Lairg LCA	
Lairg LCA	The <i>Farmed and Forested Slopes with Crofting LCT: Lairg LCA</i> is located to the north-west of the proposed development at approximately 3.2km distance at its closest point. It encompasses the northern area of Achany Glen as the glen widens towards Strath Fleet and joins the southern extent of Loch Shin. Key characteristics of the <i>Farmed and Forested Slopes with Crofting LCT: Lairg LCA</i> as described by NS include the undulating basin landform with a high proportion of woodland cover bordering extensive conifer forest to the north, west and south. Landcover comprises rough and coarse-textured landscape on upper hill slopes, long strip pastures, fenced or occasionally enclosed by boulder walls, with some pockets of pasture appearing as if ‘carved out’ of woodlands in places. Due to the high proportion of woodland cover and enclosing landform, there is a semi-enclosed character of this landscape with occasional views

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	focused mainly towards Loch Shin. The density of housing increases nearer to Loch Shin. The <i>Farmed and Forested Slopes with Crofting</i> LCT: <i>Lairg</i> LCA is not within a designated landscape, however the area is relatively scenic and the A839 Moray Firth Tourist Route is routed through the area and connects east to Loch Fleet and south towards the Kyle of Sutherland (High value). It has a Medium susceptibility to views of wind turbines mainly because of its enclosed, wooded character with limited views and its settled and developed character. Where views of other wind farms are available, they are often filtered by surrounding mature trees (as illustrated in Viewpoints 6 and 7, Figures 6.23 and 6.24). Views from within this landscape tend to be focused internally or east towards Loch Shin. Overall, the sensitivity of the <i>Farmed and Forested Slopes with Crofting</i> LCT: <i>Lairg</i> LCA to the proposed development within 10km is <i>High-Medium</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA. The nearest turbine would be located approximately 3.2km distance to the south-east. ZTV coverage is mostly indicated on elevated landform to the north of the LCA between Lairg Muir and north of Saval, and at the eastern edge of the LCA around Balnadelson. Viewpoints 6 and 7, Figures 6.23 and 6.24, located in both Volume 3 and Volume 5 illustrate views from the north of the main settlement area which would be heavily filtered by surrounding tree cover near the settlement. Views from Saval and Balnadelson (and The Ord (Viewpoint 4, Figure 6.21)) would be open, encompassing wider, more elevated views of the surrounding and more distant hills to the south and west. From these limited elevated areas, the proposed turbines would be visible beyond the rising landform relating to the adjacent <i>Rounded Hills</i> LCT at distances of between 4.5km and 10km (and beyond the existing Lairg Wind Farm). It is not considered that the proposed development would significantly alter the key perceptual characteristics of this landscape character type, which would remain as an 'Elevated undulating basin...at the foot of the Rounded Hills – Caithness & Sutherland above Lairg' and includes views of other wind farm development. The magnitude of change on the landscape character would be Low to Zero. The influence of the proposed turbines would be slightly reduced by screening from localised landform and tree cover / forestry from much of this area. The level of effect would be Moderate to Minor and Not Significant from elevated areas in the north, east and west (reducing to Minor to None and Not Significant to the south and centre of the LCT). This assessment reflects that the character of this LCA includes some visibility of existing and consented wind farms and would not change significantly with the introduction of the proposed development. The nature of these effects would be long-term (reversible), indirect and negative. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms located within this LCA. Lairg and the consented Larig II wind farms are located in the adjoining LCT to the southeast of the LCA (collectively Medium-Low to Zero magnitude). Lairg II would be most visible from areas to the north and west of the LCA. There may be views towards the more distant Achany, Rosehall, and consented Meall Buidhe (over 7km distant) which would be partially visible in a different part of the view to the west from these elevated areas (subject to localised screening) (all Very Low to Zero magnitude). The additional effect of the proposed development would be reduced to Minor to None and Not Significant (due to the proposed development located beyond Lairg / Lairg II). The combined effect would be Major to Moderate and Significant (due to Lairg and Lairg II,

Landscape Character Type and Area	Assessment
	and <u>not</u> the proposed development), to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> There are no application wind farm developments within this LCA. Other applications which would have an influence on this LCA include Garvary at 1.6km from the Lairg LCA boundary at its closest point (Medium-Low to Zero magnitude). Garvary Wind Farm would be located within the same cluster as Lairg, Lairg II and the proposed development. The additional effect of the proposed development would be reduced to Minor to None and Not Significant due to the location of the proposed development beyond Lairg / Lairg II and Garvary). The combined effect would be Major to Moderate and Significant (due to Lairg, Lairg II and Garvary and <u>not</u> the proposed development), to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
134 - Sweeping Moorland and Flows – Caithness and Sutherland LCT	
North of Lairg and Strath Fleet LCA	The Sweeping Moorland and Flows occur extensively across the northern half of the wider (45km) Study Area (as shown in Figure 6.7). Within 10km, a narrow area of the LCT is located between two areas of <i>Rounded Hills – Caithness and Sutherland LCT</i> to the north of Strath Fleet. The western extent of this area wraps around the <i>Farmed and Forested Slopes with Crofting LCT: Lairg LCA</i> and is occupied by extensive coniferous forestry. To the east, the <i>Sweeping Moorland and Flows LCT: North of Lairg and Strath Fleet LCA</i> extends to Strath Brora and Inchomnie (continuing northeast beyond the Study Area). Viewpoint 9 (Figure 6.26) is located within this LCA. The key characteristics of this LCT are described by NS as: ▪ <i>“Gently sloping or undulating landform which lies generally below 350 metres.</i> ▪ <i>Occasional isolated hills of limited height form local landmark features.</i> ▪ <i>Lochs and mature, meandering rivers.</i> ▪ <i>Very distinct flora, dominated by sphagnum mosses, produced by the wetness and infertility of the flows.</i> ▪ <i>Areas of peat cuttings and haggings.</i> ▪ <i>Pockets of improved grazing, mainly within the outer fringes of sweeping moorland.</i> ▪ <i>Coniferous forest forming a dominant characteristic within some parts of this landscape character type.</i> ▪ <i>Ribbons of broadleaf woodland occasionally run along the water courses and loch edges.</i> ▪ <i>Very sparsely settled with dispersed crofts, farms and estate buildings largely found on the outer edges of this landscape or near a strath.</i> ▪ <i>Vehicular tracks within parts of the landscape.</i> ▪ <i>Wind farms, transmission lines, the A9 and a network of minor roads are key features within the more modified outer fringes within Caithness.</i> ▪ <i>Long, low and largely uninterrupted skylines offering extensive views across this landscape and result in a feeling of huge space.</i>

Landscape Character Type and Area	Assessment
	▪ <i>Consistent views to the distant Lone Mountains and Rugged Mountain Massif –Caithness & Sutherland.</i> ▪ <i>Great sense of exposure on areas of flat peatland on upland plateau.</i> ▪ <i>A strong sense of remoteness is associated within the largely uninhabited, inaccessible core flows and moorlands of this landscape."</i> Within 10km, the LCA is not located within a designated <i>landscape</i>, although the <i>Ben Klibreck – Armine WLA (WLA 35)</i> overlaps the LCA to the north which indicates a High-Medium landscape value. The susceptibility to change from the introduction of the proposed development is Medium due to the large scale of the LCT and influence of existing neighbouring wind farm development on this landscape. The overall sensitivity is therefore considered to be <i>High-Medium</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA. The nearest turbine would be located approximately 5.2km to the south. ZTV coverage is fragmented to the west and east of the LCA due to intervening undulations in the landform. Extensive coniferous forestry to the west further limits potential visibility. A band of theoretical visibility spans the LCA from the centre to the southeast of the LCA, following the gently rising landform between Cnoc Fodha (227m AOD), West Langwell and East Langwell. Much of this visibility overlaps with the ZTV for the existing and consented Lairg and Lairg II wind farms. Visibility of the proposed development would not significantly alter or affect the landscape character of this area and the magnitude of change would range from Low to Zero. The level of effect on the landscape character of this area would be Moderate to Minor, to None and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg and consented Lairg II wind farms would be visible (4.5km to 5km distant respectively) with some turbines partially screened by intervening landform (both Low to Zero magnitude). To the east, the existing Kilbraur and Kilbraur Extension would be located within the wider <i>Sweeping Moorland and Flows LCT</i> at approximately 5.4km distance. These would significantly affect the LCT within 2km of the turbines (High to Zero magnitude). Further and more distant existing windfarms are visible to the southwest including Achany and Rosehall (both Very Low to Zero magnitude). The additional effect of the proposed development would remain Moderate to Minor, to None and Not Significant. The combined landscape effect would be Substantial to Major and Significant (due to Kilbraur and Kilbraur Extension and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> Garvary application would be visible partially behind and to the right of the proposed development at 6km distance, partially screened by intervening landform (Low – Very Low to Zero magnitude). Garvary would close the gap between the proposed turbines and Lairg II and would create a cluster of windfarm development in the adjacent <i>Rounded Hills – Caithness and Sutherland LCT: South of Strath Fleet LCA</i>. Several further application wind farms would have very limited influence on this LCA (all Very Low to Zero magnitude). The additional effect of the proposed development would remain Moderate to Minor, to None and Not Significant. The combined landscape effect would be Substantial to Major and Significant (due to Kilbraur and Extension and <u>not</u> the

Landscape Character Type and Area	Assessment
	proposed development). The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
Landscape Character in the Wider 45km Study Area (and up to 15km south)	
145 – Farmed and Forested Slopes with Crofting LCT – Bonar Bridge to Skelbo, and Kincardine LCAs	The Farmed and Forested Slopes with Crofting LCT: Bonar Bridge to Skelbo LCA wraps around upper hill slopes between the Dornoch Firth and Loch Fleet (as shown in Figure 6.7). The Kincardine LCA extends to the south of the Dornoch Firth southeast of Ardgay. Both LCAs share the same features and characteristics as the Lairg LCA (assessed above) but are located to the south and southeast of the proposed development, extending along both sides of the Dornoch Firth. The LCAs are located within the <i>Dornoch Firth</i> NSA which indicates a High landscape value. The susceptibility to change from the introduction of the proposed development is Medium due its enclosed, wooded features with limited views and its settled and developed character. The overall sensitivity is therefore considered to be <i>High-Medium</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA. The nearest turbine would be located approximately 6.3km to the north. ZTV coverage is fragmented, occurring to the west of the LCA on elevated landform to the east and southeast of Bonar Bridge to the north of Dornoch Firth and in Kincardine to the south of Dornoch Firth. There is no or very little ZTV coverage to the east of the LCA. Extensive coniferous forestry to the east and southeast of Bonar Bridge would screen potential visibility from these areas (subject to felling). There would be theoretical visibility from the Kincardine area as the landform rises in this area and orientates north and northeast towards the proposed turbines. However, views from this area would be limited by the presence of extensive coniferous and mixed forest, although there would be some views between woodland and forested areas where the proposed development would be visible at approximately 11km distance. Viewpoint 11 (Figure 6.28) shows potential views from the lower-lying part of this LCA where views are further screened by coniferous forestry on rising landform to the north of Dornoch Firth. The proposed development would not significantly alter or affect the landscape character or key characteristics of this area, and the key characteristics of the LCAs would be retained. The magnitude of change on both LCAs would be Very Low to Zero. The level of effect on the landscape character of this area would be Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Achany and Rosehall wind farms would be visible at distances over 14km to the northwest from elevated locations subject to screening from intervening forest (both Very Low to Zero magnitude). The consented Meall Buidhe would also be partially visible in elevated views to the northwest at over ~13km (Very Low to Zero magnitude). The additional effect of the proposed development would remain Minor to None and Not Significant. The combined landscape effect would be Minor to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> Garvary application would be partially visible to the left of the proposed development from elevated areas of the LCA to the south of Dornoch Firth at over 12km distance, partially screened by intervening landform (Very Low to Zero magnitude). The additional effect of the proposed development would remain Minor to None and Not Significant. The combined landscape effect

Landscape Character Type and Area	Assessment
	would be Minor to None and Not Significant. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
330 - Rounded Hills and Moorland Slopes - Ross & Cromarty LCT – Easter Fearn LCA	The Rounded Hills and Moorland Slopes LCT: Easter Fearn LCA occurs extensively across the southern half of the wider (45km) Study Area (as shown in Figure 6.7). The LCA is located to the south of Dornoch Firth and extends south and southwest spanning an area between the Firth and the upper reaches of Strath Carron beyond 45km. Along the Dornoch Firth coastline, the LCA extends between coniferous forestry to the southeast of Ardchronie and Dounie Wood, incorporating Wester Fearn Point and Easter Fearn Point. The Dornoch Firth NSA overlaps with the LCT along its coastal edge and includes the rising landform to the summits of Cnoc a'Chlaiginn (264m AOD) and Struie (373m AOD) as well as Cadha Mòr. The key characteristics of this LCT are described by NS as: ▪ <i>“Broad, rounded hills and upland moorlands with smooth, gentle slopes down to broad straths, creating an undulating skyline.</i> ▪ <i>Occurs in a large tract which weaves around and between the adjoining Rounded Mountain Massif and Rugged Mountain Massif – Ross & Cromarty and unifies the mountain groups.</i> ▪ <i>Large areas of uniform moorland vegetation with occasional surface detail of rivers, lochs, riparian woodland, woodland patches, and regenerating trees.</i> ▪ <i>Large coniferous forests on accessible lower slopes.</i> ▪ <i>Broad straths with natural, meandering rivers and occasionally highlighted by green, unenclosed, improved pastures and riparian trees.</i> ▪ <i>Occasional major trunk roads curve through the lowest major straths, with very little associated service development.</i> ▪ <i>Small groups of mainly traditional buildings around road junctions and at rail stations.</i> ▪ <i>Man-made structures of pylons, wind farms and reservoirs occur as occasional features within a large scale landscape.</i> ▪ <i>Many archaeological features on lower ground from prehistoric, medieval and later periods.</i> ▪ <i>Large, remote interior areas of vast scale with wildness characteristics.”</i> As noted above, the Dornoch Firth NSA overlaps with the northern part of this LCA, indicating a High value. This would reduce to High-Medium and Medium outside of the NSA boundary with distance. The susceptibility to change from the introduction of the proposed development is Medium-Low due to the large scale of the LCT and influence of existing wind farm development on this landscape. The overall sensitivity is therefore considered to be <i>Medium (High-Medium within the NSA)</i>. <u>Assessment: proposed development</u> None of the proposed turbines would be located within this LCA. The nearest turbine would be located approximately 12km to the north. ZTV coverage is very limited across the LCA, with fragmented areas of theoretical visibility mostly indicated at between 12km and 20km to the northwest of the LCA. Further ZTV coverage is indicated to the northeast of the LCA to the south of Edderton and west of Tain. Elsewhere in the LCA theoretical visibility is very sparse - indicated at greater distances on very scattered isolated hills and facing slopes. Viewpoint 12 (Figure 6.29) is located within the LCA / NSA at a designated viewing location

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	and illustrates views from the northwestern edge of the LCA (Medium – Low visual magnitude of change). Beyond the NSA boundary to the south, the LCA is influenced by wind farm development in areas where it is overlapped by ZTV coverage. To the northeast of the LCA where ZTV coverage is indicated, extensive coniferous forestry limits potential visibility. Where visible, the proposed development would be seen across Dornoch Firth and two further LCTs and as a result, there would be little influence on the features and characteristics of the Easter Fearn LCA. The magnitude of change would range from Very Low to Zero. The level of effect on the landscape character of this area would be Minor to Negligible to None and Not Significant. The nature of these effects would be long-term (reversible) indirect and neutral. No significant night-time effects have been assessed as a result of the proposed aviation warning lights. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are several existing wind farms within the LCA including Beinn nan Oighrean, Beinn Tharsuinn, Coire na Cloiche, as well as Novar / Novar Extension (both located near the boundary of the LCA). The consented Strathory wind farm would also be located within this LCA. There would be significant effects from these wind farms within ~2km of the turbines (High magnitude, reducing to Low to Zero magnitude with distance). The additional effect of the proposed development would be Minor to Negligible to None and Not Significant. The combined landscape effect would be Major and Significant (due to Beinn nan Oighrean, Beinn Tharsuinn, Coire na Cloiche and Strathory, and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible), cumulative, indirect and negative. <u>Cumulative Assessment: Existing + Consented + Applications + proposed development</u> Garvary application would be partially visible to the left of the proposed development from elevated areas of the LCA at over 12km distance, partially screened by intervening landform (Very Low to Zero magnitude). The additional effect of the proposed development would be Minor to Negligible to None and Not Significant. The combined landscape effect would be Major and Significant (due to Beinn nan Oighrean, Beinn Tharsuinn, Coire na Cloiche and Strathory, and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible), cumulative, indirect and negative.
343 – Coastal Shelf LCT – Ardmore, Edderton and Whiteness Sands LCAs	This LCT forms the southern coastal edge of the Dornoch Firth. The LCT and LCAs wrap around the landform from Rubha nan Sgarbh in the north to Ardjachie Point and includes Ferry Point at the Ness of Portnaculter and the southern approach to the Dornoch Firth Bridge. Beyond this it continues as a very narrow strip towards Tain and Morrich More and then onto Whiteness Sands. The key characteristics of the LCT as described by NS are as follows: ▪ <i>Mainly natural coastal edge consisting of a variety of soft coastal features including dunes, wetlands, salt marshes, grasslands, raised beaches and beaches, demonstrating different geological processes of accretion and erosion.</i> ▪ <i>Range of habitats in stages of natural succession.</i> ▪ <i>General absence of development except where occasionally found on the more stable land.</i> ▪ <i>Variable width of the shelf, from very narrow grassed strips to broad beaches and dunes.</i> ▪ <i>Proximity of some areas of coastal shelf to steeply rising hills, creating a sharp transition in landform from a horizontal to near vertical emphasis.</i>

Landscape Character Type and Area	Assessment
	▪ Presence of coastal transport routes, from where the coastal shelf is usually in the foreground of sea views, with historic train stations, distilleries, lighthouses and RAF airfields connected to these routes. ▪ Clear, physical definition of the shelf and edges of raised beaches, rarely masked by forests or development. ▪ Dynamic, wide and sweeping sandy beaches, spits and salt marshes with natural vegetation and extensive views. ▪ Wet grassland and usually unenclosed or occasionally fenced, rough pastures on the broader coastal shelf in close proximity to the sea, often separated by a very narrow, often pebbly beach. ▪ Open views across the inner and outer Firths, and the interplay of light on water. ▪ Ever-changing line of views along the coast and firths. ▪ Sense of exposure in outer firth areas from near-constant wind, lack of trees and expansiveness of the landscape. The entire LCT is located within Dornoch Firth NSA indicating a High value. The susceptibility to change due to the introduction of the proposed development is assessed as Medium because of the presence of scattered settlement in combination with open, flat landform, intervening shelterbelts, railway line, and busy road infrastructure with trees and hedgerows. The main foci of views are the 'Open views across the inner and outer Firths, and the interplay of light on water. [and] Ever-changing line of views along the coast and firths.' (NS 2019). The overall sensitivity is therefore assessed as High. <u>Assessment: proposed development</u> ZTV coverage within this LCT occurs on the majority of the LCA between Edderton and Whiteness Sands at between approximately 16.2km – 29.5km distance. There would be theoretical visibility of blades and hubs in clear conditions subject to local intervening vegetation (Very Low magnitude). The proposed development would not alter the key characteristics of the LCA, although it would be partially visible in views across the inner and outer Firths and along the coast and firths in clear conditions. The magnitude of change on the character and key characteristics would range from Very Low to Zero and the level of effect Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms within this LCT although there are limited views of other existing wind farms including Beinn Tharsuinn and Beinn nan Oighrean and consented Strathory wind farm to the south at distances over 10km. Kilbraur, Gordonbush / Extension and the consented Meall Buidhe and Lairg II are theoretically visible across the Firth to the north and northwest at over 17km (all Very Low to Zero magnitude). The additional and combined cumulative effect of the proposed development would remain Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> There are no other wind farm applications within this LCT. Parts of Garvary would be theoretically visible adjacent to the proposed development to the northwest at distances of over 16km (Very Low magnitude). The additional and combined cumulative effect of the proposed development would remain Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative.
140 – Sandy Beaches and	This LCT covers the coastal sandy beach areas to the north of the Dornoch Firth from Meikle Ferry Slipway, past Dornoch and towards Golspie with additional

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Dunes LCT – Dornoch Sands LCA	areas to the north and south of Brora and areas to the north and west coasts of Caithness. The Dornoch Firth NSA overlaps with the LCT from Meikle Ferry Slipway to Dornoch which is the area considered in this assessment. The key characteristics of the LCT as described by NS are as follows: ▪ <i>Near continuous stretch of sandy beach between the Dornoch Firth and Brora.</i> ▪ <i>Low shingle ridges backing many of these sandy beaches and forming the base for dune systems.</i> ▪ <i>Large sand banks, splayed sandy beach and spit occurring at the mouth of the Dornoch Firth, backed by low dunes and expansive grassy links.</i> ▪ <i>Wide plain covered with gorse, heather and rough grazing land at Cuthill Links in the Dornoch Firth,</i> ▪ <i>Shingle bars at the mouth of Loch Fleet.</i> ▪ <i>Undulating machair abutting dunes and dune slacks along parts of the east Sutherland coast, with golf courses occupying some of these areas.</i> ▪ <i>Post-glacial raised shorelines backed by relict cliffs to the north of Brora with the sandy beach being narrow in this area.</i> ▪ <i>Long gently curved sandy arcs of Sinclairs Bay and Dunnet Bay in Caithness.</i> ▪ <i>Striking complex landscape pattern at Torrisdale Bay</i> ▪ <i>The long sandy beach at Balnakeil, with extensive dune system and machair.</i> ▪ <i>Remoteness of Sandwood Bay in west Sutherland.</i> ▪ <i>Focus for recreation with camp sites, caravan parks and car parks located close to more accessible areas of coast with golf courses present where links and machair areas are more extensive.</i> ▪ <i>Many small crofting communities located on the fringes of beaches, particularly in north and west Sutherland.</i> ▪ <i>Castles with historic gardens and designed landscapes, as well as prehistoric brochs and cists, cairns, and hut circles.</i> ▪ <i>Strong sense of space, light and exposure, and extensive visibility on the larger and more open stretches of sandy beach.</i> ▪ <i>Contained smaller beaches on the north coast with views focused along the beach to rocky headlands and out to sea to near shore islands.</i> ▪ <i>Strong contrast of the white/pale pink sands of the beaches in the north-west with surrounding darker cliffs and moorland.</i> ▪ <i>Wildness character to of all these seascapes, more intensely experienced on the more remote beaches along the north and west coasts of Sutherland.</i> As noted above, the Dornoch Firth NSA overlaps with the southern part of this LCT, indicating a High value. The susceptibility to change due to the introduction of the proposed development is assessed as Medium due to the 'extensive visibility' afforded within the LCT, with views focused over the water to the south away from the proposed development in combination with the presence of settlement and the busy A9 which crosses the landscape. The overall sensitivity is therefore assessed as <i>High</i>. <u>Assessment: proposed development</u> The ZTV indicates two areas of limited visibility of between one and nine turbines within this LCA at Meikle Ferry and Dornoch Links. Wireline analysis indicates that these would be theoretically visible as blades and blade tips. A combination of distance (between 15km and 19km) and localised screening from scrub, shelterbelts and dunes within this area results in a magnitude of Very Low and Zero. The proposed development would not significantly alter or affect the landscape character or key characteristics of this area, and the key characteristics of the LCT would be retained (Very Low magnitude). The level of

Landscape Character Type and Area	Assessment
	effect would therefore be Minor to None and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms within this LCT. There are limited views of other existing wind farms including Beinn Tharsuinn, Beinn nan Oighrean, Novar, Kilbraur and the consented Strathrory wind farms at distances over 12km (all Very Low to Zero magnitude). The additional and combined cumulative effect of the proposed development would remain Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> There are no other wind farm applications within this LCT. Blade tips of Garvary would be theoretically visible adjacent to the proposed development at distances of over 15km (Very Low to Zero magnitude). The additional and combined cumulative effect of the proposed development would remain Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative.
146 – Coastal Farmland and Woodlands LCT	This LCT covers the area to the north of the Sandy Beaches and Dunes LCT between Dornoch Firth and Brora and in some areas to the north and west coasts of Caithness. The Dornoch Firth NSA overlaps with the LCT to the south and west of the A949 which is the area considered in this assessment. The key characteristics of the LCT as described by NS are as follows: ▪ <i>Rolling landform to the west within the Dornoch Firth where this landscape tapers and is constrained to the north by a steep-sided densely wooded ridge.</i> ▪ <i>Gently undulating landform to the east of Skibo and Loch Fleet.</i> ▪ <i>Flat or gently sloping plain north of Loch Fleet.</i> ▪ <i>Well-wooded landscape with coniferous forests, often fringed by broadleaf trees, planted on steeper slopes and capping small ridges and knolls on the shores of the Dornoch Firth in the west.</i> ▪ <i>Policy plantings associated with estates with areas of parkland, tree avenues and ornamental plantings of broadleaves and tall conifers. Plantings of beech common along roadsides on northern lower slopes of Dornoch Firth, with a strong geometric framework of woodlands and mature trees contain large fields in this area.</i> ▪ <i>Medium to large fields of fertile soils, with a high proportion of arable cropping in some areas.</i> ▪ <i>Large castles, estate buildings and grand houses on the shores of the Dornoch Firth, as well as the visually prominent and architecturally distinct Dunrobin Castle on the coast north of Golspie, whose turrets and grand tree-lined avenue can be seen from the A9, as well as its lodges, gatehouses and buildings in and around Golspie associated with the Sutherland Estate.</i> ▪ <i>Dispersed farms throughout the area and occasional clusters of crofts, often on the edge of woodland and associated with smaller pastures on higher slopes at the transition with the Farmed and Forested Slopes with Crofts or close to the coast at Skelbo.</i> ▪ <i>High visibility from the east coast railway and coastal trunk roads, as well as the network of other roads which cross this area.</i> As noted above, the Dornoch Firth NSA overlaps with the south and western area of this LCT, indicating a High value. In addition, Skibo Castle GDL is also located within the LCT. The susceptibility to change due to the introduction of the proposed development is assessed as Medium due to screening from

Landscape Character Type and Area	Assessment
	extensive woodland within the LCT and in combination with some open views in coastal areas to the south of the LCT. The overall sensitivity is therefore assessed as <i>High-Medium</i>. <u>Assessment: proposed development</u> The ZTV indicates very limited visibility within the NSA part of the LCT of between one and six turbines in a small area of the LCA between Lonemore and Camore, and at Baldrum Wood. Wireline analysis indicates that blade tips would be theoretically visible from these locations. A combination of distance (between 14km and 17km) and localised screening from woodlands, forestry and roadside trees within this area results in a magnitude of change to the landscape character of between Very Low and Zero. The proposed development would not significantly alter or affect the landscape character of this area, and the key characteristics of the LCT would be retained. The level of effect would therefore range from be Minor to None and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms within this LCT. There are limited views of other existing wind farms including Beinn Tharsuinn, Beinn nan Oighrean, Novar, Kilbraur and the consented Strathroary wind farms at distances over 12km (all Very Low to Zero magnitude). The additional and combined cumulative effect of the proposed development would remain Minor to None and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> There are no other wind farm applications within this LCT, and no other application wind farms would be visible. Therefore, there would be no cumulative effects.

Effects on Landscape Planning Designations and Wild Land Areas

- 6.201 The proposed development is not located within any landscape planning designations. Therefore, there can be no physical or direct impact on landscape planning designations within the 45km Study Area, which include three NSAs, eight WLAs and seven SLAs. Nonetheless, the proposed development may indirectly affect the Special Landscape Qualities (SLQ), including views and perceptual qualities, for which the NSA and SLAs are valued and designated.
- 6.202 As set out in the baseline and as agreed during consultation, the indirect effects on one SLA and one NSA are included in the assessment, as follows:
- Dornoch Firth NSA (NSA 40); and
 - Loch Fleet, Loch Brora and Glen Loth SLA (SLA 9).
- 6.203 In summary, none of the landscape planning designations within the Study Area would be significantly affected by the proposed development in terms of their overall integrity. However, there would be a significant, cumulative effect on one of the SLQs of the Dornoch Firth NSA (*"Inhabited surrounds within a wilder backdrop of hills and moors"*) related to the visibility of the proposed development from the Struie Viewpoint which appears within the *"wilder backdrop of hills and moors"* as illustrated in Viewpoint 12

(Figure 6.29). Visibility of the proposed development from within the NSA would be limited and the objectives of the NSA designation and its overall integrity would not be compromised by the visibility of the development from this Viewpoint alone.

- 6.204 At a local level, the proposed development would not have a significant adverse effect on the integrity of the Loch Fleet, Loch Brora and Glen Loth SLA or the qualities for which it has been designated.

Methodology for Assessing Landscape Planning Designations and Wild Land Areas

- 6.205 The assessment of landscape planning designations differs from landscape character or visual assessment in that it considers the effects of the proposed development on the Special Landscape Qualities (SLQs), including views and perceptual qualities and the integrity of the designation as advised by SNH in their document 'Siting and Designing Wind Farms in the Landscape, Version 3a':

"The key test applied in relation to NSAs, but often employed for other valued landscapes too, is whether impacts would affect the integrity of a valued landscape."

(Siting and Designing Wind Farms in the Landscape, Version 3, SNH, 2017, paragraph 3.11)

- 6.206 This approach is also echoed in NPF4, Policy 4, and the HwLDP, Policy 57 as explained previously in paragraph 6.16.

- 6.207 In order to assist the assessment, a description of each of the landscape planning designations and their SLQs are documented by THC in respect of SLAs and by NS in respect of NSAs. It is important to note that wind farm development is not necessarily incompatible with the valued qualities of a landscape as it depends on the nature and / or effects of the development and the nature of the SLQs. A visual effect on a view from the SLA for example, may or may not affect the SLQ and the integrity of the designation. In particular, the Landscape Institute further advises:

- *"An internationally, nationally or locally valued landscape does not automatically or by definition have high susceptibility to all types of change."*
- *"It is possible for an internationally, nationally or locally important landscape to have relatively low susceptibility to change resulting from the particular type of development in question, by virtue of both the characteristics of the landscape and the nature of the proposal."*
- *"The particular type of change or development proposed may not compromise the specific basis for the value attached to the landscape."¹³*

- 6.208 The effects of the proposed development on the SLQs have been assessed in accordance with the methodology set out in Appendix 6.1 which accords with GLVIA 3. In addition, the assessment of landscape planning designations has been guided by SNH's working draft 'Guidance for Assessing the Effects on Special Landscape Qualities', November 2018. This guidance has been developed for landscape professionals undertaking LVIA for

¹³ GLVIA 3, paragraphs 5.46-47

developments or land use changes with potential to impact on the SLQs of NSAs or National Parks. Drawing from this document, the NSA assessment comprises 4 stages:

- *“Step 1: The Proposal – Gain as full an understanding of the proposal as possible;*
- *Step 2: Definition of the Study Area and Scope of the Assessment - identifying the area likely to be affected;*
- *Step 3: The Analysis of Impacts and Effects on SLQs; and*
- *Step 4: Summary of Impacts on the SLQs, implications for the NSA/NP and possible future effects on SLQs and recommendations for mitigation.”.*

6.209 In summary, the sensitivity of each relevant SLQ is determined through a combination of value and the susceptibility of the SLQ to change posed by the proposed development; this in turn is considered against the nature or magnitude of change in order to determine the level of effect on each receptor (SLQ). The design process is integral to the assessment which is an iterative process that seeks to reduce adverse effects and ensure that where possible, mitigation is embedded into the proposed development. Each effect is described in terms of its geographical extent (through reference to the viewpoints and ZTV) and whether it is cumulative, temporary / long term, positive / neutral / negative.

6.210 The potential night-time effects of proposed aviation warning lights on both receptors are assessed separately in Technical Appendix 6.3.

6.211 A high-level assessment of Wild Land on WLA35 is reported in Table 6.11 as requested by THC, however, NS agreed to scope out a Wild Land Assessment following the adoption of NPF4 and the unlikely potential of significant effects from any of the WLAs. In undertaking this assessment, reference has been made to NS's Technical Guidance, Assessing Impacts on Wild Land Areas, 2020.

Dornoch Firth NSA

6.212 The Dornoch Firth NSA encompasses the waters of the firth, associated seascape and enclosing landscape. The scenic qualities whilst focusing on the central firth, include views from along both sides and across the Dornoch Firth, at both high elevation and lower sea level. The Dornoch Firth NSA is described in the SNH description from Scotland's Scenic Heritage 1978 as follows:

“By comparison with other east coast firths the Dornoch Firth is narrow and sinuous, yet it exhibits within its compass a surprising variety of landscapes. It is enclosed by abrupt rounded granitic hills clad in heather moor and scree, their Gaelic names of cnoc, meall and creag giving the clue to their character. Their lower slopes are frequently wooded, oakwoods being a noticeable feature of the area, but with other deciduous and coniferous species represented in plantations which vary from the policy plantings of Skibo Castle to the pines of the Struie Forest. Interspersed among these hills and plantations are areas of pasture and arable on the lower alluvial lands, with whin and broom a common feature in the hedgerows and on the sandy links of the outer firth. But above all it is the firth itself, with its innumerable bays, sands, flats, shallows and promontories which presents a constantly changing scene as much with the coming and going of the tide as with the changing scene afforded by passage

round its shores. Migdale with its loch expresses an inland variation of the same theme and has been included for the complement it makes to the firth, the last undeveloped estuary of its kind on the east coast."

(Scotland's Scenic Heritage, Countryside Commission for Scotland, 1978, page 49.)

- 6.213 This description was retained by NS's Commissioned Report No. 374 'The special qualities of the National Scenic Areas' (SNH, 2010), which supplemented the Dornoch Firth NSA description by providing a list of the NSA's 'special qualities' (referred to here as 'Special Landscape Qualities' – SLQ's) which are summarising as follows:

- *"The contrast between the enclosed west and the expansive east*
- *Inhabited surrounds within a wilder backdrop of hills and moors*
- *A wide diversity of woodland cover*
- *A rich variety of alluvial lands, dunes and links*
- *The ever-changing firth*
- *The tranquillity of an undeveloped coastline*
- *Migdale, a microcosm of the wider Dornoch Firth."*

(The Special Qualities of the National Scenic Areas, SNH Commissioned Report No.374, 2010, page 162)

- 6.214 The Dornoch Firth NSA description may be further updated by acknowledging that the SLQs and scenic value of the NSA remain strong today. This is despite development within the Dornoch Firth NSA since its designation, including various upgrades to the A9 and the construction of the Dornoch Firth Road Bridge in 1991, occasional residential properties / settlement development and wind farm development that is visible from several locations in the hills beyond the NSA boundary. With these exceptions, the estuary remains less developed than others on the east coast, although this is not a wild land area and a variety of landscapes, including a range of rural development and existing wind farms, are visible from within the NSA.

- 6.215 As noted in the Dornoch Firth NSA description, the seascapes and waters of the firth are the main, unifying focus of the NSA, surrounded and enclosed by a harmonious layering of different LCTs from the sand banks, mudflats, beaches, and coastal shelves of the shoreline, through to pasture fields, woodland and forests and enclosed by rounded hills, crags and moorland. The western half of the NSA (west of the Dornoch Firth Road Bridge, towards Bonar Bridge and Ardgay / Kincardine) is more enclosed in character and includes the separate loch at Migdale. Loch Migdale and its surroundings form a discrete area of the NSA, representing a microcosm of the NSA to the north of the Dornoch Firth. In contrast, the eastern area is more open and includes the Dornoch Links to the north and a large area of MOD land with restricted access to the south. Much of the Dornoch Firth is bounded by 'A' class roads which include tourist routes (A836 and Sustrans Cycle Route, A9 North Coast 500 and the A949) and the B9176 Moray Firth Tourist Route (including two 'Stuie Viewpoint' laybys), and there are a number of small villages along the coastline and some larger settlements along the boundary of the NSA including Dornoch, Tain, Ardgay and Bonar Bridge. Some pylons are present in the west between Easter Fearn and Kincardine and the NSA also includes part of the mainline railway line (Inverness to Wick) on the south side of the Dornoch Firth, between Tain and Ardgay. The Dornoch Firth (due to its sinuous nature) can be sub-divided into separate interconnected places in the form

of numerous small bays and promontories, including the former ferry crossing. The private estate at Skibo Castle is a GDL that extends over approximately 3,250 hectares of the NSA, incorporating two lochs and large areas of mature mixed woodland, trees and garden areas.

- 6.216 The Dornoch Firth NSA boundary does not extend to include the visual watershed or enclosing mountains and hills that are visible from within the NSA, rather focusing on the shores of the coastal shelves of the firth. Struie Hill (331m AOD) is a locally prominent and craggy hill on the southern boundary of the NSA with Beinn Tharsuinn (692m AOD) and some existing wind farms visible beyond this to the south and southwest (part of the *Rounded Hills and Moorland Slopes - Ross & Cromarty LCT*). Further *Rounded Hills - Caithness & Sutherland* are visible to the north and west with some notable mountain peaks (Ben More Assynt and Ben Klibreck) visible beyond this from elevated areas. Despite being beyond the NSA boundary they contribute to the scenic quality and SLQs of the Dornoch Firth NSA.

Stage 1: The proposed development in relation to the Dornoch Firth NSA

- 6.217 The proposed development is located approximately 8.3km to the north of the Dornoch Firth NSA boundary. The boundary of the NSA is illustrated in Figures 6.5 and 6.6 and in more detail as part of Figures 6.9a-c. Figures 6.5-6 and 6.9a illustrate the extent to which the Dornoch Firth NSA is overlapped by the blade tip ZTV, indicating the maximum extent of theoretical visibility. Figures 6.9b-c illustrate the blade tip and hub height ZTV respectively but exclude areas of forestry and represent a more realistic impression of actual visibility on the ground, subject to forestry management and the potential of other vegetation and in some cases buildings to screen the view.
- 6.218 Only the proposed turbines and associated aviation warning lights on six of the turbines would be visible from within the Dornoch Firth NSA. No ground-based or other associated infrastructure, forming part of the proposed development would be visible, although the upper part of a crane may be visible during construction.
- 6.219 Four viewpoints are located within the NSA and a summary of the viewpoint assessment, reported in Appendix 6.2, and Table 6.5 is provided as follows:
- Viewpoint 11: A836 Wester Fearn – Minor (Moderate to Minor) and not significant;
 - Viewpoint 12: B9176 Struie Layby - **Moderate** and significant;
 - Viewpoint 15: A9 Dornoch Bridge / NC 500 - Moderate to Minor and not significant; and
 - Viewpoint 16: Tain Waterfront - Minor and not significant.
- 6.220 The proposed development includes embedded mitigation that has been developed through the iterative design and assessment process described in Chapter 3 and previously in paragraphs 6.121-135 of this chapter. Special attention was paid to the visual composition of the turbines and the cumulative appearance of the proposed development alongside the Garvary application from Viewpoint 12: B9176 Struie Layby in particular. This has ensured the turbine composition would appear as a simple, cohesive, and ordered layout when viewed from the NSA viewpoint. The height of the turbines is also considered to fit with the large-scale landscape setting of its location.

- 6.221 As part of the design workshop, THC agreed that a cohesive composition from this viewpoint had been achieved.

Stage 2: Study Area and SLQ Selection

- 6.222 The ZTV illustrated in figures 6.5-6 and 6.9a-c extends across areas in the west of the NSA at approximately 8.5km distance from the proposed development to areas in the far east at just over 30km distance near Portmahomack. For this reason, the whole of the Dornoch Firth NSA has been included in 'study area' for this assessment, although the assessment has focused on those limited areas of ZTV around Viewpoint 12 where significant visual effects are likely. This decision is supported by analysis of the ZTV plots and viewpoints included within the NSA which has also taken account of how the area is perceived and used by people who would view the area from recreational viewpoints and routes within the NSA.
- 6.223 The area of the Dornoch Firth NSA, north and west of Edderton is all within 8.3-15km distance of the proposed development. Both the blade tip and hub height ZTVs indicate fragmented areas of theoretical visibility within this area. To the north of the Dornoch Firth they include areas of un-named moorland hills and north facing slopes that are not accessed by mapped roads or paths in the area surrounding Loch Migdale. To the south of the Dornoch Firth they include Kincardine, much of which is overlapped by multiple areas of trees, woodland and forestry and the north facing slopes of Church Hill to the south of the pylons which is also not accessed by mapped roads or paths. Visibility from publicly accessible areas within these areas is unlikely to be significant due to the intervening distance and high likelihood of vegetation and landform screening as represented by unobstructed views from Viewpoint 11.
- 6.224 A further, relatively small area of ZTV overlap is noted at Cadha Mòr and includes approximately 2km of the B9176: Moray Firth Tourist Route (including the northern most Struie Viewpoint layby), Struie Wood and Struie Hill. (It should be noted that there are two Struie Viewpoint laybys on the B9176: Moray Firth Tourist Route. The southernmost of these views east towards Dornoch (Grid Ref: 266044, 883350) is outwith the NSA and the ZTV with no view of the proposed development. The northernmost Struie Viewpoint layby is illustrated by Viewpoint 12). There are open views of the proposed development from the B9176, including the northernmost Struie Viewpoint layby and Struie Hill as represented by Viewpoint 12. The visual effects from these locations are assessed as Moderate and significant.
- 6.225 The majority of ZTV overlap of the Dornoch Firth NSA is all beyond 15km and mainly focused on the southern shores and waters of the Dornoch Firth between Edderton Sands, Inver (including the MOD Danger Area at Morrich More) and Portmahomack all beyond 15km distance from the proposed development. It should be noted that the waters of the Dornoch Firth are not frequented by yachts and sailing boats and there are no marinas or ferry routes within the NSA. Theoretical visibility is also indicated from part of the northern shores at Dornoch Point, Dornoch Links and the Dornoch Firth Road Bridge / A9. By comparing Figures 6.9b-c the majority of theoretical visibility would be limited to blade tips as illustrated by Viewpoints 15 and 16 and the visual effects would not be significant due to the intervening distance, landform screening and the tendency for these views to be

experienced as wide panoramic coastal views typically extending over 180° and viewing over long distances.

6.226 As agreed with NS (Scoping Opinion dated 15 August 2022), the following SLQs summarised in the SNH Commissioned Report No.374, 2010 have been included in the assessment as they relate to perceptual aspects of the NSA.

- The contrast between the enclosed west and the expansive east;
- Inhabited surrounds within a wilder backdrop of hills and moors; and
- The tranquillity of an undeveloped coastline.

6.227 A fourth SLQ was proposed for assessment in the Scoping Report ("Migdale, a microcosm of the wider Dornoch Firth") and although NS did not object to its inclusion in the assessment, further analysis of the ZTV as illustrated in Figures 6.9b-c reveals very limited theoretical visibility from this area. There would be no visibility from the publicly accessible shores and surrounds of Loch Migdale, including the walking loop around 'A'Chraigs'¹⁴ which are all outwith the blade tip ZTV. There would be **No Effect** on the SLQs related to physical characteristics and for these reasons the following SLQs have been excluded from the assessment:

- A wide diversity of woodland cover;
- A rich variety of alluvial lands, dunes and links;
- The ever-changing firth; and
- Migdale, a microcosm of the wider Dornoch Firth.

Stage 3: NSA Assessment

6.228 A total of three SLQs (numbered 1-3) are considered relevant to this assessment and have been assessed here with a summary of the assessment provided in Stage 4 and Table 6.9.

SLQ 1: 'The contrast between the enclosed west and the expansive east'

6.229 The SNH Commissioned Report No.374, 2010 further describes this special quality as follows (WSP emphasis underlined):

"The Dornoch Firth exhibits a surprising variety of landscapes, with dramatic contrasts to east and west.

To the east there is expansiveness where offshore views lead out to sea and a limitless horizon.

To the west there is a sinuous firth and a sense of enclosure, where inland views are bounded by opposing shores against a backdrop of hills.

Further Information:

The NSA unfurls from the narrow pinch-point of Bonar Bridge seawards to the open firth. It is enclosed to the north, west and south by a range of different landscapes. Their juxtaposition creates a remarkably complex interplay of

¹⁴ Route retrieved from https://www.walkhighlands.co.uk/maps/map1_13sl.shtml.

scenery. The contrasts east and west are brought to the fore when crossing the A9 road bridge.

Curving, sinuous, undulating natural forms of the shoreline and hills are interwoven, and often interlocking. These forms are set within a broad landscape extending the length of the firth, which tends to be horizontally structured. The landforms and land use appear as layers in the landscape: the rolling, rounded hills provide the backcloth; then there are the lower hill slopes; then the alluvial flats; the firth shoreline, and finally the firth itself.

An expansive feel, looking over water to the distant, blue hills, can also be had by looking into the NSA from, for example, Tarbert Ness."

- 6.230 The SLQ may be brought up to date with reference to wind farm development. Where visible this tends to be located in the background hills beyond the NSA viewing to the northeast or southeast and presenting as a minor feature that nonetheless reinforces the contrast between east and west as views towards the east tend to have no visible wind farm development. The relevant component of this SLQ is the "contrast between the enclosed west and the expansive east".
- 6.231 The sensitivity of this SLQ is assessed as *High*. This has been derived from the High value of the NSA designation and the High susceptibility of this SLQ to change. The susceptibility of the SLQ has been assessed as High because of the need to retain a strong or "dramatic contrast" between the views east and west within the NSA. This is reinforced by the contrast in the underlying landscape character, between the combinations of *Strath, Farmed and Forested Slopes with Crofting and Rounded Hills / Rounded Hills and Moorland Slopes* LCTs the latter of which contain wind farm development in the west; and the combinations of *Sandy Beaches and Dunes, Coastal Farmland and Woods, Farmed and Forested Slopes and Lowland Farmed Plain* LCTs in the east, which have no wind farm development.
- 6.232 The contrast between the eastern and western views and their different character and appearance is reinforced by the physical separation of opposing views in opposite directions, for example 'looking east' from the Dornoch Firth Road Bridge and then turning to 'look west' from the same receptor. The experience is also reinforced by the two Struie Viewpoint laybys on the B9176: Moray Firth Tourist Route. The southernmost of these views east (views west are blocked by Struie Hill) and the northernmost layby views mainly west (views out to sea are also blocked by Struie Hill) as represented by Viewpoint 12 (Figure 6.29). The proposed development would have no effect on this physical separation which reinforces the contrast between views east and west.
- 6.233 Neither would it affect the contrast in landscape character between east and west with the host LCT of *Rounded Hills – Caithness and Sutherland* remaining an area where wind farm development is recognised as a key characteristic. Where visible from Viewpoints 11, 15 and 16, the proposed development appears firmly within the western views / portion of the NSA. When viewed from Viewpoint 12: Struie Viewpoint (northern) layby, the location of the windfarm can be perceived as either:
- 1) The proposed development would appear peripheral to the western views which are focused east along the Strath / Kyles of Sutherland towards Ben More Assynt. The

majority of Google images for this Struie Viewpoint are focused on this portion of the view and would effectively 'cut off' the proposed development. Or;

- 2) The proposed development would appear central to the wider 180° views from this location, located wholly within the western part of the NSA and viewing only the western part of the NSA and its defining characteristics.

6.234 In either case, the proposed development would not dilute the contrasting views and characteristics between the east and western areas of the NSA and could be said to reinforce the sense of western 'enclosure' through its location above the enclosing hills and slopes of the Kyles of Sutherland.

6.235 To conclude, the proposed development would lead to a Very Low of Zero effect on SLQ 1: *'The contrast between the enclosed west and the expansive east'*. The level of (daytime) landscape effect on this SLQ would be **Minor to None** and Not Significant. The nature of this effect would be long term (reversible), indirect, and neutral.

Cumulative Assessment: proposed development, Existing and Consented Wind Farms

6.236 In terms of cumulative effects, the proposed development would add a Very Low to Zero magnitude of change to the existing and consented wind farms (Achany, Rosehall, Meall Buidhe, Lairg II, and the cluster at Beinn Tharsuinn, including Strathrory) which are just visible in the far distance and background landscape to the northwest, west and southwest, beyond the western half of the NSA. The level of effect on this SLQ would remain **Minor to None** and Not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.

Cumulative Assessment: proposed development, Existing, Consented and Application Wind Farms

6.237 Taking account of other wind farm applications, notably the Garvary application, the proposed development would appear alongside this application when viewed from Viewpoint 12. Neither scheme would significantly affect SLQ 1 either individually or in combination, and if anything, the combined effect would further reinforce the contrast between east and west (with wind farm development being associated with the west). The level of additional and the combined effect on this SLQ would remain **Minor to None** and Not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.

Effects of Reduced Intensity Aviation Warning Lights

6.2 Viewing the same area at night, the contrast between an *"enclosed west and the expansive east"* is only perceptible during limited periods between dusk and dawn (during civil twilight) and may only occur for half an hour before the onset of nautical twilight and then astronomical twilight when any discernment of the landscape or 'nightscape' would be limited to the shapes of hills, subject to the availability of moonlight or other light sources. Artificial lights are visible along the shorelines both to the east and west, although more so towards the east where the lights of Tain and Dornoch are more clearly visible. The aviation warning lights associated with the proposed development would be visible

along the skyline and could be said to potentially alter the contrast between the darker west and the partly lit shorelines visible in the east, although this effect would be barely perceptible from Viewpoints 11, 15 and 16. Viewing from Viewpoint 12, the level of night-time visual effect would range from Moderate to Minor or Minor and not significant as reported in Technical Appendix 6.3. Taking account of the night-time assessment the level of effect on SLQ1, as far as this could be perceived during limited periods between dusk and dawn would be **Minor to None** and Not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.

- 6.238 Taking account of other wind farm applications, notably the Garvary application, the proposed development would introduce further aviation warning lights to an area that already contains aviation warning lights as a result of Garvary. The additional effect of the proposed development would remain **Minor to None** and Not Significant, whilst the combined cumulative effect would increase with more lights visible and resulting in a **Moderate to Minor** effect that would not be Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.

SLQ 2: 'Inhabited surrounds within a wilder backdrop of hills and moors'

- 6.239 The SNH Commissioned Report No.374, 2010 further describes this special quality as follows (WSP emphasis underlined):

"The inner firth wends its way inland until the hills and moors sweep round to provide an undulating backdrop to the green and fertile alluvial lands. This horizon of wilder hills contrasts markedly with the mosaic of farms and woods on the coastal flats – which comes across as an ordered, long-inhabited land.

Further Information:

The Firth is enclosed by hills. To the south, the rounded hills of Ross-shire form an extensive sweep from east to west; their rolling, open slopes convey a sense of grandeur, enclosing views southwards from the northern shores.

Passage through the hills is confined to the base of the hill slopes at coastal level, or to the natural road-crossing (B8176) at The Struie. As this road leaves the confines of the hills at Cadha Mòr (Great, Narrow Pass), a broad panorama opens out across the Firth.

To the north, the moorland hills are lower, more sloping and can be less pronounced in form. The higher peaks tend to be rocky. An area of sweeping moorland forms a distinctive backdrop to Migdale's settlement and character.

Although the hills and moors possess a long history of land use, they come across as wilder and less intensively managed than the alluvial lowlands."

- 6.240 The relevant component of this SLQ is the way the hills and moors provide an enclosing backdrop to the Dornoch Firth NSA and the degree to which they may be described as wild. Much of the enclosing hills and moorland visible from within the Dornoch Firth NSA are outwith the NSA boundary. They are described as having a "wilder" or less developed character in comparison with the farmed lowlands. This creates a contrast between the farmed and inhabited lower lying landscapes surrounding the waters of the Dornoch Firth and the Kyles of Sutherland, and the "wilder" enclosing backdrop of hills and moors. The landscape character of the northern background hills differs from the southern hills which

are described as having a “sense of grandeur” and being larger in scale in comparison to the northern hills which are lower and tend to be “less pronounced”.

6.241 This SLQ is reflected in the landscape character of the *Rounded Hills – Caithness and Sutherland* LCT to the north of the Dornoch Firth. There are two key characteristics of this LCT which are relevant and slightly contradictory as follows:

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

6.242 In the first of these, wind farm development is recognised as a key characteristic in some parts of the LCT, whilst in other, more remote or less developed areas the landscape is recognised as having a strong wild character, although the hills and moors of the *Rounded Hills* within the Site or between the proposed development and the NSA are not WLAs or designated for their wild land quality. In contrast, lower lying landscapes of the *Strath, Farmed and Forested Slopes with Crofting, Sandy Beaches and Dunes, Coastal Farmland and Woods*, and *Farmed and Forested Slopes* are recognised as lower lying and inhabited or ‘non-wild’ landscapes.

6.243 The sensitivity of this SLQ is assessed as *High*. This has been derived from the high value of the NSA designation and the high to medium susceptibility of this SLQ to change as the northern enclosing hills and moors do not illustrate a strong sense of wildness in comparison to the southern hills. They are lower in elevation, less pronounced and beyond the NSA boundary they contain some wind farm development (Achany, Rosehall, Meall Buidhe, and Lairg II). The distant mountains of Ben Klibreck and Ben More Assynt present an exception being located within more distant WLAs.

6.244 The contrast in landscape character between the “*Inhabited surrounds within a wilder backdrop of hills and moors*” or between the *Rounded Hills* to the north and the lower lying and inhabited landscapes surrounding the waters of the Dornoch Firth (namely the *Strath, Farmed and Forested Slopes with Crofting, Sandy Beaches and Dunes, Coastal Farmland and Woods*, and *Farmed and Forested Slopes*) is marked by many characteristics, not least their low-lying location, habitation and land use, but also the lack of wind farm development within these often smaller scale landscapes. In contrast, the *Rounded Hills* contain wind farm development (a key characteristic), and that distinction further emphasises the contrast between the “*Inhabited surrounds*” and the “*backdrop of hills and moors*”. The degree to which the “*backdrop of hills and moors*” can be described as “wild” is tempered by their lower lying, less pronounced character and the presence of wind farm development. In this respect the proposed development both reinforces the landscape contrast referred to within SLQ 2 but also reduces the sense of wildness although the proposed development is 14.5km distant from Viewpoint 12. In respect of this viewpoint the magnitude of change is Low, mainly because there would remain a strong contrast between the “*Inhabited surrounds within a wilder backdrop of hills and moors*” which would retain a strong sense of wilder hills and moors emphasised by the rocky outcrops, moorland vegetation and their uninhabited quality, despite the presence of wind farms. Taking account of the high sensitivity and low magnitude of change, the level

of (daytime) landscape effect on SLQ 2, as perceived from Viewpoint 12 would be **Moderate** and Significant. The nature of this effect would be long term (reversible), indirect, and negative. Considering this SLQ from other viewpoints within the NSA the proposed development would have a Very Low magnitude and a **Minor** and Not Significant effect on the degree of wildness and contrast between the “*Inhabited surrounds within a wilder backdrop of hills and moors*”. In this respect the objectives of the designation and its overall integrity would not be compromised.

Cumulative Assessment: proposed development, Existing and Consented Wind Farms

- 6.245 In terms of cumulative effects, the addition of the proposed development and / or its combined effect with other the existing and consented wind farms (Achany, Rosehall, Meall Buidhe, Lairg II, and the cluster at Beinn Tharsuinn, including Strathrory) would not alter the **Moderate** and Significant level of effect likely to be perceived from Viewpoint 12. The nature of this effect would be cumulative, long term (reversible), indirect, and negative. Considering this SLQ from other viewpoints within the wider NSA it is not however considered that the objectives of the designation and its overall integrity would be compromised.

Cumulative Assessment: proposed development, Existing, Consented and Application Wind Farms

- 6.246 When considered cumulatively the proposed development would sit to the right of the Garvary application, appearing as a similar scale, and creating a compatible cluster of development in that sector of the view in terms of layout, turbine height and rotational speed. Both schemes appear equally visible within the background hills and moorland beyond the NSA, although the proposed development (at 14,531m distance) is approximately 500m further away than Garvary (at 14,035m distance), a difference that is perhaps balanced by the slight foreshortening of the proposed development viewed beyond the more immediate slopes of Creag a Bhealaich which encloses the Dornoch Firth at approximately 1km north of the NSA boundary. Both wind farms also flank Ben Klibreck which is visible in the far distance.
- 6.247 The addition of the proposed development to a scenario that included the Garvary application would introduce further wind farm development to Viewpoint 12 in an area that is already characterised by a similar scale of wind farm development and in this respect the new baseline would not be as “wild” as previously. The additional magnitude of change would therefore be reduced to Very Low and the additional level of effect of the proposed development on the contrast between the “*Inhabited surrounds within a wilder backdrop of hills and moors*” would reduce to **Minor to None** and Not Significant due to the pre-existing Garvary Wind Farm. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.
- 6.248 The combined effect of the proposed development and the Garvary application would however lead to a Low magnitude of change affecting the same background portion of the view from Viewpoint 12. There would remain a strong contrast between the “*inhabited surrounds within a wilder backdrop of hills and moors*” and the perception of a wilder backdrop of hills and moors would remain strong, although the hills and moors would more

overtly contain wind farm development some distance beyond the NSA boundary. Drawing from the high sensitivity and low magnitude of change, the level of (daytime) landscape effect on SLQ 2, as perceived from this viewpoint would be **Moderate** and Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and negative. Considering this SLQ from other cumulative viewpoints within the wider NSA the effects would not be significant, and the objectives of the designation and its overall integrity would not be compromised.

Effects of Reduced Intensity Aviation Warning Lights

- 6.3 Viewing the same area at night, the contrast between the “*Inhabited surrounds within a wilder backdrop of hills and moors*” is only perceptible during limited periods between dusk and dawn (during civil twilight) and may only occur for half an hour before any discernment of the landscape or ‘nightscape’ becomes limited to the shapes of hills / water, subject to the availability of moonlight. Artificial lights are visible along the shorelines and in the lower lying landscapes. With the exception of the consented Strathroly Wind Farm, aviation lights would not be visible along the skyline.
- 6.4 The aviation warning lights associated with the proposed development would also be visible along the skyline, although barely perceptible from Viewpoints 11, 15 and 16. Viewing from Viewpoint 12, the level of night-time visual effect would range from Moderate to Minor or Minor and not significant as reported in Technical Appendix 6.3. Taking account of the night-time assessment the level of effect on SLQ2, as far as this could be perceived during limited periods between dusk and dawn would be **Minor to None** and Not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.
- 6.249 Taking account of other wind farm applications, notably the Garvary application, the proposed development would introduce further aviation warning lights to an area that already contains aviation warning lights as a result of Garvary. The additional effect of the proposed development would remain **Minor to None** and Not Significant, whilst the combined cumulative effect would increase with more lights visible from Viewpoint 12 along the skyline which otherwise would be unlit in comparison to the partially lit inhabited surrounds. The lights would, however, have limited visibility due to the embedded mitigation and the resulting level of effect would be **Moderate to Minor** and not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and neutral.

SLQ 3: ‘The tranquillity of an undeveloped coastline’

- 6.250 The NS’s Commissioned Report No.374 (SNH, 2010) further describes this special quality as follows:

“The Dornoch Firth lacks any major ports or industry along its shoreline and possesses a rural ambience of great tranquillity.”

Further Information:

“The firth is not without its obvious structures. Infrastructure includes the railway along the south side, the A9 crossing, with its long bridge, and the A836 metal bridge at Bonar Bridge. This transport infrastructure offers opportunities for good

views of the NSA, whether travelling by train or crossing the bridges, but does not diminish the rural character of the area."

- 6.251 The relevant component of this SLQ is the relative lack of development along the coastline in comparison to other firths on the east coast and the extent or degree to which it can be described as 'tranquil' and rural in character.
- 6.252 The sensitivity of this SLQ is assessed as *High*. This has been derived from the high value of the NSA designation, whilst also noting that the susceptibility of this SLQ may be reduced (medium). In terms of development, this is not a 'wild land area' and there is a reasonable degree of 'rural development' as noted in the report description which partly contradicts the SLQ description in respect of development and the claim to 'great tranquillity'. The NSA contains a number of 'A' class roads, rail infrastructure, the Dornoch Firth Road Bridge and associated traffic, as well as rural development in the form of small villages and some larger settlement on the edge of the NSA. Other existing wind farms are also visible from within the NSA. Thus, the extent of development within the NSA is intermediate or 'rural' in character as opposed to 'great'. However, despite the level of development, a strong 'sense of tranquillity' and rural ambiance is apparent across much of the NSA, which may be attributed to the large areas of open water and expansive views as well as the absence of major ports or industry.
- 6.253 The proposed development would appear compatible with the contemporary rural scenery that includes a range and variety of other rural development such as wind farms. The cohesive layout and design would appear as a simple wind farm that visually affects a small part of the overall panorama where visible from the assessment viewpoints. Temptations to 'label' the proposed development as 'large industry' are not helpful and in terms of affecting tranquillity imply, for example, visually disorganised development, noise, distracting and irregular movement, large numbers of people and air pollution, none of which apply to the proposed development. Further, it is recognised that tranquillity is a very subjective term and attempts to grade this beyond 'great' or 'strong' levels of tranquillity and limited or no tranquillity have been resisted in this assessment.
- 6.254 With or without the proposed development, the NSA would remain an area of rural development with a rural ambiance and a strong sense of tranquillity, lacking in 'major ports' or 'industry' along its shoreline. Considering the design of the proposed development, the NSA would remain an area of strong or 'great tranquillity' as depicted in Viewpoints 11, 12, 15 and 16 which illustrate (in the relevant photomontages found in Volumes 3 and 5) a high degree of scenic quality and associated tranquillity.
- 6.255 To conclude, it is considered that the proposed development would have a Very Low effect on the sense of tranquillity / rural ambiance and its presence would not diminish the rural character of the area or its undeveloped coastline. The level of (daytime) landscape effect on this SLQ would be **Minor** (increasing to **Moderate to Minor** in respect of the aviation warning lights) and Not Significant and the nature of this effect would be indirect, long term (reversible) and negative to neutral.

Cumulative Assessment: proposed development, Existing and Consented Wind Farms

- 6.256 The existing wind farm development at Beinn Tharsuinn, Beinn nan Oighrean and Coire na Cloiche and the consented Strathrory has little or no effect on the sense of tranquillity / rural ambiance of the NSA and its undeveloped coastline (Very Low magnitude). The level of cumulative landscape effect (both additional and combined) on this SLQ would be **Minor** and Not Significant. The nature of this effect would be cumulative, indirect, long term (reversible) and negative to neutral.

Cumulative Assessment: proposed development, Existing, Consented and Application Wind Farms

- 6.257 The proposed development would sit to the right of the Garvary application, appearing as a similar scale within the same sector of the view. Considering both the additional effect and the combined cumulative effect of the proposed development the NSA would still remain an area of strong or 'great tranquillity' with an undeveloped coastline as depicted in Viewpoints 11, 12, 15 and 16, which illustrate a high degree of scenic quality and associated tranquillity. The level of cumulative landscape effect (both additional and combined) on this SLQ would be **Minor** and Not Significant. The nature of this effect would be cumulative, indirect, long term (reversible) and negative to neutral.

Effects of Reduced Intensity Aviation Warning Lights

- 6.5 Considering the sense of tranquillity / rural ambiance and an undeveloped coastline, this would only be perceptible during limited periods between dusk and dawn and further limited to the perception of artificial lights indicating a developed or undeveloped coastline. Aviation warning lights (assessed in Technical Appendix 6.3) would be visible as illustrated in Figure 6.3.1a-f, appearing as small point features, along the horizon. They would not contribute further to lighting visible along the coastline and would have a Very Low magnitude of change resulting in a **Minor** and Not Significant effect this SLQ. The nature of this effect would be indirect, long term (reversible) and negative to neutral.
- 6.258 Taking account of the Garvary application, the proposed development would introduce further aviation warning lights to an area that already contains aviation warning lights as a result of Garvary. The additional effect of the proposed development would remain **Minor** and Not Significant, whilst the combined cumulative effect would increase with more lights visible from Viewpoint 12 along the skyline and affecting the perceived sense of tranquillity and relatively undeveloped quality. The lights would, however, have limited visibility due to the embedded mitigation and the resulting level of effect would be **Moderate to Minor** and not Significant. The nature of this effect would be cumulative, long term (reversible), indirect, and negative to neutral.

Stage 4: Statement of Significance

- 6.259 The assessment has concluded that there would be no significant effects on the objectives of the Dornoch Firth NSA and its overall integrity would not be compromised in landscape planning terms as set out in NPF4, Policy 4.

6.260 In defining 'integrity' the assessment has drawn from the definition used by NS's Commissioned Report No. 374 *'The special qualities of the National Scenic Areas'* (SNH, 2010) which describes "*Authenticity and integrity expressed, for example, as areas of distinctiveness, sense of place, unspoilt character or historic environment.*" In this assessment therefore the term 'integrity' refers to the degree to which perceptions such as distinctiveness, sense of place, and unspoilt character are expressed intact, across the NSA as a whole through its SLQs, reflecting the purpose or objectives of its designation. Reference to 'historic environment' is not listed within the SLQs and such an assessment, if required, would be considered further as part of the Heritage assessment in Chapter 7. The principal reasons for this conclusion are set out as follows, whilst a summary of the Dornoch Firth NSA assessment of SLQs is set out in Table 6.9.

- The proposed development is located outwith the NSA boundary by 8.3km and would have no physical effects on the NSA or three of the seven SLQs that relate specifically to physical attributes;
- The NSA assessment of SLQs concludes that there would be no significant effects on the perceptual qualities of the remaining four SLQ's with the exception of one of the SLQs as perceived from Viewpoint 12. Significant visibility of the proposed development is largely limited to a localised area around the northernmost Struie Viewpoint on a layby off the B9176: Moray Firth Tourist Route (Viewpoint 12);
- The NSA assessment of specific SLQs has confirmed that there would be a Low 'risk of damage or loss' or magnitude of change and a **Moderate** and Significant effect on SLQ 2: "*Inhabited surrounds within a wilder backdrop of hills and moors*" with the proposed development reducing, but not eliminating the perception of a 'wild' character to the backdrop of hills and moors as perceived from Viewpoint 12 only;
- This same effect would be cumulative with the Garvary application with both developments affecting the same portion of the panoramic view to a similar degree;
- In planning terms this limited and significant effect is considered further and weighed against the benefits of the proposed development;
- The proposed development includes embedded mitigation which has evolved from an iterative design and assessment process ensuring that the visual composition of the proposed turbines as seen from Viewpoint 12 presents as a simple and cohesive turbine composition that would appear as a minor horizontal and vertical feature when compared to the horizontal and vertical scale of the landscape in the panoramic view from this location;
- Other areas of theoretical visibility represented by the ZTV are fragmented or limited to blade tip visibility. Viewpoint analysis from these locations confirms that the visual effects would not be significant. Consequently, the assessment has confirmed that there would be a Low to Very Low 'risk of damage or loss' or magnitude of change and the levels of effect on the three SLQs included in the assessment would not be significant; and
- There would be no effect on the central focus and water body of the Dornoch Firth NSA and the NSA designation would retain a strong sense of place, distinctiveness and unspoilt character across the area of the NSA as a whole.

6.261 There would be no significant effects on the remaining SLQs and the objectives of the Dornoch Firth NSA and its overall integrity would not be compromised as a result of the

proposed aviation warning lights, the effects of which are reported in Technical Appendix 6.3.

6.262 A summary of the SLQ assessment for the Dornoch Firth NSA is set out in Table 6.9.

Table 6.9: SLQ Assessment for the Dornoch Firth NSA

Special Landscape Quality	Sensitivity	Magnitude (Risk of damage / loss)	Level of Effect
1. The contrast between the enclosed west and the expansive east	High	Very Low to Zero	Minor to None (Not significant)
2. Inhabited surrounds within a wilder backdrop of hills and moors	High	Low (Viewpoint 12) to Very Low	Moderate and Significant (Viewpoint 12 only) to Minor to None (Not significant)
3. A wide diversity of woodland cover	Not assessed – physical characteristics that could not be affected by the proposed development which is well beyond the NSA boundary.		
4. A rich variety of alluvial lands, dunes and links			
5. The ever-changing firth			
6. The tranquillity of an undeveloped coastline	High	Very Low	Minor (Not significant)
7. Migdale, a microcosm of the wider Dornoch Firth	Not assessed – area largely outwith the ZTV with no view of the proposed development from publicly accessible areas.		

Loch Fleet, Loch Brora and Glen Loth SLA

6.263 SLAs are non-statutory designations that represent landscapes and features of local / regional importance and value within THC area. Further guidance on SLAs and their special qualities and features of importance is provided by THC in their *Assessment of Highland Special Landscape Areas*¹⁵.

6.264 The *Loch Fleet, Loch Brora and Glen Loth* SLA is located approximately 12km distance to the south-east of the proposed development at its closest point and extends further northeast to approximately 38km distance. It covers an extensive area of open moorland hills, glens, straths and lochs as well as areas of coastal shelf and shoreline (21,040 ha) between Loch Fleet and West Helmsdale and includes Loch Brora, Glen Loth and an array of summits between 500m AOD and 630m AOD. There are many special qualities and features of importance within this SLA and reference has been restricted to those that are considered relevant to the proposed development which are overlapped by the ZTV.

6.265 The SLQ's (referred to in the document as 'special qualities') are listed by THC in the above document and are described and assessed individually in Table 6.10 against the proposed development. A high-level assessment has been undertaken reflecting the limited ZTV

¹⁵ https://www.highland.gov.uk/downloads/file/2937/assessment_of_highland_special_landscape_areas

coverage, distance from the proposed development and the lower likelihood of significant effects, which has been confirmed by this assessment. This assessment therefore does not follow the four-stage approach of the NS working draft '*Guidance for Assessing the Effects on Special Landscape Qualities*', November 2018, which is aimed at nationally designated landscapes.

- 6.266 Although locally designated, the SLA is indicative of High value as two national tourist routes, the North Coast 500 and Moray Firth Tourist Route, pass through it. The landscape is of Medium susceptibility to wind farm development due to the presence of existing wind farm development on the northwestern boundary of the SLA which lowers susceptibility to change. Conversely, the more open upland landscape characteristics in combination with coastal features that are visible across the seascape from the south of the wider Study Area (including the Dornoch Firth NSA) increase susceptibility to change to High-Medium. The overall sensitivity of the SLA is assessed as *High-Medium*.

Assessment: proposed development

- 6.267 Due to distance from the proposed development and intervening landform, ZTV coverage is limited within the SLA to scattered slopes to the southwest and occasional summits to the north and north-east. The nearest areas of theoretical visibility are indicated on elevated slopes and summits at either side of The Mound at Loch Fleet including Mound Rock (208m AOD) and Princess Cairn (261m AOD). Although there is theoretical visibility indicated on the flat links area to the north of Loch Fleet, the area is covered by extensive coniferous forestry at Balblair Wood and views would be very restricted. To the north of Loch Fleet, theoretical visibility occurs above Strath Llundaidh on the upper slopes and summit of Beinn Llundaidh and at Ben Bhraggie (Viewpoint 14, Figure 6.31). Beyond this, as the SLA continues northwest, theoretical visibility occurs infrequently on facing slopes and summits at Ben Horn, Col-bheinn, Beinn Dhorain and Beinn Mhealaich.
- 6.268 The assessment against each of the SLQs of the SLAs is reported in Table 6.10, as follows:

Table 6.10: SLQ Assessment for the Loch Fleet, Loch Brora and Glen Loth SLA

Special Landscape Quality Citation (Note text in italics is extracted from the citation in full)	Assessment
Key Landscape and Visual Characteristics	
1. <i>A relatively simple uniform, rolling plateau of interior broad, interwoven rounded hills, clothed by an open mosaic of heather and grass moorland. As this composition is fairly simple, and extends throughout the area, there is a strong consistency of this backdrop to the coast.</i>	The turbines would not affect the simple topography and moorland vegetation cover. The turbines are predominantly screened from coastal areas within the SLA and would not affect the simple and 'strong consistency of this backdrop to the coast'. Where the ZTV indicates theoretical visibility from the southern edge of the SLA at the coast, the turbines would be screened by intervening vegetation. The strong backdrop of hills would remain as a consistent characteristic. There would be no effect on this key characteristic.
2. <i>The hill area is breached by major straths and glens which have differing local</i>	The turbines would be theoretically visible from the eastern edge of Loch Fleet, however, in

Special Landscape Quality Citation (Note text in italics is extracted from the citation in full)	Assessment
<i>character derived from the varying combination of native woodland, forest plantation, moorland and water bodies. They provide sheltered access routes through the hills and provide physical and visual connections between the interior and the coastal shelf and North Sea.</i>	reality the blade tips would be barely perceptible due to the distance and screened by intervening vegetation. The turbines would not be visible from Loch Brora, Dunrobin Glen or Glen Loth. There would be no effect on the provision of 'sheltered access routes through the hills' or the 'physical and visual connections between the interior and the coastal shelf and North Sea.' There would be no effect on this key characteristic.
3. To the east lies a narrow but relatively fertile coastal shelf contains the main road and rail routes in this area, and small farms and settlements at fairly regular intervals. A distinctive field pattern of pasture runs parallel to the coast, marked in places by windswept trees and stone walls.	The turbines are predominantly screened from the coastal areas with no view likely at Littleferry within the SLA and there would be no effect on the small farms, settlements and field patterns within this area. There would be no effect on this key characteristic.
4. The linear coastal shelf, is defined on its interior side by the edge formed by the adjacent hill slopes, the elevation which provides expansive views both along the coastal edge and outwards across the open sea. Interior views are limited by the convex nature of the hill slopes.	The turbines would not be visible from the linear coastal shelf, and no effect on the seaward views which are the primary focus. There would be no effect on this key characteristic.
5. Loch Fleet is the most northerly inlet on the east coast. Where an inlet occurs, defined by its distinctive opposing spits of land, a sheltered, enclosed tidal basin is fringed with shingle shores and pine woods. At low tide, exposed mudflats create a distinctive feature whose character is enlivened by large flocks of wading birds.	The turbines would be theoretically visible from the eastern edge of Loch Fleet, however, in reality the blade tips would be barely perceptible due to the distance and screened by intervening vegetation. There would be no significant effect on this key characteristic (Very Low to Zero magnitude and Minor to None level of effect).
6. Views are obtained from some areas of wind turbines and overhead electricity lines whose large scale and man-made character can seem to diminish the scale of the interior hills and their wildness qualities.	Views of existing wind turbines and electricity lines /pylons are noted as present within parts of the SLA and are listed as a characteristic, although it is noted that they 'can seem to diminish the scale of the interior hills and their wildness qualities'. Given the very limited visibility of the proposed development from this SLA (limited to eastern edge of Loch Fleet where the turbines would be barely perceptible), the proposed turbines would not diminish the scale of the hills, which would remain the greater in terms of mass and scale. In this respect it should be noted that the proposed development is located approximately 11.4km distance beyond the SLA boundary at distances between ~11.4km and ~38km. Whilst it would add to the presence of wind farm development in views

Special Landscape Quality Citation (Note text in italics is extracted from the citation in full)	Assessment
	west (Viewpoint 14: Ben Bhraggie), the proposed development would not diminish the perceived scale of the hills within the SLA due to its distance. The absence of ZTV coverage across most of the SLA, particularly to the north and northwest of the site indicates that the qualities of wilderness and tranquillity would not be affected by the introduction of the proposed turbines. There would be no significant effect on this special quality (Very Low magnitude and Minor to Negligible level of effect).
7. <i>Along the coast and around the inlet, there are a number of historic built features that form prominent focal features and landmarks.</i>	This is assumed to be a reference to Loch Fleet and Skelbo Castle and views of the Duke of Sutherland Monument on the summit of Ben Bhraggie. There would be No View of the proposed development from Skelbo Castle, and very limited visibility from the eastern edge of Loch Fleet. Similarly, the proposed development would not affect views towards the Sutherland Monument. It should be noted that there are few other 'prominent focal features and landmarks' along the coast within the SLA and there would be no view of the proposed development from the Category A listed church at Lothmore and no effect on its setting or 'landmark' quality. There would be no significant effect on this key characteristic (Very Low to Zero magnitude and Minor to None level of effect).
Historic Features (assessed as landscape and visual receptors in terms of the views of the proposed development from these locations).	
1. <i>Skelbo Castle is a dominant feature on the south-side of Loch Fleet, sitting atop a hill commanding excellent views of the loch.</i>	Skelbo Castle is outwith the ZTV. There would be no effect on this special quality.
2. <i>The Mound is a very prominent and clearly man-made causeway over which the main A9 coastal road passes. Engineered by Telford in 1814 -16 it spans the mouth of Loch Fleet with a bridge at its northern end and offers spectacular coastal views.</i>	The Mound is outwith the ZTV and there would be no view of the proposed development from this area. There would be no effect on this special quality.
3. <i>The hills that separate Loch Brora from Glen Loth have a light scattering of mainly late medieval settlement and shielings. Apart from on the most inaccessible hills, head dykes and enclosures can be traced through the landscape with the occasional remains of a settlement located along a river valley in between.</i>	Loch Brora and Glen Loth are outwith the ZTV and there would be no view of the proposed development from these areas. There would be no effect on this special quality.

Special Landscape Quality Citation (Note text in italics is extracted from the citation in full)	Assessment
4. <i>Glen Loth is rich in the remains of past settlement. Well preserved prehistoric remains proliferate from the flat coastal areas. Heading north the steepness of the glen sides soften the density of prehistoric settlement and later medieval township increases. Interspersed within the remaining prehistoric settlement, souterrains and standing stones still survive.</i> 5. <i>Substantial remains of later medieval township occur, centred around Loth Burn in the lower slopes of Beinn Mhealaich, and are still clearly visible and easily identifiable within the landscape.</i>	Glen Loth, Loth Burn and Clach Mhic Mhios Standing Stones are outwith the ZTV and there would be no view of the proposed development from these areas. There would be no effect on this special quality.
6. <i>Centred around the banks of Loch Brora, monuments include well defined burial cairns, roundhouses and associated field systems, brochs and homesteads. Many of these early sites have been incorporated within the field systems and head dykes of later medieval townships which themselves survive along the Loch.</i>	Loch Brora is outwith the ZTV and there would be no view of the proposed development from this area. There would be no effect on this special quality.
7. <i>Prehistoric settlement and burial cairns are located on the eastern slopes of Cnoc Odhar overlooking Loch Fleet and on the south-facing slopes of Creag an Amalaidh. On the northside of Loch Fleet on the flat improved plains in between The Mound and Kirkton another extensive prehistoric settlement exists.</i>	There would be very limited visibility of the proposed development from the southern slopes of Creag an Amalaidh. ZTV coverage occurs mainly to the west facing slopes but extends to the summit and southwest facing slopes. From here views towards the proposed turbines would be to the northwest along Strath Carnaig towards the low hills forming the skyline of the view. The proposed turbines would be visible as blades and tips beyond the hills and outwith the SLA (subject to screening from intervening vegetation). The proposed development would be seen beyond other human development including scattered settlement, pylons and roads. There would be no significant effect on this key characteristic (Very Low magnitude and Minor to Negligible level of effect).
An Integrated Combination of Landform	
8. <i>The combination and juxtaposition of the rolling moorland hills, linear glens, the coastal shelf and tidal basin creates a diverse yet connected landscape composition which is experienced in sequence when travelling along the A9 and from the railway</i>	The proposed development would not affect the combination and juxtaposition of different landscape types or the appreciation of their diversity and combination. There would be very limited visibility of the wind farm from either the A9 or the railway line from within the SLA. There would be no significant effect on this special quality (Very Low magnitude and Minor to Negligible level of effect).
9. <i>Many small, often linear, settlements lie to the northwest of the A9, strung along</i>	The proposed development would have no effect on the panoramic views out to sea from

Special Landscape Quality Citation (Note text in italics is extracted from the citation in full)	Assessment
<i>the footslopes of the interior hills, and these enjoy panoramic views out to sea. In contrast the larger settlements just outside the SLA boundary but visible from within it</i>	Helmsdale, Brora, Golspie and other smaller villages within the SLA. There would be no effect on this special quality.
10. There is a strong contrast between the expansive open forms of the moorland hills, the narrow, enclosed and intimate forms of the glens and straths, the linear coastal fringe with its extensive sea views and the intimate wooded enclosure of the Loch Fleet tidal basin	The proposed development would not affect the strong contrasts between the various landscape character types. There would be no effect on this special quality.
11. The locally dominant ridgeline of Ben Bhraggie overlooking Loch Fleet and lower lying coastland is overlooked by the monument to the Duke of Sutherland which acts as a focal feature within the southern part of the SLA	Viewpoint 14: Ben Bhraggie (Figure 6.31) – This summit is a popular local route for walkers and mountain bike users. There would be no view from the monument and most of the views are orientated to the south and east, away from the proposed turbines. The visual effects are assessed as Moderate and Not Significant due to the orientation of views and where other existing and consented wind farm development would be more visible outwith the SLA. The proposed turbines would not be visible in views towards the ridgeline of Ben Bhraggie or the monument to the Duke of Sutherland from Loch Fleet and the lower lying coastland. Where theoretical visibility occurs at the eastern edge of Loch Fleet, there would be no, or very limited visibility of the proposed development due to extensive coniferous forest cover. In addition, the orientation to the proposed turbines would be west/ northwest, away from the Ben Bhraggie ridgeline and monument. There would be no significant effect on this special quality (Very Low magnitude and Minor to Negligible level of effect).
Accessible yet Secluded Glens and Lochs	
12. The interior is largely screened by the edge of the hill landform, but occasional views are obtained where glens intersect with the coastal shelf. Readily accessible, these sheltered glens offer a sense of seclusion, tranquillity and intimacy from the busier coastal fringe.	The proposed development would not affect areas where the glens intersect the coastal shelf at either Loch Fleet, Loch Brora, Dunrobin or Glen Loth, all of which areas are outwith the ZTV. The proposed development would not affect the existing sense of seclusion, tranquillity and intimacy of these areas in contrast with the busier coastal fringe. There would be no effect on this special quality.

6.269 In summary, the proposed development would not significantly affect any of the SLQs of the Loch Fleet, Loch Brora and Glen Loth SLA, and the overall integrity of the SLA.

6.270 The nearest point on the SLA boundary to the proposed turbines is approximately 12km distance. There is very limited ZTV coverage across the SLA, where theoretical visibility is

indicated it does not overlap with the main features of importance listed within the Assessment of Highland Special Landscape Areas¹⁶.

- 6.271 Overall, the magnitude of change within the SLA would be Very Low to Zero and the level of effect **Minor to None** and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative.
- 6.272 No significant night-time effects have been assessed as a result of the proposed aviation warning lights.

Cumulative Assessment: Existing + Consented Sites + proposed development

- 6.273 There are two clusters of existing wind farm development located along the northwestern boundary of the SLA comprising Kilbraur and Kilbraur Extension, and Gordonbush and Gordonbush Extension. Although these are located in lower-lying areas, they would significantly affect the SLA where visible near the boundary (High magnitude – reducing with distance and visibility). Chleansaid would be visible to the northwest from some elevated areas at approximately 21km distance (Very Low to Zero magnitude). Other more distant existing wind farms are visible in clear conditions to the southwest in the same FoV as the proposed development, including Rosehall, Achany, and Lairg and the consented Lairg II wind farms. These are visible from occasional elevated parts of the SLA between approximately 13 - 22km distance (all Very Low to Zero magnitude). The more distant Beinn nan Oighrean, Beinn Tharsuinn, Coire na Cloiche and Novar as well as the consented Strathroy are visible nearer the coastline to the southwest (all Very Low to Zero magnitude). The additional effect of the proposed development would be **Minor to None** and Not Significant. The combined effect would be **Substantial to Major** and Significant (due to Kilbraur, Kilbraur Extension, Gordonbush and Gordonbush Extension, and not the proposed development) taking account of all wind farm development. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.

Cumulative Assessment: Existing + Consented Sites + Applications + proposed development

- 6.274 There would be no application wind farms located within the SLA. Garvary and Strath Oykel wind farms would be located to the southwest and would extend the cluster of wind farm development adjacent to the proposed development at approximately 13km (Garvary) and 28km (Strath Oykel) (both Very Low to Zero magnitude). The additional effect of the proposed development would be **Minor to None** and Not Significant. The combined effect would be **Substantial to Major** and Significant (due to Kilbraur, Kilbraur Extension, Gordonbush and Gordonbush Extension, and not the proposed development) taking account of all wind farm development. The nature of these effects would be long-term (reversible), cumulative, indirect and negative.

High Level Wild Land Assessment

- 6.275 Through post-scoping consultation as noted in Table 6.1, NS was content to scope out the assessment of WLAs within the 45km Study Area. However, THC requested a high-level

¹⁶ <https://www.highland.gov.uk/downloads/file/2937/assessment-of-highland-special-landscape-areas>

assessment of the Ben Klibreck - Armine Forest WLA (WLA 35) which is provided below and broadly follows NS's Technical Guidance, Assessing Impacts on Wild Land Areas, 2020.

- 6.276 The assessment has taken account of how the area is perceived and used by people, and a number of recreational viewpoints and routes within the blade tip ZTV have been considered in the assessment. All the summit views would be experienced as wide panoramic views (typically 360°) and viewed over long distances. The proposed development is not within a WLA, so the physical integrity of the WLA as a whole would remain intact. The only potential for effects would occur as a result of intervisibility between the WLA and the proposed development.

Ben Klibreck – Armine Forest WLA

- 6.277 The proposed development would be located approximately 10.5km southwest of the boundary of the Ben Klibreck – Armine Forest WLA (WLA 35). Viewpoint 19 is located within the WLA and the WLA boundary is illustrated in Figure 6.9a. ZTV coverage within the WLA is limited, being present on the south and some southwest facing low to mid slopes of Ben Armine and Borrobol Forests and includes the summit of Ben Klibreck. The WLA overlaps with the Ben Klibreck and Loch Choire SLA and some of the Bens Giam and Loch nan Clar SLA. The WLA covers three LCTs, including *Rounded Hills*, *Sweeping Moorland and Flows*, and *Lone Mountains* LCTs. The ZTV pattern reflects the underlying landform within the WLA, and the percentages of theoretical visibility cover are summarised as follows:

- ZTV (to blade tip) coverage of the proposed development accounts for 23% of the entire WLA.

- 6.278 All of the five Wild Land Qualities (WLQ) identified in NS's Ben Klibreck – Armine Forest WLA Description (2017) have been included in the assessment and each of these WLQ has been assessed as of High sensitivity as a precaution, although more detailed analysis may identify some variability in sensitivity.

- 6.279 The proposed development, located outwith the WLA, could not affect the physical attributes associated with the WLQs, but could affect the perceptual responses experienced from within the WLA which are listed as follows:

- Sense of Sanctuary / Solitude / Refuge;
- Arresting / Inspiring Qualities, Sense of Awe and Prospect;
- Risk or Anxiety / Hazard; and
- Physically Challenging.

- 6.280 Table 6.11 provides a high-level assessment on the SLQs of the Ben Klibreck – Armine Forest WLA. In summary, the proposed development would not significantly affect the perceptual responses and WLQs of the Ben Klibreck – Armine Forest WLA being visible to the south of the WLA towards an area that is already influenced by existing wind farms and other human development.

Table 6.11: High-level WLQ Assessment: Ben Klibreck – Armine Forest WLA

Receptor / Location	Wild Land Assessment			Cumulative Wild Land Assessment			
	Sensitivity	Magnitude of Change	Level of Effect	Existing + Consented		Existing, Consented + Applications	
				Additional	Combined	Additional	Combined
WLQ 1: “An awe-inspiring simplicity of landform and landcover and a perception of ‘emptiness’, so that the extent of the peatland often seems greater than it is.”							
Overall Assessment within 30m of the proposed development	High	Very Low	Minor and Not Significant	Minor and Not Significant	Moderate to Minor and Not Significant	Minor and Not Significant	Moderate to Minor and Not Significant
	Views towards the proposed development from the southern and some central parts of the WLA are tempered by the presence of existing wind farms and further human development beyond the WLA boundary. The simple landform and landcover with the perception of ‘emptiness’ would be unaffected by the proposed development located over 10.5km at its closest point from the WLA boundary. The overall effects (and cumulative effects) of the proposed development on WLQ 1 and the associated perceptual qualities of simplicity and emptiness WLQs would not be significantly affected. The existing Creag Riabhach and Gordonbush wind farms and the consented Chleansaid and Strath Tirry wind farms are the most prominent developments, closest to the WLA and most likely to affect the WLQs. Despite their scale and contrasting form and colour they would not significantly affect the awe-inspiring simplicity of landform and landcover and a perception of ‘emptiness which would remain strong and apparent. Other more distant wind farms would appear more diminutive and have a reduced magnitude.						
WLQ 2: “Arresting, isolated mountains rise up in stark contrast to surrounding peatland and glens, amplifying the awe-inspiring qualities of each.”							
Overall Assessment within 30km of the proposed development	High	Very Low	Minor and Not Significant	Minor and Not Significant	Moderate to Minor and Not Significant	Minor and Not Significant	Moderate to Minor and Not Significant

Receptor / Location	Wild Land Assessment			Cumulative Wild Land Assessment			
	Sensitivity	Magnitude of Change	Level of Effect	Existing + Consented		Existing, Consented + Applications	
				Additional	Combined	Additional	Combined
	The effects of the proposed development would be limited to the southern extremities of the WLA which have a weakened WLQ due to the context of other human land use and the existing wind farms along the margins and southern and southeastern extremities of the WLA. Limited effects would also affect some central and western areas; however, these are over 20km distance with the proposed development visible beyond the WLA boundary in clear conditions. The overall effects (and cumulative effects) of the proposed development on WLQ 2 and the associated perceptual qualities of arresting, isolated and awe-inspiring WLQs would not be significantly affected. The existing Creag Riabhach and Gordonbush wind farms and the consented Chleansaid and Strath Tirry wind farms are the most prominent developments, closest to the WLA and most likely to affect the WLQs. Despite their scale and contrasting form and colour they would not significantly affect the dominance of the mountains and the 'arresting' and 'awe-inspiring' qualities which would remain strong and apparent. Other more distant wind farms would appear more diminutive and have a reduced magnitude.						
WLQ 3: “A remote interior where access involves long distances and lengthy time via penetrating glens or crossing over and around rugged landforms and waterbodies.”							
Not assessed – The proposed development would not be visible from the penetrating glens and waterbodies within the remote interior of the WLA.							
WLQ 4: “An extensive area of peatland with a prevailing strong sense of naturalness.”							
Overall Assessment within 30km of the proposed development	High	Very Low	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant
	The effects of the proposed development would be limited to the southern extremities of the WLA which have a weakened WLQ due to the context of other human land use and the existing wind farms along the margins and southern and southeastern extremities of the WLA. Limited effects would also affect some central and western areas however, these are over 20km distance with the proposed development visible beyond the WLA boundary in clear conditions. Views towards the proposed development are tempered by the presence of existing wind farms and further human development to the south beyond the WLA boundary. The overall effects (and cumulative effects) of the proposed development on WLQ 4 and the associated perceptual qualities of naturalness WLQs would not be significantly affected. The existing Creag Riabhach and Gordonbush wind farms and the consented Chleansaid and Strath Tirry wind farms are the most prominent developments, closest to the WLA and most likely to affect the WLQs. Despite their scale and contrasting form and colour they would not significantly affect the extensive area of peatland with a prevailing strong sense of naturalness. Other more distant wind farms would appear more diminutive and have a reduced magnitude.						

Receptor / Location	Wild Land Assessment			Cumulative Wild Land Assessment			
	Sensitivity	Magnitude of Change	Level of Effect	Existing + Consented		Existing, Consented + Applications	
				Additional	Combined	Additional	Combined
WLQ 5: “A secluded, elevated and remote interior plateau shielded by an outer rim of hills, in which there is a strong sense of solitude, sanctuary and risk.”							
Overall Assessment within 30km of the proposed development	High	Very Low	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant	Minor and Not Significant
	The proposed development would be theoretically visible from limited elevated locations within the interior plateau including Ben Armine. However, it is more than 25km distance and the proposed development would only be visible in clear conditions to the south which is already influenced by existing wind farms and other human development located closer to the boundary of the WLA. The overall effects (and cumulative effects) of the proposed development on WLQ 5 and the associated perceptual qualities of solitude, sanctuary and risk WLQs would not be significantly affected. The existing Creag Riabhach and Gordonbush wind farms and the consented Chleansaid and Strath Tirry wind farms are the most prominent developments, closest to the WLA and most likely to affect the WLQs. Despite their scale and contrasting form and colour they would not significantly affect the secluded, elevated and remote interior plateau shielded by an outer rim of hills, in which there is a strong sense of solitude, sanctuary and risk. Other more distant wind farms would appear more diminutive and have a reduced magnitude.						

Residual Visual Effects

- 6.281 Visual effects are assessed by considering the sensitivity of the receptor (people in the landscape) and the magnitude of change that would affect the view or overall visual amenity. They are defined by the Landscape Institute in GLVIA 3, paragraphs 6.2 as follows:

"An assessment of visual effects deals with the effects of change and development on the views available to people and their visual amenity. The concern here is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements."

- 6.282 The assessment has taken a precautionary approach and focused on visual receptors within 10km of the proposed development to the north, east and west and within 15km to the south of the proposed development, in order to assess the likely significant visual effects. This has been guided by the results of the viewpoint analysis (Technical Appendix 6.2) which indicated that significant visual effects would be limited to within approximately 9.5km of the proposed development with a further potentially significant effect in the south at approximately 14.5km distance. Within the wider Study Area, the assessment has included receptors of national importance such as Scotland's Great Trails, Sustrans Cycle Routes and popular hill walking summits (Munros and Corbetts) that are overlapped by the blade tip ZTV.

Visual Effects during Construction, Operation and Decommissioning

- 6.283 The majority of the significant visual effects would be experienced as a result of views of the proposed turbines during the operational period and this forms the main focus of the assessment. However, the visual effects associated with the construction and decommissioning phases of the proposed development and the infrastructure components also have the potential to be significant and these have been included in the assessment where there is the potential for a significant visual effect.
- 6.284 An outline description of the visual effects associated with the construction and decommissioning phases is set out here.

Visual Effects during Construction

- 6.285 The assessed levels of effect will increase from Zero, at the start of construction and progressively increase to a maximum level of effect, equal to that occurring during operation, upon completion of the construction period. The construction effects although temporary are likely to involve greater movement of machinery and visibility of contrasting construction activity, background noise and associated lighting. The nature of these effects would be temporary, direct, and negative. Some construction activities may be remote from the turbine locations (access works) and / or temporary (temporary construction compounds) and subject to restoration on completion of the construction period.

6.286 An outline assessment of each of the component parts of the proposed development likely to be constructed during the construction period is provided as follows:

- **New Internal Access Tracks, Turning Heads and Crane Hard-standings:**
Approximately 7.22km of the proposed new access tracks are unlikely to cause significant visual effects on local receptors as they would have low visibility due to the Site location and the surrounding landform. Small sections of the access tracks would be visible from Viewpoints 2, 8, 9 and 10 within 10km of the proposed development. The access tracks are not crossed by any recreational routes. The proposed development will also use the wind farm tracks which will be constructed as part of the consented Lairg II Wind Farm which have a total length of 3.5km.
- **Temporary construction compound:**
One temporary construction compound is proposed and as with the internal access tracks it is not sited in a visually prominent location and is unlikely to cause significant visual effects during the construction period. The construction compound would be largely screened by intervening landform which would provide sufficient screening to avoid wider visibility or significant visual effects from surrounding receptors. It would not be visible from any viewpoints within 10km.
- **Grid Connection Infrastructure:**
As with the temporary construction compound, the substation and Energy Storage Compound (ESC) would be largely screened by intervening landform which would provide sufficient screening to avoid wider visibility or significant visual effects from surrounding receptors. The top of the substation is theoretically visible from Viewpoint 2; however, it would be barely perceptible due to the intervening landform. It would not be visible from any other viewpoints within 10km.
Electrical cables connecting to the proposed turbines to the substation would be underground within the Site, and post construction there would be no visual effects.
- **On-Site Borrow Pits:**
There would be very limited visibility of the three borrow pit locations due to the screening effects of the surrounding landform which would provide sufficient screening to avoid wider visibility or significant visual effects from surrounding receptors. Each borrow pit would be subject to a more detailed excavation and restoration plan.

Visual Effects during Operation

6.287 The assessed levels of effect are likely to be at their greatest during the period of operation (which is the focus of the main visual assessment), due to the visibility of the proposed turbines and associated infrastructure. However, in comparison to a busy construction site, the appearance of the proposed development would also recover a 'calmer' visual character with negligible levels of maintenance activity visible on Site.

Visual Effects during Decommissioning

6.288 During decommissioning the wind farm would return to a construction site for a temporary period and the level of visual effect would gradually reduce with the removal of the turbines and associated above ground infrastructure. Therefore, the visual effects likely to

be experienced during the decommissioning period would reduce from the operational levels and would not be significant on completion of the decommissioning. As with the construction period, although temporary, these works are likely to involve greater movement of machinery and visibility of contrasting construction activity, background noise and associated lighting. In overall terms the level of visual effect would reduce to non-significant levels and the nature of these effects would be permanent, direct, and neutral when compared to the pre-existing baseline landscape of the local area.

Visual Effects on Views from Settlements and Residential Properties

- 6.289 The visual effects likely to be experienced from settlements include consideration of residential areas, the public realm and public open spaces within the settlement boundaries that would be frequented by people. The sensitivity of each of these receptors (people) has been assessed as *High*.
- 6.290 As outlined in the baseline, there are no residential properties within 2km of the proposed turbines and in accordance with the Landscape Institute guidance, a Residential Visual Amenity Assessment (RVAA) is excluded from the assessment.
- 6.291 In summary, there would be no significant visual effects on any settlements within the Study Area.
- 6.292 There would also be no significant night-time effects and a full night-time assessment of the aviation warning lights is provided in Technical Appendix 6.3.

Table 6.12: Visual Effects on Views from Settlements

Settlement	Assessment
Lairg	Lairg is a small settlement located at either side of Little Loch Shin. To the east of the Loch, the settlement is contained within a narrow 'basin' landform with the majority of the settlement formed along the A839 as it descends from the upper reaches of Strath Fleet. Further areas of the settlement (Lochside) are located on the rising landform overlooking Little Loch Shin to the north of the settlement. To the west of Little Loch Shin, a further area of the settlement (Ord Place) is accessed via The Black Bridge where the Loch narrows. This area is located on a relatively level area of ground at the base of The Ord (150m AOD). Aside from the access along the A839 from Strath Fleet to the east, the settlement is accessed from the south and north by the A836 which follows the eastern edge of Little Loch Shin, the A839 to the west which crosses Little Loch Shin at The Black Bridge and continues towards Rosehall, and the B864 which follows Achany Glen to Invershin to the south. Further minor roads connect from the main settlement to elevated scattered property at Torroble and Tomich to the southeast and Saval and Lairg Muir to the northeast. The main settlement area is located between approximately 5.5 – 6.9km distance from the nearest turbine of the proposed development. Due to the containment of the settlement by surrounding hills to the east and west, views are mostly internal within the settlement (particularly along the A839) or orientated towards Loch Shin or Little Loch Shin. More elevated properties to the north and east of the settlement have wider views which include views south and southeast towards the proposed development. The settlement is interspersed with mature trees and small woodland areas and in combination with the surrounding landform and built form, views within the settlement tend to be mostly close to mid-range with views of the hills between Achany Glen and Strath Fleet often screened or filtered or occurring above surrounding vegetation and buildings – as illustrated in Viewpoints 6 and 7.

Settlement	Assessment
	<u>Assessment: proposed development:</u> ZTV analysis indicates that theoretical visibility from the settlement would occur in the north (Lochside) and west (Ord Place) areas of the settlement. There would be no theoretical visibility from the main area of the settlement along the A839 apart from a small area near the junction with the A836, and partial visibility of between one and nine turbines where visibility is indicated to the north and west of the settlement. Where visible from the north of the settlement, the proposed turbines would be heavily filtered by mature trees and tree belts, with only glimpsed views available when moving through this part of the settlement as illustrated in Viewpoints 6 and 7, Figures 6.23 and 6.24 (Very Low (summer), and Low-Very Low (winter) to Zero magnitudes). In areas to the west of the settlement at Ord Place, views from properties are variously orientated, but are generally north-south along Achany Glen or east-west across Little Loch Shin. Views within this area are, however, often screened by surrounding buildings – although there are views of the wider landscape between buildings and above rooftops from upper stories of some properties and from properties along the eastern edge of Ord Place where they are not filtered by vegetation. Wireline analysis from this part of the settlement indicates that partial blades and blade tips would be theoretically visible from this part of the settlement beyond the existing Lairg turbines. These are likely to be screened by intervening forestry and / or tree belts on the rising slopes and hills to the southeast of the settlement (at most Very Low to Zero magnitude if forestry were felled). The level of effect from this part of the settlement would range from Minor and Not Significant (Moderate to Minor and Not Significant in winter) to No View. The nature of these effects would be long-term (reversible), indirect and negative to neutral. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> Blades and hubs of Lairg Wind Farm are visible on the skyline to the southeast from parts of the settlement at a minimum of 2.9km from the main part of the settlement area with some views heavily filtered by vegetation (Medium - Low to Zero magnitude). A cluster of wind farms would be theoretically visible to the southeast beyond Achany Glen including Beinn nan Oighrean, Beinn Tharsuinn and Novar / Extension at distances over 20km (subject to localised screening) (all Very Low to Zero magnitude). The consented Lairg II would be visible behind and to the right of the existing Lairg Wind Farm from elevated areas to the north of the settlement and from the west of the settlement where it would be visible on the skyline above trees at ~3.5km (High-Medium to Zero magnitude). The additional effect of the proposed development would range from Minor and Not Significant (slightly reduced due to the presence of other wind farms) to No View. The combined effect would range from Substantial to Major and Significant (due to Lairg and Lairg II and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: proposed development + Existing + Consented Sites + Applications</u> Garvary Wind Farm would be visible behind and to the right of Lairg II covering ~30° of the horizontal FoV at a minimum 4.6km distance (High-Medium to Zero magnitude). Shinness would be visible in views to the north at a minimum 10.4km (Low magnitude). The additional effect of the proposed development would range from Minor and Not Significant (slightly reduced due to the presence of other wind farms) to No View. The combined effect would range from Substantial to Major and Significant (due to Lairg, Lairg II and Garvary and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.

Visual Effects on Views from Transport Routes

- 6.293 This section of the assessment considers the sequential and cumulative visual effects on views of the proposed development from selected transport routes within 10/15km of the proposed development.
- 6.294 The views from these routes (including rail routes) would be experienced transiently by road users (mainly drivers / passengers and where appropriate cyclists) who would experience the wind farm as part of the changing sequence of views experienced from the road / rail route. Each of the roads were driven in both directions to assess the potential effects. All routes were assessed with the assistance of sequential wirelines, ZTV maps and True View Visuals 3D augmented reality software. The assessment has also taken account of other wind farms visible from these routes.
- 6.295 In summary, significant effects would be limited to sections of the following transport routes:
- Up to approximately 6km of the A839 (also Moray Firth Tourist Route) along intermittent sections between Rovie Lodge and Acheilidh for westbound users, and up to approximately 5.4km of the A839 (undesignated) intermittently between west of the entrance to Achany Wind Farm and the junction with the B864 for eastbound users;
 - Up to approximately 5.4km of the minor, unclassified Lochbuie Road between north of Sleastary and Loch Buidhe, and between Kinnabad and Loch an Lagain, depending on direction of travel;
 - Much of the minor, unclassified Muie Road (north of the A839) for westbound users; and
 - Much of the minor, unclassified road between East Langwell and West Langwell, depending on direction of travel.
- 6.296 None of the remaining transport routes would be significantly affected by the proposed development.
- 6.297 There would be no significant night-time effects and a full night-time assessment of the aviation warning lights is provided in Technical Appendix 6.3.

Table 6.13 Visual Effects on Views from other Transport Routes

Transport Route	Description of Effects
A839	The A839 is a single carriageway route approximately 37km in length and is divided into two distinct sections, broken by a short section of the A836. The first section passes along Strath Fleet for approximately 25km between the A9 at The Mound in the east and the A836 at Lairg. It is located between approximately 2.4 – 13.4km distance from the proposed development. Within 10km, the route travels between Marian's Rock and the A836 at Lairg. The route follows the lower strath floor to the north of the River Fleet and adjacent to the Far North (Inverness to Wick) Railway Line. Views are generally channelled along the valley in the direction of travel (northwest or southeast bound) with the strath sides forming the skyline and screening longer range views to the north and south. Viewpoint 1 (Figure 6.18) and Viewpoint 5 (Figure 6.22) are located along this route. This section of the route forms part of the Moray Firth Tourist Route indicating a High value. The views from the route would be mainly

Transport Route	Description of Effects
	experienced by tourists (High susceptibility) and other road users (Medium susceptibility). Therefore, susceptibility to change is assessed as High to Medium and the overall sensitivity along this section of the route along Strath Fleet is assessed as <i>High</i>. The second section of the route is a single-track road with passing places and travels between the A836 at Lairg at Black Bridge and the A837 at the Rosehall War Monument for approximately 12km. This section of the route crosses the wide valley floor at the mouth of Achany Glen before climbing to undulating moorlands west of Gruids where it passes extensive coniferous forest plantations and gently descends towards Rosehall monument. Views along this section of the route are often restricted by the surrounding forest, although there are some longer range views east across Achany Glen from elevated sections of the route west of Gruids, as well as occasional elevated views west. Viewpoint 8 (Figure 6.25) and Viewpoint 10 (Figure 6.27) are located along this section of the route. This part of the route is located between approximately 5.5km and 15.1km from the nearest proposed turbine. This section of the route is not promoted as a tourist route and is not overlapped by any landscape designations, indicating a Medium value. The views from the route would be experienced by road users who would experience the view transiently and who would be focused on the view ahead (Medium susceptibility). Sensitivity is therefore assessed as <i>Medium</i> along this section of the route. <u>Assessment: proposed development – Strath Fleet</u> ZTV coverage indicates partial theoretical visibility of between one and six turbines between Rovie Lodge and Acheilidh (for approximately 6km of the 25km section of the route) and between west of Rhaoine and east of Lairg (for approximately 4.8km of the 25km section of the route). Theoretical visibility of between one and three turbines is also indicated for approximately 100m at the junction with the A836 at Lairg. Due to the length and partially wooded / forested nature of the strath, visibility of the proposed development would vary as the distance, screening and perceived scale of the turbines in the landscape changes. Where visible between Rovie Lodge (Viewpoint 5) and Acheilidh (Viewpoint 1) for westbound users, the turbines would appear as a new feature at the head of the valley or along the valley sides, mitigated slightly by the intervening distance. The turbine blade rotation would also be visible. Roadside vegetation and farm buildings / properties would further screen the proposed turbines in some places. Up to three hubs and three blades on the skyline at Tressady would also be visible where the strath widens and provides a wider view. The turbines would be visible between 2.4 – 6.7km distance for westbound users (Medium - Low to Low, to Zero magnitude). In views eastbound between Lairg and west of Rhaoine, site visits and wireline analysis indicate that typically up to three partial blades and blade tips would be visible at between 2.6 and 5.1km distance. Along this section of the route, roadside vegetation would filter views of the turbine blades in places (Very Low magnitude). From the junction with the A836, views towards the proposed development would be screened by intervening vegetation and buildings. The magnitude of change on westbound users of the A839 between Rovie Lodge and Acheilidh would range between Medium-Low, to Low and Zero resulting in a Major to Moderate, to Moderate and Significant effect (intermittently for approximately 6km of the 25km route) to No View (remainder of the route). Assuming an average speed of 50mph these significant views would be experienced intermittently for approximately 3-5 minutes experienced by westbound road users between Rovie Lodge and Acheilidh. The level of effect on eastbound road users between Lairg and west of Rhaoine would be Minor and Not Significant (for approximately 4.8km of the route) to No View (for the remainder of the route). The nature of these effects would be long-term (reversible), indirect and negative. <u>Assessment: proposed development – Lairg to Rosehall</u> ZTV coverage indicates theoretical visibility of all the proposed turbines for much of the route between Lairg and Netherton. Visibility would generally occur for eastbound road users travelling towards Lairg. Site visit and wireline analysis indicates

Transport Route	Description of Effects
	that the proposed development would be most visible between west of the entrance to Achany Wind Farm (Viewpoint 10) and Gruids at the junction with the B864 (for approximately 5.4km of the route) at between approximately 6 – 9.9km distance. The turbines would be partially screened by intervening landform such that the bases of lower towers would be screened. The turbines would appear slowly rotating against the sky, although beyond landform which defines the views and to some extent mitigates the distance of the turbines. The design of the wind farm presents as a simple and cohesive layout, visible along the skyline and appearing in part of the landscape already influenced by wind farms from this route. Views of the proposed turbines would become increasingly oblique as the route passes through Gruids (Medium magnitude). Between Netherton and the entrance to Achany Wind Farm, views would be partially screened by landform and in addition, either entirely or partially screened by roadside forestry (subject to felling) (Low-Very Low to Zero magnitude). At the B864, the road changes orientation and follows Little Loch Shin northwest towards Lairg. Views from this section of the route would be heavily screened by roadside / loch side trees (Very Low to Zero magnitude). The magnitude of change on eastbound users of the A839 between west of the entrance to Achany Wind Farm and the junction with the B864 would be Medium resulting in a Moderate and Significant effect (approximately 5.4km of the 12km section of route). Assuming an average speed of 50mph these significant views would be experienced intermittently for approximately 3-4 minutes experienced by westbound road users between Rovie Lodge and Acheilidh. Elsewhere along the route, the magnitude of change would range between Low and Zero (even with felling) resulting in a Moderate to Minor and Not Significant effect to No View. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The route would pass within 1.6km of the existing Lairg Wind Farm along Strath Fleet to the east the settlement of Lairg (Medium to Zero magnitude), and there would also be views of Lairg Wind Farm adjacent to the proposed development in the direction of travel (eastbound) between Rosehall and Lairg. There would be glimpsed and partial views of Rosehall and Achany wind farms from Strath Fleet as the route nears Lairg settlement, and closer range views of them between Rosehall Monument and Gruids where the road passes ~1.8km to the south of the turbines (although views from here are partially screened by landform and forestry) (Medium to Zero magnitude). There would also be views of the consented Lairg II Wind Farm for eastbound users between Rosehall and Lairg where it would be visible to the fore of the proposed turbines (High-Medium to Zero magnitude). Meall Buidhe would be visible to the south from western parts of the route (Medium-Low to Zero magnitude). Other more distant existing and consented wind farms may be visible in glimpsed views along the route (all Very Low to Zero magnitude). The additional effect of the proposed development would be Moderate to No View and Not Significant (reduced due to the presence of other wind farms). The combined effect would be Substantial to Major and Significant (due to Achany, Lairg, Lairg II, and <u>not</u> the proposed development) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. There would no cumulative effects from the section of the route through Strath Fleet. <u>Cumulative Assessment: proposed development + Existing + Consented Sites + Applications</u> Garvary Wind farm would be visible from parts of the route between Rosehall Monument and Lairg and would be seen partially to the fore of the proposed development alongside the consented Lairg II (High-Medium to Zero magnitude). Strath Oykel would also be visible for westbound users from the western parts of the route (Medium to Zero magnitude). Shinness would be visible in views north at Gruids (Low magnitude). The additional effect of the proposed development would be Moderate to Minor, to No View and Not Significant (reduced due to the presence of other wind farms). The combined effect would be Substantial to Major and Significant (due to Achany, Lairg, Lairg II, Garvary, Strath Oykel and <u>not</u> the proposed

Transport Route	Description of Effects
	development) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. There would no cumulative effects from the section of the route through Strath Fleet. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
A836	This route runs between the A9 south of Dornoch Firth Bridge and John o'Groats via Lairg, Altnaharra and Tongue and is approximately 196km in length. Within 10km, the A836 forms part of the Moray Firth Tourist Route and parts of this route overlaps with the Inverness to John O'Groats Sustrans Network and passes between Bonar Bridge on the western edge of Dornoch Firth, and Dalchork, north of Lairg (the Moray Firth Tourist Route changes direction and continues along the A839 at Lairg). From the south, the A836 follows the northeastern edge of the Kyle of Sutherland and heads roughly north along Achany Glen to Lairg where it skirts the eastern edge of Loch Shin before continuing north along Strath Tirry. Views are generally channelled along the straths and glens, although there are more open views across the Dornoch Firth as the road approaches Bonar Bridge from the south. Forestry and woodland are evident along Achany Glen and further filter views along this section of the route. The road is located approximately 5.1km distance west of the proposed development at its closest point. Beyond 10km to the south, the route continues as part of the Inverness to John O'Groats Sustrans Network and a small part of the Moray Firth Tourist Route between Bonar bridge and the junction with the B9176 before its termination at the A9 south of Dornoch Bridge. This section of the route follows the southern edge of Dornoch Firth and briefly heads inland at Ardmere and Edderton. Views along this part of the route are heavily filtered by vegetation in places, but there are intermittent views north across the Firth for most of this section. Beyond 10km to the north, the A836 becomes a single-track road with passing places after the A838 junction and continues as part of the Inverness to John O'Groats Sustrans Network along the wide, shallow Strath Tirry landform towards the narrower form of Strath Vagastie towards Altnaharra and the vast open moorland plain beyond. Views along Strath Tirry are constrained in places by coniferous forest planting, although there are open views to the west across open moorland towards distant hills to the south of the strath. Views within Strath Vagastie are generally channelled by the surrounding hills and landform in contrast to the views across the expansive open moorland north of Altnaharra. The value of this route varies between High and High-Medium (dependent on overlaps with the Moray Firth Tourist Route, Dornoch Firth NSA and the Inverness to John O'Groats Sustrans Network). The route would be experienced by tourists and those within the NSA (High susceptibility) and other road users (including experienced cyclists on the Inverness to John O'Groats Sustrans Network). The sensitivity would therefore vary between <i>High and High-Medium</i>. <u>Assessment: proposed development</u> ZTV coverage indicates patchy theoretical visibility along the route with the greatest areas of theoretical visibility beyond 10km to the south and north of the route. Travelling from south to north, there would be visibility of all 12 turbines (hubs and blades) for northbound users for approximately 3km between the A9 junction and Edderton at approximately 18km distance. Views from this section would be heavily filtered by roadside vegetation with occasional intermittent glimpses (Low-Very Low to Zero magnitude). A further section of theoretical visibility is indicated for approximately 3.2km between Wester Fearn and Hatchery. Gaps in the roadside vegetation allow longer stretches of theoretical visibility in this section of the route. However, views towards the proposed turbines would be partially screened by intervening forestry to the north of Dornoch Firth as shown in Viewpoint 11 (Figure 6.28) (Very Low magnitude (Low to Very Low if forestry felled)). There would be no further theoretical visibility until a very short (0.5km) section of the route where visibility of all 12 turbines is indicated as the route approaches a layby and parking area at Allt na Fearn Mor to the south of Lairg Station. However, views from the road at this point are heavily filtered by local landform and mixed woodland vegetation. Viewpoint 3 (Figure 6.20) is taken from a bridge near the layby and illustrates the rising

Transport Route	Description of Effects
	landform beyond the roadside trees (Very Low to Zero magnitude). There would be no visibility of the proposed turbines for northbound users beyond this point. Travelling from north to south, ZTV coverage indicates theoretical visibility up to 14km of the route between The Crask Inn and Dalmichy. Views from this section of the route would be subject to intermittent screening from coniferous forestry and local landforms at between approximately 12km and 26km distances. The proposed turbines would be visible as hubs and blades on the skyline of the distant hills and appear as a simple group of turbines. The turbines would be visible above the coniferous forestry in part of the view that is not in the main expansive view to the southwest. Viewpoint 13 (Figure 6.30) is located at this section of the route and illustrates the long-range views. The magnitude of change along this section of route along Strath Tirry would range from Low to Very Low, and Zero. There would be two further short stretches of theoretical visibility near Dalchork (approximately 0.3km and 0.7 km of the route) where blades and blade tips would be theoretically visible. Visibility from these sections would be mostly screened by vegetation (Very Low to Zero magnitude). There is very limited ZTV coverage as the route passes through Lairg, where patches of theoretical visibility of 1-3 turbines are indicated through the main settlement, increasing to up to 12 turbines as the road ascends the rising landform to the north of the settlement towards Lairg Lodge (~1.3km of the route). In reality, views from within the settlement would be screened by vegetation and buildings. Whilst on the rising landform to the north of the settlement, views would be mostly screened by dense roadside trees such that there would be a glimpsed view of the proposed turbines as the road approaches the settlement from the north as illustrated in Viewpoint 7 (Figure 6.24) (Low-Very Low magnitude (winter) to Very Low magnitude (summer)). There would be no visibility of the proposed turbines southbound from the remainder of the route. The magnitude of change would vary from Low to Zero and the level of effect would range from Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The most visible existing wind farms along the route would be Lairg Wind Farm which would be most visible alongside the proposed development in views from Lairg and Strath Tirry (Low to Zero magnitude) and the consented Lairg II Wind Farm would also be visible alongside the existing Lairg Wind Farm and the proposed development from Lairg but would be seen in close proximity as the road passes south of Lairg Station (High to Zero magnitude). Sequentially, Creag Riabhach is located adjacent to the road towards the north of the Crask Inn in the north (High to Zero magnitude), and the consented Sallachy (Low to Zero magnitude) as the route heads north towards Altnaharra. The consented Strath Tirry Wind Farm would also be located in close proximity to the road near Rhian (High to Zero magnitude). The consented Chleansaid Wind Farm would be visible as the route passes through Strath Tirry at ~4.4km, partially screened by forestry (High-Medium to Zero magnitude). Other existing and consented wind farms would be visible at greater distances from parts of the route (most notably the open views from Strath Tirry) including Rosehall and Achany and Achany Extension (all Low to Zero magnitude) and Beinn nan Oighrean, Beinn Tharsuinn and Coire na Cloiche (all Very Low magnitude). The additional effect of the proposed development would be Minor and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Substantial and Significant (due to Lairg II, Strath Tirry, Chleansaid, Creag Riabhach and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be visible in conjunction with the proposed development forming a cluster of wind farms in the views alongside Lairg and Lairg II. Garvary would be seen alongside Lairg II from the route as it passes to the south of Lairg Station (High to Zero magnitude). Shinness Wind Farm would be visible as the route passes through Strath Tirry at ~1.5km, (High to Zero magnitude). Creag Riabhach Extension would also be

Transport Route	Description of Effects
	located adjacent to the road near Altnaharra (High to Zero magnitude). The additional effect of the proposed development would be Minor and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Substantial and Significant (due to Lairg II, Strath Tirry, Chleainsaid, Creag Riabhach + Extension, Garvary, Shinness and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Minor road: Lochbuie - between Bonar Bridge and Loch Fleet, via Loch Buidhe	This minor, single track road with passing places passes between Bonar Bridge and Loch Fleet, via Loch Buidhe. The route follows the low-lying agricultural landscape to the northeast of Bonar Bridge before traversing moorland and turning east along Strath Carnaig towards the A9 at The Mound. Views along the route are generally filtered by roadside vegetation and landform as the route travels through the agricultural farmland – although there are intermittent views towards Loch Migdale near Bonar Bridge. Views open (northbound) north of Kinnabad as the route enters open moorland and heads towards Loch Buidhe – although the gently undulating landform and coniferous forestry screen views in some directions, as illustrated in Viewpoint 2 (Figure 6.19). Pylons are a feature in this part of the view as they connect with a sub-station south of Loch Buidhe. As the route travels east along Strath Carnaig, views become generally channelled along the strath in the direction of travel, with views increasingly restricted by woodland as the route travels east towards Loch Fleet. The route is not located within a nationally or locally designated landscape neither is it overlapped by a tourist route, indicating a Medium value. The view would be experienced by road users whose attention or interest is likely to be focused on the road ahead and susceptibility to change is assessed as Medium, and the sensitivity is assessed as <i>Medium</i>. <u>Assessment: proposed development</u> Starting from the south of the route, one blade tip would be theoretically visible as the route passes to the west of Loch Migdale, however, it would be screened by vegetation (Zero magnitude). ZTV coverage indicates theoretical visibility of all 12 turbines for approximately 5.4km as the route enters open moorland to the north of Kinnabad and continues east past Loch Buidhe with a short (approximately 0.6km) break as the route dips and passes Loch an Lagain. The turbines would be visible in the direction of travel (northbound towards Loch Buidhe and westbound along Strath Carnaig). Northbound, between Kinnabad and Loch an Lagain (for approximately 2km), the lower parts of the proposed turbines would be partially screened due to intervening landform such that blades, hubs and upper towers would be visible (High-medium magnitude). Between north of Sleastary and Loch Buidhe (for approximately 1.6km of the route), there would be visibility of full and partial towers. The road passes closest to the proposed turbines at this section of the route (2.2km at its nearest point). Viewpoint 2 (Figure 6.19) illustrates views from this section of the route where the majority of the turbine towers would be visible, including the tower and base of several turbines (High magnitude), with the lower towers and bases increasingly screened by Meall na Tulchainn to the right. The turbines would appear slowly rotating against the sky. Sections of the access track would also be visible from this part of the route, including the access from the consented Lairg II Wind Farm. The expansive open landscape helps to mitigate the apparent scale of the turbines and combined with the foreground and mid-ground vertical pylons, the proposed development would appear rationally located and reasonably well accommodated in the views from this section of the route, seen beyond the pylons and adjacent to a cluster of wind farm development. The magnitude would reduce to High-Medium north of Sleastary as the mixed native woodland plantation along this section of the route gradually mature through the operational period of the proposed development and partially screen some of the turbines. Further theoretical visibility of between one and six turbines is indicated further east along Strath Carnaig between the point that the overhead line crosses the road and west of Salmon Ladder (for

Transport Route	Description of Effects
	approximately 3.7km of the route). Along this section of the route, wireline analysis and site visits indicate that the proposed turbines would be visible on the skyline for approximately 1km as either partial blades or blade tips that would be visible beyond a row of pylons that also break the skyline at the same location. After 1km, views are heavily filtered by surrounding roadside trees and vegetation (Very Low to Zero magnitude). There would be no visibility of the turbines for the remainder of the route. The magnitude of change would range between High (between north of Sleastary and Loch Buidhe for approximately 3.4km) and High-Medium (between Kinnabad and Loch an Lagain for approximately 2km), and Very Low to Zero for the remainder of the route. The level of effect would be range from Major and Significant (between north of Sleastary and Loch Buidhe for approximately 3.4km) and Major to Moderate and Significant (between Kinnabad and Loch an Lagain for approximately 2km) reducing to Negligible and Not Significant to No View on the remainder of the route. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> Lairg Wind Farm would be partially visible to the northwest for a short section of the route (for approximately 1km) as a hub and two blades at approximately 6.5km distance (Low to Zero magnitude). Rosehall and Achany would also be partially visible from the same location to the northwest at over 13.5km distance (Low - Very Low to Zero magnitude). A cluster of wind farms would be visible to the south including Novar, Coire na Cloiche and Beinn Tharsuinn as the route descends (southbound) from Kinnabad at distances between ~9.2km and 16km (all Low – Very Low to Zero magnitude). The consented Lairg II Wind Farm would be partially visible for approximately 1km as up to three hubs and two blades adjacent to the existing Lairg Wind Farm at 6km distance (Low to Zero magnitude). The additional effect of the proposed development would be Major and Major to Moderate and Significant (for approximately 5.4km of the total route) to Negligible to No View and Not Significant (the remainder of the route). The combined effect would be Major and Major to Moderate and Significant (due to the proposed development) to Negligible to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible adjacent to the proposed development between Kinnabad and Loch Buidhe as towers, hubs and blades at 3.3 km distance at its closest (High to Zero magnitude). Visibility of Garvary would extend slightly further along Strath Carnaig. The additional effect of the proposed development would be Major and Major to Moderate and Significant (for approximately 5.4km) to Negligible to No View and Not Significant (the remainder of the route). The combined effect would be Major and Major to Moderate and Significant (due to Garvary and the proposed development) to Negligible to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Minor roads within Strath Fleet	Minor roads within Strath Fleet include a short section of a single-track road connecting properties at Muie to the north of the A839 and single-track roads connecting properties at Acheilidh, Ardachu, Inchcape and Rovie to the south of the A839. These roads are located on the lower slopes of the strath and afford slightly elevated views across and along the Strath. The majority of views are open along the minor roads with occasional scrub or tree belts – typically around property and field boundaries along the valley floor. Along the short road to Muie, open views south and southwest across and along the strath become increasingly screened by intervening landform (Creag a'Mhuilleir) as the route progresses west and gains altitude. There is scattered settlement along the routes.

Transport Route	Description of Effects
	The routes are not located within a nationally or locally designated landscape and are not promoted tourist routes, indicating a Medium value. The views would be experienced by road users whose attention or interest is likely to be focused on the road ahead and susceptibility to change is assessed as Medium. The sensitivity is assessed as <i>Medium</i>. <u>Assessment: proposed development</u> ZTV coverage from the roads to the south of the A839 indicates visibility of between one and six turbines between Acheilidh and Rossal (including the spur at Ardachu), and again as the route approaches the underpass at Dalmore. Views would be southwest and visible to westbound road users and would include visibility of up to two hubs and three blades / partial blades in the direction of travel (albeit away from the main view across the strath). Views along this route would be intermittently screened by intervening trees at various residential and farm properties and would be visible in combination with a communications mast and telegraph poles for part of the route (Low to Zero magnitude). Theoretical visibility of blade tips as the route approaches the underpass at Dalmore would be screened by roadside vegetation (Zero magnitude). To the north of the A839 from the minor road to Muie, there would be theoretical visibility of between seven and 12 turbines as the road progresses west and gains elevation. Wireline analysis and site visits indicate that from the lower parts of the route six turbines would be partially visible at hub height with the lower towers screened by landform. Visibility of the turbines would increase as the route gains height such that up to 11 hubs and partial towers would be potentially visible at the end of the route (with the lower parts of some turbines screened by Creag a'Mhuilleir). The route would be at its closest point at this location, approximately 3km from the nearest turbine. There would be some screening from intermittent trees around residential properties along the route and by local landform at the end of the route. The turbines would be seen in part of the view influenced by foreground landform (Creag a'Mhuilleir) which screens views along the wider strath to the west and forms a local focal point on the skyline. There would be no visibility of the proposed turbines eastbound along the route where there are longer range views along Strath Fleet in the direction of travel. The magnitude of change for westbound users would be High-Medium. The magnitude of change on westbound users of the minor roads to the south of the A839 would range between Low to Zero and the level of effect would be Minor and Not Significant to No View. The magnitude of change on westbound road users of the minor road to the north of the A839 at Muie would be High-Medium and the level of effect would be Major to Moderate and Significant. There would be No View on eastbound users of all these roads in Strath Fleet as the proposed development would be behind the direction of travel. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There are no existing or consented wind farms visible from these routes. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> A hub and several blades / blade tips from Garvary would be visible from elevated parts of the road to Muie (Medium-Low to Zero magnitude). The additional effect of the proposed development would be Major to Moderate and Significant. The combined effect would be Major to Moderate and Significant (due to the proposed development). There would be no cumulative effects from the minor roads to the south of the A839. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Minor roads connecting	Minor roads connecting Rogart and East and West Langwell include a network of single-track roads north of the A839 connecting from Rogart Lodge and Rogart

Transport Route	Description of Effects
Rogart and East and West Langwell	Station with scattered properties at West Langwell, Little Rogart and East Langwell. The routes climb the steep slopes of Strath Fleet before traversing elevated, gently undulating moorlands. Views from the routes vary between the steep valley sides where woodlands, forests, scrub and roadside trees line the roads which often curve around landforms on their ascent to the top of the valley. This often restricts, filters or channels views of the wider strath to the south and surrounding landscape, and the gently undulating upland areas which are open in character and afford extensive views across the surrounding landscape to the south and southeast, although some views are constrained by the undulating landform, areas of woodland, and trees at residential properties or field boundaries. The most extensive views occur along the minor roads between East Langwell and West Langwell where open views across moorland extend 180° from the southeast to the northwest. Viewpoint 9 (Figure 6.26) is located on the minor road at West Langwell. The routes are not located within a nationally or locally designated landscape and are not promoted tourist routes, indicating a Medium value. The views would be experienced by road users whose attention or interest is likely to be focused on the road ahead and susceptibility to change is assessed as Medium. The sensitivity is assessed as <i>Medium</i>. <u>Assessment: proposed development</u> ZTV coverage is relatively limited as the routes climb the valley sides – although some theoretical visibility is indicated to the northwest of Rovie Lodge. This would be filtered by roadside vegetation and up to four hubs and three blades / tips adjacent to communication towers would be visible (Low to Zero magnitude). From the elevated sections of the minor roads beyond the strath sides, ZTV coverage indicates visibility of all 12 turbines along the majority of the routes with some scattered areas where there is no theoretical visibility due to intervening knolls and dips in the landform. Minor roads in and around Rogart would experience potential visibility of up to six partial towers, up to three hubs and partial blades/tips. The views would be oblique from the main (north-south orientated) route and road users would have to look away from the direction of travel. Views from this area (Rogart) would also be subject to intermittent screening from residential properties and vegetation, but where visible and in the direction of travel (e.g. along westbound routes towards East Langwell / Morness) the proposed turbines would be visible at distances of approximately 9km to 10km on the skyline (Medium to Zero magnitude). From Little Rogart, views from the minor road would be partly screened by landform and roadside trees along the route. From here, the turbines would be visible in the direction of travel (westbound) at between 9km and 7.5km (Medium to Zero magnitude). Between East Langwell and West Langwell, views from the roads are more open and there are fewer knolls and dips in the landform or roadside trees. Views across the landscape are large scale and the falling landform draws the eye to the south, southwest and southeast. Viewpoint 9 (Figure 6.26) is located along this route (Medium magnitude). The turbines would be oblique and perpendicular to the direction of travel along these routes at distances of 8km to 8.3km. The turbines would be partially screened by intervening landform such that the bases and some lower towers would be screened and two of the turbines would be visible at hub height. The wind farm would appear as a simple and cohesive group with slow rotation clearly visible against the sky. Small sections of the access track would also be visible. Although prominent, the proposed development would be reasonably well accommodated in views from this route due to the wide panoramic views visible from this elevated route and large-scale landscape. The magnitude of change on views from road users would range between Medium and Low to Zero and the level of effect would be Moderate and Not Significant to No View for the majority of these minor roads. There would, however, be a Moderate and Significant visual effect from the minor road between East Langwell and West Langwell due to the extent of visibility of the turbines appearing prominent from the most elevated and open section of the road. The nature of these effects would be long-term (reversible), indirect and negative.

Transport Route	Description of Effects
	<u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> Lairg would be visible from elevated sections of the roads to the north of Rogart and between East and West Langwell as two turbines on the skyline at 9-13km distance (Low to Zero magnitude). The consented Lairg II Wind Farm would be visible as blades from parts of roads around Rogart and hubs and blades from West Langwell (Medium-Low to Zero magnitude). Kilbraur and Kilbraur Extension are visible in views to the east from roads north of Rogart and East Langwell at distances of ~3.6-5.8km, although partially screened by landform in places (Medium to Zero magnitude). In clear conditions, Achany and Rosehall wind farms would be partially visible at over 17.3km to the west, and Beinn nan Oighrean, Beinn Tharsuinn and Coire na Cloiche would be partially visible to the south from the West Langwell Road at over 26km (all Very Low to Zero magnitude). The consented Achany Extension and Meall Buidhe wind farms would be visible to the west and southwest (both Low-Very Low magnitude). The additional effect of the proposed development would be Moderate and Significant. The combined effect would be Major to Moderate and Significant (due to the proposed development, Kilbraur / Extension and Lairg II). Kilbraur / Extension would be decommissioned prior to the end of the operational period of the proposed development. However, cumulative effects would continue as a result of Lairg II and the proposed development which would be largely decommissioned during the same time period. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be partially visible from elevated sections of the roads to the north of Rogart (mostly as blades, Low to Zero magnitude) and between East and West Langwell as hubs and blades behind and to the right of the proposed development, at between 10.2 and 12km distance (Medium-Low to Zero magnitude). Strath Oykel Wind Farm would be theoretically visible to the southwest as blades from the West Langwell road (Very Low to Zero magnitude). The additional effect of the proposed development would be Moderate and Not Significant (reduced due to the presence of other wind farms). The combined effect would be Major to Moderate and Significant (due to the proposed development, Kilbraur / Extension, Lairg II and Garvary). Kilbraur / Extension would be decommissioned prior to the end of the operational period of the proposed development. However, cumulative effects would continue as a result of Lairg II and the proposed development which would be largely decommissioned during the same time period. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
The Far North (Inverness to Wick) Railway Line	The Far North Railway Line extends between Inverness and Thurso / Wick and is approximately 260km in length. Within 10km, the route passes along Strath Fleet and Achany Glen / Kyle of Sutherland between Morvich in Strath Fleet to Ardgay via Lairg. The route follows the lower valley floor, crossing from the north to the south of the River Fleet after Rogart Station and continuing to the east of the River Shin, crossing the Kyle of Sutherland after Invershin Station and continuing south of the Dornoch Firth towards Tain beyond 10km. Views towards the proposed development from the route are orientated towards rising landform and are intermittently screened or filtered by landform or rail-side vegetation. Occasionally the route passes through cuttings and views are further screened by close range landform. The rail route is promoted by Scotrail as a 'Great Scenic Line' and also partly passes through the Dornoch Firth NSA beyond 10km. The value of the route is therefore assessed as High. The susceptibility of passengers on the train is assessed as High to Medium, due to the transient nature of the views experienced and the location of the proposed development in the wider area where the passenger's attention or interest is promoted as part of the route. Rail passengers would only be able to experience the view from one side of the train carriage, perpendicular to the route

Transport Route	Description of Effects
	and dependent on the orientation of their seat. As a result, the sensitivity of the rail passengers on this route varies between <i>High</i> and <i>High-Medium</i>. There are currently four train services during the day for the full length of route with a further three shorter journeys up to Tain. The assessment has considered a return journey as a normal part of the passenger experience. Passengers on the train may have taken the train to experience the views but would be travelling at speed and would gain transient views of the landscape. <u>Assessment: proposed development</u> ZTV coverage indicates very limited theoretical visibility within 10km. This is mostly due to the route location at the base of the rising valley landforms in relation to the location of the proposed turbines which are beyond the valley sides. Theoretical visibility of between one and six turbines is indicated as the route passes between Rossal and Acheilidh (2.6km of the route in Strath Fleet). Views from this section would affect westbound users and would be intermittent and filtered between clumps of woodland. There would be visibility of up to two hubs and three blades / partial blades in views southwest at between 2.4km - 4.2km distance (Low to Zero magnitude). Theoretical visibility of one and three turbines is also indicated for a very short section (1.5km section) at Tomich and again (0.7km section) at Torroble. At Tomich, the route is in a shallow cutting and views are filtered by rail-side vegetation at either side of an overhead line and pylons. Wireline analysis indicates that partial blade and blade tip would be theoretically visible, but this would be barely discernible in the view (Very Low to Zero magnitude). At Torroble, the line is on a slight embankment as it approaches the A836. Wireline analysis indicates visibility of a blade tip, however this would be screened by woodland (Zero magnitude). Further theoretical visibility of up to all 12 turbines is indicated to the south of Lairg Station for up to 1.2km of the route, and wireline analysis indicates visibility of up to 10 turbines (up to four hubs and six blades/tips). The rail line is mostly recessed in a cutting in this section and views would be further screened by rail and road-side trees (A836) as well as surrounding woodland (Very Low to Zero magnitude). Beyond 10km, there is theoretical visibility between Ardgay and Easter Fearn, and between Edderton and Fearn via Tain. From these sections, much of the turbines would be screened by forestry or rail-side vegetation such that only blade tips would be visible (Low-Very Low to Zero magnitude). The magnitude of change for passengers on the route would vary from Low to Zero resulting in a Moderate and Not Significant effect to No View. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The route would pass within 1.4km of the existing Lairg Wind Farm as it passes to the south of the settlement of Lairg, although the lower towers would be screened by landform (High-Medium to Zero magnitude). The consented Lairg II Wind Farm would also be theoretically visible at Torroble as hubs at 1.5km but would be subject to screening from woodland (High-Medium magnitude in views between woodland) and in filtered views between Lairg Station and Invershin (Medium to Zero magnitude). There would be potential glimpsed views of Achany and the consented Meall Buidhe as the line passes south of Lairg, subject to screening from vegetation (Very Low to Zero magnitude). Strathrory would be visible from a short section of the route near Edderton (Low-Very Low magnitude). Other more distant existing and consented wind farms may be visible in glimpsed views along the route (Very Low to Zero magnitude). The additional effect of the proposed development would be Moderate and Not Significant to No View. The combined effect would be Substantial to Major and Significant (due to Lairg, Lairg II, and <u>not</u> the proposed development) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind farm would be visible from parts of the route as it passes to the south of the settlement of Lairg behind Lairg II as hubs and blades (High-Medium magnitude) and in filtered views between woodland as the line passes between Lairg and

Transport Route	Description of Effects
	Invershin alongside Lairg II (Medium to Zero magnitude). The additional effect of the proposed development would be Moderate and Not Significant to No View. The combined effect would be Substantial to Major and Significant (due to Lairg, Lairg II, Garvary and <u>not</u> the proposed development) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
'A' roads beyond 10km	
A838	The A838 is a single-track road with passing places and loops between the A836 north of Lairg at Dalchork and the A836 at Tongue via Laxford Bridge and Durness and is approximately 135km in length. Within the 45km Study Area, it heads northwest from Lairg (Dalchork), following the northern edge of Loch Shin and continuing to Loch More, north of Kinloch. The route generally follows the low-lying landform adjacent to the lochs and passes through areas of coniferous forestry, dispersed settlement, and open moorland with occasional semi-improved grassland fields towards the lochs. Views are often heavily filtered by forestry or roadside trees, particularly on rising landform to the east of Loch Shin with the loch remaining the main focal point in intermittent views. Northwest of Loch Shin, the route passes through more open moorland and the route is flanked by rising landform at both sides, restricting views of the wider landscape. The route is not located within a nationally or locally designated landscape and is not a promoted tourist route, indicating a Medium value. It does however have some scenic qualities and passes along the western edge of the Fionaven – Ben Hee WLA as it passes Loch More beyond 35km. The views would be experienced by road users whose attention or interest is likely to be focused on the road ahead and susceptibility to change is assessed as Medium. Whilst it is not a promoted tourist or cycling route, it is one of the few routes in the Highlands connecting the central Highland areas and the west coast and has importance as an A-class road. The sensitivity is assessed as <i>Medium</i>. <u>Assessment: proposed development</u> ZTV coverage indicates theoretical visibility along approximately 22km of the route between 10km and 32km of the proposed development between Colaboll and west of Overscraig Hotel. This would be mostly experienced by road users travelling south along the route towards Lairg where the proposed turbines would be visible in the direction of travel. Travelling southeast from Overscraig Hotel to Fiag Bridge, the route passes through forestry and there would be theoretical visibility of all 12 turbines in distant views in clear conditions subject to intervening screening from roadside trees and forestry and partial screening from landform where the road twists around contours (Very Low to Zero magnitude). Between Flag Bridge and Loch an Fhreiceadain, the route passes through open moorland and there would be views towards the proposed development on the skyline as both towers and in places hubs or blades as the route undulates and follows the contours. Occasional scrub may also filter views in places. The proposed turbines would be visible in clear conditions at between 18-25km (Low-Very Low magnitude). Between Loch an Fhreiceadain and West Shinness, views of the proposed turbines would become increasingly screened by intervening woodland and forestry on the skyline at between 18-15km (Low to Very Low magnitude). Between West Shinness and Colaboll views along the route are screened or heavily filtered by forestry or roadside trees and there would be at most glimpsed views or partial views of blades above the treeline (Very Low magnitude). At Colaboll, views towards the proposed turbines are open as the route reaches a bend in the road. At this location, wireline analysis indicates theoretical visibility of blade tips which would be barely discernible at over 10km distance (at most Very Low to Zero magnitude). The magnitude of change for southbound road users between Overscraig Hotel and Colaboll would range between Low to Zero and the level of effect would be Minor to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. There would be no

Transport Route	Description of Effects
	effect for northbound users along this route as the proposed development would be behind the direction of travel. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The proposed development would be intervisible with and adjacent to the existing Lairg Wind Farm (Low to Zero magnitude). From Colaboll, the consented Lairg II would be visible beyond intervening landform at over 9km (Medium to Zero magnitude). The consented Sallachy Wind Farm would be visible at 2.5km across Loch Shin (High magnitude – reducing with distance). Partial blades / tips of Achany Extension would also be theoretically visible across Loch Shin to the south and west of the route (Low to Zero magnitude). The additional effect of the proposed development would be Minor to Negligible and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Major and Significant (due to Sallachy and Lairg II, and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be visible in conjunction with the proposed development forming a cluster of wind farms in the views alongside Lairg and Lairg II. From Colaboll, Garvary would be less screened by intervening landform and would be visible as hubs at over 9km (Medium to Zero magnitude). This route passes close to Shinness Wind Farm which would be visible sequentially (subject to screening from landform and vegetation) (High to Zero magnitude). The additional effect of the proposed development would be Negligible and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Substantial to Major and Significant (due to Sallachy, Lairg II, Garvary, Shinness and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
A837	The A837 connects the A836 at Invershin in the east and Lochinver in the west and is approximately 72km in length. Within the 45km Study Area, it heads west from Invershin, following the northern edge of Kyle of Sutherland and Strath Oykel and continuing to Ledmore where it turns north towards Ardvreck Castle at the junction with the A894. It is generally a single-track road with passing places except between Altass and east of Oykel Bridge which is a single carriageway. The route follows the low-lying landform adjacent to Kyle of Sutherland and Strath Oykel but crosses an elevated area to the east of Oykel Bridge before dropping down to the bridge and gently climbing towards the undulating landscape to the west of Bridge of Oykel. Views from Kyle of Sutherland and Strath Oykel generally along the valley and are often heavily filtered by forestry or roadside trees. Where the route traverses the elevated section east of Oykel Bridge, there are long range views (eastbound) along the Strath towards the rising hills east of Invershin. Viewpoint 17 (Figure 6.34) is located along this section of the route. To the west of Oykel Bridge, views towards the proposed development are screened by intervening hills and landform. Although not a promoted tourist route, the A837 is one of the few routes in the Highlands connecting the Dornoch Firth and the west coast and has importance as an A-class road. There are no national or local landscape planning designations overlapping the majority of the route (Medium value), although at Ledmore, the route enters the Assynt - Coigach NSA and becomes part of the North Coast 500 Tourist Route (High Value). The views from the route would be experienced by tourists (High susceptibility) along the North Coast 500 north of Ledmore and other road users (Medium susceptibility). The sensitivity would therefore be Medium (the majority of the route) and High (north of Ledmore). <u>Assessment: proposed development</u> ZTV coverage indicates theoretical visibility from Strath Oykel to the west of Rosehall (between 1 and 12 turbines theoretically visible) and on the elevated section of the

Transport Route	Description of Effects
	route to the east of Oykel bridge (all 12 turbines theoretically visible). In the section of the route to the west of Rosehall, the road begins to climb and gain elevation. Views would be mostly screened by roadside vegetation but there would be intermittent views of up to five hubs and six blades between roadside trees in views east along the strath at between 19-22km distance (Low – Very Low magnitude). On the elevated section of the route, east of Oykel Bridge, there would be open views along the strath towards the proposed turbines for approximately 1.2km, as illustrated in Viewpoint 17 (Figure 6.34) (Low-Very Low magnitude). There would be no further theoretical visibility along the route. The magnitude of change for eastbound users would range between Low-Very Low (for ~4.2km of the route) to Zero and the level of effect would be Minor to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. There would be no effect for westbound users along this route as the proposed development would be behind the direction of travel. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg (Low-Very Low to Zero magnitude) and consented Lairg II wind farms (Low to Zero magnitude) would be visible to the fore of the proposed development from parts of the route. The existing Achany and Rosehall wind farms would be partially visible in eastbound views at Rosehall, subject to forestry (Low to Zero magnitude). Meall Buidhe would be visible between Linsidemore and Langwell (Medium to Zero magnitude). The additional effect of the proposed development would be Minor to Negligible and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Moderate and Significant (due to Meall Buidhe and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Strath Oykel Wind Farm would be visible to the south of the strath as the route passes to the west of Rosehall and rises towards the elevated section of the route at a minimum distance of 2km (High to Zero magnitude). Garvary would be visible to the fore of the proposed development forming a cluster of wind farms in the views alongside Lairg and Lairg II (Medium to Zero magnitude). The additional effect of the proposed development would be Negligible and Not Significant to No View (reduced due to the presence of other wind farms). The combined effect would be Major and Significant (due to Strath Oykel and Meall Buidhe and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.

Visual Effects on Views from Recreational Routes

- 6.298 The visual assessment has considered the potential visual effects likely to be experienced by people (walkers / cyclists / horse riders / and others) on recreational routes overlapped by the blade tip ZTV. The recreational routes include Core Paths, heritage paths and Scottish hill tracks which have been assessed within 10/15km of the proposed development. These routes are illustrated in Figures 6.11 a/b.
- 6.299 Each of these routes were walked and / or visited and walked in sections according to the ZTV coverage and the assessment has been assisted on-site with the use of sequential wirelines and True View Visuals 3D software.

- 6.300 All of the routes have been assessed as of *High* sensitivity on account of their High-Medium value as recreational routes, some routed through designated landscapes and the High susceptibility of the people using these routes, mostly walkers and cyclists, whose attention would be focused on the landscape around them. Some exceptions include sections of routes that partly follow existing roads.
- 6.301 In summary, there would significant visual effects from parts of the following recreational routes:
- Core Path SU16.03 – Ord Hill from Ord Place – from the upper slopes and summit of Ord Hill;
 - Core Path SU20.05– Free Church - Ardichoncherr – Tressady – western 1.1km section of route;
 - Core Path SU20.06 and SU20.07 – Morness - Mill - Little Rogart / Little Rogart – Morness - intermittent views for up to 0.7km / 0.2km sections of the routes;
 - Core Path SU16.08 and SU16.09 - Braemore – Achany / Gruid's Wood - up to 3.2km / 0.3km sections of the routes;
 - Scottish Hill Track 318: Aultguish Inn to Ardgay; and
 - Moray Firth Tourist Route – up to 7km of the 128km route (overlapped with the A839and B9176).
- 6.302 There would be no significant visual effects on the views from any other recreational routes within the Study Area.
- 6.303 There would be no significant night-time effects and a full night-time assessment of the aviation warning lights is provided in Technical Appendix 6.3.

Table 6.14: Visual Effects on Views from Recreational Routes

Recreational Route	Description of Effects
Local Recreational Routes	
Core Paths around Lairg (SU16.01, SU16.02, SU16.03, and SU16.06)	Core Paths around Lairg are illustrated in Figures 6.11 a/b and include: • SU16.01 - Ferry Wood Forest located to the west of Little Loch Shin and accessed from the Ferrycroft Visitor Centre (2.15km in length). • SU16.02 – Gunn's Wood to the southeast of the settlement (incorporating SU16.07 Balloan – Lairg) (2.19km / 1km in length) • SU16.03 – Ord Hill from Ord Place to the west of the settlement accessed from the Ferrycroft Visitor Centre (2.24km in length). • SU16.06 - Clash Breac - Primary School (0.29km in length) Visibility along these routes varies due to intervening landform and vegetation. With the exception of SU16.03 these routes are routed or partially routed through woodland or forestry or are surrounded by built form (SU16.06). As a result, visibility across the surrounding landscape is filtered or limited by surrounding foreground trees or buildings. Exceptions to this is SU16.01 where there are open areas to the north of the route as the path nears Lairg Power Station Dam and there are open views across Little Loch Shin to the east and over Loch Shin to the north and northwest, and to the south of the route as it nears Ferrycroft Visitor Centre where views would be increasingly filtered by path-side vegetation and buildings. In addition, there would be potential views from parts of SU16.02 where there are gaps for overhead lines and pylons, although views from here would be filtered by the remaining mature trees.

Recreational Route	Description of Effects
	<u>Assessment: proposed development</u> <i>SU16.01 - Ferry Wood Forest</i> ZTV coverage indicates theoretical visibility of between one and six turbines along the route. Site visits and wireline analysis indicates that visibility would occur in the open areas to the north of the Core Path where a partial hub, blades and blade tips would be theoretically visible on the skyline in views southeast at distances of over 7km subject to screening from scrub and intervening vegetation (Low-Very Low to Zero magnitude) and seen beyond the existing Lairg Wind Farm. The level of effect would be Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative to neutral. <i>SU16.02/16.07 - Gunn's Wood/ Balloan – Lairg</i> ZTV coverage indicates theoretical visibility of between one and six turbines along the route. Site visits and wireline analysis indicates that there would no views along the majority of the forest routes but there would be the possibility of heavily filtered views near forest clearings and at the edge of the forest and near Balloan Farm where partial blades and blade tips would be theoretically visible on the skyline at over ~5.4km distance seen in the context of foreground pylons (Very Low to Zero magnitude) and seen beyond the existing Lairg Wind Farm. The level of effect would be Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and neutral. <i>SU16.03 – Ord Hill from Ord Place</i> ZTV coverage indicates theoretical visibility along the majority of the route with between seven and nine turbines theoretically visible between Ferrycroft Visitor Centre and the lower parts of Ord Hill and all 12 turbines theoretically visible on the slopes and summit of Ord Hill. Site visit and wireline analysis indicates that views of partial blades and blade tips between the Visitor Centre and the lower slopes of Ord Hill would be filtered by woodland and scrub vegetation (Very Low to Zero magnitude). As the route gains elevation, hubs and full blades would become visible with hubs and upper towers visible at the summit of Ord Hill in views southeast. Views from this location are illustrated in Viewpoint 4 (Figure 6.21) and assessed in Appendix 6.2 (Medium magnitude). The level of effect would range from Major and Significant (upper slopes and summit of Ord Hill) to Minor to No View and Not Significant (remainder of route). The nature of these effects would be long-term (reversible), indirect and negative. <i>SU16.06 - Clash Breac - Primary School</i> ZTV coverage indicates no theoretical visibility along this route (No View). <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg and consented Lairg II wind farms would be visible in the same view as the proposed turbines as hubs and partial towers (High-Medium to Zero magnitude). Strath Tirry would be visible to the north at 8.3km (Low to Zero magnitude), Chleainsaid would be visible to the north at between 9.9km and 11km (Medium- Low to Zero magnitude). Creag Riabhach would be visible to the north at 22km distance (Very Low to Zero magnitude) from SU16.03. Other theoretically visible existing wind farms would contribute to a Very Low magnitude due to the long distance and/ or screening from intervening landform and vegetation. From SU16.03, Strath Tirry would be visible to the north at 8.3km (Low to Zero magnitude) and Sallachy would be barely visible to the northwest (Very Low to Zero magnitude). The additional effect of the proposed development would be reduced to Moderate and Not Significant (from SU16.03) and Minor to No View and Not Significant (other routes). The combined effect would be Substantial to Major and Significant (due to Lairg, Lairg II, Chleainsaid and the proposed development from SU16.03) and Moderate to Minor and Not Significant to No View (other routes). Lairg would be decommissioned ~23 years prior to the end of the operational period of the proposed development. However, cumulative effects would continue as a result of Lairg II, Chleainsaid and the proposed development which would be largely

Recreational Route	Description of Effects
	decommissioned during the same time period. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible to the fore of the proposed development and overlapping with Lairg II and partially with the proposed development which would extend the presence of the cluster further to the south (High-Medium to Zero magnitude). Shinness Wind Farm would be visible in views north from some of the routes (Low to Zero magnitude). The additional effect of the proposed development would be reduced to Moderate to Minor and Not Significant (from SU16.03) and Minor to No View and Not Significant (other routes). The combined effect would be Substantial to Major and Significant (due to Lairg, Lairg II, Garvary, Chleasaid, Shinness and <u>not</u> the proposed development from SU16.03) and Moderate to Minor and Not Significant to No View (other routes). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Core Paths around the communities of Rogart and Tressady (SU20.01, SU20.05 and SU20.04, SU20.06 and SU20.07, SU20.08 and SU20.09, and SU20.03)	Core Paths around the communities of Rogart and Tressady are illustrated in Figures 6.11a/b and those that overlap with the ZTV include: • SU20.01 - Meall Mor Fire Track to the south of Strath Fleet to the southeast of Inchcape (5.77km in length). • SU20.05 and SU20.04 – Free Church - Ardichoncherr – Tressady / Free Church – Pittfure (3.5km / 1km in length). • SU20.06 and SU20.07 – Morness - Mill - Little Rogart / Little Rogart – Morness (1.5km / 1.4km in length). • SU20.08 and SU20.09 - Little Rogart Brae – Milnafua / Creag a'Bhata Circuit (2.11km / 3.06km in length). • SU20.03 - Pittentrail - Rhemusaig Bridge via curling pond (1.43km in length). Visibility along these routes vary with many of the routes passing through scrub or woodland as well as open areas. The undulating landform around Rogart and north of Tressady also provides elevated views from some routes and screening from lower areas of routes. Core Paths within Strath Fleet and in particular to the south of the strath are mostly screened by the valley sides with views only available from minor summits towards the top of the valley. Each of the routes are assessed in detail as follows with routes paired where they connect to or are in the same location: <u>Assessment: proposed development</u> <i>SU20.01 - Meall Mor Fire Track</i> ZTV coverage along this route is very limited where theoretical visibility of between one and three turbines is indicated to the north of the route (for approximately 0.2km), and up to 12 turbines as the route crosses the summit of Meall Mor (for approximately 0.3km). Site visit and wireline analysis indicates that a blade tip would be theoretically visible to the north of the route. This would be screened by intervening vegetation (Zero magnitude). At the summit of Meall Mor there would be visibility of up to 12 hubs at approximately 5.8km distance in views walking west along the route (Low magnitude). There would be no further theoretical visibility along the route. The level of effect would be Moderate and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative. <i>SU20.05 and SU20.04 – Free Church - Ardichoncherr – Tressady / Free Church – Pittfure</i> ZTV coverage indicates theoretical visibility of between one and 12 turbines on the western section of SU20.05 as the route leaves the A839 and climbs the landform east of Lettie River towards Ardichoncherr (for approximately 1.5km), and intermittent visibility of between one and six turbines along SU20.04. Site visits and wireline analysis indicates that there would be heavily filtered views for approximately 0.4km as the SU20.05 route climbs the slopes adjacent to Lettie River, and open views of up to

Recreational Route	Description of Effects
	eight hubs and upper towers, and three partial blades for approximately 1.1km of the route at over 5.2km distance (Medium magnitude). Views from SU20.04 would be heavily filtered by deciduous and coniferous woodland (Very Low to Zero magnitude). The level of effect would be Major and Significant (western part of the 3.5km section of SU20.05) to Minor to No View and Not Significant (remainder of route and all of SU20.04). The nature of these effects would be long-term (reversible), indirect and negative. <i>SU20.06 and SU20.07 – Morness - Mill - Little Rogart / Little Rogart - Morness</i> ZTV coverage indicates theoretical visibility of between one and 12 turbines along SU20.06 for approximately 0.6km as the route curves around a burn and continues west. There would be theoretical visibility of up to 12 turbines for approximately 0.7km to the centre and west of SU20.07. Site visits and wireline analysis indicates that there would be some filtered views for approximately 0.2km of SU20.06 as it passes woodland and mature trees along watercourses. Where visible along both routes, up to nine hubs/ upper towers and three partial blades would be visible at approximately 7.3km distance (Medium to Zero magnitude). The level of effect would be Major and Significant to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. <i>SU20.08 and SU20.09 - Little Rogart Brae – Milnafua / Creag a'Bhata Circuit</i> ZTV coverage indicates theoretical visibility of between one and nine turbines along a short (0.2km) section of the SU20.08 at the western extent of the route, for approximately 0.6km of the northwestern extent of SU20.09, and for approximately 0.4km as the route passes to the northeast of Pittentrail. Site visits and wireline analysis indicates that there would be theoretical visibility of up to five hubs from SU20.08 at its western extent at 7km distance (Low to Zero magnitude). Views from the northwest extent of SU20.09 would be heavily screened as the route passes through woodland (Very Low to Zero magnitude). There would be theoretical visibility of partial blades and blade tips as the route passes to the northeast of Pittentrail (Very Low to Zero magnitude). The level of effect would be Moderate and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative. <i>SU20.03 - Pittentrail - Rhemusaig Bridge via curling pond</i> ZTV coverage indicates theoretical visibility of between one and three turbines on the eastern section of the route (0.6km) section of the route. Site visits and wireline analysis indicates that there would be theoretical visibility of up to two blade tips. The route passes through woodland and theoretical visibility would be restricted to areas to the northeast of the route. It is unlikely that the blade tips would be discernible. At most, the magnitude of change would be Very Low to Zero. The level of effect would be Minor to Negligible and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and neutral. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There would be theoretical visibility of blade tips from the existing Lairg and consented Lairg II wind farms in the same view as the proposed turbines (both Very Low to Zero magnitude). The existing Kilbraur and Kilbraur Extension would be visible to the northeast from Meall Mor at ~ 8.4km (Medium-Low to Zero magnitude) in combination with the more distant Gordonbush / Extension (Low to Zero magnitude). The additional effect of the proposed development would be Major and Significant for very short sections of three routes to Moderate to No View and Not Significant for the remainder of these routes and all remaining routes. The combined effect would be Major and Significant (due to the proposed development and Kilbraur / Extension). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be visible in the same view as the proposed turbines as hubs and blades behind and to the left of the proposed turbines from Meall Mor (SU20.01) and

Recreational Route	Description of Effects
	as occasional hubs and blades from other routes (Low magnitude reducing to Zero). The additional effect of the proposed development would be Major and Significant for very short sections of three routes to Moderate to No View and Not Significant (for the remainder of these routes and all remaining routes. The combined effect would be Major and Significant (due to the proposed development and Kilbraur / Extension). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Gruid's Wood Core Paths (SU16.08 and SU16.09)	Core Paths at Gruid's Wood are illustrated in Figures 6.11 a/b and include: • SU16.08 - Braemore – Achany (3.23km in length). • SU16.09 – Gruid's Wood (2.46km in length). There are open views from SU16.08 which passes through medium scale improved and semi-improved grassland fields for the majority of its length. SU16.09 passes through recently felled and replanted coniferous forestry to the north of the Core Path where views are currently relatively open but will become screened over time, as well as areas of mature forestry and woodland to the centre and east of the route where views would be screened or filtered by surrounding trees. <u>Assessment: proposed development</u> <i>SU16.08 - Braemore – Achany</i> ZTV coverage indicates theoretical visibility of all 12 turbines along the route in views to the east. Site visit and wireline analysis indicates that all of the turbines would be visible as hubs and partial towers from the west of the route, with visibility of the southern turbines reducing to blades as the route progresses southeast at distances of between 8.5km and 6.5km. Views would be partially filtered towards the southeast of the route as it passes between (felled) forestry blocks and passes field boundary trees and scattered buildings (Medium magnitude). The turbines would appear slowly rotating against the sky, although beyond landform which defines the views to the east, and mitigates, to some extent the distance of the turbines from the route. The design of the wind farm presents as a simple and cohesive layout, visible along the skyline and appearing in part of the landscape already influenced by wind farms. The level of effect would be Major and Significant (up to 3.2km of the route) to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. <i>SU16.09 – Gruid's Wood</i> ZTV coverage indicates theoretical visibility of all 12 turbines along the route in views looking east. Site visit and wireline analysis indicates that the turbines would be partially screened by intervening landform such that the bases or lower towers would be screened as illustrated in Viewpoint 8 (figure 6.25) (Medium magnitude). The turbines would appear slowly rotating against the sky, although beyond landform which defines the views, and mitigates, to some extent the distance of the turbines from the route. The design of the wind farm presents as a simple and cohesive layout, visible along the skyline and appearing in part of the landscape already influenced by wind farms. Visibility of the turbines would slightly reduce over time as the coniferous forestry east of the Core Path fully matures through the operational period of the proposed development. The level of effect would be Major and Significant (up to 0.3km of the route) (reducing to Major to Moderate and Significant as forestry matures) to No View and Not Significant. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg would be visible to the left of the proposed development at a minimum distance of 4.5km (Medium-Low to Zero magnitude) and the consented Lairg II would be visible to the fore of the proposed development at 4.1km distance (High-Medium magnitude). A cluster of wind farms would be theoretically visible to the south including Beinn nan Oighrean, Beinn Tharsuinn but these would be mostly

Recreational Route	Description of Effects
	screened by intervening vegetation (Very Low to Zero magnitude). Similarly, Achany Wind Farm would be theoretically visible to the northwest but would be mostly screened by intervening vegetation and landform (Very Low to Zero magnitude), and Chleansaid would be theoretically visible to the north but would be screened by vegetation (Very Low to Zero magnitude). The additional effect of the proposed development would be reduced (Low magnitude) due to its location beyond Lairg and Lairg II wind farms, resulting in a Moderate and Not Significant effects to No View. The combined effect would be Substantial to Major and Significant (due to Lairg and Lairg II, and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible behind and to the right of Lairg II and to the fore of the proposed development at 4.5 km distance (High-Medium to Zero magnitude). The additional effect of the proposed development would be reduced (Low-Very Low magnitude) due to its location beyond Lairg, Lairg II and Garvary wind farms, resulting in a Moderate to Minor and Not Significant to No View. The combined effect would be Substantial to Major and Significant (due to Lairg, Lairg II, Garvary and <u>not</u> the proposed development) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Core Paths around Culrain (SU08.02, SU08.03, and SU03.01)	Core Paths around Culrain are illustrated in Figures 6.11a/b. Those overlapped by the ZTV include: • SU08.02 - Carbisdale (5.48km in length). • SU08.03 – Lochcoire, Lower Track (1.52km in length). • SU03.01 – Cornhill – Culrain, via Invercharron Hill/Carbisdale (7.76km in length). These three routes are located within or partially within forestry and views would be heavily screened where this is the case. Each of the routes are assessed in detail as follows with routes paired where they connect or are in the same location: <u>Assessment: proposed development</u> <i>SU08.02 - Carbisdale</i> ZTV coverage indicates theoretical visibility of between one and seven turbines north from Culrain, and up to 12 turbines from elevated sections of the route at and around Carbisdale Castle. Site visit and wireline analysis indicates that there would be theoretical visibility of up to seven blade tips from the route north from Culrain. These would be screened by intervening vegetation (Zero magnitude). As the route gains elevation towards Carbisdale Castle all 12 turbines would be theoretically visible as blades or as blades and hubs from parts of the route. Although there would be some open views around the castle, most of the views of the proposed development would be heavily filtered by surrounding forestry and woodland (Low-Very Low, to Zero magnitude). The level of effect would be Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative to neutral. <i>SU08.03 – Lochcoire, Lower Track</i> ZTV coverage indicates theoretical visibility of all 12 turbines along this route. Site visits and wireline analysis indicates that there would be open views for approximately 0.5km of up to eight hubs and four blades from the route southeast from Hillton. To the northwest of Hillton, forestry felling has opened some views towards the hubs and blades – although these would be filtered by remaining trackside trees / scrub and views would reduce over time as replanted forest matures. The turbines would be visible at between 9.5km to 10km distances (Low to Zero magnitude). The level of effect would be Moderate and Not Significant (reducing to Moderate to Minor and

Recreational Route	Description of Effects
	Not Significant as forestry matures) to No View. The nature of these effects would be long-term (reversible), indirect and negative. <i>SU03.01 – Cornhill – Culrain, via Invercharron Hill / Carbisdale</i> ZTV coverage indicates theoretical visibility of between one and 12 turbines along the route for approximately 6km of the route, with no theoretical visibility indicated for 0.5km to the north of the route and for approximately 1.2km at the southern end of the route. Site visits and wireline analysis indicates that there would be theoretical visibility of up to 10 hubs reducing to visibility of blades / tips as the route progresses from north to south. Where theoretical visibility is indicated, the route would pass through an area of coniferous forestry and views would be heavily filtered. In areas of felling, there would be some views – although these would remain lightly filtered by remaining trees lining the route in combination with middle distance forestry. Where visible in filtered views, the turbines would be seen at approximately 10km (Very Low to Zero magnitude subject to forestry). The level of effect would be Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> There would be theoretical visibility of blades from the existing Lairg and consented Lairg II wind farms (both Low to Zero magnitude) in the same view as the proposed development. There would be theoretical visibility of other more distant existing and consented wind farms in other parts of the view, but these would be mostly screened by intervening vegetation (all Very Low to Zero magnitude). The additional effect of the proposed development would be Moderate to No View and Not Significant. The combined effect would be Moderate to No View and Not Significant due to Lairg, Lairg II and the proposed development. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be visible in the same view to the fore of the proposed turbines and continuing to the fore of Lairg and Lairg II – joining the wind farms in the view to form a cluster (Medium-Low to Zero magnitude). The additional effect of the proposed development would be reduced to Moderate to Minor and Not Significant to No View. The combined effect would be Major to Moderate and Significant (due to Garvary and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Scottish Hill Track 318: Aultguish Inn to Ardgay (Dornoch Firth)	Scottish Hill Track 318 traverses the Study Area between the A836 near Invershin to the southwest and the minor road at Acheilidh to the northeast. The route crosses the undulating moorland area adjacent to the Site, passes under pylons and overhead lines, and would be located approximately 0.6km to the east of the nearest turbine of the proposed development at its closest point. <u>Assessment: proposed development</u> From southwest to northeast, ZTV coverage indicates patchy theoretical visibility of all 12 turbines along the southwestern half of the route (for approximately 7km of the route) with visibility indicated on north facing slopes (for approximately 4km of the route in total). There would be theoretical visibility of all 12 turbines for approximately 8km of the route within 2km of the proposed development, with visibility tapering off to between one to three turbines for the last approximate 0.5km of the route near Acheilidh. The route is routed predominantly through open moorland and there would be minimal screening from any scrub vegetation where theoretical visibility is indicated. The magnitude of change would range between High within 2km of the proposed turbines reducing to Medium in areas of patchy visibility to the southwest, and Low to Zero where visibility reduces in dips, and to the southwest and northeast ends of the route. The level of effect would be Substantial and Significant (within 2km)

Recreational Route	Description of Effects
	reducing to Major and Significant (beyond 2km to the southwest), to Moderate to No View and Not Significant (remainder of the route). The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg and consented Lairg II wind farms would be as hubs and blades along the route visible to the left of and behind the proposed development at a minimum distance of 4.3km (Medium / Medium-Low to Zero magnitude). Clusters of wind farms would be intermittently theoretically visible to the south (Beinn nan Oighrean, Beinn Tharsuinn), northwest (Rosehall and Achany / Extension), and northeast (Gordonbush / Extension and Kilbraur / Extension) but would be visible at greater distances in clear conditions (Low-Very Low / Very Low to Zero magnitude). The additional effect of the proposed development would range from Substantial and Significant to No View and Not Significant. The combined effect would be Substantial and Significant (due to Lairg and Lairg II and the proposed development) to No View and Not Significant. Lairg would be decommissioned ~23 years prior to the end of the operational period of the proposed development. However, cumulative effects would continue as a result of Lairg II and the proposed development which would be largely decommissioned during the same time period. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible partially overlapping with the proposed turbines in views from the southwest, and behind the proposed turbines as the route passes the proposed development at 1km distance to the south of the route (High to Zero magnitude). The additional effect of the proposed development would range from Substantial and Significant to No View and Not Significant. The combined effect would be Substantial and Significant (due to Lairg, Lairg II, Garvary and the proposed development) to No View and Not Significant. Lairg would be decommissioned ~23 years prior to the end of the operational period of the proposed development. However, cumulative effects would continue as a result of Lairg II and the proposed development which would be largely decommissioned during the same time period. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
National Recreational Routes within 45km	
Moray Firth Tourist Route (overlapped with A839, A836 and B9176)	The Moray Firth Tourist Route is a nationally promoted tourist route between Inverness and the Mound on Loch Fleet – approximately 128km in length. Within the 45km Study Area, it travels from Canon Bridge in the south to the Mound on Loch Fleet in the east. From south to north, the route overlaps with the A9, B9176, A836 and A839 as illustrated in Figure 6.10. At its closest point the route would pass approximately 2.4km distance to the northeast of the proposed development. Viewpoints 1, 3, 5, 11 and 12 are located along this route. As the route is a nationally promoted tourist route, the value of the route is assessed as High. However, the route itself is not the tourist destination and it passes through undesignated landscapes as well as through designated landscapes such as the Dornoch Firth NSA and Loch Fleet, Loch Brora and Glen Loth SLA indicating a variable value of High to Medium along its route. The susceptibility to change from the introduction of the proposed development is considered to be High (tourists) to Medium (other road users) and the overall sensitivity of this route is therefore assessed as <i>High</i>. <u>Assessment: proposed development:</u> There is no ZTV coverage from the section of the route along the A9 between Canon Bridge and Alness (Zero magnitude).

Recreational Route	Description of Effects
	ZTV coverage from the B9176 is very limited to the northern part of the route between the northern most Struie Viewpoint layby (Viewpoint 12) and Wester Fearn. Site visits confirm that visibility from the B9176 would be largely limited to approximately 1km of the route from the Struie Viewpoint layby with views towards the proposed development becoming progressively oblique as the route descends to Wester Fearn where the turbines would be screened by intervening vegetation. There would be No View of the proposed development from the southernmost Struie Viewpoint along this route as views are blocked by Struie Hill. Views from the northernmost layby are represented by Viewpoint 12 and assessed in Appendix 6.2 (Low magnitude). The level of effect would be Moderate and Significant to No View and the nature of these effects would be long-term (reversible), indirect and negative. The section of the route overlapped with the A836 and A839 are assessed in Table 6.13. In summary, taking account of the entire 128km Moray Firth Tourist Route, significant visual effects would be limited to short, intermittent sections of the following: ▪ Westbound users of the route (overlapped with the A839) along Strath Fleet between Rovie Lodge and Acheilidh - for approximately 6km of the route); and ▪ Southbound users of the route (overlapped with B9176) around the northernmost Struie layby – for up to 1km of the route. These significant visual effects (up to 7km) would equate to ~5% of the entire 128km route. Assuming an average speed of 50mph these significant views would be experienced intermittently for a total period of approximately 5-6 minutes experienced by westbound road users between Rovie Lodge and Acheilidh along Strath Fleet (A839) and up to 1km around the northernmost Struie layby on the B9176. There would no significant visual effects from the section of the route that overlaps with the A836. <u>Cumulative Assessment: Existing + Consented Sites + proposed development (B9176 section)</u> Lairg Wind Farm would be visible as blades and tips at 18.5km (Very Low to Zero magnitude). Rosehall and Achany wind farms would be visible to the northwest at over 22km (Very Low to Zero magnitude). The existing Beinn Tharsuinn Wind Farm (Low to Zero magnitude) would be largely visible from the central parts of the B9176 section of the route. The existing Novar and Novar Extension wind farms (Low-Very Low to Zero magnitude) would also be visible from parts of the route near the Strathly Road junction, subject to screening by forestry. The existing Kilbraur and Kilbraur Extension wind farms would be theoretically visible from the northern sections of the route subject to further screening (Very Low to Zero magnitude). Lairg II would be visible to the fore of Lairg Wind Farm as partial hubs and blades at 16.9km (Very Low to Zero magnitude). Achany Extension would be partially visible behind Rosehall and Achany, but barely perceptible at 27.5km (Very Low to Zero magnitude). Meall Buidhe would be visible to the northwest at over 20km distance (Very Low to Zero magnitude). Strathrory would be visible from central sections of the route (High to Zero magnitude). Chleainsaid would be visible in clear conditions at over 30km (Very Low to Zero magnitude). The additional effect of the proposed development would range from Moderate and Significant to No View and Not Significant. The combined effect would be Substantial and Significant (due to Strathrory and to a lesser degree (Moderate) with the proposed development) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development (B9176 section)</u> Garvary Wind Farm would be visible in the same view as the proposed development as a separate wind farm at 14km (Low to Zero magnitude), Chleainsaid would be visible in clear conditions at over 30km (Very Low to Zero magnitude). The additional effect of the proposed development would range from Moderate and Significant to No View and Not Significant. The combined effect would be Substantial and

Recreational Route	Description of Effects
	Significant (due to Strathrory and to a lesser degree (Major to Moderate) with the proposed development and Garvary) to No View and Not Significant. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Inverness to John O'Groats Sustrans Network (overlapped with the A836 – Tain to Altnaharra)	Assessed as part of the A836 in Table 6.13 as this route overlaps with this transport route between Tain and Altnaharra.
Sustrans Cycle Route 1 (Inverness to Tain)	The Sustrans Cycle Route 1 is a long-distance cycle route of approximately 2,034km between Dover in England and Inverness. From Inverness, the route splits just north of the Kessock Bridge – the first section ('summer route') passes through the Black Isle via Cromarty and Nigg to Tain on the Nigg ferry, whilst the second section ('winter route') passes through Dingwall and Alness before re-joining the first section at Tain. At its closest point in Tain, the route would pass approximately 22km distance to the southeast of the proposed development. As the route is a nationally promoted recreational route, the value of the route is assessed as High. The susceptibility to change from the introduction of the proposed development is considered to be High (recreational users) and the overall sensitivity of this route is therefore assessed as <i>High</i>. <u>Assessment: proposed development:</u> The greatest extent of ZTV coverage is indicated on the 'summer route' between Pitcalnie and Tain – although there is a further area of theoretical visibility on an elevated part of the Black Isle at Craighead. Travelling south to north along the route, theoretical visibility at Craighead would be at over 40km distance where the turbines may be visible in clear conditions as blades (Very Low to Zero magnitude). Between Pitcalnie and Tain, the proposed turbines would be theoretically visible as blades at distances of between 22-34km. Views would be mostly screened by intermittent close and middle-distance vegetation resulting in a Very Low to Zero magnitude. Some of the blade tips would not be discernible in the view due to the intervening distance. ZTV coverage from the 'winter route' is very limited to the approach to Tain from the southwest and through the settlement on minor roads. In reality, views would be mostly screened by intervening vegetation on the approach to Tain and by buildings through the settlement (Very Low to Zero magnitude). The level of effect would range from Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and neutral. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The proposed turbines would be intervisible with Lairg and Lairg II from some locations as well as Kilbraur and Gordonbush (all Very Low to Zero magnitude). Strathrory would be visible between Nigg and Hilton of Cadboll (Low-Very Low to Zero magnitude). The additional effect of the proposed development would be Minor and Not Significant to No View. The combined effect would also be Moderate to Minor and Not Significant (due to Strathrory) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative to neutral. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be visible to the left of the proposed development (Very Low to Zero magnitude). The additional effect of the proposed development would be Minor and Not Significant to No View. The combined effect would also be Moderate to Minor and Not Significant (due to Strathrory) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative to neutral.

Recreational Route	Description of Effects
	<u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
North Coast 500 (overlapped with A9)	The North Coast 500 is an 830km long promoted tourist route that follows Scotland's mainland coastline starting from and ending back in Inverness. Within the 45km Study Area, it travels on the A862 / A9 north from Canon Bridge to Tain where it crosses the Dornoch Firth Bridge and continues along the coastline through Brora and Helmsdale. A further section of the route passes to the west of the 45km Study Area along the A837 at Ledmore and following the A835 southwest. The route would pass approximately 12.8km distance to the southeast of the proposed development at its closest point. Viewpoint 15 (Figure 6.32) is located along this route on the Dornoch Firth Bridge. As a trunk road, the A9 is not a 'slow road' or co-used as part of Scotland's Great Trails. Except for the urban parts of the route, there are no footpaths or cycle lanes. The main purpose along the A9 is transport, and through successive upgrading the character of the road is increasingly that of a contemporary highway. Further, the A9 itself is not one of Scotland's established 13 National Tourist Routes. However, the majority of the A9 within the Study Area is classified as a tourist route (and partially overlaps with the Sustrans Cycle Route 1 and Moray Firth Tourist Route) and parts of it passes through the Dornoch Firth NSA. The value of the route is therefore assessed as High. In terms of road users, these will vary greatly from people 'at work' or commuting, to local people and tourists who may be driving to a destination or who may be driving to enjoy the view. Road users are also travelling at speed and experience the landscape as a sequence of views, usually looking in one direction depending on their location in the vehicle. The drivers will be focused on the activity of driving and are likely to be less sensitive than the passengers. Both groups would be less sensitive than non-motorised receptors including residents and walkers. The susceptibility of change for users travelling along the route is therefore assessed as High to Medium and the overall sensitivity of the route is assessed as <i>High</i>. <u>Assessment: proposed development:</u> ZTV coverage is indicated for a short section of the route between Calrossie (south of Tain) to Dornoch Bridge where up to 12 turbines would be theoretically visible. Further very short sections of theoretical visibility of one to three turbines are indicated as the route passes near Everlix, Skelbo and The Mound. Views between Calrossie and Dornoch Bridge would be intermittently screened by intervening vegetation with some open views as the route approaches the bridge (Very Low to Zero magnitude). Views from Dornoch Bridge are illustrated by Viewpoint 15 (Figure 6.32) (Low-Very Low magnitude) and views of blade tips as the route passes near Everlix and The Mound would be screened by intervening vegetation (Zero magnitude). Views from Skelbo (0.4km of the route) would be filtered by vegetation in summer views and / or glimpsed in filtered winter views (Low-Very Low magnitude). The level of effect along the route would range from Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative to neutral. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> Beinn nan Oighrean, Coire na Cloiche, Beinn Tharsuinn, and Novar / Extension would be partially visible in clear conditions from parts of the route to the west / southwest (Very Low magnitude). Strathrory would be visible to the southwest from the Dornoch Firth Bridge (Low to Zero magnitude). The additional effect of the proposed development would be Moderate to Minor and Not Significant to No View. The combined effect would also be Moderate and Not Significant (due to Strathrory) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary would be partially visible to the left of the proposed development at distances over 13.5km (Very Low to Zero magnitude). The additional effect of the

Recreational Route	Description of Effects
	proposed development would be Moderate to Minor and Not Significant to No View. The combined effect would also be Moderate and Not Significant (due to Strathory) to No View. The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
John o'Groats Trail	Assessed as part of the Sustrans Cycle Route 1 and North Coast 500 above as this route largely overlaps with these routes between Alness and Helmsdale. The only deviation of this route is around Dornoch which is mostly outwith the ZTV and any theoretical visibility is screened by intervening vegetation.

Visual Effects on Views from Recreational and Tourist Destinations

- 6.304 The visual assessment has considered the potential visual effects likely to be experienced by people at recreational / visitor or tourist destinations or attractions, which are overlapped by the ZTV, within the LVIA Study Area. Each of these locations were visited and / or assessed with the use of ZTVs and wirelines. All of the destinations have been assessed as of *High* sensitivity on account of their High - Medium value as recreational and tourist destinations, some located within designated landscapes and the High susceptibility of the people visiting these destinations, whose attention would be focused on the landscape around them. Golfers have been assessed as of medium sensitivity as the attention or interest is likely to be focused on the sporting activity.
- 6.305 In summary, there would be a significant effect on two receptors at the summit of Struie Hill and The Ord, although there would be No View of the proposed development from the majority of the track (Core Path) leading to the summit of Struie Hill. Whilst there would be a significant effect on the views from the summit of Struie Hill and The Ord viewing towards the proposed development, there would be no significant effects on the overall walking experience and summit / destination views of these routes, due to the intervening distance, 360° / wide panoramic views, large-scale landscape and partial landform screening.
- 6.306 None of the remaining tourist / visitor attractions would be significantly affected by the proposed development.
- 6.307 No significant night-time effects would result of the proposed aviation warning lights.

Table 6.15: Visual Effects on Views from Recreation and Tourist Destinations

Recreational and Tourist Destinations	Assessment
Ferrycroft Visitor Centre	Ferrycroft Visitor Centre is a single storey building surrounded by hedgerows, mixed tree belts and scrub woodland. Views toward the proposed development would be heavily filtered and views would be similar to those assessed for the lower parts of Core Path SU16.01 and SU16.03 in Table 6.14. The level of effect would be Moderate to Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect and negative to neutral.

Recreational and Tourist Destinations	Assessment
The Ord (Ord Hill)	Views from The Ord are assessed as part of Viewpoint 4 within Technical Appendix 6.2 and illustrated in Figure 6.21. Impacts upon setting are addressed within Chapter 7: Cultural Heritage. To summarise, the magnitude of change would be Medium and the level of effect would be Major and Significant.
Carbisdale Castle	Carbisdale Castle is located on a slightly elevated location to the north of Culrain and has open views across and along the Kyle of Sutherland, with the main views orientated to the south / southeast and east / northeast. However, there is also mature woodland surrounding the Castle to the northeast, south and southwest. There would be theoretical visibility of up to one to three blade tips from the castle grounds which would be mostly screened by middle distance vegetation (Very Low to Zero magnitude). The level of effect would be Minor and Not Significant to No View. The nature of these effects would be long-term (reversible) indirect, and neutral. No existing or consented wind farm would be visible. Blade tips of Garvary would be theoretically visible in the same FoV as the proposed development (Very Low to Zero magnitude). The additional and combined cumulative effect would remain Minor and Not Significant to No View. The nature of these effects would be long-term (reversible), indirect, cumulative and neutral. <u>Night-time effects</u> No aviation warning lights would be visible.
Struie Hill	Struie Hill (331m AOD) is accessed via the Struie Hill Mast Track Core Path RC15.04. There is no ZTV coverage from the majority of this 2.45km long Core Path with the only area of visibility indicated at the summit of Struie Hill. It is located 14.1km distance southeast of the proposed development. <u>Assessment: proposed development</u> All 12 turbines would be visible on the skyline from the summit beyond the Firth affecting approximately 7° of the horizontal FoV. The lower parts of the turbines would be screened by intervening landform such that mostly upper towers and hubs would be visible, with one turbine appearing as a blade. The wind farm presents as a simple row of well-spaced turbines, visible along the skyline and appearing beyond foreground hills and would be associated with a more distant landscape beyond Dornoch Firth and the NSA. In addition, the proposed turbines would be visible at a distance of over 14km in the context of other wind farms already visible in the view (albeit Very Low magnitude). None of the other infrastructure elements of the proposed development would be visible from this location. The magnitude of change would be Low. The level of effect would be Moderate and Significant (summit of Struie Hill) to No View (Core Path). The nature of these effects would be long-term (reversible), indirect and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> Lairg Wind Farm would be visible as blades and tips at 18.5km (Very Low magnitude). Rosehall and Achany wind farms would be visible to the northwest at over 22km and Kilbraur and its Extension would be visible to the northeast at over 24km distance (all Very Low magnitude). Beinn Tharsuinn, Beinn nan Oighrean (both Low magnitude), Coire na Cloiche (Low-Very to Low magnitude) and Strathrory (Medium-Low magnitude) would be visible to the southwest. Lairg II would be visible to the fore of Lairg Wind Farm as partial hubs and blades at 16.9km (Very Low magnitude). Achany Extension would be partially visible behind Rosehall and Achany, but barely perceptible at 27.5km (Very Low to Zero magnitude). Meall Buidhe would be visible to the northwest at over 20km distance (Very Low magnitude). Chleansaid would be visible in clear conditions at over 30km (Very Low magnitude). The additional effect of the proposed development would be Moderate and Significant. The combined effect would be Major to Moderate and Significant (due to Beinn Tharsuinn, Beinn nan

Recreational and Tourist Destinations	Assessment
	Oighrean, Strathrory and the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible in the same view as the proposed development as a separate wind farm at 14km (Low magnitude), and Shinness would be visible at over 33km behind Garvary (Very Low magnitude). The additional effect of the proposed development would be Moderate and Significant. The combined effect would be Major to Moderate and Significant (due to Beinn Tharsuinn, Beinn nan Oighrean, Strathrory, Garvary and the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Princess Cairn	Princess Cairn (261m AOD) is a minor hill (Marilyn) to the west of Loch Fleet. Although there are no tracks or routes to the summit, the hill is promoted as a walking destination – although it is less walked than other summits in the wider Study Area. Views from the summit are panoramic with the main focus across Loch Fleet to the east. Views inland include views along Strath Fleet to the northeast and Strath Carnaig to the west. <u>Assessment: proposed development</u> All 12 proposed turbines would be visible from the summit in views northwest at approximately 12km distance. The turbines would appear slowly rotating against the sky, although partly beyond landform which provides some partial mitigation. The wind farm presents a simple row of well-spaced turbines (with some limited overlapping), visible along the skyline, and appearing reasonably well accommodated in the view. Ground-based infrastructure would not be visible. The magnitude of change would be Low and the level of effect would be Moderate and Not Significant due to the large scale of the receiving landscape, panoramic views, intervening distance and extent of visibility of the turbines on the horizon in part of the view that is not the main focus. The main view out towards Loch Fleet and the coastline to the east and south would be unaffected by the proposed development. The nature of these effects would be long-term (reversible) indirect, and negative. <u>Cumulative Assessment: Existing + Consented Sites + proposed development</u> The existing Lairg Wind Farm would be partially visible as blades, and Achany and Rosehall wind farms would be visible behind the proposed development (all Very Low magnitude). Kilbraur and Kilbraur Extension would be partially visible to the north at 9.2km distance (Medium-Low magnitude). A further cluster of wind farms would be visible to the southwest including Coire na Cloiche, Beinn Tharsuinn and Strathrory (all Very Low magnitude). The consented Lairg II Wind Farm would be visible as blades and a hub behind the proposed turbines (Low-Very Low magnitude). The additional effect of the proposed development would be Moderate and Not Significant. The combined effect would be Major to Moderate and Significant (due to Kilbraur and Extension and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative. <u>Cumulative Assessment: Existing + Consented Sites + Applications + proposed development</u> Garvary Wind Farm would be visible partially behind and extending left of the proposed development as towers, hubs and blades at approximately 12km distance (Low magnitude). Shinness would be visible at over 29km to the northwest in clear conditions (Very Low magnitude). The additional effect of the proposed development would be Moderate and Not Significant. The combined effect would be Major to Moderate and Significant (due to Kilbraur and Extension and <u>not</u> the proposed development). The nature of these effects would be long-term (reversible) indirect, cumulative and negative.

Recreational and Tourist Destinations	Assessment
	<u>Night-time effects</u> No significant night-time effects would result of the proposed aviation warning lights.
Munros	
Ben Klibreck	Views from Ben Klibreck are assessed as part of Viewpoint 19 within Technical Appendix 6.2 and illustrated in Figure 6.36. To summarise the magnitude of change would be Very Low and the level of effect would be Minor and Not Significant.
Ben More Assynt	Views from Ben More Assynt are assessed as part of Viewpoint 21 within Technical Appendix 6.2 and illustrated in Figure 6.38. To summarise the magnitude of change would be Very Low and the level of effect would be Minor and Not Significant.
Corbetts	
Càrn Chuinneag	Views from Càrn Chuinneag are assessed as part of Viewpoint 18 within Technical Appendix 6.2 and illustrated in Figure 6.35. To summarise the magnitude of change would be Low-Very Low and the level of effect would be Moderate to Minor and Not Significant.

Summary of Residual Landscape and Visual Effects

6.308 A summary of the landscape and visual and cumulative effects are provided in Tables 6.16-17 and the information set out in these tables is explained as follows:

- Receptor Name.
- Sensitivity: The sensitivity of the receptor is recorded (ranging from 'High', 'Medium', 'Low', and 'Very Low') in accordance with the methodology in Appendix 6.1.
- LVIA Assessment ('Stand-alone' or Primary Effect):
 - Magnitude: The magnitude of change, taking account of the proposed development only, is recorded (ranging from 'High', 'Medium', 'Low', 'Very Low' and 'Zero') in accordance with the methodology.
 - Level of Effect: The level of effect for the proposed development only, is recorded and takes account of the sensitivity and magnitude in accordance with the methodology. Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations.
- Cumulative Assessment (CLVIA):
 - Magnitude (Existing and Consented Wind Farms): The magnitude of change, taking account of other existing and consented wind farms is recorded (ranging from high, medium, low, very low, and zero) in accordance with the methodology;
 - Additional Level of Effect: Adding the proposed development to the baseline of existing and consented wind farms;
 - Scenario 1 / Cumulative Level of Effect 1: The level of effect, taking account of the other existing, consented / under construction wind farms and the proposed development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to

significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets;

- Magnitude (Other Application Wind Farms): The magnitude of change, taking account of other wind applications is recorded (ranging from high, medium, low, very low, and zero) in accordance with the methodology;
- Additional Level of Effect: Adding the proposed development to the baseline of existing and consented wind farms and other wind farm applications; and
- Scenario 2 / Cumulative Level of Effect 2: The level of effect, taking account of the other existing, consented / under construction, application wind farms and the proposed development, is recorded (taking account of the sensitivity and magnitude in accordance with the methodology). Those levels of effect shown in bold relate to significant effects in accordance with the relevant EIA Regulations and the wind farm contributing most to the cumulative effects is recorded in brackets.

Table 6.16: Summary and Evaluation of the Predicted Landscape and Cumulative Landscape Effects

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
Direct Landscape Effects on the 'Host' Landscape Character Type: (135) Rounded Hills – Caithness and Sutherland LCT: South of Strath Fleet LCA									
Construction Effects: 135 - Rounded Hills: Caithness and Sutherland: South of Strath Fleet LCA	Medium	Zero to High	None to Major	Cumulative effects would increase from None at the start of construction to the operational levels of Major (due to Lairg, Lairg II, Garvary and the PD).					
Operational Effects: 135 - Rounded Hills: Caithness and Sutherland: South of Strath Fleet LCA	Medium	High (up to 2 – 3.5km) to Zero	Major (up to 2 – 3.5km) reducing to Moderate and None	High to Zero	Moderate (up to 2 – 3.5km)	Major (up to 2 – 3.5km) (Lairg, Lairg II and PD) to None	High to Zero	Moderate to Minor	Major (up to 2 – 3.5km) (Lairg, Lairg II, Garvary and PD) to None
Decommissioning Effects: 135 - Rounded Hills; South of Strath Oykel LCA	Medium	Very Low	Negligible	The residual cumulative effects post decommissioning would be Negligible.					
Indirect Landscape Effects on the Surrounding Landscape Character within 10km									
135 -Rounded Hills - Caithness and Sutherland LCT: North of Strath Fleet LCA	Medium	Medium-Low to Zero	Moderate to Minor, to None	Medium-Low to Zero	Minor, to None	Moderate to Minor, to None	Low to Zero	Minor, to None	Moderate to Minor, to None

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
142 - Strath – Caithness and Sutherland LCT: Strath Fleet LCA	High - Medium	Medium (up to 3.5km) to Zero	Major to Moderate (up to 3.5km) to None	Low to Zero	Major to Moderate (up to 3.5km) to None	Major to Moderate (up to 3.5km) (PD) to None	Very Low to Zero	Major to Moderate (up to 3.5km) to None	Major to Moderate (up to 3.5km) (PD) to None
145 - Farmed and Forested Slopes with Crofting LCT: Lairg LCA	High - Medium	Low to Zero	Moderate to Minor reducing to None	Medium-Low to Zero	Minor reducing to None	Major to Moderate (Lairg and Lairg II) to None	Medium - Low to Zero	Minor reducing to None	Major to Moderate (Lairg, Lairg II and Garvary) to None
134 - Sweeping Moorland and Flows – Caithness and Sutherland LCT: North of Lairg and Strath Fleet LCA	High - Medium	Low to Zero	Moderate to Minor reducing to None	High to Zero	Moderate to Minor reducing to None	Substantial to Major (Kilbraur and Extension) to None	Low-Very Low to Zero	Moderate to Minor reducing to None	Substantial to Major (Kilbraur and Extension) to None
Indirect Landscape Effects on the Surrounding Landscape Character within the wider 45km Study Area (and up to 15km south)									
145 – Farmed and Forested Slopes with Crofting LCT – Bonar Bridge to Skelbo, and Kincardine LCAs	High - Medium	Very Low to Zero	Minor to None	Very Low to Zero	Minor to None	Minor to None	Very Low to Zero	Minor to None	Minor to None
330 - Rounded Hills and Moorland Slopes - Ross & Cromarty	High - Medium	Very Low to Zero	Minor to Negligible, to None	High to Zero	Minor to Negligible, to None	Major (Beinn nan Oighrean, Beinn Tharsuinn, Coire na	Very Low to Zero	Minor to Negligible, to None	Major (Beinn nan Oighrean, Beinn Tharsuinn, Coire na

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
LCT – Easter Fearn LCA						Cloiche and Strathrory)			Cloiche and Strathrory)
343 – Coastal Shelf LCT – Ardmore, Edderton and Whiteness Sands LCAs	High	Very Low to Zero	Minor to None	Very Low to Zero	Minor to None	Minor to None	Very Low to Zero	Minor to None	Minor to None
140 – Sandy Beaches and Dunes LCT – Dornoch Sands LCA	High	Very Low to Zero	Minor to None	Very Low to Zero	Minor to None	Minor to None	Very Low to Zero	Minor to None	Minor to None
146 – Coastal Farmland and Woodlands LCT	High – Medium	Very Low to Zero	Minor to None	Very Low to Zero	Minor to None	Minor to None	Zero	No cumulative effects	
Indirect Effects on Landscape Planning Designations and Wild Land Areas									
Dornoch Firth NSA	High	Low to Zero	Moderate (SLQ 2 and Viewpoint 12 only), to Minor to None	Very Low to Zero	Moderate (SLQ 2 and Viewpoint 12 only), to Minor to None	Moderate (PD from SLQ 2 and Viewpoint 12 only), to Minor to None	Low to Zero	Minor to None	Moderate (Garvary + PD from SLQ 2 Viewpoint 12 only), to Minor to None
Loch Fleet, Loch Brora and Glen Loth SLA	High - Medium	Very Low to Zero	Minor, to None	High to Zero	Minor, to None	Substantial to Major (Kilbraur and Ext. and Gordonbush	Very Low to Zero	Minor, to None	Substantial to Major (Kilbraur and Ext. and Gordonbush

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
						and Ext.) to None			and Ext.) to None
Ben Klibreck - Armine Forest WLA (WLA 35)	High	Very Low	Minor	Medium - Low	Minor	Moderate to Minor	Medium – Low	Minor	Moderate to Minor

Note: Significant effects resulting from the proposed development are indicated in bold text and shaded dark grey.

Table 6.17: Summary and Evaluation of the Predicted Visual and Cumulative Visual Effects

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
Visual Effects on Settlements									
Lairg	High	Low-Very Low to Zero	Moderate to Minor, to No View	High-Medium to Zero	Minor to No View	Substantial to Major (Lairg, Lairg II) to No View	High-Medium to Zero	Minor to No View	Substantial to Major (Lairg, Lairg II, Garvary, Shinness) to No View
Visual Effects on Transport Routes									
A839	High to Medium	Medium to Zero	Major to Moderate, to Moderate (11.4km of 37km route) to Zero	High-Medium to Zero	Moderate to No View	Substantial to Major (Achany, Lairg, Lairg II) to No View	High-Medium to Zero	Moderate to Minor, to No View	Substantial to Major (Achany, Lairg, Lairg II, Garvary, Strath Oykel) to No View
A836	High / High-Medium	Low to Zero	Moderate to Minor, to No View	High to Zero	Minor to No View	Substantial (Lairg II, Strath Tirry, Creag Riabhach, Chleansaid) to No View	High to Zero	Minor to No View	Substantial (Lairg II, Strath Tirry, Creag Riabhach + Extension, Chleansaid, Garvary, Shinness) to No View
Minor road: Lochbuie	Medium	High (3.4km) / High-Medium (2km) to Zero	Major (3.4km) / Major to Moderate	Low to Zero	Major (3.4km) / Major to Moderate (2km) to No View	Major / Major to Moderate (PD) to No View	High to Zero	Major (3.4km) / Major to Moderate (2km) to No View	Major / Major to Moderate (Garvary, PD) to No View

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
			(2km) to No View						
Minor roads within Strath Fleet	Medium	High-Medium (Muie Road), to Low to Zero (other roads)	Major to Moderate (Muie Road), to Minor to No View (other roads)	Zero	No cumulative effect		Medium-Low to Zero	Major to Moderate (Muie Road), to Minor to No View (other roads)	Major to Moderate (Muie Road) (PD), to Minor to No View (other roads)
Minor roads connecting Rogart and East and West Langwell	Medium	Medium and Low, to Zero	Moderate (minor road East to West Langwell), to Moderate to No View (other roads)	Medium-Low to Zero	Moderate (minor road East to West Langwell), to Moderate to No View (other roads)	Major to Moderate (Kilbraur + Extension, Lairg II, PD), to No View	Medium-Low to Zero	Moderate to No View	Major to Moderate (Kilbraur + Extension, Lairg II, Garvary, PD), to No View
The Far North (Inverness to Wick) Railway Line	High / High-Medium	Low to Zero	Moderate to No View	High-Medium to Zero	Moderate to No View	Substantial to Major (Lairg, Lairg II), to No View	High-Medium to Zero	Moderate to No View	Substantial to Major (Lairg, Lairg II, Garvary), to No View
A838	Medium	Low to Zero	Minor to No View	High to Zero	Minor to Negligible, to No View	Major (Sallachy, Lairg II) to No View	High to Zero	Negligible, to No View	Substantial to Major (Sallachy, Lairg II, Garvary, Shinness) to No View
A837	High to Medium	Low-Very Low to Zero	Minor to No View	Low to Zero	Minor to Negligible, to No View	Moderate (Meall Buidhe) to No View	High to Zero	Negligible, to No View	Major (Meall Buidhe, Strath

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
									Oykel) to No View
Visual Effects on Local Recreational Routes									
Core Paths around Lairg	High	Medium (upper SU16.03) to Low-Very Low and Zero (other routes)	Major (upper SU16.03), to Moderate to Minor to No View (other routes)	High-Medium to Zero	Moderate to No View	Substantial to Major (Lairg, Lairg II, Chleansaid, PD) (upper SU16.03) to No View	High-Medium to Zero	Moderate to Minor, to No View	Substantial to Major (Lairg, Lairg II, Chleansaid, Garvary, Shinness) (upper SU16.03) to No View
Core Paths around the communities of Rogart and Tressady	High	Medium (SU20.05 / SU20.06 / SU20.07) to Low and Zero (other routes)	Major (SU20.05 / SU20.06 / SU20.07), to Moderate to No View (other routes)	Medium-Low to Zero	Major (SU20.05 / SU20.06 / SU20.07), to Moderate to No View (other routes)	Major (Kilbraur + Ext, PD) to No View	Low to Zero	Major (SU20.05 / SU20.06 / SU20.07), to Moderate to No View (other routes)	Major (Kilbraur + Ext, PD) to No View
Gruid's Wood Core Paths	High	Medium (3.2 / 0.3km of routes) to Zero	Major (3.2 / 0.3km of routes) (Major to Moderate) to No View	High-Medium to Zero	Moderate to No View	Substantial to Major (Lairg, Lairg II) (both routes) to No View	High-Medium to Zero	Moderate to Minor, to No View	Substantial to Major (Lairg, Lairg II, Garvary) (both routes) to No View

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
Core Paths around Culrain	High	Low to Zero	Moderate to No View	Low to Zero	Moderate to No View	Moderate to No View	Medium-Low to Zero	Moderate to Minor, to No View	Major to Moderate (Garvary) to No View
Scottish Hill Track 318: Aultguish Inn to Ardgay (Dornoch Firth)	High	High to Zero	Substantial (2km) / Major (beyond 2km SW) to No View	Medium to Zero	Substantial (2km) / Major (beyond 2km SW) to No View	Substantial (Lairg, Lairg II, PD) to No View	High to Zero	Substantial (2km) / Major (beyond 2km SW) to No View	Substantial (Lairg, Lairg II, Garvary, PD) to No View
Moray Firth Tourist Route (overlapped with A839, A836 and B9176) – Assessed as part of the A839 and A836 above									
Moray Firth Tourist Route – <u>B9176 section only</u>	High	Low to Zero	Moderate to No View	High to Zero	Moderate to No View	Substantial (Strathorry) (Moderate – PD) to No View	Low to Zero	Moderate to No View	Substantial (Strathorry) (Major to Moderate – PD, Garvary) to No View
Inverness to John O'Groats Sustrans Network	Assessed as part of the A836 as this route overlaps with this transport route between Tain and Altnaharra.								
Sustrans Cycle Route 1 (Inverness to Tain)	High	Very Low to Zero	Minor to No View	Low-Very Low to Zero	Minor to No View	Moderate to Minor (Strathorry), to No View	Very Low to Zero	Minor to No View	Moderate to Minor (Strathorry), to No View

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
North Coast 500 (overlap with A9)	High	Low-Very Low to Zero	Moderate to Minor, to No View	Low to Zero	Moderate to Minor, to No View	Moderate (Strathrory) to No View	Very Low to Zero	Moderate to Minor, to No View	Moderate (Strathrory) to No View
John o'Groats Trail	Assessed as part of the Sustrans Cycle Route 1 and North Coast 500 as this route largely overlaps with these routes between Alness and Helmsdale. The only deviation of this route is around Dornoch which is mostly outwith the ZTV and with any theoretical visibility screened by intervening vegetation.								
Visual Effects on Recreational and Tourist Destinations									
Ferrycroft Visitor Centre	Assessed as part of the lower elevations of Core Paths SU16.01 and SU16.03.								
The Ord (Ord Hill)	Views from The Ord are assessed as part of Viewpoint 4 within Technical Appendix 6.2 and illustrated in Figure 6.21.								
Carbisdale Castle	High	Very Low to Zero	Minor to No View	Zero	No cumulative effect		Very Low to Zero	Minor to No View	Minor to No View
Struie Hill	High	Low to Zero	Moderate to No View	Medium-Low to Zero	Moderate to No View	Major to Moderate (Beinn Tharsuinn, Beinn nan Oighrean, Strathrory, PD) to No View	Low to Zero	Moderate to No View	Major to Moderate (Beinn Tharsuinn, Beinn nan Oighrean, Strathrory, Garvary, PD) to No View

Receptor	Sensitivity	Primary Assessment: LVIA: proposed development only		Assessment: CLVIA: proposed development (PD) and other wind farms					
		Magnitude (Standalone)	Level of Effect (Standalone)	Magnitude (Existing and Consented)	Additional Level of Effect	Scenario 1: Combined Level of Effect:	Magnitude (Applications)	Additional Level of Effect	Scenario 2: Combined Level of Effect:
Princess Cairn	High	Low	Moderate	Medium-Low	Moderate	Major to Moderate (Kilbraur + Ext)	Low	Moderate	Major to Moderate (Kilbraur + Ext)
Munros									
Ben Klibreck	High	Very Low	Minor	High	Minor	Substantial (Creag Riabhach)	Low	Minor	Substantial (Creag Riabhach + Ext, Shinness)
Ben More Assynt	High	Very Low	Minor	Medium-Low	Minor to Negligible	Major to Moderate (Sallachy)	Low-Very Low	Negligible	Major to Moderate (Sallachy)
Corbetts									
Càrn Chuinneag	High	Low-Very Low	Moderate to Minor	Low	Moderate to Minor	Moderate	Low-Very Low	Minor	Moderate

Note: Significant effects resulting from the proposed development are indicated in bold text and shaded dark grey.

Summary and Conclusions

- 6.309 The proposed development would comprise 12 wind turbines with a maximum height of 230m to blade tip and associated infrastructure located approximately 7.6km¹⁷ southeast of Lairg and 8km west of Pittentrail within an undesignated area of *Rounded Hills - Caithness and Sutherland* landscape character. Cumulatively, the proposed development would form part of a cluster of wind farm development comprising the existing Lairg and consented Lairg II wind farms and the Garvary application.
- 6.310 The proposed turbines would be located within open moorland within an area of low-lying hills between Strath Fleet (running to the north and east), and Achany Glen (running to the west and southwest). To the south the low-lying hills continue towards the Dornoch Firth which forms an expansive waterbody contained by both the low-lying hills to the north and further hills south. In the wider Study Area to the south and southwest, the low-lying hills transition to more elevated hill ranges. To the west beyond Achany Glen, undulating upland areas are further bisected by straths and glens, most notably Strath Oykel and Glen Cassley. To the northwest, extensive, relatively low-lying moorland extends from Loch Shin across Strath Tirry before the landform once again rises towards Ben Armine Forest to the north. Ben Klibreck appears as a distinctive isolated Munro in this landscape. To the northeast the low-lying hills continue and to the east the hills fall towards the coastline and extensive seascape.
- 6.311 Beyond 10km, theoretical visibility becomes fragmented and patchy and is mostly indicated to the south, southwest, west and northwest of the Study Area. To the south and southwest, theoretical visibility is indicated on the upland areas beyond Dornoch Firth, with breaks in the theoretical visibility in low-lying valleys at Strathcarron and the Kyle of Sutherland. ZTV coverage is more limited beyond 20km and is most evident along the Portmahomack coastline and on scattered hill summits and sloping land orientated towards the proposed development where the views are experienced as part of much wider panoramas and 360° views.
- 6.312 The LVIA has been undertaken in accordance with GLVIA 3 by chartered landscape architects at WSP. The assessment process has encompassed the construction, operation, and decommissioning phases of the proposed development.

Landscape Planning Policy and Guidance

- 6.313 The design and assessment process has taken account of national and local planning requirements in relation to wind farm development, as described Chapter 5: Renewable Energy and Planning Policy, and the Planning Statement which accompanies this Section 36 Application. This includes NPF4, the Highland-wide Local Development Plan (LDP) (2012) and Caithness and Sutherland LDP (CaSPlan) (2018).
- 6.314 The proposed development being greater than 50MW, falls within Section 36 of the Electricity Act 1989 and the Schedule 9 requirement to have “*regard to the desirability of preserving natural beauty*” and to provide reasonable mitigation.

¹⁷ When measured from the centre point of the Site

- 6.315 NPF4 was adopted by the Scottish Ministers on 13th February 2023 and now forms part of the statutory development plan. NPF4, Policy 11: Energy part 'e' advises that although significant landscape and visual impacts are to be expected, *"the project design and mitigation will demonstrate how significant landscape and visual impacts are addressed"* noting that *"where impacts are localised and/or appropriate design mitigation has been applied, they will generally be considered to be acceptable."*
- 6.316 NPF4, Policy 4 advises that where development proposals affect National Scenic Areas (NSA) they will only be supported where:
- "i. The objectives of designation and the overall integrity of the areas will not be compromised; or
 - ii. Any significant adverse effects on the qualities for which the area has been designated are clearly outweighed by social, environmental or economic benefits of national importance.
- 6.317 At a local planning policy level, the Highland-wide Local Development Plan (HwLDP) (2012) and in particular Policy 67: Renewable Energy Development and THC's Onshore Wind Energy Supplementary Guidance (2016)¹⁸ (OWESG) are relevant. Policy 67 in particular provides support for proposals which are *"located, sited and designed such that they will not be significantly detrimental overall"*.

Consultation

- 6.318 Consultation has been undertaken with THC and NS who commented on aspects of methodology, sources of information, viewpoint selection, scope of assessment and cumulative development. Post-scoping consultation was undertaken via a Technical Note (TN) issued to THC and NS on 14 December 2022 to further agree the LVIA viewpoints and several aspects of the assessment, which was agreed through subsequent email correspondence. A design workshop was also held via Teams with THC on 1 February 2023.

Mitigation Inherent in the proposed development

- 6.319 The inherent nature of wind turbines as tall, modern structures means that the form of the wind farm as a whole is important. The appearance of the wind farm as an object or composition in the landscape has been a key factor in generating the layout. In this respect the design evolution has taken account of the following guidance:
- *SNH Guidance on Siting and Designing Windfarms, Version 3a, 2017*, which aims to achieve a simple, rational and cohesive design that, to a reasonable degree, avoids overlapping turbines and gaps within the visual composition; and
 - Landscape constraints, opportunities and guidance for wind farm development within the *Rounded Hills – Caithness and Sutherland LCT*, described by the NS *Landscape Character Assessment, 2019*, the relevant policies of the HwLDP and THC's OWESG (2016).

¹⁸ <https://www.highland.gov.uk/onshorewind>

- 6.320 As set out in Chapter 4, *"The overall design layout principle of the proposed development has been to achieve a coherent and compact design, which minimises direct and indirect adverse effects on the local and wider landscape, while balancing commercial considerations and maximising energy production."* The design evolution has aimed to reduce landscape, visual and cumulative effects and to respect the landscape characteristics identified in the in the *NS Landscape Character Assessment, 2019*, including consideration of the appropriate scale, form, pattern and construction materials, as well as the potential cumulative effect of other wind farm developments (including height and rotation relative to other existing wind farms).
- 6.321 A key consideration for the proposed development was the landscape character and expansive scale and simplicity of the host moorland (*Rounded Hills – Caithness and Sutherland LCT*) which has a reduced susceptibility to large turbines in comparison to other smaller scale and complex landscape character types. As set out in Chapter 4, the visual composition and layout design was guided by the following general design principles:
- *"The avoidance of overlapping or 'stacked' turbines, where possible, through careful placement in order to form a well-spaced group or array when viewed from the receiving landscape including key design viewpoints;*
 - *The avoidance of outlying turbines which appear separate or stand apart within the landscape in order to reduce the lateral spread of the proposed development;*
 - *The selection of an appropriate turbine height which respect the scale of the receiving landscape and achieves a balanced composition when viewed from the surrounding landscape whilst recognising that current wind turbine technology has progressed with larger turbines required for greater energy efficiency;*
 - *The development of a layout which relates well to other existing and proposed wind farms within the local area, as well as being coherent in isolation."*
- 6.322 Whilst it may not be possible for the general design principles to be fully achieved (for example it is not possible to avoid all turbine overlap) the establishment of these general principles as part of the design process is important in order to demonstrate appropriate mitigation. Notably, the design process evolved through five stages or interim layouts and collectively the following landscape mitigation was achieved:
- The initial 20 turbine layout was established by taking account of a 1.5km buffer from the nearest inhabited residential properties (increased to 2km) with the site location being removed from landscape designations.
 - The layout has 'pulled back' some of the turbines from the north where they would be more visible from the A839 and Strath Fleet;
 - Eight turbines were removed from the original layout and the turbine height was selected in response to the landscape scale, character and 'fit' with other wind farm development, with the turbine height of six turbines set at 230m and the remaining six turbines at 200m to blade tip;
 - Special attention was paid to the visual composition of the turbines and the cumulative appearance of the proposed development alongside the Garvary application from Viewpoint 12: B9176 Struie Layby in the NSA. This has ensured the turbine composition would appear as a simple, cohesive, and ordered layout when viewed from the NSA viewpoint.

- Design consideration was also given to the cumulative design of the neighbouring wind farms including Lairg, Lairg II and Garvary which create one 'wind farm group' or cluster.
- Design revision of turbine infrastructure was undertaken to eliminate impacts upon native woodland within the Site boundary.

6.323 The design process also took account of consultation advice and feedback from two public exhibitions, tenanted crofters and a design workshop with THC on 1 February 2023 which assisted in the overall design of the proposed development.

6.324 Within 15km, the site area and the proposed development is surrounded to the north, west and south by the valleys of Strath Fleet, Achany Glen and Strath Oykel / Kyles of Sutherland which contain most of the main visual receptors including the main roads (notably the A839 to the north and the A836 to the west and south). Taking account of the main viewpoints in these areas it should be noted that the proposed development would very often be partly screened by combinations of landform, roadside vegetation and other existing or consented wind farm development (Lairg and Lairg II) with the Garvary application contributing further to this. From this perspective the proposed development is the 'least visible' of the Lairg and Garvary group of wind farms as follows:

- Largely screened by landform / vegetation: Viewpoints 1, 3, 5, 6, 7, 11, and 13; and
- Appearing beyond other wind farm development: Viewpoints 4, 8 and 10.

6.325 As a result, there are few locations where the proposed development can be seen at close range and / or without the partial screening of landform / vegetation or other wind farms.

Landscape and Cumulative Landscape Effects

6.326 The proposed development is not located within any designated landscapes or WLAs.

6.327 Significant effects resulting from large-scale wind farm development are unavoidable and the proposed development would have a localised significant effect on part of the *Rounded Hills – Caithness and Sutherland LCT: South of Strath Fleet LCA*, within up to approximately 2 – 3.5km of the proposed turbines. These effects would also be limited by the presence of other wind farm development notably the existing Lairg and consented Lairg II wind farms. A localised and significant cumulative effect is also predicted as a result of the combined effect of the existing Lairg and consented Lairg II wind farms and the Garvary application. A small area of the *Strath – Caithness and Sutherland LCT: Strath Fleet LCA* between 2km and up to 3-3.5km around Muie and Ardachu in the central western part of the LCA would also be significantly affected by the proposed development.

6.328 All remaining LCTs within the Study Area would not be significantly affected by the proposed development in terms of their landscape character, although there would be significant visual effects on the views from some of these areas.

6.329 There would also be a significant, cumulative effect on the views from the northernmost Struie Viewpoint on the B9176: Moray Firth Tourist Route within the Dornoch Firth NSA

(Viewpoint 12, Figure 6.29a-f. located in Volume 3). The proposed development includes embedded mitigation which has addressed the visual composition of the proposed turbines as seen from Viewpoint 12, ensuring a simple and cohesive turbine composition that would fit with the scale of the landscape as seen in the panoramic views from this location. Although there would be a localised and significant affect one of the SLQs of the NSA (SLQ 2: *'Inhabited surrounds within a wilder backdrop of hills and moors'*) the assessment has concluded that there would be no significant effects on the objectives of the Dornoch Firth NSA and its overall integrity would not be compromised in landscape planning terms as set out in NPF4, Policy 4.

- 6.330 The assessment also concludes that there would be no significant effects on the Loch Fleet, Loch Brora and Glen Loth SLA or the Ben Klibreck - Armine Forest WLA (WLA 35).

Visual and Cumulative Visual Effects

- 6.331 The ZTV (calculated to blade tip) for the proposed development is limited, accounting for 29% of the total Study Area, reducing to 25% when considering hub height visibility. Viewpoint analysis indicates that significant visual effects are likely to affect limited locations within approximately 9.5km distance from the proposed development (subject to a clear view of the proposed turbines, landform and vegetation screening). A further potentially significant effect has been identified as a precaution in the south at approximately 14.5km distance from the nearest turbine as illustrated by Viewpoint 12: B9176 Struie Layby.

Effects on Views from Settlements and Residential Properties

- 6.332 There would be no significant visual effects on any settlements within the Study Area including Lairg.
- 6.333 There are also no residential properties within 2km of the proposed turbines.

Effects on Views from Transport Routes

- 6.334 Significant visual effects would be limited to sections of the following transport routes:
- Up to approximately 6km of the 25km section of the A839 (also Moray Firth Tourist Route) along intermittent sections between Rovie Lodge and Acheilidh for westbound users, and up to approximately 5.4km of the 12km section of the A839 (undesignated) intermittently between west of the entrance to Achany Wind Farm and the junction with the B864 for eastbound users;
 - Up to approximately 5.4km of the minor, unclassified Lochbuie Road between north of Sleastary and Loch Buidhe, and between Kinnabad and Loch an Lagain, depending on the direction of travel;
 - Much of the minor, unclassified Muie Road (north of the A839) for westbound users; and
 - Much of the minor, unclassified road between East Langwell and West Langwell, depending on direction of travel.

- 6.335 None of the remaining transport routes would be significantly affected by the proposed development.

Receptors on Views from Recreational Routes

- 6.336 There would be significant visual effects from parts of the following recreational routes:
- Core Path SU16.03 – Ord Hill from Ord Place – from the upper slopes and summit of Ord Hill;
 - Core Path SU20.05– Free Church - Ardichoncherr – Tressady – western 1.1km section of route;
 - Core Path SU20.06 and SU20.07 – Morness - Mill - Little Rogart / Little Rogart – Morness - intermittent views for up to 0.7km / 0.2km sections of the routes;
 - Core Path SU16.08 and SU16.09 - Braemore – Achany / Gruid's Wood - up to 3.2km / 0.3km sections of the routes;
 - Scottish Hill Track 318: Aultguish Inn to Ardgay; and
 - Moray Firth Tourist Route – up to 7km of the 128km route (overlapped with the A839 and B9176).
- 6.337 There would be no significant visual effects on the views from any other recreational routes within the Study Area.

Effects on Views from Recreational and Tourist Destinations

- 6.338 There would be a significant effect on two receptors at the summit of Struie Hill and The Ord, although there would be No View of the proposed development from the majority of the track (Core Path) leading to the summit of Struie Hill. Whilst there would be a significant effect on the views from the summits of Struie Hill and The Ord viewing towards the proposed development, there would be no significant effects on the overall walking experience and summit / destination views of these routes, due to a variety of reasons related to the intervening distance, 360° / wide panoramic views, large-scale landscape and partial landform screening.
- 6.339 None of the remaining tourist / visitor attractions would be significantly affected by the proposed development.

Night-time Assessment on Aviation Warning Lights

- 6.340 The Lighting Strategy for the proposed development has been approved by the CAA and requires six of the turbines to be lit (T1, T2, T4, T8, T9 and T11).
- 6.341 A full night-time assessment of the aviation warning light effects is provided in Technical Appendix 6.3. It has concluded that there would be no significant night-time effects on landscape character or designations and no significant night-time effects on the views from visual receptor location where people are likely to be present at night.

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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 7: Cultural Heritage

April 2024

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7 CULTURAL HERITAGE

Introduction

- 7.1 This chapter considers the potential effects of Acheilidh Wind Farm (the 'proposed development') on Cultural Heritage.
- 7.2 This chapter is also supported by the following figures as contained within Volume 2:
- Figure 7.1: Designated heritage assets and Zone of Theoretical Visibility (Blade Tip)
 - Figure 7.2: Proposed development layout and non-designated heritage records
 - Figure 7.3: Photomontage Visualisation from The Ord (SM1812)
 - Figure 7.4: Wireframe Visualisation from Balcharn Chambered Cairn (SM1768)
 - Figure 7.5: Wireframe Visualisation from East Kinnauld Fort (SM1861)
 - Figure 7.6: Wireframe Visualisation from East Kinnauld Broch (SM1862)
 - Figure 7.7: Wireframe Visualisation from Achnagarron Standing Stones (SM1762)
- 7.3 The chapter is supported by two Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 7.1: Designated Heritage Assets Gazetteer; and
 - Technical Appendix 7.2: Non-designated Heritage Assets Gazetteer.
- 7.4 Other relevant chapters include Chapter 6: Landscape and Visual Impact Assessment Chapter 13: Socio-economics and Tourism and Chapter 14: Other Issues.
- 7.5 This chapter was prepared by competent experts Craig Stewart and Kevin Paton. Craig Stewart is a Consultant in WSP's Cultural Heritage team, with 8 years' experience in heritage consultancy. Kevin Paton is a Principal Consultant in WSP's Cultural Heritage team, with 16 years' experience in the cultural heritage sector. Both experts hold membership of the Chartered Institute for Archaeologists (CIfA): Craig Stewart at Practitioner grade (PCIfA) and Kevin Paton at Member grade (MCIfA).

Legislation, Policy, and Guidance

Legislation

- 7.6 Certain heritage assets that are deemed to be of particular importance are given legal protection. The importance of heritage assets and the protection of these and their settings is recognised in legislation as well as national, regional, and local planning policy. The following legislation is relevant to the assessment of the effects on Cultural Heritage receptors:
- Paragraph 3(2) of Schedule 9 of the Electricity Act 1989 requires the Scottish Ministers, in considering any relevant proposals for which their consent is required under Section

36 of the Act, to have regard to the desirability of protecting sites, buildings and objects of architectural, historical, or archaeological interest. Where the person who formulated the proposals is a licence holder, the duty under paragraph 3(1)(b) requires that person who formulated the proposals to do what they reasonably can to mitigate any effect that the proposals would have on any such sites, buildings, or objects.

- The Ancient Monuments and Archaeological Areas Act 1979 (AMAAA) provides for a schedule of monuments which are protected and sets out measures for their protection and management. Provisions of the AMAAA are amended by the Historic Environment Scotland Act 2014;
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 (the 1997 Act) provides for the definition and protection of a list of buildings and areas of architectural and historical interest and sets out the requirement to have special regard to the desirability of preserving the buildings or their settings in considering development proposals.
- Historic Environment (Scotland) Act 2014, which further amended provisions of the above Acts and established Historic Environment Scotland.

Policy

7.7 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the renewable energy and planning policy framework that is relevant to the EIA process and the proposed development. The policies set out include those from the National Planning Framework 4 (NPF4) and the Highland-wide Local Development Plan (LDP) in addition to the Highland Historic Environment Strategy.

7.8 Planning Policy issues relating to Cultural Heritage are set out in Table 7.1, below.

Table 7.1 Planning Policy Issues relevant to Cultural Heritage

Policy Reference	Policy Issue
National Planning Policies	
NPF4: Policy 11 (Energy)	Policy 11 (e) identifies a number of considerations which are likely to be relevant when determining proposed energy infrastructure developments, including “vii. impacts on the historic environment”.
NPF4: Policy 7 (Historic assets and places)	Protection and enhancement of the historic environment forms part of the Scottish Government's national spatial strategy set out on page 7 of NPF4. The policy intent for Policy 7 is to “protect and enhance historic environment assets and places, and to enable positive change as a catalyst for the regeneration of places.”. In relation to listed buildings, Policy 7(c) states that “Development proposals for the reuse, alteration or extension of a listed building will only be supported where they will preserve its character, special architectural or historic interest and setting. Development proposals affecting the setting of a listed building should preserve its character, and its special architectural or historic interest.”

Policy Reference	Policy Issue
	In relation to scheduled ancient monuments, Policy 7(h) states "Development proposals affecting scheduled monuments will only be supported where: i. direct impacts on the scheduled monument are avoided; ii. significant adverse impacts on the integrity of the setting of a scheduled monument are avoided; or iii. exceptional circumstances have been demonstrated to justify the impact on a scheduled monument and its setting and impacts on the monument or its setting have been minimised."". In relation to gardens and designed landscapes, Policy 7(i) states that "Development proposals affecting nationally important Gardens and Designed Landscapes will be supported where they protect, preserve or enhance their cultural significance, character and integrity and where proposals will not significantly impact on important views to, from and within the site, or its setting.". In relation to non-designated heritage assets, Policy 7(o) states that "non-designated historic environment assets, places and their setting should be protected and preserved in situ wherever feasible. Where there is potential for non-designated buried archaeological remains to exist below a site, developers will provide an evaluation of the archaeological resource at an early stage so that planning authorities can assess impacts. Historic buildings may also have archaeological significance which is not understood and may require assessment. Where impacts cannot be avoided, they should be minimised. Where it has been demonstrated that avoidance or retention is not possible, excavation, recording, analysis, archiving, publication, and activities to provide public benefit may be required through the use of conditions or legal/planning obligations. [...]".
PAN 2/2011 Planning and Archaeology (July 2011)	This document provides advice to planning authorities and developers on dealing with archaeological remains.
Historic Environment Policy for Scotland (HEPS)	The document is designed to support and enable good decision-making about changes to the historic environment. HEPS sets out a series of principles and policies for the recognition, care, and sustainable management of the historic environment.
Highland-wide Local Development Plan (HwLDP) 2012 (presently under review)	Policy 57: Natural Built and Cultural Heritage sets out assessment of development proposals as follows: "All development proposals will be assessed taking into account the level of importance and type of heritage features, the form and scale of the development, and any impact on the feature and its setting... The following criteria will also apply: 1. For features of local/regional importance we will allow developments if it can be satisfactorily demonstrated that they will not have an unacceptable impact on the natural environment, amenity, and heritage resource. 2. For features of national importance we will allow developments that can be shown not to compromise the natural environment, amenity, and heritage resource. Where there may be any significant adverse effects, these must be clearly outweighed by social or economic benefits of national importance. It must also be shown that the development will

Policy Reference	Policy Issue
	support communities in fragile areas who are having difficulties in keeping their population and services. 3. For features of international importance developments likely to have a significant effect on a site, either alone or in combination with other plans or projects, and which are not directly connected with or necessary to the management of the site for nature conservation will be subject to an appropriate assessment. Where we are unable to ascertain that a proposal will not adversely affect the integrity of a site, we will only allow development if there is no alternative solution and there are imperative reasons of overriding public interest, including those of a social or economic nature. Where a priority habitat or species (as defined in Annex 1 of the Habitats Directive) would be affected, development in such circumstances will only be allowed if the reasons for overriding public interest relate to human health, public safety, beneficial consequences of primary importance for the environment, or other reasons subject to the opinion of the European Commission (via Scottish Ministers). Where we are unable to ascertain that a proposal will not adversely affect the integrity of a site, the proposal will not be in accordance with the development plan within the meaning of Section 25(1) of the Town and Country Planning (Scotland) Act 1997."
Highland Historic Environment Strategy (2013)	A document intended to define Highland Council's approach to the protection of the historic environment through the planning process. Strategy prepared as Supplementary Guidance to the HwLDP, specifically Policy 57 outlined above. Key strategic aims relevant to assets discussed in this report are as follows. Scheduled Monuments Strategic Aim 13: That scheduled monuments - and their setting – within Highland are protected from harmful developments which may affect their national importance. Archaeological Sites and Landscapes Strategic Aim 16: To ensure that the importance of non-designated archaeological sites and landscapes and their settings are understood and wherever possible are protected from harmful developments. Strategic Aim 17: To ensure no asset or its setting is lost or altered without adequate consideration of its significance and of the means available to preserve, record and interpret it in line with national and local policy and Highland Council's Standards for Archaeological Work. Strategic Aim 18: To maintain a database of all known sites and landscapes in Highland for the purpose of future protection, preservation, interpretation, education, and promotion, to identify and add new sites to the record and enhance information held for sites already known. Strategic Aim 19: To ensure that areas of special historic or archaeological interest within Highland are assessed and where appropriate designated as archaeological heritage areas.

Guidance

- 7.9 Planning authorities are directed to the HEPS, Historic Environment Circular 1, Planning Advice Note (PAN) 2/2011 and Historic Environment Scotland (HES)'s Managing Change in the Historic Environment guidance note series in their consideration of planning

applications affecting the historic environment. The most relevant of the Managing Change series are Managing Change in The Historic Environment: Setting (2019) and Managing Change in The Historic Environment: Gardens and Designed Landscapes (2019).

- 7.10 The assessment of cultural heritage has followed the guidance above and was undertaken in accordance with guidance published by the Chartered Institute for Archaeologists (CIfA), specifically the standard and guidance for historic environment desk-based assessment¹ (CIfA, 2020).

Consultation

- 7.11 As part of the Scoping exercise, a consultation process was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 7.12 Scoping Opinions were received from HES on 6th September 2022 and the Highland Council on 16th September 2022. HES were contacted by telephone noting Craig Stewart's broad agreement with HES' Scoping Opinion on 28 September 2023.

A summary of these consultation responses is provided in Table 7.2 below. Table 7.2: Consultation Responses

Consultee	Date Received	Consultation Response(s)	How and where is this addressed?
HES	06/09/22	HES presented a list of four Scheduled Monuments identified as potential receptors of significant effects via setting, recommended that impacts on the setting of heritage assets should be assessed using photomontage and wireframe visualisations where impacts are likely to be highest and requested that consideration be given to heritage assets beyond the 10km Extended Study Area presented in scoping for settings effects.	The initial list of heritage assets presented formed the focus of the site and receptor visit was carried out in October 2023; an initial screening of designated heritage assets out to a 15km distance was carried out to identify any potential receptors beyond the Extended Study Area of 10km. See Scope of Assessment, Identification and Assessment of Key Effects

¹ CIfA, 2020

Consultee	Date Received	Consultation Response(s)	How and where is this addressed?
Highland Council	16/09/2022	Highland Council noted they expect any assessment to contain full appreciation of the setting of identified heritage assets that may have been affected by the development "directly or indirectly". Additionally, Highland Council noted the work would need to address the additional survival of unrecorded remains associated with prehistoric activity in the area. Where impacts are unavoidable, methods to mitigate impacts are expected to be discussed in detail.	Scope of Assessment, Identification and Assessment of Key Effects

Scope of Assessment

Effects Assessed in Full

7.13 The following effects were considered to be potentially significant in relation to Cultural Heritage at the scoping stage, informed initially by HES' initial Scoping Opinion in September 2022 and have been assessed in full within this chapter:

- Effects by disturbance on heretofore unrecorded archaeological remains within the Site boundary.
- Effects to the setting of the following Scheduled Monuments:
 - SM1812, The Ord Chambered Cairns, Cairns, Settlements and Field Systems;
 - SM1768, Balcharn, Chambered Cairn 120m W Of;
 - SM1861, East Kinnauld, Fort 1000m Ne Of Eiden;
 - SM1862, East Kinnauld School, Broch Ne Of;
 - SM1762, Achnagarron, Two Standing Stone Ne Of and MHG10614, Possible Stone Circle, Achnagarron

Effects Scoped Out

7.14 An initial appraisal was made of designated heritage assets beyond the 10km extent of the Extended Study Area in line with HES' Scoping Opinion. This appraisal was out to a distance of 15km from the Site boundary. The Scheduled Monuments within the ZTV at this distance related to a settlement represented by hut circles and field system remains at Cnoc Olasdail (SM4375 - ZTV for 10-12 blade tips) and a fort at Creag an Fhithich (SM10942

- ZTV for 1-3 blade tips). Neither of these monuments appeared to have settings vulnerable to being affected by the proposed development. In addition, the north-western extent of Skibo Castle inventory Garden and Designed Landscape (GDL00343) is within 15km of the Site. The partial visibility of proposed turbines from the southern areas of the GDL (outwith the 15km radius) is not considered likely to affect the designed landscape's setting. As a result, assessments of change to setting beyond the Extended Study Area of 10km were scoped out.

- 7.15 The broch at Brae, Strath Carnaig (SM1840) was initially identified as a potential receptor, but has been scoped out following a site visit. No visibility from the receptor was identified in the design freeze ZTV (See Fig 7.1), and no key views of the receptor that may contain the proposed development could be identified on site.

Cumulative Effects

- 7.16 There are 29 operational, consented or in-application wind energy developments in the area between 10 and 30km around the Site. The Site would be located c 1.5km east of the in-application Garvary wind farm and consented Lairg II wind farm, in addition to c 2km southeast of the existing Lairg wind farm (see Fig 6.1), adding to a relatively dense cluster of wind energy development east of the A836 and south of A839, between Lairg and Bonar Bridge. In order to consider the effects of the proposed development when taken in combination with other wind energy developments, the cumulative baseline established for the Landscape and Visual Impact Assessment (Chapter 6) has been used.

Assessment Methodology and Significance

Study Area

- 7.17 A study area of 500m ("the Study Area") from the boundary of the Site in relation to potential receptors of effects through disturbance was established in consultation with Historic Environment Scotland (HES) and Highland Council (see Figure 7.2). This Study Area was defined to allow relevant data to be collected in order to allow an assessment of the potential presence of archaeological remains within the Site. A search was made of the Highland Council Historic Environment Team (HCHET) Historic Environment Record (HER) and the HES spatial datasets of designated heritage assets in this area.
- 7.18 An extended study area of 10km ("the Extended Study Area") from the Site was established following an initial appraisal of potential receptors beyond 10km, per HES' scoping response (See Figure 7.1) which may be subject to change within their setting. A search was made of the HES spatial datasets of designated heritage assets within this Extended Study Area, in addition to the HCHET historic environment record (HER) records to a distance of 500m, following an initial appraisal of non-designated records out to 5km.

Desk Based Study and Data Sources

- 7.19 The gathering of baseline data was carried out in accordance with the principles of Standard and guidance for historic environment desk-based assessments (Chartered Institute for Archaeologists [CIfA], 2020).

7.20 For the purpose of establishing the historic environment baseline, the following sources have been consulted:

- Geographic Information System (GIS) data on World Heritage Sites, Scheduled Monuments and Listed Buildings obtained from Historic Environment Scotland (HES);
- GIS data on non-designated heritage assets obtained from the Scottish National Record of the Historic Environment (SNRHE) which is maintained by HES;
- Information from the Highland Council Historic Environment Record (HER);
- Readily accessible primary and secondary historical sources were consulted for information relating to the area's historical past, including past land use;
- Pre-Ordnance Survey maps of the Proposed Development, held by the National Library of Scotland (NLS). The relevant maps range in date from the seventeenth to the nineteenth centuries;
- First and subsequent editions of the Ordnance Survey maps of the area of interest, held by the NLS;
- The solid and drift geology maps for the Proposed Development, recorded by the British Geological Survey (BGS)/ Geological Survey of Great Britain maps; and
- Light Detection and Ranging (LiDAR) data, obtained online from the NLS.

Field Survey

7.21 A series of visits were made to the Site and relevant designated heritage assets in the extended Study Area from 17th to 20th October 2023. Previously identified designated heritage assets were visited to assess the nature of their respective settings, with the Site visited to characterise present ground conditions, land-use, and likely impact on archaeological survival.

Assessment of Significance

7.22 The levels of effect upon a heritage asset for either direct or indirect effects would largely depend upon its level of importance and the potential magnitude of change as a result of the proposed development. Tables 7.3 and 7.4 respectively provide details on how the historic environment assessment would establish importance and magnitude of change, which would then inform the conclusion as to the level of effect upon the heritage asset based on a matrix approach set out in Table 7.5, this being tempered by professional judgement as necessary.

7.23 The rationale contained within Table 7.3 is predominantly based on information provided within the NPF4 (Scottish Government, 2023) and the associated supporting documents PAN2/2011 Planning Advisory Note on Planning and Archaeology, further by HES guidance documents HES Policy Statement (HES, 2019) and the Historic Environment Circular 1 (HES, 2019b). Note that the categorisation of the relative importance of those heritage assets which are of less than national importance generally relies on professional judgement.

Table 7.3: Categorisation of Importance

Importance	Rationale
<i>High (National and International)</i>	World heritage sites are designated on the basis of 'Outstanding Universal Value' and would normally be considered of international importance. By legal definition, Scheduled Monuments are considered as being of national importance. As the process of scheduling is ongoing and as scheduling is a representative designation, there are further assets which are not scheduled but which may be of equivalent importance. HES describes Category A listed buildings as buildings of national or international importance, either architectural or historic; or fine, little-altered examples of some particular period, style or building type (HES website - Categories of listed building). NPF4 states that sites identified within the Inventory of Historic Battlefields and the Inventory of Gardens and Designed Landscapes are of national importance. Conservation areas rated by HES as of Outstanding quality (where such appraisals have been made) could be considered as being of national importance.
<i>Medium (Regional)</i>	These include archaeological sites which do not merit scheduling, but which are nevertheless of interest, or which could make a substantial contribution to established regional research agendas. HES describes Category B listed buildings as buildings of regional or more than local importance; or major examples of some particular period, style or building type, which may have been altered (HES website - Categories of listed building). The principles of selection for designation of conservation areas do not explicitly include valuations of national, regional, or local importance, although most examples would be of importance on a regional level. Designed landscapes that are recognised by local authorities but not included within the Inventory of Gardens and Designed Landscapes would usually be considered to be regionally important.
<i>Low (Local)</i>	The majority of non-designated assets would normally be considered of local importance. HES describes Category C listed buildings as buildings of local importance; lesser examples of any period, style or building type, as originally constructed, or moderately altered; and simple, traditional buildings that group well with other listed buildings (HES website - Categories of listed building).
<i>Lesser</i>	These include those features which are no longer extant, where there are no further known or surviving remains (e.g. locations of previous archaeological work), or where assets may have minimal importance, such as modern quarries.

Table 7.4: Magnitude of Effect

Magnitude	Criteria
<i>High</i>	<i>Total or substantial change to an asset or complete alteration of the characteristics of an assets' setting.</i>
<i>Moderate</i>	Partial alteration of an asset. Substantial change to the key characteristics of an asset's setting, or a more total alteration which is temporary and/or reversible.
<i>Low</i>	Minor alteration of an asset. Changes to a setting which do not affect the key characteristics, or which is short term and/or reversible.

Magnitude	Criteria
<i>Negligible</i>	Minor alteration of an asset. Minor and short term or very minor and reversible changes to its setting which do not affect the key characteristics.

Table 7.5: Significance of Effects Matrix

Magnitude	Importance			
	High (National)	Medium (Regional)	Low (Local)	Lesser
High	Major beneficial/adverse (Significant)	Major beneficial/adverse (Significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)
Moderate	Major beneficial/adverse (Significant)	Moderate beneficial/adverse (Potentially significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)
Low	Moderate beneficial/adverse (Potentially significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)
Negligible	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)	Minor beneficial/adverse (Not significant)

Assumptions and Limitations

- 7.24 During the walkover survey, every effort was made to visit locations where detailed setting assessment was requested by consultees. However, not all locations were visited, and where this was the case, other methods were used, such as topographic information, ZTV, aerial photography, and google earth mapping, to support the assessment and mitigate this limitation.

Baseline Conditions

Location, topography, and geology

- 7.25 The Site is located in an area of rough pasture and areas of native broadleaf planting, 7.6km south-east² of Lairg in Sutherland in the Highlands. The western boundary of the Site is effectively defined by Loch Cracail Mor and Loch Cracail Beag, two inland lochs neighbouring one another in a north-south orientation.
- 7.26 The Site occupies an upland area south of the A839 road after it passes out of Lairg to the east, topography defined by steep hillsides rising to Creagan Glas in the south-east and An Stoc-bheinn in the west. The Site contains a number of watercourses, largely derived from the stream Allt Loch na Saobhaidhe and its tributaries, in addition to four lochs and a single lochan.

² Measured from the centre of the Site.

- 7.27 The underlying geology of the Site consists of the Altnaharra Psammite Formation – this is a metamorphic bedrock consisting of Psammite and micaceous psammite, formed between 1000 and 541 million years ago. This is locally overlain with peat deposits throughout the Site and an alluvial fan deposit at the southeast of Loch Cracail Mor. The soil profile is characterised by peaty gleys, poorly draining soils developed under conditions of intermittent waterlogging and feeding into peat formation.

Previous investigations within or adjacent to the proposed development area

- 7.28 The HCHET HER records 13 previous investigations having taken place within or partly within the Site (see Fig 7.2). The investigations are summarised as follows:

- EHG1438: Archaeological desk-based assessment (DBA) and walkover survey carried out in 2006, in advance of the then-proposed development of Lairg wind farm. Fifteen archaeological features were noted during survey, thirteen of which had been previously recorded, two which were unrecorded and noted during fieldwork. One of these new features was a cairn located close to the Lairg wind farm access track, located outside the Site.
- EHG5035: A watching brief associated with Lairg wind farm in 2016 recorded a group of field clearance cairns prior to removal in order to accommodate an access road in the west of the Site. No other features were recorded.
- EHG3016: A DBA and walkover survey was undertaken in advance of overhead power line refurbishment between Cassley and Shin, near Lairg in Sutherland. Few previously unknown archaeological features were recorded during the walkover survey, none of which were located within the Site.
- EHG3362: A DBA and walkover survey conducted in a proposed forestry area in the eastern extent of the Site. No archaeological features were recorded or surveyed within the Site.
- EHG4319: A DBA and walkover survey conducted on an area of proposed forestry at Acheilidh Common Grazings east of Loch Cracail Mor within the centre of the Site, the survey area overlapping with Turbine locations T1, T2 and T9. Work revealed two unrecorded archaeological sites of a dyke with associated clearance cairns and a group of clearance cairns and lynchet of a field system. Almost all the archaeology was situated to the same height above sea-level with no indication of any archaeological activity on the higher slopes or close to the water's edge of each loch.
- EHG4350: DBAs and walkover surveys were carried out in November 2002 and April 2003 in advance of a proposed wind farm development at Cambusmore Estate, near Bonar Bridge, Sutherland. The result of this work suggested that the archaeological potential of the area was variable. On the south-facing slopes above Loch Buidhe and the Abhainn an t-Stratha Charnaig, and along the Allt Garbh-alrigh the potential is high, elsewhere the potential is unknown but probably low. Thirty-eight features were found within the proposed development area, all of which are located outwith the Site.
- EHG539: A DBA and walkover survey carried out in advance of water supply upgrading and AC maintenance works in 2000. The walkover survey was focused on

a wayleave area and recorded a series of stone dykes, farmstead buildings and township remains, all located outwith the Site.

- EHG5678: A DBA and watching brief on a controlled topsoil strip in 2019.
- EHG5690: A DBA and walkover survey to inform an Environmental Impact Assessment in advance of the proposed development of Lairg II wind farm. The walkover survey recorded the remains of a head dyke as well as four buildings, four clearance cairns and at least one enclosure.
- EHG5700: A DBA and walkover survey in 2017, informing the environmental assessment of the proposed Garvary wind farm. A low archaeological potential was identified away from bodies of water and watercourses in the upland area. Remains identified were mostly of medieval/post-medieval settlement of pre-Clearance date and most of the settlement sites were entirely abandoned by the end of the 19th century, outwith the Site.
- EHG5701: An additional walkover survey of the proposed Garvary wind farm in 2019 identified 29 archaeological features of predominantly post-medieval date, outwith the Site.
- EHG5778: A DBA and walkover survey in 2017-18 in advance of proposed overhead line reinforcement works between Lairg and Loch Buidhe. No archaeological features were identified in the area of the Site bisected by the survey route.

Chronology

Prehistoric (c. 15000 BCE – 450CE)

- 7.29 Prehistoric activity within the Site is represented by two distinct areas of activity: The Lochs in the west and the Strath Fleet Valley in the north. The Lochs area comprises a series of likely Bronze Age (2400 BC to 551 BC) hut circles interspersed through the western area of the Site set into hillsides overlooking Loch Cracail Mor and Loch Cracail Beag (MHG12765, MHG12766, MHG12771, MHG12772, MHG12773, MHG12775, MHG12776 MHG12777), with a field system area (indicated by stone heaps and wall remnants) associated with three huts on the western slope of An-Stoc Bheinn (MHG12774, MHG32643, MHG32644). Further to this, a potential crannog is recorded in HCHET HER data at the southern limit of Loch Cracail Beag (MHG12778) immediately west of the Site boundary, based on the presence of a potentially artificial island 8m from the shore. More complete, legible examples of this settlement pattern can be observed in scheduled settlement areas of contemporary date at Achany Glen (SM2208), 768m south of the Site (SM2208), the Ord, 1.3km north-west of the Site and Invershin Primary School, 5.5km south-west of the Site (SM5498).
- 7.30 The Strath Fleet area is characterised by the presence of the broch at A'Mheirle (MHG12764). Situated on sloping ground at an elevation of 180-200m AOD overlooking the River Fleet to the north and with a tributary stream (Allt na' Meirle) immediately to the west, this fortified Iron Age dwelling is in a largely degraded state. The feature is largely present as a rubble heap, with some structural details still discernible including an outer wallface and potential entrance on the east side.
- 7.31 Prehistoric settlement beyond the Site as referenced above include a pattern of settlement characterised by hut circles, field clearance and associated field divisions set into upland areas and hillsides at Achany Glen and The Ord. The Iron Age tendency to

fortified settlements is in further evidence at the brochs of Brae/Strath Carnaig (SM1840) 4km south-east of the Site and East Kinnauld (SM1862) 6.5km south-east of the Site, and fort of East Kinnauld (SM1861), 6km south-east of the Site. Broad settlement pattern relationships to sources of fresh water can be observed in the location of these heritage assets relative to streams and lochs, with higher ground and views along natural routeways providing defensive capabilities.

- 7.32 The second major theme of prehistoric activity in the study areas is that of funerary and ritual monuments. The chambered cairns at the Ord and Balcharn, non-designated barrow at Balcharn and standing stones at Achnagarron point to a monumental tradition in the area from the Neolithic (the “great”³ chambered cairns at the Ord and Balcharn) to Bronze Age (Achnagarron and Balcharn) periods. A social/ritual importance appears to have been assigned to areas of high ground relative to bodies of water and valleys such as Loch Shin, Achany Glen and Strath Fleet.
- 7.33 The potential for further archaeological remains associated with settlement in the prehistoric period is anticipated to be **high** within the Site, with any remains likely to be associated with agricultural activity such as enclosure banks, of **low** importance.

Early historic to medieval periods

- 7.34 No features clearly associated with the early historic or medieval periods are recorded within the Site. The Site and Study Area appear to have been marginal in these periods, with settlement activity focused on the coastal region with major regional settlements at Dornoch and Tain, inland activity being focused on cyclical pasture farming. A heritage asset of note within the Extended Study Area is Lettie’s Grave, square cairns (SM13619). This is a scheduled monument consisting of three-square burial cairns, probably dating between 500CE and 800CE located 1.9km north-east of the Site. The cairns occupy a south-west facing hillside and overlook Abhainn Lettie, a tributary of the River Fleet. Of further interest is the attested 11th or 12th century battle at Drinbleah, near Bonar Bridge between the then-inhabitants of the area with the Danes or the Norse, Sutherland being a contested part of the Earldom of Orkney at the time⁴.
- 7.35 The potential for as yet unknown remains associated with the early historic and medieval periods is considered to be **low**, with agricultural remains such as field boundaries being considered most likely to survive in the area. Any substantial remains surviving in the Site (i.e. structural evidence of settlement) would be considered of **low** importance given the presently sparse understanding/archaeological resource relative to inland settlement and cultivation during these periods in the region.

Post-medieval to modern periods

- 7.36 Within the Site, the post-medieval to modern periods are represented by four heritage assets:

³ A distinction from smaller, later burial cairns present on the Ord made in Wickham-Jones 1994, 6

⁴ Gordon 1999c, 18: Reference made to “A contest of the inhabitants with the Danes”.

- An unoccupied, unroofed building at Allt an Cealgaiche (MHG19228) in the far south of the Site;
- An apparent abandoned farmstead at A'Mheirle, around the aforementioned broch in the north of the Site (MHG12770; associated with a settlement named Marlig in Roy's Highland map of 1747-52); and
- An enclosure at Bad Leathan in the east of the Site, undated but visible on the first edition Ordnance Survey six-inch map of 1879 (MHG18423).
- The remains of a minor deserted township at Ruigh na Cup (MHG12769) in the west of the Site. Comprising the remains of a longhouse surviving to 0.5m height, a smaller structure surviving to 0.4m height with associated small, enclosed plot of land, a more ruinous footing with a small curvilinear enclosure attached. Cultivation lines and clearance cairns surround the structure remains and all are enclosed by a discontinuous head dyke.

7.37 Within this period, a key influence on activity within the Site would have been changes in land use from medieval and earlier agriculture to the changes brought on by the clearances. Inhabitants in the Sutherland estates were relocated from inland regions in the thousands from 1807 to 1821 in estate management changes aimed at increasing profit through sheep pasture and turning the population of internal parishes (relevant to the Site: Criech, Lairg and Rogart) to newer industries in small crofts on the east coast⁵.

7.38 This would have effectively amounted to a depopulation of the area around the Site (principally relative to Strath Fleet) and this change is reflected in references to the parish populations in the old statistical accounts followed by later references to local economies in the new accounts⁶. Roy's map of the Highlands (1747-52)⁷ shows a sparse pattern of small farmsteads/settlements along Strath Fleet from Lairg to the coast, including "Marlig" and "Achalea" within and adjacent to the Site, though upland areas do not appear inhabited. Ordnance Survey mapping from the first edition onwards shows the Site as open and pastoral land until the late 20th century⁸. Commercial forestry plantations are visible in aerial imagery as early as 2004 in the west of the Site, north and east of Loch Cracail Mor⁹.

7.39 There is a **high** potential for survival of structures or archaeological remains associated with the post-medieval to modern periods, most likely shielings and former field boundaries indicative of rough pasture farming given the previous records and investigations within and immediately adjacent to the Site. Such remains are anticipated to be of **low** importance.

Future Baseline

7.40 In the event of no development taking place, use of land within the Site is anticipated rough pasture and native woodland growth.

⁵ Devine 2018, 226-227

⁶ Gordon 1999, 1999b, 1999c; Sinclair 1999, 1999b, 1999c

⁷ Accessed via National Library of Scotland

⁸ ibid

⁹ Google Earth Imagery

Identification and Assessment of Key Effects

Assessment of Effects on Cultural Heritage through disturbance

Surviving archaeological remains within the Site

- 7.41 The potential for hitherto unrecorded archaeological remains within the Site of prehistoric or postmedieval date is assessed as **high**, derived from the known locations of the non-designated hut circles discussed in paragraphs 7.29 and 7.36. While most Site infrastructure and proposed construction phase works are located away from the recorded areas, the proposed Site access passes through the monument record area associated with Ruigh na Cup township (MHG 12769), a buffer area associated with hut circles and an associated field system at Leathad Creagach (MHG12776) and may move directly through a recorded hut circle at Leathan Creagach (MHG12775). Further to this, contemporary and associated remains could be disturbed or removed by construction works. This would be a **high** magnitude of change to heritage assets of **low** sensitivity, resulting in a **not significant effect** in the absence of mitigation.
- 7.42 There is a **high potential** for post-medieval or early modern period remains in the form of abandoned building remains at Allt an Cealgaiche, A'Mheirle and Bad Leathan. This would result in a **high** magnitude of change to assets of **low sensitivity** and the effect would be **not significant** in the absence of mitigation.

Assessment of Effects on Cultural Heritage arising through change to setting

SM1812 The Ord, Chambered Cairns, Cairns, Settlements and Field Systems

Importance and Present Setting

- 7.43 The Ord is a scheduled monument located 1.2km north-west of the Site and 7.1km north-west of the nearest turbine position (T1). The scheduled area, irregular in shape, covers a low hill immediately west of Lairg, occupying part of a peninsula between Loch Shin and Little Loch Shin. The hill's summit is at 150m AOD and vegetation is characteristic of the surrounding area: rough, heather covered moorland. As indicated by the scheduled monument name, this asset comprises the remains of multiple phases of prehistoric funerary architecture, settlement and agriculture effectively forming a discreet prehistoric landscape.
- 7.44 The earliest features within this scheduled monument are the two great chambered cairns Ord North and Ord South, located at the hill's summit. Ord North is a largely intact circular chambered cairn, 25m in diameter with an entrance-oriented south-east. Ord South is the remains of a circular chambered cairn with the remnants of a polygonal chamber exposed through previous disturbance, its former entrance-oriented south-east. Both

cairns conform to the Orkney-Cromarty type¹⁰¹¹. Excavations at Ord North in 1967 produced radiocarbon dates indicating activity here as of 4500 years ago. The cairn interior produced some evidence for burial over centuries in the form of burnt bone and fragments of decorated pottery. The later phase of activity at the Ord coincided with the Bronze Age and a move to settlement alongside smaller, individualised burial cairns following the cessation of use of the great cairns. Four such cairns are located around the hill summit and at some point, an additional burial was sunk into Ord North during this period. Around 20 well-preserved hut circles are known within the scheduled area and traces of others are present, in addition to a burnt mound (communal cooking site) on the north-east slope and broad circular ditch with low exterior bank (potentially an enclosed homestead) on the southern slope. The scheduled area is interspersed with evidence of field management and division in the form of low stone clearance cairns and boundary banks.

- 7.45 The **high importance** assigned to the Ord is drawn from archaeological and historic interest owing to the well-preserved state of the monument and the evocative nature of the same. Further architectural interest can be drawn from the relatively intact state of the Ord North chambered cairn, providing an illustration of this type of burial mound. The nature of The Ord's setting is multifaceted. In the first instance the scheduled area itself partly reflects the setting of many individual features within. Viewed in association with its core elements in the burial cairns, this setting can be chiefly associated with medium to long views outward east, south-east, west, and north. This takes in the presence of monumental architecture relative to lower, settled land, water bodies associated with the northern River Shin valley and Loch Shin, with hill ridgelines in the distance. The Ord is readily accessible to the public and on a clear day a sense of prominence is gained at the hill's summit when the cairns are revealed to the observer. The monuments setting makes a largely beneficial contribution to its importance, though some adverse contributions are worth noting: The (non-scheduled) 20th century mast and relay station at the summit, adjacent to the great cairns, the presence of modern settlement and infrastructure to the east in Lairg, the altered water level associated with the dammed Loch Shin and wind farms in the distance to the east (Lairg) and west (Achany and Rosehall) detract in part from the read prominence of the funerary monuments at the summit. The setting of the settlement remains is largely tied to the nearby landform, situated on lower hillsides within sight of water sources. The preservation of much of the field systems surrounding the hut circles and lesser importance of long views outward to the settlement remains, places greater importance on the settlement remains' immediate surroundings and perceptibility of Loch Shin and the valley floor.

Change to Setting

- 7.46 Figure 7.3 illustrates the change to setting to eastward views from the summit of The Ord. All twelve proposed turbine positions would be visible to hub height from here. This would introduce a clearly modern visual element in long views to the south-east, though rising topography in the middle distance would provide a degree of visual separation from the middle-distance views of Shin Valley.

¹⁰ Wickham-Jones, 1994

¹¹ Darvill 2002, 301

Significance of Effect

- 7.47 The presence of the turbine array in long distance views to the south-east would affect the setting of this monument, though not in a way that would compromise the setting's integrity. The turbine layout from the Ord generally follows the immediate topography of the landscape with limited stacking in effect at Turbines 11 and 12. Additionally, the proposed development does not extend past the operational Lairg Wind Farm, limiting the lateral spread of turbines to the east. In addition, the position of the new turbines behind the ridgeline would create an effect of partial enclosure, an effect of visual separation of the turbines from the valley floor overlooked by the Ord. This would affect a single view orientation from the Ord summit, involve visual separation and the Ord cairns' relationship to the surrounding landform would in effect be unchallenged. This would be a **low magnitude of change** resulting in a **not significant effect**.

SM1768 Balcharn, chambered cairn 120m W of

Importance and Present Setting

- 7.48 Balcharn is a Scheduled Monument located 2.9km north-west of the Site, and 5.7km north-west of the nearest turbine position (T1). The scheduled monument covers the remains of an Orkney-Cromarty type chambered cairn positioned on a southwest-facing hillside north of the A839 road as it moves eastward out of Lairg into Strath Fleet, 120m west of Balcharn farmhouse. The cairn itself has been disturbed and appears as a 28m wide irregular earth-covered mound rising to a height of 2.3m above ground level on its western side. The remains of the chamber are evident in the robbed-out centre of the cairn mound, indicated by two stones protruding from the turf. The south-eastern edge of the cairn has been crossed by a stock enclosure wall which is excluded from the scheduling.
- 7.49 Balcharn is assigned **high** importance deriving from archaeological and historic interest, with the potential to provide important information on funerary and ritual architecture of the Neolithic period in Scotland holding particular emphasis.
- 7.50 The monument's present setting has been affected principally by the stock enclosure immediately to the south-east, in addition to more visibly modern farm infrastructure to the north-east, 33kV pylons to the north-east and east, and commercial forestry to the south. The three turbines of the existing Lairg wind farm are visible behind a ridgeline to the south-east in longer views. The existing setting is broadly characterised by the cairn's hillside position and the outward views this provides further along the A839 east into Strath Fleet and west toward Lairg and Loch Shin following the landform. Little survives to indicate the cairn's former setting on approach save for views of the feature from uphill. The cairn is readily accessible from the farm track and views from here give a sweeping impression of the rural landscape of inland Sutherland. Bare moorland and open skies characterise these outward views. An impression of the cairn being situated at a liminal point between the open water of Loch Shin and sheer valley of Strath Fleet can be gained. The cairn's status as a monumental funerary structure and associated archaeological and historic interest is reinforced in these middle-distance outward views, though the close proximity of working infrastructure serves to impose on the sense of isolation one would consider integral to this type of feature. The setting's contribution to the interests outlined above reduces considerably in the monument's immediate surroundings.

Change to Setting

- 7.51 The ZTV (Figure 7.1) shows the monument is located in an area with theoretical visibility for 4-6 turbines at blade tip. Figure 7.4 indicates six turbines visible in views to the south-east from the Balcharn cairn, with two visible to hub height. The turbines would appear as a clearly modern feature, distinct from the existing Lairg wind farm turbine array. Some seasonal screening would be provided by a small cluster of silver birch trees on the south-eastern side of the Balcharn farm track.

Significance of Effect

- 7.52 The Acheilidh turbines visible from the monument in longer views to the south-east, when visible, would effectively frame the Strath Fleet Valley viewed in this direction, appearing as they would be behind the rising topography. The form of the valley to the east would still be perceptible from the cairn and the impression gained of the cairn overlooking the landscape would be unchanged. This would be a **low** magnitude of change resulting in a **not significant effect**.

SM1861 East Kinnauld, fort 1000m NE of Eiden

Importance and Present Setting

- 7.53 The East Kinnauld Fort is a scheduled monument located 6km south-east of the Site and 9.2km east of the nearest turbine position (T4). The monument is an Iron Age or early historic fort occupying the summit of a steep hill above Strath Fleet. The fort consists of an inner enclosure measuring about 37.0m north-east to south-west by 29.0m north-west to south-east. This contains a smaller enclosure of 9.0m diameter and is surrounded by a wall described in an ordnance survey report of 1971 reproduced in the Canmore record entry as “reduced to an amorphous spread”. Outworks surrounding the fort include a ditch and outer bank scarped from the bottom of a low cliff facing the west side of the fort, a natural trench along the northern approach to the fort, scarped and heightened to provide further defence on the north side, a stony bank with an entrance gap extending south from the south-west side of the fort and another bank on the east side.
- 7.54 The fort's **high importance** is drawn from archaeological and historic interest. This is associated with the monument's potential to yield evidence of a sequence of defended upland settlement in Strath Fleet.
- 7.55 The fort's setting is characterised by its relationship in the near and middle distance to the valley floor of Strath Fleet. Views from the northern approach to the fort and within the fort itself are oriented east-west along the valley and invoke a sense of a commanding position along the River Fleet and land routes in the valley floor. The setting makes a major contribution to the importance of the monument.

Change to Setting

- 7.56 The ZTV (Figure 7.1) shows the centre, west, and south of the scheduled monument in an area of theoretical visibility for 1-3 turbines to blade tip. The wireframe visualisation shows three turbine blade tips would be visible beyond the ridgeline to the west along Strath

Fleet (T1, T2 and T3). This would add a new, passing, visual component to long views from the monument.

Significance of Effect

- 7.57 The three blade tips would present a slightly perceptible, modern, visual element separated by topography from the valley floor that forms the key setting to the East Kinnauld Fort. The addition of these blade tips in these views would not impose on the sense of commanding presence associated with the fort's setting. This would be a **low** magnitude of change producing a **not significant effect**.

SM1862 East Kinnauld School, broch NE of

Importance and Present Setting

- 7.58 The East Kinnauld broch is a scheduled monument located 6.1km south-east of the Site and 9.5km east of the nearest turbine position (T4). The broch is positioned uphill of the East Kinnauld fort (SM1861) and is located 160m north-east of that monument. The feature is present in the form of stone-built wall remains (4.4m thick in the eastern arc increasing to 4.9m in the sides of an entrance passage at the west of the feature, per most recent survey¹²) enclosing an interior diameter of 9.5m. Survey records note the wall stands to a considerable height beneath debris, with a visible height above debris of 1.2m. Traces of internal partition indicating interior chambers have been noted surviving as recently as the mid-2000s¹³.
- 7.59 The **high importance** of this monument is drawn from archaeological and historic interest. The former through the potential of the broch to provide further evidence on the Iron Age settlement of the Strath Fleet region and the latter for providing a representative example of this monument type, providing associations with a particular settlement practice. The setting of this monument contributes through these interests. The broch's associations with the nearby fort and commanding middle and long views of Strath Fleet to the west and east are, through its positioning, key to its appreciation.

Change to Setting

- 7.60 The ZTV (Figure 7.1) shows the monument in an area of theoretical visibility for 4-6 turbines to blade tip. A wireline visualisation (Fig 7.6) from the monument indicates five of the turbines would be visible from the monument in views to the west following construction. Two of these turbines (T1 and T3) would be visible to hub height with the other three (T2, T4 and T6) showing as blade tips with partial hub exposure. Whilst the wireline indicates T8 would be visible at tip height, this would not be sufficiently decipherable within the landscape. The cycle of afforestation/deforestation on the ridgeline behind the turbines would provide a partial screening effect for the latter two. The turbines would appear as a new, visibly modern component in views from the broch to the west.

¹² E W MacKie 2007, 632

¹³ *ibid*

Significance of Effect

- 7.61 As noted in paragraph 7.58 the broch's key setting relationship is to Strath Fleet via its position overlooking the valley. The addition of turbines visible past the ridgeline would in effect frame Strath Fleet and, while adding modern features to this view, would not impose on the integrity of the broch's setting. This would be a **low** magnitude of change producing a **not significant effect**.

SM1762 Achnagarron, two standing stones NE of; MHG10614 Possible Stone Circle, Achnagarron

Importance and Present Setting

- 7.62 The Achnagarron standing stones are a Scheduled Monument located 5km north-east of the Site and 8.8km north-east of the nearest turbine position (T4). The stones are situated on a rise to the north of Achnagarron farm near Rogart, surrounded by rough pasture and moorland with commercial woodland to the west. The standing stones are positioned 30m apart and are positioned in a north-east to south-west alignment. The south-western stone is 1.3m in height, with the north-eastern stone 1.6m high and leaning to the south. The south-western stone occupies the higher ground of the two at 165m AOD compared to the north-eastern stone at 160m AOD. The stones are effectively positioned on the southern edge of an upland plateau with evidence of contemporary settlement in the form of hut circles covered by a separate scheduled monument 175m to the north-east (SM1827). In addition to the standing stones, a spread of small cairns are present along the spine of the hill, over 140m east to west¹⁴. A record held by Highland Council notes the presence of other prominent stones around the brow of the hill that may indicate the standing stones form part of a larger alignment or stone circle monument¹⁵.
- 7.63 The Scheduled Monument is of **high importance** based on archaeological and historic interest. These interests are drawn from the stones' intrinsic characteristics as representative of a monument type, research potential, association with a particular phase of activity within this part of the Highlands and their context in the form of setting. The setting of these stones is tied to their proximity to the settlement to the north-east and high position affording long views in all directions, interspersed with screening through areas of high ground. While the sense of monumentality can be difficult to discern outside close proximity to the stones, outward views from the monument invoke a sense of being tied to/overseeing the surrounding landscape. This is particularly present in views from the upright, south-western stone. This setting makes a key contribution to the monument's importance.

Change to Setting

- 7.64 The ZTV (Figure 7.1) shows the Scheduled Monument in an area of theoretical visibility for 10-12 proposed turbines at blade tip. Figure 7.7 shows The Acheilidh turbines would appear

¹⁴ RCAHMS. 1996 The Royal Commission on the Ancient and Historical Monuments of Scotland. Monuments on record: annual review, 1995-6. Edinburgh. Page(s): 18 RCAHMS Shelf Number: A.2.ANN, RCAHMS. 1995 The Royal Commission on the Ancient and Historical Monuments of Scotland: Monuments on record: annual review 1994-1995. Edinburgh. Page(s): 16

¹⁵ <https://her.highland.gov.uk/monument/MHG10614>

in long-distance views from the stones to the south-west be, ten visible to hub height and two visible at blade tip. This would present a clearly modern component in long views framed behind this topography, appearing at the “edge” of an undulating landscape overlooked from the stones.

Significance of Effect

- 7.65 The setting of the Achnagarron standing stones being characterised by a sense of looking out from a focal point at a high plateau of local topography across a landscape falling away and rising again would not be compromised by the appearance of turbines in the long distance of views to the south-west. Views in directions other than the south-west would be unaffected. This would comprise a **low** magnitude of change, producing a **not significant effect**.

Decommissioning Effects

- 7.66 The effects of decommissioning would effectively be the removal of the new visual element introduced by the proposed development in addition to potential effects arising from the decommissioning process itself or the temporary occupation of land. The effects would generally be temporary and of limited duration and are anticipated to be **negligible**.

Cumulative Effects

- 7.1 Within 10km of the Site one additional wind farm is consented: This is Lairg II, immediately west of the Site. A further wind farm at Garvary is in application immediately west of the Site, and the existing Lairg wind farm is positioned immediately north-west of the Site.
- 7.2 A potential receptor for significant effects has been identified at The Ord (SM1812) As shown in Figure 7.3. The consenting and construction of Garvary wind farm in addition to Acheilidh and Lairg II would result in the addition of 43 turbines to southeastern outward views from the Ord summit. The twelve visible Acheilidh turbines would in effect appear behind Lairg, Lairg II and the three northernmost Garvary turbines in these views, present in gaps between the Lairg, Lairg II and Garvary wind farms running north to south. The Acheilidh turbines would not, however, link the other wind farms together owing to a gap in their own visible layout between turbines T5 and T6. It is not anticipated that the magnitude of change introduced by the consented and in-application wind farms would be made any more significant by the addition of the Acheilidh turbines, with the proposed development contrasting in distance and arrangement with the Lairg II and Garvary turbines appearing behind the ridgeline. This would provide a **low** magnitude of change producing a **not significant effect**.

Mitigation Measures and Monitoring

- 7.3 The presence of heritage assets within the Site (primarily prehistoric hut circles and postmedieval farmstead remnants) identified in this study indicate a high potential for survival of similar archaeological remains within the Site. In addition, proposed access works have the potential to disturb four non-designated, recorded heritage assets. Effects on these heritage assets and potential archaeological remains during the construction

phase could be effectively mitigated by an agreed programme of archaeological works prepared in consultation with Highland Council and subject to condition. The programme methodology would be set out in an archaeological /project design and would incorporate walkover survey, marking of surviving features for avoidance and an archaeological watching brief.

Residual Effects

7.4 A summary of the residual effects assessment is provided in Table 7.6 below.

Table 7.6. Residual Effects

Potential Receptor and Effect	Magnitude of Change	Receptor Sensitivity	Significance: Construction	Significance: Operation	Significance: Decommissioning	Significance: Cumulative	Summary Rationale
Disturbance of previously recorded heritage assets within the Site	Low	High	Not significant	N/A	N/A	N/A	Design of proposed development infrastructure largely precludes any disturbance of the identified features through avoidance with the exception of features interacting with proposed western access. Mitigation strategy applied to previously unrecorded heritage assets (see below) would apply here.
Disturbance of previously unrecorded heritage assets within the Site	Low	Low	Not significant	N/A	N/A	N/A	Mitigation strategy entailing walkover, marking of surviving features for avoidance and archaeological monitoring agreed with the Highland Council would preclude significant effects.
Effect on character and setting of The Ord (SM1812)	Low	High	N/A	Not significant	Not significant	Not significant	The presence of the turbine array in long distance views to the south-east would affect the setting of this monument, though not in a way that would compromise the setting's integrity. The turbine layout from the Ord generally follows the immediate topography of the landscape with limited stacking in effect at Turbines 11 and 12. In addition, the position of the new turbines behind the ridgeline would create an effect of partial enclosure, an effect of visual separation of the turbines from the valley floor overlooked by the Ord. This would affect a single view orientation from the Ord summit, involve visual separation and the Ord cairns'

Potential Receptor and Effect	Magnitude of Change	Receptor Sensitivity	Significance: Construction	Significance: Operation	Significance: Decommissioning	Significance: Cumulative	Summary Rationale
							relationship to the surrounding landform would in effect be unchallenged.
Effect on character and setting of Balcham Chambered Cairn (SM1882)	Low	High	N/A	Not significant	Not significant	Not significant	The Acheilidh turbines visible from the monument in longer views to the south-east, when visible, would effectively frame the Strath Fleet Valley viewed in this direction, viewed as they would be behind the rising topography. The form of the valley to the east would still be perceptible from the cairn and the impression gained of the cairn overlooking the landscape would be unchanged.
Effect on character and setting of East Kinnauld Fort (SM1861)	Low	High	N/A	Not Significant	Not significant	Not significant	The three blade tips would present a slightly perceptible, modern, visual element separated by topography from the valley floor that forms the key setting to the East Kinnauld Fort. The addition of these blade tips in these views would not impose on the sense of commanding presence associated with the fort's setting.
Effect on character and setting of East Kinnauld Broch (SM1862)	Low	High	N/A	Not significant	Not significant	Not significant	The broch's key setting relationship is to Strath Fleet via its position overlooking the valley. The addition of turbines visible past the ridgeline would in effect frame Strath Fleet and, while adding modern features to this view, would not impose on the integrity of the broch's setting.
Effect on character and	Low	High	N/A	Not significant	Not significant	Not significant	The setting of the Achnagarron standing stones being characterised

Potential Receptor and Effect	Magnitude of Change	Receptor Sensitivity	Significance: Construction	Significance: Operation	Significance: Decommissioning	Significance: Cumulative	Summary Rationale
setting of Achnagarron Standing Stones (SM1762)							by a sense of looking out from a focal point at a high plateau of local topography across a landscape falling away and rising again would not be compromised by the appearance of blade tips in the long distance.

Summary

- 7.5 This chapter considers the effects of Acheilidh Wind Farm ('the proposed development') on Cultural Heritage and Archaeology. The assessment has identified five potential receptors for significant effects via changes within the setting of heritage assets (five scheduled monuments within an Extended Study Area of 10km) in addition to a high potential for archaeological remains of prehistoric and post-medieval date within the Site.
- 7.6 While the proposed development would introduce a new, visible, and clearly modern visual component to views of and from the receptors assessed, none of the associated effects are considered to be more than a low magnitude of change and no significant effects are anticipated in association with changes within the setting. The construction of Site infrastructure has potential to remove previously unrecorded archaeological remains within the Site but following an agreed programme of mitigation through preliminary walkover survey and/or on-site monitoring of access works and turbine installation this is not considered to result in a significant effect.

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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 8: Geology, Hydrology and Hydrogeology

April 2024

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8 GEOLOGY, HYDROLOGY AND HYDROGEOLOGY

Introduction

- 8.1 This chapter considers the potential effects of Acheilidh Wind Farm (the 'proposed development') on geology, hydrology, and hydrogeology.
- 8.2 This chapter is also supported by the following figures as contained within EIA Volume 2: Figures:
- Figure 8.1: Superficial Geology;
 - Figure 8.2: Bedrock Geology;
 - Figure 8.3: Soils Mapping;
 - Figure 8.4: Regional Hydrogeology;
 - Figure 8.5: Groundwater Vulnerability;
 - Figure 8.6: Hydrological Features; and
 - Figure 8.7: Private Water Supplies.
- 8.3 The chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 8.1: Outline Water Crossing Inventory;
 - Technical Appendix 8.2: Outline Peat Landslide Hazard Risk Assessment (PLHRA);
 - Technical Appendix 8.3: Outline Peat Management Plan; and
 - Technical Appendix 8.4: Carbon Calculator.
- 8.4 Other relevant chapters include Chapter 9: Ecology.
- 8.5 The author of this Chapter, Stuart Clarke BSc (Hons) MSc, has approximately 10 years of relevant experience in ground conditions baseline assessments and associated preparation of EIA Chapters relating to ground conditions (including peat) for a range of infrastructure and renewable energy developments across Northern Ireland and Scotland.
- 8.6 The reviewer of this Chapter, David Gemmell BSc (Hons) MSc, a chartered Environmentalist and Scientist, has approximately 19 years of relevant experience in in ground conditions baseline assessments and associated preparation of EIA Chapters relating to ground conditions (including peat) for a range of infrastructure, mining and renewable energy developments across Western Australia, the UK and particularly Scotland.

Legislation, Policy, and Guidance

Legislation

- 8.7 Regulation of activities relating to the water environment in Scotland is the responsibility of the Scottish Environment Protection Agency (SEPA) and the relevant local authorities.
- 8.8 The European Union (EU) *Water Framework Directive* (WFD) has been implemented in Scotland through the *Water Environment and Water Services (Scotland) Act 2003* (WEWSA). This Act introduced a regulatory system for the water environment with SEPA as the lead authority working alongside the public, private and voluntary sectors. The Act ensures that all human activities with the potential to cause a harmful effect on the water environment can be controlled by establishing a framework for co-ordinated controls on water abstraction and impoundment, engineering works affecting watercourses, and discharges to the water environment.
- 8.9 The EC Groundwater Directive provides specific measures to protect groundwater against pollution and deterioration. This Directive is implemented through the *Water Environment (Controlled Activities) (Scotland) Regulations 2011* (CAR) (as amended), introduced under WEWSA to provide the main regulatory controls for protecting the water environment from harm. CAR introduced specific controls for activities affecting watercourses and waterbodies and which encompass the following activities relevant to the Proposed Development:
- Discharges to all wetlands, surface waters and groundwaters; and,
 - Engineering works in inland waters and wetlands.
- 8.10 SEPA maintains water monitoring and classification systems that provide the data to support the aim of the WFD, namely that all waterbodies would have good ecological status, or similar objective, by 2015. The classification system covers all rivers, lochs, transitional, coastal and groundwater bodies, and is based on an ecological classification system with five quality classes: High, Good, Moderate, Poor, and Bad. It has been devised following EU and UK guidance and is underpinned by a range of biological quality elements, supported by measurements of chemistry, hydrology (changes to levels and flows) and morphology (changes to the shape and function of waterbodies).
- 8.11 The *Water Resources (Scotland) Act 2013* makes provisions for the development of Scotland's water resources through improved water quality, the creation of contracts for non-domestic sewerage services, protection of the public sewer network and the maintenance of private sewerage works.
- 8.12 The relevant legislation relating to flood prevention is the *Flood Risk Management (Scotland) Act 2009*, which replaces the *Flood Prevention (Scotland) Act 1961* (as amended).
- 8.13 UK legislation on contaminated land is principally contained in Part IIA of the *Environmental Protection Act 1990* (EPA). This legislation endorses the principle of a 'suitable for use' approach to contaminated land, where remedial action is only required if there are unacceptable risks to health or the environment, taking into account the use of the land and its environmental setting.
- 8.14 The *Environment Act 1995* creates a system whereby local authorities must identify and, if necessary, arrange for the remediation of contaminated sites. The provisions are set out in

Section 57, which inserts Part IIA into the EPA 1990. In addition to these requirements, the operation of the regime is subject to regulation and statutory guidance.

- 8.15 The Contaminated Land (Scotland) Regulations 2000 (as amended) sets out the responsibilities of authority and SEPA in the identification and management of contaminated land. Scottish Planning Policy, is also used to address contaminated land through the planning process, following the same principles as those set out under Part 2A.

Policy

- 8.16 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development. The policies set out include those from the Highland Wide Local Development Plan (LDP), National Planning Framework 4 (NPF4) and other relevant guidance.

- 8.17 NPF4 contains policies with relevance to Geology, Hydrology and Hydrogeology including Policy 5 (Soils), which states the following:

- Development proposals on peatland, carbon-rich soils and priority peatland habitat will only be supported for the generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emissions reductions targets. Where development is proposed on peatland, carbon-rich soils, or priority peatland habitat, a detailed site-specific assessment will be required to identify the following:
 - The baseline depth, habitat condition, quality, and stability of carbon-rich soils;
 - The likely effects of the development on peatland, including on soil disturbance; and
 - The likely net effects of the development on climate emissions and loss of carbon.
- This assessment should inform careful project design and ensure, in accordance with relevant guidance and the mitigation hierarchy, that adverse impacts are first avoided and then minimised through best practice. A Peat Management Plan (PMP) will be required to demonstrate that this approach has been followed, alongside other appropriate plans required for restoring and / or enhancing the site into a functioning peatland system capable of achieving carbon sequestration.

- 8.18 The following policies within the Highland Wide LDP are also considered to be of relevance to the geological, hydrological, and hydrogeological assessment presented within this chapter:

- Policy 28: Sustainable Design – This policy states that developments will be assessed on the extent to which they, make use of brownfield sites, existing buildings and recycled materials, impact on non-renewable resources such as mineral deposits of potential commercial value and prime quality agricultural land and demonstrate sensitive siting and design in keeping with the natural environment and in making use of appropriate materials;
- Policy 53: Minerals – This policy specifically states borrow pits that are near to or on the site of the associated development will be supported if it can be demonstrated

that they are the most suitable source of material, are time limited and that appropriate environmental safeguards are in place for the workings and the reclamation.

- Policy 55: Peat and Soils - This policy specifically states that development proposals should demonstrate how they will avoid unnecessary disturbance of peat and soils, and that unacceptable peat disturbance would not be permitted unless it is shown that the adverse effects of this are outweighed by social, environmental, or economic benefits. It also states that where development on peat is clearly unavoidable, a peat management plan demonstrating how impacts have been minimised and mitigated may require to be submitted.
- Policy 62: Geodiversity – This policy states that development proposals that include measures to protect and enhance geodiversity interests of international, national, and regional/local importance in the wider countryside, will be supported.
- Policy 63: Water Environment – This policy states that proposals for development that do not compromise the objectives of the Water Framework Directive (2000/60/EC), will be supported.
- Policy 64: Flood Risk – This policy states that development proposals should avoid areas susceptible to flooding and promote sustainable flood management.
- Policy 66: Surface Water Drainage – This policy states that the proposed development must be drained by Sustainable Drainage Systems (SuDS) designed in accordance with The SuDS Manual ((CIRIA C697) and, where appropriate, the Sewers for Scotland Manual 2nd Edition.
- Policy 72: Pollution – This policy states that major developments and developments that are subject of Environmental Impact Assessment will be expected to follow a robust project environmental management process.

Guidance

8.19 The following relevant guidance has been considered as part of the assessment of geology, hydrology, and hydrogeology:

- SEPA (2009) - Temporary Construction Methods (WAT-SG-29);
- SEPA (2017) Guidance for Pollution Prevention (GPP) 5: Works and maintenance in or near water;
- SEPA (2021) Supporting Guidance (WAT-SG-75) – Sector Specific Guidance: Water Run-Off from Construction Sites;
- SEPA (2016) The Water Environment (Controlled Activities) (Scotland) Regulations (as amended) - A Practical Guide;
- SEPA (2017) Land Use Planning System Guidance Note 4 (LUPS GU4) - Planning guidance on on-shore windfarm developments;
- SEPA (2006) Guidelines for Water Pollution Prevention from Civil Engineering Contracts, Special Requirements';
- SEPA (2009) Policy 19 Groundwater Protection Policy for Scotland (Version 3);
- CIRIA (2001) C532: 'Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors';
- SEPA (2012) PPG6: Working at Construction and Demolition Sites;

- NatureScot (2019) Good Practice During Wind Farm Construction;
- NatureScot (2023) Advising on peatland, carbon-rich soils, and priority peatland habitats in development management;
- Scottish Government, SNH, SEPA (2017) Guidance on Developments on Peatland - Peatland Survey (2017); and
- Developments on Peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste (Scottish Renewables and SEPA, 2014).
- Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017)

Consultation

- 8.20 As part of the Scoping exercise, consultation was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 8.21 The Scoping Opinion was received from the Scottish Government Energy Consents Unit (ECU) on 7th October 2022.
- 8.22 Consultation relevant to the geology, hydrology and hydrogeology assessment was undertaken with NatureScot, The Highland Council and SEPA who commented on aspects of methodology, sources of information, scope of assessment and cumulative development. A summary of these consultation responses is provided in Table 8.1.

Table 8.1: Consultation Responses

Consultee	Date Received	Consultation Response	Where and how is this addressed?
The Highland Council	16 th September 2022	The Highland Council indicated the following:	
		Most of the site is within a Group 2 'Area with significant protection' due to Carbon Rich Soils, Deep Peat, and Priority Peatland Habitat (CPP). It was recommended that a peat assessment is undertaken to guide development away from the most sensitive areas and help inform potential mitigation.	Several phases of peat probing works have been completed within the development site. The results of this have been used to inform the development design with a view to avoiding sensitive areas. An outline Peat Management Plan and an outline Peat Slide Risk Assessment are provided in Technical Appendices 8.2 and 8.3, respectively.
		The EIAR should include an assessment of the effects on Ground Water Dependent Terrestrial Ecosystems (GWDTE).	A map of potential GWDTEs identified from an NVC survey, and associated buffers is provided in Chapter 10: Ecology and Technical Appendix 10.2: Phase 1 Habitat, NVC & GWDTE Survey.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
			Potential effects on GWDTEs are discussed in paragraphs 8.71 to 8.79.
		The EIAR will be expected to identify all water crossings and include a systematic table of watercourse crossings or channelising, with detailed justification for any such elements and design to minimise impact.	Details of proposed new and altered water crossings are provided in Technical Appendix 8.4. Water crossings are discussed in paragraphs 8.93 to 8.94.
		The need for, and information on, abstractions of water supply for concrete works or other operations should be identified.	Arrangements for water abstractions are discussed in paragraph 8.147.
		The applicant will be required to carry out an investigation to identify any private water supplies, including pipework, which may be adversely affected by the development and to submit details of the measures proposed to prevent contamination or physical disruption.	A map of private water supply (PWS) abstractions provided in consultation with The Highland Council and associated buffers is provided as Figure 8.7. Potential effects on PWS are discussed in paragraphs 8.80 to 8.84.
		The EIAR must consider the risks of engineering instability relating to presence to peat on the site. A comprehensive peat slide risk assessment will be expected. It should include a detailed map of peat depth and evidence that the scheme minimises impact on areas of deep peat. The EIAR should include site-specific principles on which construction method statements would be developed for engineering works in peat land areas, including access roads, turbine bases and hard standing areas, and should include particular reference to drainage impacts, dewatering and disposal of excavated peat.	An outline Peat Management Plan and an outline Peat Slide Risk Assessment are provided in Technical Appendices 8.2 and 8.3, respectively.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
		The EIAR should include a full assessment on the impact of the development on peat. The assessment of the impact on peat must include peat probing for all areas where development is proposed.	
		Carbon balance calculations should be undertaken and included within the EIAR with a summary of the results provided focussing on the carbon payback period for the wind farm.	Carbon payback periods are discussed in Chapter 3: Project Description. Carbon balance calculations are presented in Technical Appendix 8.4.
		The EIAR should fully describe the likely significant effects of the development on the local geology including aspects such as borrow pits, earthworks, site restoration and the soil generally including direct effects and any indirect. Proposals should demonstrate construction practices that help to minimise the use of raw materials and maximise the use of secondary aggregates and recycled or renewable materials. Where borrow pits are proposed the EIAR should include information regarding the location, size, and nature of these borrow pits including information on the depth of the borrow pit floor and the borrow pit final reinstated profile. This can avoid the need for further applications.	Proposed borrow pits are discussed in Chapter 3: Project Description and paragraphs 8.95 to 8.100.
		The developer should provide, by way of an assessment of potential contamination issues, site history information concerning the site's past use to determine whether the site is suitable for use.	A review of available historical maps for the Proposed Development is included in paragraphs 8.105 to 8.107.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
NatureScot	15 th August 2022	NatureScot highlighted that the vast majority of the proposal site is covered by Class 2 areas or peatland, with smaller extents of Class 1. These areas are described as nationally important carbon-rich soils, deep peat, and priority peatland habitat likely to be of high conservation concern and/or restoration value. NatureScot consider that the developer will need to demonstrate, that a wind farm can be built on the site without significant loss or damage to these nationally important interests. The EIA Report should include how impacts to these interests will be avoided, mitigated and/or compensated.	An outline Peat Management Plan is provided in Technical Appendix 8.2, which presents the results of peat surveys undertaken at the site and details how peat will be managed during the proposed construction works.
SEPA	16 th August 2022	SEPA indicated that the following items must be submitted with the EIA:	
		a) Map and assessment of GWDTEs and buffers	a) A map of potential GWDTE's identified from an NVC survey and associated buffers is provided in Chapter 10: Ecology and Technical Appendix 10.2: Phase 1 Habitat, NVC & GWDTE Survey. Potential effects on GWDTE are discussed in paragraphs 8.71 to 8.79.
		b) Peat depth survey and table detailing re-use proposals	b) An outline Peat Management Plan and an outline Peat Slide Risk Assessment are provided in Technical Appendices 8.2 and 8.3, respectively.
		c) Map and site layout of borrow pits	c) Proposed borrow pits are discussed in Chapter 3: Project Description and paragraphs 8.95 to 8.100.
		d) Schedule of mitigation including pollution prevention measures	d) Mitigation measures are set out in paragraphs 8.134 – 8.164 and summarised in the

Consultee	Date Received	Consultation Response	Where and how is this addressed?
			Schedule of Mitigation in Chapter 15.
		e) Decommissioning Statement	e) Outline decommissioning proposals are provided in Chapter 3: Project Description and effects are assessed in this chapter as appropriate.
The Highland Council	15 th September 2023	Consultation relating to private water supplies. The Highland Council provided information on activities registered or licensed under the Controlled Activities Regulations in the vicinity of the site.	A map of private water supply (PWS) abstractions provided in consultation with The Highland Council and associated buffers is provided as Figure 8.7. Potential effects on PWS are discussed in paragraphs 8.80 to 8.84.
SEPA	Various dates	On 1 November 2022, the applicant issued the project mapping presented at the Highland Council pre-application meeting to SEPA, who provide responses in relation to watercourse buffers, peat and GWDTE on 15 December 2022. Following a conversation between the applicant and SEPA, SEPA provided further responses on 20 December 2022, including in relation to proposed tracks. SEPA were subsequently consulted (by way of teams call on 28 February 2023 where Phase 2 peat depth mapping was shared with RPS present) to seek their feedback on the 'design chill' development layout and its potential impact upon peat. On the basis of these discussions SEPA could not support the location of T11 or the track in the centre of the site and the T-junction to the north. SEPA (in their email of 8 March 2023) of also alluded to a number of other turbines/related infrastructure where relatively minor movements or	Consultation feedback from SEPA has helped to guide the approach to design iteration and to minimise any impacts on peat (refer to Paragraphs 8.57 to 8.65 and Technical Appendix 10.2 Outline Peat Management Plan). See also SEPA email chain of 8 March 2023 (Appendix D of Appendix 8.2 Outline Peat Management Plan) for details.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
		reorientations could result in significant improvements to the layout. A third phase of peat probing (Phase 2b) was completed in March 2023 following the amendment of the infrastructure alluded to by SEPA in their email of 8 March 2023.	

Assessment Methodology and Significance

Scope of Assessment

Consultation

- 8.23 As noted in the previous Section, consultation has been undertaken with NatureScot, The Highland Council and SEPA. Responses and relevant considerations are noted in Table 8.1.

Study Area

- 8.24 The study area has incorporated the area within the site boundary and this assessment also considers any potential hydrological and hydrogeological effects up to 1 km from any proposed infrastructure (see Figure 3.1).
- 8.25 The location of private water supplies (PWS) within 1km of the proposed new infrastructure have been identified following consultations with The Highland Council, site survey work and a review of available OS mapping.
- 8.26 The criteria for defining the study area have been established based on the professional judgement and experience of the assessment team with regard to likely access and working areas, and with due consideration to the relevant guidance on geological, hydrological, and hydrogeological assessment.

Desk Study

- 8.27 Baseline conditions have been established primarily through desk-based research which has included:
- Consultation with SEPA, NatureScot and The Highland Council;
 - Identification of the locations and characteristics of catchments and principal watercourses and waterbodies, as shown on 1:50,000 scale OS mapping which may be affected by construction activities;
 - Identification of SEPA/WFD watercourse and waterbody classification;
 - Review of on-line SEPA flood mapping;

- Review and collation of pertinent information on surface hydrology, flooding, climate, etc.;
- Review of on-line British Geological Survey (BGS) geological mapping of the area, and the SNH Carbon and Peatlands Map 2016;
- Review of drainage / surface water and hydrogeological characteristics and groundwater resource;
- Review of NatureScot's Sitelink map to identify any protected areas that may be located on or in the vicinity of the site, such as Sites of Special Scientific Interest (SSSI) which include sites that are designated as a result of their geology and Geological Conservation Review sites (GCR); and
- Review of publicly available historical mapping.

Site Visit

8.28 Several site survey visits have been undertaken by members of the assessment team as described below:

- During peat depth survey work in winter / spring 2023, the site was visited and surveyed extensively, with observations made of site terrain, vegetation, the nature of watercourses and their banks, ground conditions (including any evidence of peat slides / instability), and the nature and condition of existing infrastructure (e.g. tracks), if present.
- The two proposed water crossings were inspected during the peat survey work.
- Habitat and vegetation surveys were undertaken in June 2022, providing information relevant to the identification of habitats which could represent groundwater dependent terrestrial ecosystems (GWDTE).

Peat Depth Survey

8.29 On the basis of the scoping responses received from The Highland Council, SEPA and NatureScot and from a review of available desk-based information including published geological mapping, the Scottish Natural Heritage (SNH) Carbon and Peatlands Map (2016) and aerial photography it was considered that peat would be present across much of the development site.

8.30 Peat depth surveys have subsequently been undertaken at the site over the course of four phases. A 'Phase 1' peat survey was initially undertaken by Taylor Wildlife in June 2022. These works focused on the site boundary at the time but omitted an area to the east of the site around a known Schedule 1 nest. The probing works were undertaken on a general 100m grid.

8.31 On the basis of these works, the core area of deep (>1m) peat was mostly in the central and south-eastern areas of the site and around Lochan na Faolaig. Much of the west of the site had much shallower peat (<50cm), particularly on the north-west slopes leading down to Loch Cracail Mor.

8.32 Following completion of the Phase 1 survey, the site design was reviewed, and changes were made to avoid or minimise siting infrastructure on areas of deeper peat. A 'design

'chill' was subsequently arrived at and a Phase 2 survey was undertaken by RPS in January and February 2023. The Phase 2 survey comprised detailed surveys at each proposed turbine and hardstanding location, along all proposed new access tracks, and at other proposed infrastructure locations including the site substation, construction compound and borrow pit search areas.

8.33 The pattern of peat probing in relation to proposed turbine locations and other infrastructure elements can be broadly described as follows:

- Probe at each proposed turbine location plus an additional probe, approximately 25m from the turbine location to the north, south, east, and west;
- Probes advanced on a grid at approximate 25m centres across the area of each proposed turbine hardstanding and crane pad area;
- Probes advanced at 50 m centres along the proposed routes of new access tracks; and
- Probes advanced on a grid at approximate 25m centres at the location of the proposed substation, the proposed construction compound and within each of the proposed borrow pit search areas.

8.34 Following completion of the Phase 2 survey, SEPA were consulted (by way of teams call where peat depth mapping was shared) to seek their feedback on the 'design chill' development layout and its potential impact upon peat. Based on these discussions, SEPA could not support the location of T11 or the track in the centre of the site and a T-junction to the north. SEPA also alluded to several other turbines / related infrastructure where relatively minor movements or reorientations could result in significant improvements to the layout.

8.35 A third phase of peat probing (Phase 2b), using the probing patterns described above, was completed by RPS in March 2023 following the amendment of the infrastructure alluded to by SEPA.

8.36 Following a further change to the proposed design layout, a fourth phase of peat probing (Phase 2c) was completed by Wildlife Consulting in February 2024. These additional probing works were predominantly undertaken in northern and southern parts of the site and focussed on areas that would be subject to development but had not been probed during previous investigation works. The Phase 2c probing works were completed on a general 25m grid, although it is noted that the peat probing depth was limited to the length of the peat probe that was used (300cm).

8.37 Data obtained from the peat depth surveys were subsequently used to plot the presence and distribution of peat across the revised 'design chill' development layout, create a peat contour plan, and feed into detailed design iteration. The data was subsequently used to inform an outline Peat Landslide Risk Assessment (PLHRA) and development of an outline Peat Management Plan (PMP); refer to Technical Appendices 8.1 and 8.2, respectively.

Assessment of Significance

Sensitivity

- 8.38 The sensitivity characteristics of geological hydrological and hydrogeological resources have been guided by the matrix presented in Table 8.2, which lists indicative criteria.

Table 8.2: Sensitivity Criteria (Geology, Hydrology and Hydrogeology)

Sensitivity	Definition and Examples
High	Areas containing geological, geomorphological, or hydrological features considered to be of national interest, for example, Aquatic Natura 2000 sites, Special Areas of Conservation, Sites of Special Scientific Interest. Highly permeable superficial deposits allowing free transport of contaminants to groundwater and surrounding surface waters. Wetland/watercourse of High or Good Ecological Status. Raised or blanket bog. High risk of flooding. Land capable of supporting Arable Agriculture i.e. Class 1, 2 and 3.1.
Medium	Areas containing features of designated regional importance, for example, Regionally Important Geological and Geomorphological Sites (RIGS) considered worthy of protection for their educational, research, historic or aesthetic importance. Moderately permeable superficial deposits allowing some limited transport of contaminants to groundwater and surrounding surface waters. Wetland/watercourse of Moderate Ecological Status. Significant peat deposits. Moderate risk of flooding. Land capable of supporting Mixed Agriculture i.e. Class 3.2, 4.1 and 4.2.
Low	Geological features not currently protected and not considered worthy of protection. Low permeability superficial deposits likely to inhibit the transport of contaminants. Wetland/watercourse of Poor or Bad Ecological Status or no WFD classification. Thin superficial peat deposits. Low risk of flooding. Land capable of supporting improved grassland or rough grazing only i.e. Class 5.1 to 7.

- 8.39 The criteria for sensitivity have been developed based on a hierarchy of factors relating to quality of the aquatic and geological environment including international and national designations, water and soil quality information, waterbody status from the WFD review work undertaken to date by SEPA, consultations, site visits, and the professional judgement of the assessment team.

Magnitude

- 8.40 The prediction and assessment of the magnitude of effects on geology, hydrology, and hydrogeology has been undertaken using a series of tables to document the various potential impacts from aspects of the construction and operational phases of the Proposed Development. Impacts have been predicted based on the guidance criteria

for the magnitude of change set out in Table 8.3. Impacts from aspects of decommissioning are considered to be the same as or lesser than those for construction.

Table 8.3: Magnitude of Effects Criteria (Geology, Hydrology and Hydrogeology)

Magnitude	Criteria
High	Total loss of, or alteration to key features of the baseline resource such that post development characteristics or quality would be fundamentally and irreversibly changed, for example, extensive excavation of peatland or watercourse realignment.
Medium	Loss of, or alteration to key features of the baseline resource such that post development characteristics or quality would be partially changed, for example, in-stream permanent bridge supports or partial excavation of peatland.
Low	Small changes to the baseline resource, which are detectable, but the underlying characteristics or quality of the baseline situation would be similar to pre-development conditions e.g. culverting of very small watercourses/drains and / or the excavation of thin deposits of peat.
Negligible	A very slight change from baseline conditions, which is barely distinguishable, and approximates to the 'no change' situation, for example short term compaction from machinery movements.

- 8.41 Using these criteria, potential effects resulting from the proposed development have been assessed. These effects are presented in paragraphs 8.108 – 8.133. Details of generic and site-specific mitigation measures are given in paragraphs 8.134 – 8.164, with the remaining residual effects detailed in paragraphs 8.165 – 8.173.

Significance of Effects

- 8.42 The significance of predicted effects has been assessed in relation to the sensitivities of the baseline resource. A matrix of significance, based on the combination of magnitude of change and sensitivity of receptor, has been developed to provide a consistent framework for evaluation. This is shown in Table 8.4 below.

Table 8.4: Significance of Effects Matrix

	Sensitivity			
Magnitude	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

- 8.43 The guideline criteria for the various categories of effect are provided in Table 8.5.

Table 8.5: Significance Criteria (Geology, Hydrology and Hydrogeology)

Significance	Definition	Guidance Criteria
Major	A fundamental change to the environment.	Changes in water quality or quantity affecting widespread catchments or

Significance	Definition	Guidance Criteria
		groundwater reserves of strategic significance, or changes resulting in substantial loss of conservation value to geological or aquatic habitats and designations.
<i>Moderate</i>	A large, but non-fundamental change to the environment.	Changes in water quality or quantity affecting part of a catchment or groundwaters of moderate vulnerability, or changes resulting in loss of conservation values to geological or aquatic habitats or designated areas.
<i>Minor</i>	A small but detectable change to the environment.	Localised changes resulting in minor and/or reversible effects on soils, surface and groundwater quality or habitats.
<i>Negligible</i>	No detectable change to the environment.	No effects on geological resources, drainage patterns, surface and groundwater quality or aquatic habitats.

8.44 In the above classification, fundamental changes are those which are permanent, either adverse or beneficial, and would result in widespread change to the baseline environment. For the purposes of this assessment, those effects identified as being major or moderate have been evaluated as significant environmental effects and, therefore, are those which may have an adverse effect on the status of waterbodies, watercourses, groundwater or geological resources.

8.45 These matrices have been used to guide the assessment, though they have been applied with a degree of flexibility, since the evaluation of effects will always be subject to location-specific characteristics which must be taken into account. For this reason, the evaluation of the significance of effects in particular will not always correlate exactly with the cells in the relevant matrix, especially where professional judgement and knowledge of local conditions may result in a slightly different interpretation of the impact concerned.

8.46 Cumulative effects have been accounted for through the prediction and evaluation of effects at a catchment-wide level.

Requirements for Mitigation

8.47 Committed mitigation measures are presented within this chapter where the potential to affect sensitive geological, hydrological, or hydrogeological receptors has been predicted. These may include temporary effects from construction or permanent/longer-term effects associated with the operational phase of the Proposed Development and its associated infrastructure.

Assessment of Residual Effect Significance

8.48 An assessment of any predicted significant residual effects on sensitive geological, hydrological, or hydrogeological receptors is presented within this chapter.

Limitations

- 8.49 No water quality monitoring or intrusive investigations, other than peat depth survey work as described in paragraphs 8.29 to 8.37, have been undertaken. This is not considered to represent a significant limitation to the assessment of effects, as detailed intrusive site investigation works and water quality monitoring would, as is typical, be undertaken prior to and during construction to inform detailed engineering design, micro-siting, and environmental protection and control measures to be implemented.

Baseline Conditions

Designated Sites

- 8.50 Reference to the NatureScot Site Link map indicates that no designated sites relating to geology, hydrology and hydrogeology are located within or in proximity to the study area.

Geology (including Soils)

- 8.51 BGS online mapping for the study area shows that the development site is underlain by metamorphic bedrock of the Altnaharra Psammite Formation which comprises psammite and micaceous psammite formed approximately 541 to 1,000 million years ago. This rock was originally sedimentary in origin, forming in shallow seas, and has subsequently undergone low grade metamorphic change.
- 8.52 Granite intrusions (Scottish Highland Siluro-Devonian Calc-Alkaline Minor Intrusion) are also shown to be present in the north-western part of the site in proximity to the proposed access track linking the proposed development site with the Lairg II windfarm.
- 8.53 The bedrock geology as shown on BGS 1:50,000 scale mapping is shown on Figure 8.2.
- 8.54 BGS mapping shows that bedrock across the site area is overlain by Till and Moranic deposits or Peat. The Till and Moranic deposits are expected to comprise poorly sorted sand, gravel, cobbles, and boulders in a clay matrix. Localised areas situated in northern and central parts of the site are shown to have little or no superficial material over bedrock.
- 8.55 With respect to soil resources, reference to the National Soil Map of Scotland indicates that soils across the majority of the site are classified as '*peaty gleys with dystrophic blanket peat with peaty gleyed podzols.*' The exception to this is an area in the south-eastern part of the site situated between Lochan na Faolaig and the site boundary where soils are classified as '*dystrophic peat.*'
- 8.56 The superficial geology as shown on BGS 1:50,000 scale mapping is shown on Figure 8.1 and peat mapping for the site area is shown on Figure 8.3.

Peat

- 8.57 The SNH carbon and peatland mapping (2016) defines that most of the site comprises Class 2 peat, which is described as '*Peat soil with occasional peaty soil.*' The south-eastern part of the site around Lochan na Faolaig is defined as Class 1 peat, which is described as

'Peat soil.' Further areas defined as containing Class 1 peat are located in northern and north-eastern parts of the site at the summit of An Stoc-bheinn and on the south-western site boundary.

- 8.58 Peat depth surveys were undertaken as described in paragraphs 8.29 to 8.37, in consultation with SEPA and guided by Guidance on Developments on Peatland - Site Surveys (2017) to identify and characterise peat deposits that may be present around proposed turbines and associated infrastructure.
- 8.59 The locations and findings of the peat probes are illustrated within Technical Appendix 8.2: Outline Peat Management Plan.
- 8.60 The Guidance on Developments on Peatland - Site Surveys (2017) uses the definition of peat, deep peat, and organo-mineral (peaty) soils which is presented in the Joint Nature Conservation Committee (JNCC) report 445 Towards an Assessment of the State of UK Peatlands (2011). This definition, which has been used within this chapter, is summarised below:
- **Peaty (or organo-mineral) soil:** a soil with a surface organic layer less than 0.5 m deep;
 - **Peat:** a soil with a surface organic layer greater than 0.5 m deep which has an organic matter content of more than 60%;
 - **Deep peat:** a peat soil with a surface organic layer greater than 1.0 m deep.
- 8.61 In total 535 peat probes were advanced across the development site in March 2024 (Phase 2c), 1,144 probes were advanced between January and March 2023 (Phase 2/2b), and approximately 600 probes were advanced in June 2022 (Phase 1). Contouring of the peat probe results from all stages of the work was subsequently undertaken to establish an estimation of the peat depths across the assessment site.
- 8.62 The Phase 2/2b peat probing generally confirmed the Phase 1 findings in that extensive deep (>1.0m) peat is located in central and south-eastern areas of the site. The most recent Phase 2c probing has recorded further areas of deep peat in the northern part of the site. The average depth of peat across the site based on Phase 2/2b/2c findings is 1.12m. The maximum recorded peat depth of 7.63m was recorded in the central area of the site.
- 8.63 Full details of the peat depth survey, together with an outline Peat Slide Risk Assessment, are provided in Technical Appendix 8.3. An outline Peat Management Plan is provided as Technical Appendix 8.2.
- 8.64 Laboratory testing results from samples of peat taken during peat depth surveys (one sample per turbine location except T2, T3 and T9) identified moisture contents generally within the typical values for peat of 85 to 95% for the 9 samples, with an average moisture content of 89.2%. Carbon contents were recorded as being below the typical value of 55% for peat in all 9 samples. This suggests that materials in at least some areas of the site, may be considered peaty or organo-mineral soils, rather than peat. Refer to Technical Appendix 8.2 for further details.

- 8.65 Overall, the sensitivity of the baseline geological resources at this site are considered to be medium, given the presence of peat across the site, although of variable thickness.

Hydrogeology

- 8.66 The groundwater body beneath the site is indicated by SEPA to comprise part of the Northern Highlands groundwater body. This groundwater body was classified by SEPA in 2021 as having an overall status of good.
- 8.67 Hydrogeology mapping data from the BGS shows that the bedrock beneath the main site area comprises a low productive aquifer in which flow is virtually all through fractures and other discontinuities.
- 8.68 Peat and peaty soils would be expected to contain perched groundwater but would also be expected to inhibit groundwater flow. Till deposits, where present, are anticipated to be of variable permeability, depending on the proportion of clays and silts relative to coarser components (sand, gravel, cobbles, and boulders).
- 8.69 Groundwater vulnerability mapping indicates that most of the site is classified as Class 4a or 4b with some localised areas classified as 5. Class 4a / 4b areas are those where groundwater would be vulnerable to pollutants that are not readily adsorbed or transformed. Superficial deposits within areas classified as 4a generally comprise low permeability soils but are less likely to include clay, whereas superficial deposits in areas classified as 4b are more likely to include clay. Class 5 areas are those where groundwater would be vulnerable to most pollutants, with rapid impact in many scenarios. Areas classified as 5 are those where superficial deposits are likely to be thin or absent.
- 8.70 Regional hydrogeology and vulnerability mapping for the site is shown on Figures 8.4 and 8.5.

Potential Groundwater Dependent Habitats

- 8.71 Twelve areas of potential GWDTE were identified during National Vegetation Classification survey work that has been undertaken at the site (see Chapter 9: Ecology and Figure 9.3 for further detail).
- 8.72 Of these, five areas were considered to be groundwater dependent by the ecologists as a result of the vegetation types that were encountered and evidence of groundwater arising from springheads or percolating through the ground. These areas predominantly comprised M10, M11 and M32 communities (Mires flushes and springs).
- 8.73 One area is situated in the northern part of the site, two areas are located in central parts of the site, a fourth is located in the eastern part of the site and the fifth is located out with the site boundary but within the western buffer zone.
- 8.74 The first GWDTE is noted to be located approximately 300m south-west of the nearest proposed turbine base (T1) and the main access track. Given its distance from the proposed infrastructure, it is considered that this GWDTE is unlikely to be impacted by the proposed development.

- 8.75 The second GWDTE is located on the northern bank of the Allt na h-Uaighe watercourse and approximately 300m south-west of the nearest turbine base (T5) and associated infrastructure. Given its distance from the proposed infrastructure, it is considered that this GWDTE is unlikely to be impacted by the proposed development.
- 8.76 The third GWDTE is located on the eastern bank of an unnamed tributary of the Allt na h-Uaighe watercourse. It is situated approximately 300m north of the nearest turbine base (T5) and approximately 300m west of the main access track linking T2 and the T5 spur. Given its distance from the proposed infrastructure, it is considered that this GWDTE is unlikely to be impacted by the proposed development.
- 8.77 The fourth GWDTE is located approximately 500m east of the nearest turbine base (T10). Given its distance from the proposed infrastructure, it is considered that this GWDTE is unlikely to be impacted by the proposed development.
- 8.78 The fifth GWDTE is located out with the site boundary but within the western buffer zone and is situated approximately 750m south-west of the nearest turbine base (T12) and associated infrastructure. This GWDTE is considered likely to be isolated from impacts from within the site boundary due to its distance from the nearest proposed turbine / infrastructure feature and because of the buffering effects of an intervening watercourse (Allt Garbh-airigh), which flows along the development site boundary between the GWDTE area and the proposed infrastructure.
- 8.79 Based on the above, it is considered that each of the GWDTE's that have been identified on site are unlikely to be affected by the proposed development. As such, GWDTE's are not considered further within this chapter.

Private Water Supplies

- 8.80 The Highland Council were consulted about the presence of Private Water Supplies (PWS) located in the vicinity of the proposed turbines and associated infrastructure. Records for two PWS located within 4.0km of the site have been provided.

Table 8.6: Summary of PWS Located in the Vicinity of the Site

Unique ID	Site Name	Class	Co-ordinates	Source Type
37650	Fleetwood House	B – Domestic Supply	266685, 904547	Borehole
50390	Rhaoine	B – Domestic Supply	264655: 905288	Hill Run Off

- 8.81 Both of the PWS records are shown to be located to the north of the development site. The closest of these is Fleetwood House, which is located approximately 2.5km north of the nearest proposed infrastructure (the main access track to the development site and a proposed borrow pit search area) and approximately 2.75km from the proposed location of the nearest turbine (T1). The PWS at Rhaoine is situated approximately 4km north-west of the nearest proposed infrastructure. Given their distance from the proposed infrastructure, these PWS abstractions are considered unlikely to be impacted by the proposed development.

- 8.82 No wells, springs or other features suggesting the potential presence of a PWS have been identified from a review of OS mapping, within the site boundary or within 1km of any proposed turbines or other new infrastructure. In addition, no evidence of potential PWS were observed on site during the course of the site survey work.
- 8.83 A map highlighting the location of the PWS record described above are presented on Figure 8.7.
- 8.84 An assessment of effects on PWS is not considered further within this chapter.

Summary of Groundwater Sensitivity

- 8.85 Taking account of the low productivity aquifer underlying the site, generally low permeability superficial deposits and the absence of PWS in the study area, the sensitivity of baseline hydrogeological resources beneath this site is considered to be low.

Watercourses

- 8.86 As shown on Figure 8.6, there are a number of watercourses within the study area. The largest of these is Allt Garbh-airigh, which rises from three small unnamed tributaries, situated to the south of the main access track in the northern part of the site. Allt Garbh-airigh includes two surface water features, Loch Cracail Mor, and Loch Cracail Beag, which are situated on the western site boundary. The watercourse drains in a southerly direction along the western boundary where it eventually meets Allt an Cealgaiche in the southernmost part of the site. This watercourse continues to flow in a southerly direction towards Loch Buidhe approximately 2km south-east. An unnamed watercourse rising from the western slope of An Stoc-bheinn drains in a westerly direction and flows into Loch Cracail Mor.
- 8.87 Allt an Cealgaiche rises from Lochan na Faolaig, which is located in the centre of the southern part of the development site in the area where T10 and T11 are proposed to be constructed. Lochan na Faolaig drains from its eastern bank in a southerly / south-westerly direction and follows the development site's south-eastern boundary towards Allt Garbh-airigh. No infrastructure is proposed to be constructed in proximity to this watercourse.
- 8.88 Allt Ach'na h-Uaighe, which rises on the southern slope of An Stoc-bheinn in the eastern part of the site drains through the centre of the development site in a westerly direction towards Allt Garbh-airigh, entering at a point situated in between Loch Cracail Mor and Loch Cracail Beag. This watercourse is shown to traverse the route of the access track that is proposed to be constructed between T2 and T7. A small unnamed tributary of Allt Ach'na h-Uaighe is shown to rise to the north of this watercourse and drains in a southerly direction. This tributary is also shown to be traversed by the access track that is proposed to be constructed between T2 and T7 and the proposed access spur for T5.
- 8.89 Allt Loch na Saobhaidhe rises from the northern bank of Loch na Saobhaidhe, which is located in the eastern part of the site in the area in which T4, T6 and T8 are proposed to be constructed. This watercourse drains in a northerly direction towards Strath Fleet and the River Fleet located approximately 2km from the site. No infrastructure is proposed to be constructed in proximity to this watercourse.

- 8.90 Both the Allt Garbh-airigh and Allt an Cealgaiche were classified by SEPA in 2020 as being in Good condition.
- 8.91 For the purposes of this assessment and taking account of the Good status of the local watercourses, the sensitivity of baseline hydrological resources at this site is considered to be medium.
- 8.92 The hydrological features described above are highlighted on Figure 8.6.

Water Crossings

- 8.93 The road and tracks providing access to the turbines and other infrastructure will require to cross watercourses at a number of locations. In total, two new water crossings will be required. The proposed new crossings are briefly outlined below, with further details provided in the outline water crossing schedule, Technical Appendix 8.1.
- NWC1 is a new crossing of an unnamed tributary of Allt Garbh-airigh on the main access track close to the T5 access spur. An oversized bottomless arched culvert watercourse crossing will be formed at the new track crossing point.
 - NWC2 is a new crossing of Allt Garbh-airigh on the on the main access track close to the T5 access spur. An oversized bottomless arched culvert watercourse crossing will be formed at the new track crossing point.
- 8.94 The locations of the existing and proposed water crossings are shown in Figure 3.1.

Borrow Pit Search Areas

- 8.95 As shown on Figure 3.1, three borrow pit search areas have been identified:
- 8.96 The northern borrow pit search area is immediately north of the proposed main access track. This location is considered likely to be a suitable location for providing stone for access track construction in northern parts of the site.
- 8.97 The central borrow pit search area is immediately north of the proposed track that is to be constructed between T2 and T3. This location is considered likely to be a suitable location for providing stone for access track construction across central and eastern parts of the site.
- 8.98 The southern borrow pit search area is immediately east of the proposed track that is to be constructed between T9 and T12. This location is considered likely to be a suitable location for providing stone for access track construction in the southern part of the site.
- 8.99 The bedrock geology in the borrow pit search areas is reported to comprise psammite and micaceous psammite of the Altnaharra Psammite Formation. As set out in Chapter 3: Project Description, intrusive site investigation work will be undertaken at each borrow pit search area to further characterise the rock, identify its suitability, and allow a specific excavation location or locations within the search areas to be confirmed prior to commencement.

- 8.100 Following excavation, the borrow pit area(s) will be restored using site-won soils in accordance with relevant good practice guidance. Further information on the use of excavated peat for restoration of borrow pits is given in Technical Appendix 8.2 Outline Peat Management Plan.

Flooding

- 8.101 The online SEPA Indicative River & Coastal Flood Map illustrating the areas where there is a 0.1% or greater probability of being flooded in any given year, i.e. the 1:200-year flooding event, in the vicinity of the site has been reviewed.
- 8.102 This map indicates that areas of fluvial flood risk (flooding from rivers) are confined to the channels and immediate vicinity of Allt Garbh-airigh on the western site boundary.
- 8.103 This map identifies very limited, localised areas with a risk of surface water flooding, all confined to the surface water features that are located on site.
- 8.104 With the only flood risk being associated directly adjacent to the onsite watercourses, remote from any proposed infrastructure, the risk of flooding on the site, and the sensitivity of the site to flooding, is considered to be low.

Contaminated Land

- 8.105 Historically, the main body of the is shown to have largely comprised undeveloped moorland, with historical maps from the mid-1800s to 1955 showing no development onsite.
- 8.106 No potential sources of contamination are shown to be present on-site on the available historical maps. In addition to this, no recent development is noted to have taken place on site during site visits undertaken as part of this assessment.
- 8.107 With no potentially significant contamination sources identified within the main body of the site, contaminated land will not be considered further within this assessment.

Identification and Evaluation of Key Effects

- 8.108 The potential effects resulting from the proposed development are detailed below. Effects have been separated into those which occur during the construction, operation, and decommissioning phases individually.

Construction Effects

- 8.109 The construction phase includes all activities prior to the operation of the proposed development, i.e. up to the point at which the turbines begin generating electricity. The following paragraphs outline the potential effects identified, with respect to geology, hydrology, and hydrogeology during this phase.

Pollution Impact from Sediment Run-off / Transport and / or Chemical Contaminated Run-off

- 8.110 Surface run-off containing silt and other sediments, particularly during and after rainfall events, has the potential to enter the watercourses, drains and lochs that are present on-site. Silt and sediment laden surface water run-off is predicted to arise from excavations, exposed ground, and any temporary stockpiles.
- 8.111 Silt and sediment laden run-off has the potential to impact on the water quality and hydrological and ecological function of receiving watercourses at and downstream of the works in the absence of any mitigation.
- 8.112 Additionally, pollutants such as oils, fuel and cement may be mobilised through mechanical leaks or spillage and carried in surface drainage. Unless managed appropriately, these pollutants could be washed into watercourses, impacting on freshwater quality and ecological value.
- 8.113 The magnitude of change, prior to mitigation, is considered to be medium, on a medium sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of **moderate adverse** significance prior to implementation of mitigation measures on watercourses and other surface water features.

Changes to Groundwater Flow

- 8.114 As discussed within the Baseline, there is anticipated to be little groundwater at shallow depth beneath the site. It is considered that any shallow groundwater will be limited to perched groundwater within peat deposits, and localised areas of till containing higher proportions of sand and gravel content. Groundwater within the bedrock is anticipated to be minimal, with flow restricted to fissures and other discontinuities.
- 8.115 Excavations will be required to form turbine foundations and borrow pit workings, and shallower excavations will be required to form platforms for the substation and the temporary construction compound. However, given the anticipated absence of substantial groundwater within the superficial deposits, any changes to groundwater flow would be highly localised.
- 8.116 There is therefore a potential low magnitude impact on a low sensitivity receptor, resulting in a direct, temporary, short-term effect of **negligible adverse** significance in the absence of mitigation.

Removal of and Impact on Peat

- 8.117 Variable thicknesses of peat have been identified across the site. Extensive design iteration work has been undertaken, seeking to avoid siting infrastructure on areas of deep (>1.0m) peat wherever possible, while taking account of other environmental and physical constraints (refer to Chapter 4: Design Evolution). This has resulted in the following:
- Five (T1, T3, T6, T7 and T9) of the 12 turbines are sited on 'peaty soil' rather than peat, i.e. average peat depth less than 0.5 m thick.

- The remaining seven (T2, T4, T5, T8, T10, T11 and T12) of the 12 turbines are sited on peat recorded at depths between 0.5 m and 1.0 m, therefore defined as peat, but not deep peat. Following detailed pre-construction site investigations, there may be an opportunity to micro-site the turbines in order to reduce the volume of peat requiring excavation.
- All other infrastructure elements (compound, substation and borrow pit search areas) are sited on areas with average peat depth less than 1.0m.
- Proposed new track sections are generally sited on areas where peat depth is less than 1.0 m. Thicker peat deposits have been identified in the central area of the site, particularly between T5 and T7, although care has been taken to avoid the deepest areas of peat to the east of the track in this area. Some thicker peat deposits have also been recorded in the north of the site, particularly in the area to the west of T1 and in the area between T1 and T2. Again, care has been taken to avoid the deepest areas of peat in these areas. The requirement for peat excavation at these locations will be minimised, via the construction of floating road, where required.

8.118 It is clear that there will be a requirement for excavation of some peat to allow construction of turbine foundations, hardstandings, new track, and other infrastructure elements. Further detail on the estimated volume of peat to be excavated, and the management of excavated peat, is given in Technical Appendix 8.2.

8.119 In the absence of mitigation, there is a potential medium magnitude impact on a high sensitivity receptor, resulting in a direct, permanent effect of **major adverse** significance.

Peat Landslide Impact on Watercourses

8.120 Construction on peat soils, and associated activities, can result in destabilisation of peat deposits on slopes and lead to slope failure, with subsequent potential for peat and soils to reach watercourses downslope and cause pollution/sedimentation and changes to fluvial geomorphology. A detailed assessment of peat landslide risk has been undertaken as presented in Technical Appendix 8.3. This has identified low to negligible peat landslide risk at all proposed turbine, hardstanding, and other infrastructure locations.

8.121 It should be noted that proposed turbines and hardstandings would not be constructed on peat, rather any peat within the footprints of turbines and hardstandings would be excavated to allow construction on a suitable founding stratum (i.e. bedrock).

8.122 In the absence of mitigation, the overall potential magnitude of impact from peat landslide resulting from construction activities at the site is assessed as low, on a high sensitivity receptor, resulting in a direct, temporary, short-term effect of **moderate adverse** significance.

Impact on the Integrity of Banking

8.123 Construction activities on or close to the sides of watercourses can detrimentally affect the structural integrity of burn banks, either through direct damage to bankside material or indirect loosening of soil structure thus impacting on the localised morphology and water quality of the watercourse through erosion or even collapse of the banking.

8.124 Permanent new watercourse crossings will be required at four locations. Subject to detailed pre-construction site investigation works, it is anticipated that these new crossings will comprise installation of oversized bottomless arched culverts. Further details are provided in EIA Volume 4, Appendix 8.1 Outline Watercourse Crossing Schedule whilst EIA Volume 2, Figure 3.5 depicts a typical watercourse crossing.

8.125 There is potential for a high magnitude impact on medium sensitivity receptors, therefore, there is potential for a direct, permanent effect of **major adverse** significance prior to the implementation of mitigation measures.

Direct Discharge of Untreated Foul Drainage

8.126 Unless appropriately sited and managed, there is potential for direct discharge of untreated foul sewage from welfare facilities from site compounds during construction.

8.127 The magnitude of change, prior to mitigation, is medium on a medium sensitivity receptor. Therefore, there is likely to be a direct, temporary, medium-term effect of **moderate adverse** significance on watercourses prior to the implementation of mitigation measures.

Operational Effects

Surface Water Drainage

8.128 The access track and crane hardstandings for the wind turbines, and any un-restored areas may result in an increased rate of surface water run-off from the site, increasing downstream flood risk and potentially resulting in soil erosion and silt-laden run-off, which could pollute watercourses, ditches, and lochs.

8.129 The magnitude of change, prior to mitigation, is high, on a high sensitivity receptor. Therefore, there is potential for a direct, long-term effect of **major adverse** significance prior to the implementation of mitigation measures.

Fluvial Geomorphology

8.130 If watercourse crossings are not designed properly to ensure continuous flows, this could potentially adversely affect the geomorphology of the streams by reducing heterogeneity.

8.131 The magnitude of change, prior to mitigation, is medium, on a high sensitivity receptor. Therefore, there is potential for a direct, permanent effect of **major adverse** significance prior to the implementation of mitigation measures.

Decommissioning Effects

8.132 Potential effects of decommissioning the proposed development are similar to those encountered in the construction phase, however, generally with less magnitude as the level of site activity is lower.

8.133 Discussions will be held with The Highland Council and the appropriate Regulatory Authorities prior to decommissioning to agree an appropriate Decommissioning Strategy.

Mitigation Measures and Monitoring

Project Design

- 8.134 The following considerations have been taken into account in the iterative design of the proposed development (note that full details of the project design are provided in Chapter 3: Project Description and the iterative design process is set out in Chapter 4: Design Evolution):
- A 50m buffer has been maintained around all surface watercourses, except where watercourse crossings are required;
 - Avoiding the placement of turbines in peat greater than 1m in depth;
 - Application of appropriate buffers (100m and 250m) around identified GWDTE; and
 - Avoidance of high-quality peatland as identified within the NVC and Peatland Condition Assessment presented in Technical Appendix 9.1.
- 8.135 Rigorous construction environmental management procedures will be implemented in line with a Construction Environmental Management Plan (CEMP) to ensure appropriate protection of the above-noted watercourses, and all other surface water receptors.
- 8.136 Areas of deep peat have been avoided in the siting of all turbines / hardstanding areas. Some sections of new access track situated in central part of the site, particularly between T5 and T7 and to the north of T1 and T2 will cross areas where peat has been recorded at thicknesses in excess of 1.0m, although care has been made to avoid the thickest peat deposits. It is proposed that floated access tracks will be placed where peat exceeds 1m in depth.
- 8.137 No infrastructure is proposed to be constructed in or near areas of medium or high peat landslide risk. Further detailed investigation will be undertaken pre-construction (see below), to clarify the risks and confirm mitigation or micro-siting to address any risks higher than negligible, as appropriate.

Pre-Construction Site Investigations

- 8.138 To determine ground and groundwater conditions across the site, pre-construction site investigations will be conducted. These investigations will focus on areas where construction is proposed to be undertaken and will allow the turbines and the associated infrastructure to be micro-sited away from any areas considered to be unsuitable, such as areas of contamination (unlikely), areas of deeper peat wherever possible, or where there are significant groundwater flows.
- 8.139 The investigations will also include targeted monitoring and assessment of the groundwater levels and flows beneath the site. This will allow for micro-siting and to assist in the detailed design of infrastructure and selection of appropriate materials for use during the construction process. Investigations within the borrow pit search areas will allow appropriate selection of specific extraction areas, to avoid or minimise any adverse effects associated with quarrying activities.

Construction

Peat

- 8.140 The pre-construction site investigations noted above, and observations during construction, will inform micro-siting, if required and appropriate, to minimise peat slide risk and the volume of peat to be extracted as far as possible.
- 8.141 The borrow pit search areas represent relatively broad zones, within which only a proportion will be excavated to win stone for the site's construction. No excavation will occur until further site investigations have been undertaken to assess the suitability of the areas and refine the assessment of peat slide risk. For example, areas of deeper peat, if found to be present within the search areas would be avoided, thereby reducing the peat slide risk. If it is determined that no suitable excavation site within any given search area can be identified, then no excavation will occur at that search area.
- 8.142 If it is not possible to avoid routing tracks over localised areas of deep peat, as is the case for stretches of track that are proposed to be constructed in central parts of the site between T5 and T7, these would be floated to avoid the requirement for excavation of peat. This would involve placing of a geotextile membrane on existing topsoil and vegetation followed by aggregate layers. Floating roads would be designed to ensure suitability for site traffic during construction and operation as per the NatureScot guidance document Good Practice During Wind Farm Construction, 2019.
- 8.143 Any peat excavated will be re-used on site as set out in the Outline Peat Management Plan (EiAR Volume 4, Technical Appendix 8.2).

Water Quality

- 8.144 The appointed Contractor will undertake pre-construction baseline water quality sampling and analysis of the principal surface water receptors Allt Ach'na h-Uaighe, Allt Garbh-airigh including Loch Cracail Mor and Loch Cracail Beag, Allt Loch na Saobhaidhe including Loch Saobhaidhe and Lochan Na Faolaig. The Contractor will implement a programme of monthly monitoring and analysis of the water quality of these watercourses / features during the construction period to ensure that they are not being impacted by the construction works. The full scope of monitoring will be detailed within the CEMP.

Pollution Impact from Sediment Run-off / Transport and / or Chemical Contaminated Run-off

- 8.145 With specific reference to the SEPA guidance document 'Guidelines for Water Pollution Prevention from Civil Engineering Contracts, Special Requirements,' the Contractor will produce a CEMP prior to the commencement of construction activities which contains a construction method statement that includes:
- A detailed breakdown of the phasing of construction activities;
 - A pollution risk assessment of the site and the proposed activities;
 - Identification of all water environment receptors that may be affected by the works and temporary discharge points to these watercourses;

- Planning and design of appropriate pollution control measures during earthworks and construction;
- Management of the pollution control system, including dewatering of excavations (if required) away from watercourses;
- Contingency planning and emergency procedures; and
- On-going monitoring of construction procedures to ensure management of risk is maintained.

- 8.146 All earthmoving works or similar operations will be carried out in accordance with BSI Code of Practice for Earth Works BS6031:1981.
- 8.147 All watercourse crossings and site discharges will be regulated under the CAR licensing regime and all necessary licences will be sought from SEPA prior to the commencement of any operations on site.
- 8.148 While it is acknowledged that best practice to minimise run-off would be to undertake construction and dismantling during the driest period of the year, given the location of the proposed development site, there are likely to be significant periods of rainfall throughout the year. Therefore, site management will check the local weather forecast daily and prime all site staff to ensure that everyone is aware of their responsibilities to maintain the pollution control system during wet weather or suspend sensitive operations during adverse weather conditions.
- 8.149 All fuel and other chemicals will be stored in accordance with best practice procedures, including being kept within a designated fuelling site located at a safe distance from existing watercourses and in appropriate impermeable bunded containers/areas, which will be defined within the outline CEMP. These will be designed to capture any leakage, whether from a tank or from associated equipment such as filling and off-take points, sighting gauges etc., all of which will be located within the bunded area.
- 8.150 Oil booms and soakage pads will be maintained in all work areas and spill kits kept in all vehicles to enable a rapid and effective response to any accidental spillage or discharge. All construction staff will be trained in the effective use of this equipment.
- 8.151 Construction vehicles and plant will be regularly maintained and all maintenance, fuelling and vehicle washing will be undertaken on appropriate impermeable surfaces away from watercourses to minimise risks of leaks to soil and surface waters.
- 8.152 Concrete batching will be undertaken in a designated area within a temporary construction compound. The Contractor will develop a method statement to address the on-site batching of concrete and the transport, transfer, handling and pouring of liquid concrete at foundations. It is likely that water will require to be abstracted to facilitate any on-site batching processes. A separate CAR licence application for any water abstractions required will be made to SEPA at the appropriate point prior to the commencement of construction.
- 8.153 Cement, grout, and unset concrete will not be allowed to enter the water environment. No operations involving concrete transfer between vehicles or into vehicles will take place within 30 m of watercourses and water bodies.

- 8.154 Any vehicles used for delivery of concrete will only be washed out at locations to be agreed with SEPA. Excess concrete or wash-out liquid will not be discharged to drains or watercourses on site or at compounds. Drainage from washout facilities will be collected and treated or removed to an appropriate treatment point / licensed disposal site.
- 8.155 Where topography dictates that working platforms are needed, these will be formed to ensure that surface water drains away from watercourses.
- 8.156 The requirement for dewatering will be minimised in all locations by timely and efficient excavation of the foundation void and subsequent concrete pouring and backfilling.

Impact on Integrity of Banking

- 8.157 During the construction phase, construction staff will be instructed to maintain a sufficient distance from the watercourses located on site to ensure there is no incursion towards them.
- 8.158 Water crossing designs will follow best practice to prevent impact on the integrity of the banking of watercourses. Detailed design will be included within a Construction Method Statement to be agreed with The Highland Council and SEPA and detailed watercourse crossing designs will be regulated under the CAR licensing regime.

Direct Discharge of Untreated Foul Drainage

- 8.159 Welfare facilities will either connect directly to self-contained storage tanks or to a septic tank, subject to approval from SEPA.
- 8.160 If self-contained or septic tanks are to be used, these will be maintained and emptied on a regular basis by a suitably licensed contractor.

Operation

Surface Water Drainage

- 8.161 The proposed track and hardstanding design principles for the Proposed Development are presented in Chapter 3: Project Description.
- 8.162 Prior to construction, a detailed Drainage Strategy (DS) will be developed and agreed with SEPA and The Highland Council. The DS will detail the site drainage design, including the type of surface to be used for new access tracks, the soft engineering and habitat enhancement measures proposed to slow surface water flows and any necessary ponds, swales, cross drains, and bunds, to ensure that run-off from hard surfaces will be controlled. The DS will also detail the dimensions and final design of proposed watercourse crossings which will be designed to maintain continuous flows.

Fluvial Geomorphology

- 8.163 The detailed design for the watercourse crossings, and the requirements for CAR authorisations or licences, will be agreed with SEPA prior to construction in order to ensure that any potential impacts are minimised.

Decommissioning

- 8.164 Potential effects of decommissioning the Proposed Development are similar to those encountered in the construction phase, however, generally with less magnitude as the level of site activity is lower.

Residual Effects

Construction

Pollution Impact from Sediment Run-off / Transport and / or Chemical Contaminated Run-off

- 8.165 The committed mitigation measures, including buffering of watercourses, implementation of a suitable CEMP and a surface water monitoring programme during construction, are considered to reduce the magnitude of impact from medium to negligible, resulting in a direct, temporary, short-term residual **minor adverse** effect and not significant in EIA terms.

Changes to Groundwater Flow

- 8.166 The committed mitigation measures, including pre-construction site investigations to inform detailed foundation and infrastructure design and micro-siting, are considered to reduce the magnitude of impact from low to negligible, resulting in a direct, temporary, short-term residual effect of **negligible** significance.

Removal of and Impact on Peat

- 8.167 The committed mitigation measures, including design iteration to avoid deep peat wherever possible (and floating tracks where not possible to avoid), implementation of a Peat Management Plan, and Habitat Management Plan to restore peatland habitat, are considered to reduce the magnitude of impact from medium to low, resulting in a direct, permanent residual **minor adverse** effect and not significant in EIA terms.

Peat Landslide Impact on Watercourses

- 8.168 The committed mitigation measures, including pre-construction site investigations to inform detailed infrastructure design, micro-siting, and appropriate geotechnical controls, are considered to reduce the magnitude of impact from low to negligible, resulting in a direct, temporary, short-term residual **minor adverse** effect and not significant in EIA terms.

Impact on the Integrity of Banking

- 8.169 The committed mitigation measures, including appropriate water crossing designs regulated by CAR and agreed with SEPA and The Highland Council and the implementation of a suitable CEMP, are considered to reduce the magnitude of impact from high to negligible, resulting in a direct, permanent residual **minor adverse** effect and not significant in EIA terms.

Direct Discharge of Untreated Foul Drainage

- 8.170 The committed mitigation measures, including appropriate management of foul drainage to be agreed with SEPA, are considered to reduce the magnitude of impact from medium to negligible, resulting in a direct, temporary, medium-term residual **minor adverse** effect and not significant in EIA terms.

Operation

Surface Water Drainage

- 8.171 The committed mitigation measures, including implementing a suitable detailed Drainage Strategy in agreement with SEPA and The Highland Council, are considered to reduce the magnitude of impact from high to negligible, resulting in a direct, long-term effect of **minor adverse** significance and is therefore not significant in EIA terms.

Fluvial Geomorphology

- 8.172 The committed mitigation measures, including appropriate water crossing designs regulated by CAR and agreed with SEPA and The Highland Council, are considered to reduce the magnitude of impact from medium to negligible, resulting in a direct, permanent residual effect of **minor adverse** significance and is therefore not significant in EIA terms.

Decommissioning

- 8.173 Residual effects of decommissioning the Proposed Development are similar to those encountered in the construction phase, however, generally with less magnitude as the level of site activity is lower.

Cumulative Effects

- 8.174 This assessment has concluded that there will be no significant effects on geological resources associated with the proposed development. As such, no significant cumulative effects on geological resources associated with the proposed development, in combination with other similar local developments currently operational, consented or in planning, are predicted.
- 8.175 In terms of hydrology and hydrogeology, no operational and / or proposed wind energy projects are located within the catchments of the watercourses that flow through or in proximity to the proposed development area. As such, it is considered that the combined effect on hydrology will be minor and no additional mitigation measures over and above those committed to in this chapter are considered necessary to address potential cumulative effects on hydrology or hydrogeology.

Summary

- 8.176 Several watercourses and surface water features are located within the development site. The largest of these is the Allt Garbh-airigh, which includes, Loch Cracail Mor and Loch

Cracail Beag and are situated on the western site boundary. This watercourse joins with Allt an Cealgaiche at the southernmost part of the site before entering Loch Buidhe approximately 2km south-east of the site. Allt an Cealgaiche rises from Lochan na Faolaig, which is located in the centre of the southern part of the development site and follows the development site's south-eastern boundary towards Allt Garbh-airigh.

- 8.177 Allt Ach'na h-Uaighe and a smaller unnamed tributary are located in the centre of the site. This watercourse flows in a westerly direction towards Allt Garbh-airigh, entering it at a point in between Loch Cracail Mor and Loch Cracail Beag. Allt Loch na Saobhaidhe is also located in the eastern part of the site, rising from Loch na Saobhaidhe and flowing in a northerly direction towards the River Fleet approximately 2km north of the site.
- 8.178 Both the Allt Garbh-airigh and Allt an Cealgaiche were classified by SEPA in 2020 as being in good condition.
- 8.179 The rock beneath the site comprises metamorphic rock of the Altnaharra Psammite Formation. Localised granite intrusions are also noted to be located on the southern boundary and in the north-western area of the site. The bedrock is classified as a low productivity aquifer. Superficial deposits largely comprise Till and Morainic deposits (typically low permeability) and peat.
- 8.180 Detailed peat surveys identified variable thicknesses of peat across the site, with deep peat (>1.0m) generally limited to central, south-eastern, and northern areas of the site. A maximum recorded peat depth of 7.63m was recorded in the central area of the site. On the basis of the Phase 2 peat probing data, approximately 38% of the probe locations were found to comprise peaty or organo-mineral soil (i.e. <0.5m thick), while peat conditions (>0.5 - <1.0m) were recorded at around 26% of the probe locations, with the remaining 36% of probes encountering deep peat (>1.0m).
- 8.181 Extensive design iteration works were undertaken to avoid siting turbines or other infrastructure on deep peat. This has resulted in areas of deep peat being avoided in the siting of all turbine / hardstanding areas. Proposed new track sections are generally sited on areas where peat depth is less than 1.0 m. Thicker peat deposits have been identified in the central area of the site, particularly between T5 and T7, although care has been taken to avoid the deepest areas of peat to the east of the track in this area. Some thicker peat deposits have also been recorded in the north of the site, particularly in the area to the west of T1 and in the area between T1 and T2. Again, care has been taken to avoid the deepest areas of peat in these areas. The requirement for peat excavation at these locations will be minimised, via the construction of floating road, where required.
- 8.182 A peat slide risk assessment has identified low risks at all turbine and other infrastructure locations.
- 8.183 Potential construction and operational effects include changes to the groundwater flow regime, the risk of pollution of watercourses resulting in adverse effects on water quality, excavation of peat, peat slide risk, and effects on the integrity of watercourse banks.
- 8.184 The mitigation measures set out in this chapter will be drawn together into a Construction Environmental Management Plan prior to the commencement of construction activities.

These mitigation measures are considered to be robust and implementable and will reduce the potential impacts on peat resources and watercourses which have been identified as medium / high to negligible. As such, the significance of residual effects on geology, surface water and groundwater, following the implementation of these mitigation measures, is considered to be **minor** or **negligible** and therefore **not significant**. Potential effects, mitigation measures and residual effects are summarised in Tables 8.7 and 8.8.

Table 8.7: Construction Summary Table

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
Pollution from sediment run-off and/or chemical contaminated run-off	Moderate	Adverse	50 m buffer around watercourses wherever possible. Water quality monitoring. CEMP and construction site management.	Minor	Adverse
Changes to groundwater flow regime	Negligible	Adverse	Pre-construction site investigation. CEMP and construction site management.	Negligible	Adverse
Removal of and impact on peat	Major	Adverse	Pre-construction site investigation. Avoidance of deep peat. Construction of floating roads where required in areas containing peat deposits >1.0m. Micro-siting infrastructure where required and appropriate if unexpected deeper peat is identified. Implementation of Peat Management Plan. Implementation of Habitat Management Plan.	Minor	Adverse
Peat landslide impact on watercourses	Moderate	Adverse	Pre-construction site investigation to inform detailed design and geotechnical control measures. Avoidance of deep peat. Micro-siting infrastructure where required and appropriate.	Minor	Adverse
Loss of bank integrity	Major	Adverse	Suitable water crossing design, regulated by CAR.	Minor	Adverse

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
			CEMP and construction site management.		
Pollution from foul drainage	Moderate	Adverse	50 m buffer around watercourses wherever possible. Water quality monitoring. CEMP and construction site management. Suitable foul drainage management in agreement with SEPA.	Minor	Adverse

Table 8.8: Operation Summary Table

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
Surface water drainage including downstream flood risk	Major	Adverse	50 m buffer around watercourses wherever possible. Detailed Drainage Strategy to be developed and agreed with SEPA and The Highland Council. To detail drainage design to slow surface water flows and ensure that run-off from hard surfaces will be controlled. Appropriate design of water crossings to maintain continuous flows.	Minor	Adverse
Alteration to fluvial geomorphology	Major	Adverse	Appropriately designed drainage and watercourse crossings.	Minor	Adverse

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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 9: Ecology

April 2024

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9 ECOLOGY

Introduction

- 9.1 This chapter considers the potential effects of Acheilidh Wind Farm (the proposed development') with regards to Ecology.
- 9.2 This chapter is supported by the following figures as contained within Volume 2: Figures:
- Figure 9.1: Site and Designated Sites;
 - Figure 9.2: Potentially Impacted Mesotopes;
 - Figure 9.3: GWDTE Locations and Buffers;
 - Figure 9.4: Potential Peatland Restoration Areas;
 - Figures 9.5: Cumulative Impacts on Class 1 Peatlands
 - Figures 9.6: Location of Static Bat Detectors; and
 - **CONFIDENTIAL** Figure 9.7: Protected Species Results.
- 9.3 The chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 9.1: National Vegetation Classification Survey and Peatland Condition Assessment
 - Technical Appendix 9.2: Fish Habitat Survey Report
 - Technical Appendix 9.3: Outline Habitat Management Plan
 - Technical Appendix 9.4: Biodiversity Net Gain Assessment
- 9.4 Protected species survey results are included in full in this chapter.
- 9.5 Other relevant chapters include Chapter 3: Project Description and Chapter 8: Geology, Hydrology and Hydrogeology. The ecology survey and assessment have been undertaken by Wildlife Consulting Limited and associates. Specifically, Rory Whytock Principal Botanist and Director (Whytock Ecology Ltd) who has undertaken the botanical assessment. Rory has a BSc in Wildlife Conservation and has been a habitat specialist for 13 years. He has served as vice county bryophyte recorder for Stirling, Ayrshire and Clyde Islands for the British Bryological Society and he is a member of CIEEM. The bat assessment has been undertaken by Lorraine Hamilton MSc, BSc, MCIEEM - Director (Cairn Ecology Ltd). Lorraine specialises in bats and has been an ecological consultant for 16 years. The remainder of the ecology assessment and overall approach and review has been undertaken by Colin Nisbet MSc, BSc, MCIEEM – Director (WildLife Consulting Ltd). Colin has 18 years' experience in ecological consultancy.
- 9.6 The aims of this assessment are as follows:
- Consider relevant legislation, policy, and guidance.

- Assess baseline data from desk-studies and site surveys to establish existing ecological interests on site, and within its immediate vicinity.
- Assess potential effects from the Proposed Development and their ecological significance, both directly and indirectly.
- Identification of cumulative effects with other wind developments.
- Identification of appropriate measures for mitigation and avoidance of potentially adverse effects from the Proposed Development.
- Identification of residual, significant effects from the Proposed Development following mitigation.

Legislation, Policy, and Relevant Guidance

9.7 Relevant legislation, policy and guidance has been consulted to inform the assessment of impacts. A list of pertinent documents are provided below; where specific documents have been consulted, these are referenced in the relevant section.

9.8 Scottish Natural Heritage (SNH) has been rebranded as NatureScot as of the 24th of August 2020. As such some guidance documents or consultation may refer to the original name used at the time of publication.

- Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) 1979;
- The Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) 1992 (92/43/EEC);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Nature Conservation (Scotland) Act 2004;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Water Environment and Water Services (Scotland) Act 2003 (as amended);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Planning Policy 2014;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Environmental Impact Assessment Directive 2014/52/EU4;
- Chartered Institute of Ecology and Environmental Management. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, and Coastal;
- Chartered Institute of Ecology and Environmental Management. (2013). Guidelines for Preliminary Ecological Appraisals;
- Institute of Environmental Management and Assessment. (2005). Guidelines for Environmental Impact Assessment; and
- Scottish Natural Heritage (2013) A handbook on environmental impact assessment.

Policy

9.9 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development. The policies set out include those from the Highland Council Local Development Plan (LDP) relevant aspects of National Planning Framework 4 (NPF4) (Scottish Government, 2023), Planning Advice Notes and other relevant guidance.

- NPF4: Policy 1: Tackling the climate and nature crises;
- NPF4: Policy 2: Climate mitigation and adaptation;
- NPF4: Policy 3: Biodiversity;
- NPF4: Policy 4: Natural Places;
- NPF4: Policy 5: Soils;
- NPF4: Policy 11: Energy; and
- The Highland Council LDP: Policy 58 Protected Species.

Legislation and Guidance

- Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) 1979;
- The Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) 1992 (92/43/EEC);
- The Wildlife and Natural Environment (Scotland) Act 2011
- Nature Conservation (Scotland) Act 2004;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Water Environment and Water Services (Scotland) Act 2003 (as amended);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Environmental Impact Assessment Directive 2014/52/EU4;
- Chartered Institute of Ecology and Environmental Management. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, and Coastal;
- Chartered Institute of Ecology and Environmental Management. (2013). Guidelines for Preliminary Ecological Appraisals;
- Institute of Environmental Management and Assessment. (2005). Guidelines for Environmental Impact Assessment; and
- Scottish Natural Heritage (2013) A handbook on environmental impact assessment.

Methodology

- 9.10 This section provides detail of the methods employed for the collection and analysis of data and the completion of the impact assessment. For general methodology in relation to the EIA please refer to EIA Volume 1, Chapter 2.

Desk Study

- 9.11 A desk study was undertaken to obtain records of sites designated for nature conservation within 5km of the developable area and to obtain background records relating to protected species within 1km of the developable area and access track from Lairg II Windfarm. The developable area is an area of land within the wider site boundary. The developable area encompasses the development, save for a connecting track from Lairg II Wind Farm and a small area of track in the north of the site, which was redesigned following discussion with local crofters. The developable area is illustrated on Figure 9.1. The following sources were consulted as part of the desk study process:

- Highland Biological Recording Group (HBRG); and
- NatureScot SiteLink (SiteLink@nature.scot).

Baseline survey

Habitats and vegetation

- 9.12 Habitats and vegetation were surveyed by Whytock Ecology over a total of six days from the 1st to the 10th of June 2022. The survey area comprised all land within the developable area and an additional 250m buffer zone.
- 9.13 National Vegetation Classification (NVC) was undertaken in accordance with *British Plant Communities* (Rodwell, 1991-2000¹) and related guidance (Rodwell, 2006²) to precisely identify the vegetation across the surveyed area. This is necessary to meet the requirements of modern legislation, especially in the identification of Groundwater Dependent Terrestrial Ecosystems (GWDTE). Habitat types (composed of one or more NVC communities) are classified according to the 'Phase 1' system (JNCC, 2010)³ that provides a well-established overview.
- 9.14 Small scale habitat and vegetation variability and zones of transition result in mosaics or gradations of two or more NVC communities. In these areas, an approximate percentage cover for each community is provided.

¹ Rodwell, J.S. (1991-2000). *British plant communities*. 5 Volumes. Cambridge University Press.

² Rodwell, J.S. (2006). *NVC Users' Handbook*. Download available at <http://jncc.defra.gov.uk/page-3724>.

³ JNCC 2010. *Handbook for phase 1 habitat survey - a technique for environmental audit and other relevant information* available from <http://jncc.defra.gov.uk/page-2468>

- 9.15 Botanical nomenclature follows that of the standard sources (Atherton et al., 2010⁴; Coppins et al., 1992⁵; and Stace, 2019⁶).

Protected species

- 9.16 Protected species surveys (including detailed bat surveys) were undertaken by Wildlife Consulting in 2022.
- 9.17 Protected species surveys were based on the Developable Area and the Access Route. Protected species surveys were undertaken across all land within 250m of the Developable Area and Access Route as shown on **CONFIDENTIAL** Figure 9.7.
- 9.18 Protected species surveys focussed on searches for the presence of otter *Lutra lutra*, water vole *Arvicola amphibius*, badger *Meles meles*, pine marten *Martes martes*, red squirrel *Sciurus vulgaris* and wildcat *Felis silvestris*. A watching brief was also kept, and signs recorded for other protected species potentially inhabiting the site, i.e. native reptiles such as adder *Vipera berus*, common or viviparous lizard *Zootoca vivipara*, and slow worm *Anguis fragilis*.
- 9.19 The site was assessed as low habitat risk to bats in line with the description of habitat provided in best practice guidance⁷. As such the site was surveyed for ten consecutive nights in each of the spring summer and autumn seasons. Surveys were completed using Wildlife Acoustics Songmeter mini (full spectrum), Wildlife Acoustics Songmeter 4 and Wildlife Acoustics Songmeter 2. The devices were deployed at 18 predetermined locations (Figure 9.6). Each device was set up to record 30 minutes before sunset to 30 minutes after sunrise. The devices record in WAV and WAC formats.
- 9.20 Data was analysed using Wildlife Acoustics proprietary software, Kaleidoscope. All species were manually checked by a suitability qualified ecologist.
- 9.21 At the time of writing the Ecobats online tool⁸ was unavailable for use. The Mammal Society noted that NatureScot had been made aware of this. As such no quantitative comparison for site risk categorisation was undertaken. Analysis of risk was based on the published risk of individual species present.

Consultation

- 9.22 As part of the Scoping exercise, a consultation exercise was undertaken to inform the design of the proposed development and to seek agreement on potential significant

⁴ Atherton, I., Bosanquet, S. & Lawley, M. (2010). Mosses and Liverworts of Britain and Ireland: a field guide. British Bryological Society.

⁵ Purvis, O. W., Coppins, B.J., Hawksworth, D. L. H., James, P.W. and Moore, D.M. (1992). The Lichen Flora of Great Britain and Ireland. Natural History Museum, London.

⁶ Stace, C.A. (2019). New Flora of the British Isles. 4th Edition. Cambridge University Press.

⁷ NatureScot (Scottish Natural Heritage), Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, The University of Exeter & Bat Conservation Trust (BCT) (2021). Bats and onshore wind turbines-survey, assessment, and mitigation

⁸ Mammal Society (2017). Ecobat. Available at: [http:// www.ecobat.org.uk](http://www.ecobat.org.uk)

environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.

9.23 The Scoping Opinion was received from ECU on 7 October 2022.

9.24 Consultation relevant to the ecology assessment was undertaken with The Highland Council, NatureScot, SEPA and RSPB Scotland who commented on aspects of methodology, sources of information, scope of assessment and cumulative development. A summary of these consultation responses is provided in Table 9.1.

Table 9.1: Consultation Responses

Consultee	Date Received	Consultation Response	Where and how is this addressed?
The Highland Council	16/09/22	The EIA should provide a baseline survey of birds and animals on site. Most of the site is within a Group 2 'Area with significant protection' due to the Carbon Rich Soils, Deep Peat, and Priority Peatland Habitat (CPP) the developer should undertake a specific peat assessment to inform the siting, design, or other mitigation in order to overcome significant effects on CPP. The EIA should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the proposed development. If wild deer are present or will use the site an assessment of the potential impact on deer will be required. This should address deer welfare, habitats, and other interests. The EIA should include an assessment of the effects on ground water dependent terrestrial ecosystems (GWDTE).	Baseline surveys were undertaken for birds, protected species, and habitats to inform baseline conditions at the site. The results of these surveys have been used to inform the evolution of the project design for example to locate project infrastructure away from areas of deep peat wherever possible. A deer management statement has been included in the Outline Habitat Management Plan which accompanies this EIA. Effects of GWDTE are assessed as part of the EIA.
NatureScot	15/08/22	NatureScot draw attention to the standing advice for protected species. NatureScot advise the full buffer area is applied to this turbine location 2. In relation to bats surveys should be undertaken once in spring, summer, and autumn.	Protected species surveys have been undertaken to inform the assessment and the results of this are included in this assessment. The previous turbine 2 location is part of a historical layout which has been superseded. All turbines and infrastructure including the proposed access route from the Lairg II windfarm

Consultee	Date Received	Consultation Response	Where and how is this addressed?
		NatureScot have advised the direct impacts on deer to be assessed.	site have been surveyed to inform this assessment. Bat surveys have been undertaken in line with current guidance. A deer management statement has been included in the Outline Habitat Management Plan which accompanies this EIA.
SEPA	08/09/22	A peatland habitat quality survey is required. A map and assessment of impacts upon Groundwater Dependent Terrestrial Ecosystems is required.	A peat condition assessment and mapping and assessment of GWDTEs is included in the EIA.

Assessment Methodology and Significance

Assessment of effects

9.25 Effects are assessed against the habitat/species baseline in accordance with best practice guidance (CIEEM, 2018)⁹ and professional judgement in a methodology that is evidenced and appropriate to the proposed wind farm. Assessment involves the following stages:

- Identification of the potential development effects.
- Consideration of the likelihood of potential effects.
- Defining the conservation importance of ecological features, to determine a level of sensitivity.
- Establishing the spatial and temporal magnitude of effects.
- Identification of significant effects (as defined by the EIA Regulations).
- Identification of mitigation measures to address significant effects.
- Opportunities for enhancement are considered where appropriate.
- Residual effects are identified, and their cumulative effect is assessed (in combination with neighbouring developments).

Identification of effects

9.26 Ecological features may be directly or indirectly affected by construction, operation and/or decommissioning in one or more of the following ways⁹:

⁹ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine v1.1. Available at <https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf>.

- Direct and indirect habitat loss.
- Disturbance to/loss of breeding sites, resting places, roosts etc. for protected species.
- Direct/indirect loss of foraging resource for protected species.
- Displacement/disruption to habitat and species population connectivity.
- Direct effects upon protected fauna, i.e. road traffic accidents, etc.
- Environmental effects, i.e. pollution of watercourses, etc.
- Changes to habitat composition or quality through land-use change, increased human presence, etc.

9.27 The potential for effects is identified from comparison of the Proposed Development characteristics outlined in the Scoping Report and Chapter 3: Project Description, contained within this EIA; and the behaviour and/or ecology of the habitats and species.

9.28 In line with the CIEEM EIA guidance⁹, consideration is given to the following characteristics when identifying potential effects of the Development on Important Ecological Features:

- Nature of effect: whether it is positive (beneficial) to any important ecological features (IEF), e.g. by increasing species diversity or extending habitat, or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
- Extent: the space over which the effect may occur;
- Magnitude: the size, amount, intensity, and/or volume of the effect;
- Duration: the persistence of an effect in relation to IEF characteristics (such as a crucial stage in a species' life cycle) as well as human time-frames;
- Frequency: the number of times an activity occurs in a given period may influence the resulting effect;
- Timing: this may result in an impact on an IEF if it coincides with critical life stages or seasons (e.g. breeding or summer drought); and
- Reversibility: a reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation (within a reasonable timescale).

Conservation importance

9.29 CIEEM guidance **Error! Bookmark not defined.** requires that nature conservation importance is defined in a geographical context as defined in **Error! Reference source not found.** Table 9.2. Evaluating a designated site is straightforward because the designation(s) indicate the importance. In the case of habitats & species, assigning value is dependent upon contextual information about designations, distribution, extent/abundance, historical records, and national trends. Consequently, even though a habitat or species may be protected through legislation at the national or international level, the importance of the population on a site may be quite different. For example, a single transitory animal or isolated patch of degraded habitat within the context of a thriving metapopulation or wider extent is of less importance than its designation.

Table 9.2: Geographical context for assessing conservation importance

Context	Criteria
International	• An internationally designated site. • Site meeting criteria for international designations or there is qualifying habitat/species connectivity with such a site. • Habitat/species present in internationally important numbers/extents (>1 % of national resource).
National	• A nationally designated site (e.g. SSSI or National Nature Reserve), or there is qualifying habitat/species connectivity with such a site. • Habitat/species present in nationally important extents/numbers (>1 % national resource).
County - Regional	• Habitat/species present in county or regionally important numbers (>1% of county or Biodiversity Action Plan resource, for example). • Areas of habitat falling below criteria for selection as a SSSI (e.g. areas of semi- natural ancient woodland >0.25 ha).
Local	• Local Nature Reserves (LNR). • Areas of semi-natural ancient woodland <0.25 ha. • Areas of habitat or species that contribute to the local ecological resource within the local context, (e.g. species-rich flushes or hedgerows).
Negligible	• Widespread, common and/or reproducible habitats/species. • Negligible features are not normally considered in the assessment process.

Magnitude of effects

- 9.30 Effect magnitude relates development-related changes in the extent/abundance and/or the integrity of an ecological feature (habitat or species). 'Integrity' is defined by the European Commission as "the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat"¹⁰. This definition that is related to the Habitats Directive can be extended more widely to include species and non-designated habitats, and it is reiterated in Scottish Planning Policy. For example, the Scottish Executive circular 6/1995¹¹ states that "The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".
- 9.31 Determining the magnitude of likely effects is therefore based on assessment of how inter-related ecological features (habitats or species) and their supporting process (e.g. water supply or prey availability) will respond to the Proposed Development at its different stages (i.e. construction, operation & decommissioning). Effects can be adverse, neutral, or beneficial and are assessed in relation to their spatial extent and temporal magnitude. The latter includes consideration of the duration, frequency, and persistence of effects; and their reversibility (passively or through mitigation). There are five magnitudes of spatial or temporal effect, respectively described in Table 9.3Table and Table 9.4.

¹⁰ European Commission Notices (2019/C 33/01). *Managing Natura 2000 sites. The provisions of Article 6 of the Habitats Directive 92/43/EEC*. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0125\(07\)&rid=2](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0125(07)&rid=2).

¹¹ <https://www.gov.scot/publications/foi-201900008726/>.

Table 9.3: Spatial effect magnitude levels

Magnitude	Definition
Very high	Almost complete loss of a feature (>80 %) or its supporting processes (e.g. water supply) that affects its long-term persistence.
High	Major loss of a feature (>20 %) or its supporting processes (e.g. water supply) that affects its long-term integrity.
Moderate	Moderate loss (10 % to 20 %) of a feature or its supporting processes that may result in its degradation.
Low	Minor loss (<10 %) of a feature or its supporting processes that may result in its modification.
Negligible	Minimal change or loss (<1 %) with effects not dissimilar to those expected within the semi-natural variability of the 'do nothing' scenario (e.g. drought).

Table 9.4: Temporal effect magnitude levels

Magnitude	Definition
Permanent	Effects continuing indefinitely beyond the lifespan of wind farm (35 years), except where there is likely to be substantial improvement after this period in which case 'Long Term' is appropriate.
Long term	Effects persisting for up to 35 years.
Medium term	Effects persisting for up to 15 years.
Short term	Effects persisting for up to 5 years.
Negligible	Negligible effect.

Cumulative effects

- 9.32 NatureScot's current guidance¹² informs the cumulative assessment of effects in combination with neighbouring developments, plans, or projects. To focus on significant effects, this assessment considers the potential for impacts with other EIA developments. The context in which these effects are considered is dependent on the behaviour and/or ecology of the feature. For example, an animal population is considered in the context of its habitat (e.g. a catchment or woodland) and the connectivity of this with additional, necessary resources (e.g. for foraging, roosting, or breeding). Alternatively, extensive blanket bog may require to be considered at a larger/regional scale. Accordingly, assessment of cumulative impacts for each feature is undertaken at the scale appropriate to its behaviour and ecology.

Significance

- 9.33 Habitats/species of negligible or low conservation importance and those that are unaffected by the development are screened out of further assessment. The significance of impacts upon the remaining Important Ecological Features is determined through a combination of their conservation importance; the magnitude (nature, extent, and timescales) of the predicted effect; and professional judgement.

¹² SNH (2012). Guidance - Assessing the cumulative impact of onshore wind energy developments. Available at: <https://www.nature.scot/guidance-assessing-cumulative-impact-onshore-wind-energy-developments>.

9.34 The latest CIEEM EcIA guidance **Error! Bookmark not defined.** discourages use of the matrix approach to determine significance and describes only two categories: 'significant' or 'not significant.' A 'significant effect' is an effect that either supports or undermines conservation objectives for ecological features.

9.35 Maintenance of favourable conservation status involves a series of inter-connected principles¹³. These are summarised in the CIEEM EcIA guidance for habitats and species as follows:

- Habitat conservation status is determined from impacts on distribution, extent, structure, and function, as well as typical species/communities.
- Species conservation status is determined from impacts on abundance, behaviour, and distribution.

Assessment Limitations

9.36 No limitations to the baseline habitat surveys are identified.

Mitigation

9.37 As outlined in the CIEEM impact assessment guidance, the following mitigation hierarchy is adopted:

- Avoidance;
- Reduction;
- Compensation; and
- Remediation.

9.38 As a result of this mitigation, all GWDTE assessed to be groundwater-dependent, including springs, are avoided, where possible, and peatland impacts are limited to wet heath on shallow peat, and marginal areas of bog protected by confinement within closed basins. In addition, consideration is given to opportunities for enhancement. These are addressed in the Outline Habitat Management Plan (Technical Appendix 9.3) that proposes measures to enhance the ecological condition and extent of blanket bog at the site. Additionally, the Biodiversity Net Gain assessment (Technical Appendix 9.4) demonstrates how this has been achieved.

Residual impacts

9.39 As a result of the evolution of the design of the project and the implementation of the mitigation measures set out in this report it is predicted that there will be no significant impacts resulting from the development on the ecological resource.

¹³ Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement 2018. Available at <https://data.incc.gov.uk/data/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe/FCS18-InterAgency-Statement.pdf>.

Scope of Assessment

Effects Assessed in Full

9.40 The following effects were considered to be potentially significant in relation to Ecology at the scoping stage and have been assessed in full within this chapter:

- Direct habitat loss of important peatlands and related habitats;
- Direct habitat loss of wetlands and related habitats including base-rich flushes and Groundwater Dependent Terrestrial Ecosystems (GWDTEs);
- Direct effects on severance/fragmentation of the above habitats;
- Indirect effects on the above habitats; and
- Cumulative effect on the above habitats.

Effects Scoped Out

9.41 On the basis of the desk based and field survey work undertaken, the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment, as proposed in the Scoping Report:

- Sites designated for nature conservation (excluding ornithology, which is discussed separately in Chapter 10).
- Effects on common and widely distributed habitats outwith the following categories:
 - Habitats listed in Annex I to the Habitats Directive, and species listed in Annex II to the Habitats Directive.
 - Biodiversity Action Plan (UKBAP) or Scottish Biodiversity List (SBL) Priority Habitats.
 - Habitats or species protected by legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended).

9.42 The desk study below provides data relating to otter places of rest and water vole burrows. However, due to the proximity of these features from the development (as described below) and the fact that no otter resting places or water vole burrows were recorded during the field survey, no effects on these features are predicted and accordingly they have been scoped out of detailed assessment.

Baseline Conditions

Desk Study

9.43 HBRG provided records of otter and water vole within the protected species desk study area between 2003 and 2011 inclusive.

9.44 The records included two water vole burrow locations, a single otter holt and a single otter couch (above ground resting place). The water vole burrow locations lie approximately 1.6km and 1.7km from the footprint of the development, respectively. Both the otter holt

and the otter couch lie approximately 1km from the footprint of the development. The locations of these features are illustrated on Figure 9.7, which has been marked as confidential, to safeguard the locations of these features.

Field Survey Results – Habitats and Vegetation

9.45 The results of the Phase 1 Habitat and NVC surveys are provided in EIA Volume 4, Technical Appendix 9.1. This data has been analysed and interpreted highlighting two elements within the overall habitat assemblage that are of local or greater than local nature conservation importance. These are:

- Peatland and related habitats, and
- Wetlands and related habitats.

9.46 The following sections describe these IEFs in more details below.

9.47 A desk-based search for species records was carried out using the NBN atlas (2023). One record relating to plant species was returned, this was the moss *Sphagnum imbricatum sensu lato*. Considering the habitat within the survey area, it is likely this refers to the species now recognised as *Sphagnum austinii* (taxonomically split from *S. imbricatum* since the record was made). *S. austinii* is an indicator of undisturbed blanket and raised mires. This species was also recorded during the habitat surveys for Proposed Development.

9.48 Peatlands and related Habitats

9.49 This receptor has three main components that were recorded within the survey area; blanket bog, wet modified bog, and heath.

9.50 Blanket bogs within the survey area have been evaluated using the guidelines for the selection of SSSIs (JNCC, 1994). This guidance provides criteria and thresholds that is used to assess areas of peatlands that qualify for selection as a SSSI. Within this guidance, functioning hydrological peatland units are assessed based upon a range of criteria including size, peat formation capabilities, surface patterning, vegetation, and indicator species. In addition, the geographical location of the peatlands is taken into consideration. This is due to blanket bogs in the north and west of the UK typically supporting a different range of vegetation types to those in the south and east.

9.51 Using these criteria, the blanket bogs within the Survey Area meet these thresholds and are considered to be of national importance for nature conservation. The effects upon blanket bogs will be detailed in this assessment.

9.52 Wet modified bogs (specifically M20a and M25 NVC communities in the survey area) are often derived from blanket bogs that have been degraded through a combination or a mixture of drainage, muirburn and grazing regimes. From the information collected during the field surveys regarding composition and quality, wet modified bog vegetation is important for nature conservation at a regional level.

9.53 The NVC survey has identified both wet and dry heaths within the survey area as being degraded in nature and not qualifying for Annex 1 quality. Upland heath communities

recorded on the site such as H10, H18 and M15 NVC communities are listed on the Scottish Biodiversity Action Plan and the Highland Biodiversity Action Plan lists. Taking into consideration their composition, quality, and the relative frequency in the surrounding wider area, both dry and wet heaths within the Survey Area are considered to be of regional importance.

- 9.54 In summary, the main component (habitat considered to be most sensitive to effects and highest value) of the peatland and related habitats IEF is blanket bogs. Wet modified bog, dry heath and wet heath do have regional value particularly when hydrologically connected to blanket bogs or considering the assemblage as a whole.

Wetlands and related habitats

- 9.55 Wetland habitats are widespread within the survey area. Many of these communities are associated with peatland communities or valley bottoms that are predominantly acidic in nature. These communities are species poor and are widespread locally, regionally, and nationally.
- 9.56 Two wetland communities are of high distinctiveness. Both are types of base-rich springs/flushes that are dependent upon groundwater. These communities support a species-rich assemblage, some of which are regionally uncommon. Wetlands of high distinctiveness are considered to be of regional importance for nature conservation.

Field Survey Results – Bats

- 9.57 In total four bat species and two genera were recorded for the site; common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and brown – long-eared bat *Plecotus auritus* with *Myotis* and pipistrelle bats (not defined to species level) also noted.
- 9.58 A total of 1516 bat passes were recorded; the following passes were recording across all detectors:
- Common pipistrelle – 956 passes (63%);
 - Soprano pipistrelle – 299 passes (20%);
 - Unidentified pipistrelle – 113 passes (7%);
 - *Myotis* sp. – 146 passes (9.9%); and
 - Brown long eared bat - 2 passes (0.1%).
- 9.59 No roosts were identified within the site or study area.
- 9.60 Table 9.5 summarises the level of collision risk, population abundance and vulnerability for each bat species recorded during the survey work.

Table 9.5: collision risk, population abundance and potential vulnerability for each bat species

Bat Species	Collision Risk	Population Relative Abundance	Potential Vulnerability
Common pipistrelle	High	common	medium
Soprano pipistrelle	High	common	Medium
Brown long-eared bat	low	Rarer	Low
Myotis sp.	low	Rarer	Low
U pipistrelle	High	common	Medium

Field Survey Results – Otter

- 9.61 No otter places of rest (holts or couches) were recorded during the protected species survey. Evidence to indicate the presence of otter (spraints) was identified within the protected species survey area including Loch na Saobhaidhne, Am Bru-lochan, Loch Cracial Mor and Loch Cracail Beag which are connected by Allt Garbh-airigh and Allt an Cealgaiche. The watercourses were considered to offer suitable habitat for resting places, foraging, and commuting.
- 9.62 In addition, a dog otter was identified on site during surveys.

Field Survey Results – Reptiles

- 9.63 Two sightings of common lizard *Zootoca vivipara* were noted within habitat north and south of the Allt Ach' na h-uaigne (NH 63399 01855 and NH 64178 01461).

Identification and Evaluation of Key Effects

Construction Effects

Predicted direct effects of construction on peatlands and related habitats

- 9.64 The most notable effect of construction on peatlands and related habitats will be direct loss from the footprint of the infrastructure (prior to any habitat reinstatement or restoration). Two broad types of infrastructure will contribute to the footprint of the windfarm: permanent and temporary. Permanent infrastructure such as crane pads, access tracks, substations, etc will remain in place throughout the construction and operational phases. Temporary infrastructure, such as the construction compound and borrow pits, will only be in place for the construction phase.
- 9.65 Temporary infrastructure may result in temporary disturbance of habitats but will be re-instated during the operational phase. In some cases, considerable earthworks will be required for the construction of temporary infrastructure that may result in permanent change or loss of the habitat despite re-instatement. This can be due to a variety of factors, but changes in topography or hydrology to peatlands are rarely likely to lead to full re-establishment of the habitat type.

- 9.66 As blanket bogs are considered to be one of the primary components of the peatland and related habitats IEF in the evaluation of this assessment, a conservative approach to calculating direct loss of peatlands where losses are considered permanent whether infrastructure is permanent or temporary (Prior to any re-instatement or enhancement). This is justified by the poor reversibility of damage to blanket bog habitats where recovery is long term.
- 9.67 Direct effects involving habitat loss due to land take from permanent infrastructure is detailed in Table 9.6 below. Full details of relevant peatland and related habitats IEF are listed by their respective habitat type (dry heath, wet heath blanket bog and wet modified bog).

Table 9.6: Permanent Infrastructure habitat loss

Phase 1 code	Habitat type	NVC code	Area of habitat loss (Ha)	% of survey area
B2.2	Neutral grassland	MG9	>0.01	>0.01
B5	Marshy Grassland	M25	0.28	0.03
D1.1	Dry heath - acid	H10 & H18	1.51	0.14
D2	Wet heath	M15	4.2	0.4
E1.6.1	Blanket bog	M17, M19 & M20	4.52	0.43
E1.7	Wet modified bog	M20 & M25	6.02	0.57
E2.1	Acid/neutral flush	M6	0.09	>0.01
F1	Swamp	S9/S27	0.11	>0.01
J4	Bare ground	N/A	0.01	>0.01
		Total	16.72	1.6

- 9.68 As noted in Table 9.6 above, direct loss of blanket bog from the Proposed Development is 4.52Ha or 0.43% of the total survey area. This figure is small both in relative size and proportion to the overall survey area. It is however important to assess these figures in relation to the overall blanket bog coverage within the site. Direct loss of blanket bog is predicted to be 1.58% of total blanket bog coverage within the Survey Area.
- 9.69 Direct loss of modified bog from the proposed development is predicted to be 6.02Ha or 0.57% of the total survey area. This equates to 1.41% of the total extent of the wet modified bog resource within the survey area. The Proposed Development causes direct loss to wet modified bog more than any other habitat type.
- 9.70 Additional habitat losses resulting from temporary infrastructure is detailed in Table 9.7 below.

Table 9.7: Temporary Infrastructure habitat loss

Phase 1 code	Habitat type	NVC code	Area of habitat loss (Ha)	% of survey area
D1.1	Dry heath - acid	H10	0.26	0.02
D2	Wet heath	M15	0.96	0.09
E1.6.1	Blanket bog	M17 & M20	0.66	0.06
E1.7	Wet modified bog	M25	0.95	0.09
		Total	2.84	0.27

- 9.71 While the majority of the most sensitive and high-quality peat forming peatland areas within the Development Area have been avoided through the design process, the Proposed Development does inevitably (due to their extent within the Developable Area) cause some direct loss to high quality peatlands. The total habitat loss of blanket bog (prior to re-instatement or enhancement) is 5.18Ha or 1.79% of all blanket bog communities identified within the survey area.
- 9.72 The direct loss of 1.79% of very high value blanket bogs prior to reinstatement and enhancement works is considered to be of a low magnitude (See Table 9.3) in the long term. Following reinstatement and enhancement direct effects will be reduced to negligible. As such, direct effects on blanket bogs are considered **not significant**.
- 9.73 Wet heath (NVC code: M15) and dry heaths (NVC codes: H10 & H18) are present within the survey area. Details gathered during the habitat surveys regarding composition and quality found that none were considered to be of Annex 1 quality. All are listed as priority habitats within the Scottish Biodiversity List and mentioned within the upland and moorland habitat category of the Highland Council Biodiversity Action Plan (Highland Nature, 2021).
- 9.74 Heath communities recorded within the Survey Area (M15, H10 & H18) are common and widespread throughout the Highland region (Averis, 2014). They have also been identified during the NVC to be in a degraded state within the survey area. Direct loss of wet heath from permanent and temporary infrastructure is 4.15% of the total wet heath component within the survey area. Direct loss of dry heath from permanent and temporary infrastructure is 1.71% of total dry heath component within the survey area. Unlike blanket bog, recovery time of both wet and dry heath is quicker and should be expected to be recoverable in the medium term. The magnitude of the impact on heath communities is low, following mitigation and re-instatement, the effects of the Proposed Development on both wet and dry heath communities will be reduced to negligible. The impact on both wet and dry heath communities will be **not significant**.

Predicted indirect effects of construction on peatlands and related habitats

- 9.75 Indirect effects on habitats are expected to occur from the Proposed Development. Indirect effects include temporary disturbance of habitats surrounding permanent and temporary infrastructure, alterations to topography, hydrology, and vegetation composition. Temporary disturbance is expected to occur within the following Zones of Influence (ZOI):

- A precautionary 25m radius surrounding all turbine bases and borrow pits, and
- A 10m radius surrounding all other infrastructure such as access tracks, hardstandings construction compounds and storage areas.

9.76 Indirect effects are predicted to be wide ranging and are often difficult to quantify. Disturbance from earthworks surrounding infrastructure will result in temporary disturbance of sensitive habitats occurring in the ZOIs stated above. Reinstatement of habitats is proposed to mitigate for some of this disturbance (in the Peat Management Plan and the Outline Habitat Management Plan), however, peatland habitats are often slow to recover. With embedded reinstatement, mitigation and good practice measures recovery is expected in the medium to long term.

9.77 Table 9.8 below details the expected temporary disturbance of habitats within the predicted ZOIs.

Table 9.8: Predicted extent of temporary disturbance on habitats within ZOIs

Phase 1	Habitat type	NVC	Temporary disturbance (Ha)	% of survey area
B2.2	Neutral grassland	MG9	0.01	>0.01
B5	Marshy grassland	M23 & M25	0.9	0.09
D1.1	Dry heath	H10 & H18	3.45	0.33
D2	Wet heath	M15	7.05	0.67
E1.6.1	Blanket bog	M17 & M20	9.73	0.93
E1.7	Wet modified bog	M15, M20 & M25	11.34	1.08
E2.1	Acid/neutral flush	M6	0.5	0.05
F1	Swamp	S9/S27	0.24	0.02
J4	Bare ground	N/A	0.03	>0.01
		Total	33.24	3.17

9.78 The Proposed Development is expected to cause temporary disturbance to 9.73Ha of Blanket bog, 11.34Ha of wet modified bog and 7.05Ha of wet heath.

9.79 Peatlands considered to be of very high sensitivity have been identified through a combination of the peatland condition assessment and notes gathered in the field regarding vegetation composition, structure, and indicator species. A total of 9.73Ha of blanket bog is affected by temporary disturbance.

9.80 Areas of very high sensitivity have been avoided where possible throughout the design process from the information gathered in the habitat surveys and the peatland condition assessment. Negative effects from temporary disturbance regarding the 9.73Ha (3.36% of blanket bog resource in survey area) of blanket bog will be minimised through good

practice measures such as floating roads and further measures set out within Technical Appendix 9.3 Outline Habitat Management Plan (OHMP) and Technical Appendix 8.2 Peat Management Plan (PMP). The magnitude of the impacts on blanket bog are classed as low. Taking into consideration the embedded mitigation, reinstatement and enhancement measures, the magnitude is reduced to negligible. As such, the impact of temporary disturbance on blanket bog is **not significant**.

- 9.81 In addition, the SSE Biodiversity Project Toolkit has been used to quantify Biodiversity Net Gain (BNG), following the completion of peatland restoration measures at the Acheilidh site. This is included as Technical Appendix 9.4 of the EIA. Although BNG is not yet adopted in Scotland it is understood that a NatureScot consultation is underway to develop a metric which is considered suitable for the habitats which lie within Scotland. The DEFRA metric is not considered suitable for upland peatland dominated environments and, in the meantime, SSE have developed their own metric, which is commonly used as an interim measure for demonstrating BNG in a Scottish context. It should be noted however that the "Trading Rules" tab in the SSE metric still uses the DEFRA criteria and hence is not applicable in a Scottish context.
- 9.82 A total of 3.34% of all peatland communities within the survey area will be indirectly effected by the Proposed development. This is categorised as a low magnitude of impact. Taking into consideration the embedded mitigation, reinstatement and enhancement measures, the magnitude is reduced to negligible. As such, the overall impact of indirect effect on the peatland and related habitats IEF is **not significant**.

Temporary disturbance and changes to composition of plant communities resulting from hydrological changes

- 9.83 Predicted hydrological impacts upon surface water are described in detail within Chapter 8. Intact or active blanket bogs communities often have a high-water table, with a water table close to the surface of the substrate (c. 10cm from the surface).
- 9.84 A high-water table in blanket bogs is essential for peat formation due to the ecological niches that the dominant peat forming Sphagnum require. Blanket bogs can cover large areas that are hydrologically connected, any changes to the hydrological mechanisms can impact the community as a whole.
- 9.85 Changes to hydrology including disturbance of the peat substrate, pollution, or alteration to surface or groundwaters can occur during the construction phase for a variety of reasons including:
- Physical disturbance of peat substrate from construction of infrastructure
 - Dewatering activities leading to a reduction in groundwater levels
 - Disruption to flow paths or changes to drainage regimes during construction (and operation) can lead to increases in run-off and a lowering of the water table
 - Pollution events from construction, operation and decommissioning activities which can contaminate surface waters
 - Pollution from increased sediment load during construction and operation.

- 9.86 Through the implementation of good practice measures as set out in the SEPA GPPs the risk of pollution events or contamination from increased sediment load to surface waters are minimised.
- 9.87 Where access tracks occur on a peat depth greater than 1m within the Development Area, floating roads will be constructed. Floating roads are constructed so that the weight of the access track sits on the peat substrate, avoiding the need for solid foundations. This approach is preferable to alternative designs as it maintains some degree of hydrological connectivity where the access track intersects an area of blanket bog. While this method is preferable, some impacts to hydrological connectivity and changes to surface water flows are still expected, though they are somewhat reduced.
- 9.88 The installation of drainage ditches in areas of deep peat (> 1m) is likely to result in localised disturbance of the peat, but the increased flow of water and surface run-off from the ditch will have a much wider impact. It is not just the water table that is impacted, installation of drainage ditches tends to empty the acrotelm (upper layer of peat) of water readily over several hundred meters from the ditch itself. The consequence of the acrotelm drying results in a progressive loss of conditions for peat forming species¹⁴. Primary consolidation (shrinkage and collapse of the peat within c. 5m surrounding the drain) is the most visible impact of the installation of these drainage ditches. However, Secondary compression which results in a shrinkage of the peat mass across several hundred meters from the ditch itself also causes long term alterations to the composition of the vegetation and functioning hydrological peatland unit (mesotope) as a whole¹⁴.
- 9.89 For the purposes of this assessment, an analysis has been undertaken where the peatlands within the Survey Area have been assigned to functional hydrological units (mesotopes) following the classification described in (Lindsay, 1995)¹⁵. Mesotopes that are directly or indirectly potentially impacted by the Proposed Development are shown in Figure 9.2. A summary of the mesotopes and the predicted impacts are provided in Table 9.9.

Table 9.9: Indirect effects: impacts on integrity of functional peatland units (Mesotopes)

Mesotope name and type	Area of Mesotope (Ha)	% Direct Loss	Condition	Comment
Allt Ach'na-h-Uige, watershed mire	2.58	13.46	Micro-erosion abundant. Extensive drainage systems surrounding community on all sides, but not within mire.	Infrastructure bisects mesotope. Peat depth survey shows it to be on thin soils.

¹⁴ Lindsay, R., Birnie, R. and Clough, J. (2014) 'Impacts of Artificial Drainage of Peatlands' IUCN UK Committee Peatland Programme Briefing Note 3. <https://iucn-uk-peatlandprogramme.org>

¹⁵ Lindsay, R (1995) *Bogs: The Ecology, Classification and Conservation of Ombrotrophic Mires* Scottish Natural Heritage, Battleby

Mesotope name and type	Area of Mesotope (Ha)	% Direct Loss	Condition	Comment
Allt Garbh-airigh, saddle mire	27.81	7.75	High quality peat forming vegetation, but active drains are frequent and active.	Mesotope is divided into three sections by two turbines, access tracks and construction compound.
Am Bru-lochan, Watershed mire	39.60	0.00	High quality peat forming vegetation. Vegetated drainage ditches infrequent, but still actively removing water. Micro-erosion in flatter areas from grazing.	Included here for clarity as it is possibly connected to the Lochan na Faolaig mesotope in small sections. However, even if considered to be connected, the distance from infrastructure is beyond the Zone of Influence, considering surface and ground water flow patterns.
An Stoc-bheinn north, watershed mire	16.24	4.53	Drained in some areas, micro-erosion significant in flatter areas and larger peat hags in others.	Infrastructure intersects western edge of the mire.
An Stoc-bheinn south, watershed mire	21.25	1.76	Drained in some areas, micro-erosion significant in flatter areas and larger peat hags in others.	Infrastructure intersects the mesotope in three.
An Stoc-bheinn west, watershed mire	0.96	13.23	Drained in some areas, micro-erosion significant in flatter areas and larger peat hags in others.	Infrastructure intersects mire into three.
Leathad Creagach, watershed mire	28.79	0.64	Forms a mosaic with both wet and dry heaths. Some unmodified blanket mire in small areas.	This mesotope is bisected by infrastructure which avoids unmodified areas of blanket bog. Infrastructure

Mesotope name and type	Area of Mesotope (Ha)	% Direct Loss	Condition	Comment
				broadly follows areas with thin peat soils and a high proportion of dry heath within the mosaic. Hydrological connectivity between the northern and southern sections which will be bisected is considered small to negligible throughout the mesotope.
Loch an Fheòir south, watershed mire	8.43	0.27	Forms a mosaic with both wet and dry heaths. Some unmodified blanket mire in small areas.	This watershed mire is bisected by infrastructure. Access track bisects mesotope where hydrological connectivity is limited to a small area.
Loch Na Saobhaidh, watershed mire	2.57	4.55	High quality peat forming vegetation. Drainage ditches frequent and actively removing water.	Infrastructure bisects portions of the mesotope on the northeastern edge of the mire.
Lochan na Faolaig, complex of watershed, valley, and basin mires	132.19	2.11	High quality peat forming vegetation. Vegetated drainage ditches infrequent, but still actively removing water. Micro-erosion in flatter areas from grazing.	A large, complex mesotope which could be further subdivided into smaller functional units. four turbines are proposed within the mesotope. Infrastructure divides the mesotope into three sections.

9.90 Taking into consideration the predicted effects of the Proposed Development on the identified mesotopes, the following impacts are highlighted:

- The Allt Ach'na-h-Uige is impacted proportionally the greatest by the Proposed Development in terms of direct loss (13.46% of total functional area). It is bisected by

infrastructure into two sections with limited use of floating roads (resulting in greater hydrological disconnect between the fragmented parts of the mesotope) due to the depth of the peat substrate. The mesotope is small and fragmented in nature, hence small losses (0.35Ha) result in a high percentage total of area lost.

- The Allt Garbh-airigh mesotopes is similarly impacted as a result of the Proposed Development in terms of direct loss (13.23% of total functional area). It is divided into five sections, with no use of proposed use of floating roads (resulting in greater hydrological disconnect between the fragmented parts of the mesotope) due to the depth of the peat substrate.
- The Lochan na Faolaig mesotope contains the best examples of peat forming vegetation within the Development Area. Direct Losses are small (2.11% of total functional unit) but indirect losses are likely to affect a large proportion of the mesotope due to fragmentation and secondary compression.
- Direct losses for the An Stoc-bheinn West mesotope are large (13.23%). However, this is due to the small and fragmented nature of the mesotope which gives any incursion a relatively high impact.

- 9.91 Direct losses for the An Stoc-bheinn North mesotope are small (4.53%). In addition, floating roads are proposed in this area. The infrastructure is sited towards the edge of the mesotope where there will only be marginal incursion to the edges of the mire and hydrological impacts are negligible in the medium or long term.
- 9.92 Direct losses for the Loch na Saobhaidhe (4.55%) and Allt Ach'na-h-Uige (13.46%) watershed mires are proportionately high, but this is attributed to the small size and fragmented nature of these mesotopes. Indirect effects are therefore also confined to the small areas of the functioning unit. Impacts are low in the medium or long term.
- 9.93 In both the Leathad Cregach and Loch an Fheòir watershed mires (around the Lairg Estate connecting track from Lairg II Wind Farm), infrastructure bisects the mesotopes where hydrological connectivity is minimal and/or where peat depth is thin. As such, indirect effects are considered to be negligible regarding changes to hydrological connectivity or related changes to vegetation composition in the medium or long term in either of these mesotopes.
- 9.94 When considering the impacts of the Proposed Development on the functioning of the mesotopes, it is important to take into consideration the current condition of the peatlands within the Survey Area. The peatland condition assessment provides in depth details with regards to the conditions of the peatlands. While large areas of high-quality peat forming vegetation is present within the Survey Area, the proposed Infrastructure is predominantly located in areas where there is some form of erosion, drainage and/or drying of the acrotelm. While this does not detract from the impacts of the Proposed Development, it does provide opportunities for mitigation or enhancement (i.e. peatland restoration) in the remaining areas.
- 9.95 Although most of the peatlands have been modified to some extent, bare peat is infrequent. This is true even in areas that are drained or showing signs of micro-erosion. High-quality peat forming vegetation is widespread even within these areas. Therefore, the

magnitude of the positive effects resulting from peatland restoration activities are likely to be moderate in the long term.

Summary of construction effects on peatlands and related habitats

9.96 The main potential effects from the Proposed Development are predicted to be:

- Direct loss of **5.18Ha** of blanket bog
- Indirect effects to **9.73Ha** of blanket bog
- Fragmentation and potential disruption (due to changes in hydrological connectivity and resulting impacts such as secondary compression) to several mesotopes (Lochan na Faolaig, Allt Garbh-airigh, An Stoc-bheinn West & Allt Ach'na-h-Uige). This is predicted to result in approximately **163.54Ha** (67.16% of total blanket bog resource within Survey Area) of very high value functional peatland being indirectly affected.

Predicted direct effects of construction on Wetlands and related habitats

9.97 The habitat surveys identified six communities that are of high distinctiveness, all of which are GWDTEs. Through the design process, three of these have been avoided and are beyond the 250m Zone of Influence from any proposed infrastructure. The effects on the remaining three GWDTEs are considered further.

9.98 A species-rich M11 NVC community containing species such as *Saxifraga aizoides*, *Thalictrum alpinus* and *Schoenus nigricans* was identified approximately 195m from the deep excavations (>1m) proposed for Turbine 1. The edge of the crane pad for Turbine 1 slightly encroaches into the edge of the 100m GWDTE buffer zone. The separation distance between the proposed deep excavations and the hydrological settings mean that the risk of direct effects are considered to be of a minor magnitude. Taking the embedded mitigation measures into account, the impact of direct effects from the Proposed Development are **not significant**.

9.99 Another two species-rich M11 GWDTE communities are located in close proximity to Turbine 5. Similarly, The edge of the crane pad for Turbine 5 slightly encroaches into the edge of the 100m GWDTE buffer zone for shallow excavations needed for construction. Both these GWDTEs are located within the 250m ZOI for deep excavations required for the turbine base and associated infrastructure. However, the infrastructure has been micro-sited to achieve some hydrological separation between both communities. The northern most M11 community is separated by a small stream and valley, while the southern M11 community lies within a different watershed to the infrastructure required for Turbine 5 (exact locations are shown in Figure 9.3). Considering the separation distance between the proposed deep excavations, topographical and hydrological settings mean that the risk of direct effects are considered to be a minor magnitude. Taking the embedded mitigation measures into account, the impact of direct effects from the Proposed Development are **not significant**.

Predicted indirect effects of construction on wetlands and related habitats

9.100 Considering the separation distance between the proposed deep excavations, topographical and hydrological settings mean that the risk of indirect effects are

considered to be Minor. Embedded mitigation measures will reduce magnitude to Negligible. As such impacts are **not significant**.

Construction impact: otter disturbance due to site clearance and construction activities

- 9.101 During the construction phase, activities to construct an access track that crosses a Allt Ach' na h-uaghe watercourse in two locations leading to turbine numbers 5 and 7, may lead to noise and vibration. Construction will be additionally, accompanied by increased human presence on site. Disturbance to otter could lead to a displacement from, or prevent commuting through, the area of activity.
- 9.102 The scheme has been designed to ensure that, where possible infrastructure is sited at least 50m away from watercourses with the exception of watercourse crossings which have been minimised to a total of two across the whole site through the evolution of the design of the project. Construction at watercourse crossings will be spatially limited and short term (access track creation will not extend for the full duration of the construction phase).
- 9.103 Although the habitat is considered suitable for the species, no resting locations were identified at these locations. The activity will be daily and limited to working hours and as such the frequency will be high in the very short-term. On completion of construction of access tracks the associated noise and vibration would cease and as such is considered to be reversible.
- 9.104 There are no predicted disturbance effects to any otter places of rest as they lie 1km from the footprint of the development, therefore no derogation licensable works have been identified for otter.
- 9.105 The construction of access tracks at watercourse crossings will involve the use of plant in close proximity to watercourses and may involve in-channel works.
- 9.106 The introduction of pollutants to a watercourse during the construction phase may reduce the water quality and negatively impact the flora and fauna therein, reducing the suitability of the watercourse for otter resting and foraging.
- 9.107 This activity will be limited temporally (limited to period of construction) however the effect could be long term dependent on the nature of the pollutant. In addition, although the point of any pollution event may be spatially limited the dispersal of pollutants in this habitat could extend further downstream. The risk of this effect only remains for the duration of the construction period.
- 9.108 Therefore, it is considered to be a negative significant effect; significant at a Local level.

Construction impact: otter direct mortality due to construction activities

- 9.109 The construction of the wind farm will require the movement of heavy plant and machinery. During the operation phase vehicular access may be required to maintain or manage the windfarm.

- 9.110 This vehicular movements would be occurring in an area where the species had not previously encountered traffic and as such direct mortality may occur due to road traffic accident (RTA) with site vehicles.
- 9.111 The effect may be temporally limited to the time the vehicle is on site but could also be long term as this may occur during the lifetime of the scheme (35 years). The effect would be permanent to the individual however at a population level would be limited in effect or detectability.
- 9.112 The effect is considered to be a negative significant effect; significant only at a Local (site) level.

Operational Effects

- 9.113 Beyond the effects identified with respect to construction, no further direct loss of habitat or degradation is anticipated during the operational phase of the Proposed Development. Therefore, no further impacts are predicted.
- 9.114 Indirect effects from long term changes in hydrology and fragmentation of peatlands are likely to result in changes to vegetation composition of blanket bog communities. Providing good practice measures are adhered to, no pollution or sedimentation events are likely during maintenance work. Operational impact: bats direct mortality due to construction activities
- 9.115 The operation of the wind farm could result in bat mortality due to collision with turbines.
- 9.116 The bat assessment analysed the potential effects of the proposed development on bats and an overall risk assessment was carried out on high collision risk bat species (soprano and common pipistrelle) recorded within the site.
- 9.117 Overall, the site is assessed to be low risk to both species throughout the year. This effect, therefore, is considered to be a negative significant effect; significant only at a Local (site) level.

Decommissioning Effects

- 9.118 Potential effects during the decommissioning of the Proposed Development would be of a similar nature to those identified during the construction and operational phases. As the Proposed Development timeline spans 35 years, any new legislation and guidance prior to decommissioning will be adhered to.

Mitigation Measures and Monitoring

- 9.119 Generic mitigation measures that would apply during construction and operational phases are outlined below. The following measures represent general best practice and would reduce potential effects on a number of receptors:
- Not more than 16 weeks prior to construction of the Proposed Development and within the correct survey season, the Applicant will engage a Suitably Qualified

Ecologist (SQE) to undertake a series of repeat ecological surveys to update the baseline data.

- The aim of the repeat ecological surveys will be to provide up to date information in order to confirm required mitigation, including the need for protected species licensing and species protection plans for the site. The result of the pre-construction surveys will be communicated to the Contractor by the SQE and will be fed into the CEMP. The recommendations will ensure compliance with the necessary wildlife legislation.
- Adherence to SEPA Guidance Pollution Prevention (GPP) in respect to working in and around watercourses.
- Adherence to NatureScot guidance on upland track construction.
- All vehicles will be restricted to 5mph while within 100m of watercourses.
- Avoidance of unnecessary disturbance to habitats by minimising the extent of vegetation clearance and other construction practices.
- Restriction of plant and personnel to a prescribed working corridor through the use of temporary barriers or fences, minimising damage to habitats and potential direct mortality and disturbance to species.
- Adherence to best practice guidance with respect to culvert and bridge design.
- Any trenches dug during construction and decommissioning operations will be covered at the end of each day to prevent mammals becoming trapped. Alternatively, mammal ramps will be positioned in such a way that trapped mammals may be allowed to escape.
- All exposed pipes and trenches will be checked each morning prior to starting construction activities. If trapped animals are found, the SQE will be contacted.

9.120 Ecological toolbox talks will be provided to all new site staff on the potential presence of protected species and any measures that need to be undertaken.

Construction

9.121 The Proposed Development has sought to implement the mitigation hierarchy in relation to the effects on habitat through the design process. Embedded mitigation has been largely effective in implementing avoidance of IEFs. The extent and location of blanket bog communities within the Developable Area means that it has not been possible to completely avoid impacts on blanket bog.

9.122 As such, measures to minimise or reduce the scale of the impact on these IEFs have included selecting routes through areas which are less damaging to the function of the blanket bog and the use of floating roads on areas of deep peat to minimise potential hydrological impacts.

9.123 An Outline Habitat Management Plan (OHMP) and an Outline Peat Management Plan (OPMP) (EIA Volume 4, Technical Appendix 9.1 and 8.1, respectively) details the proposed mitigation and enhancement measures designed to reduce negative impacts. In summary, these proposals include:

- Reduction of grazing through deer management.

- Peatland restoration of suitable areas involving ditch blocking (112.64Ha of potentially suitable areas are shown in Figure 9.4).
- During the pre-construction and construction phase, any tree within 30m of access tracks or other infrastructure, or 200m of turbine locations with suitable features to support roosting bats, should be identified and a buffer demarked. No access will be taken within this area without the permission and presence of the ECoW.
- Should any additional suitable features for roosting bats or bat roosts be identified within 30 m of any working areas or 200m of turbine locations, during the pre-construction surveys or during construction, all works will cease until the ECoW is contacted for advice. It may be necessary to obtain a licence from Nature Scot.
- All site lighting (if required) will be directed to the area required and light spill minimised. No lighting of woodland edges will or tree/structures with suitable features should be undertaken.
- Translocate any surplus excavated peat within the Developable Area.

Operation

- 9.124 Monitoring of the proposed mitigation and enhancement activities outlined above will be carried out to measure effectiveness during the lifespan of the windfarm (35 years). There is currently not a strict timeline for the peatland restoration proposals, though these should be carried out during either construction phases or at the beginning of the operational phase.

Decommissioning

- 9.125 During the decommissioning of the Proposed Development, potential effects on IEFs will be similar to those during the construction phase. Similar measures to minimise impacts will be employed but will use any updated published guidance or legislation which will be incorporated into the relevant management plan/s prior to decommissioning.

Cumulative Effects

- 9.126 In addition to assessing the impacts of the Proposed Development upon IEFs, it is also appropriate to assess the cumulative impacts of the Proposed Development in the context of similar proposals within the wider region. In this case, blanket bogs are considered the primary component of conservation concern within the Peatland and related habitat IEF.
- 9.127 A common approach to previous wind farm cumulative assessments for potentially impacted peatlands has been to compare the potentially impacted peatland areas with their respective Proposed Development plans as a percentage to all peatland habitat (whether modified or not) in the wider region. However, this approach does not fully recognise the quality of the peatlands or whether they are actively peat forming or not.
- 9.128 In order to address these limitations, an alternative approach has been taken in this assessment. The NatureScot Carbon and Peatland Map (2016)¹⁶ provides details with

¹⁶ NatureScot (2016) NatureScot Carbon and Peatland map. Accessed online 01/11/2023 at: <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>, 09/11/2023

regard to the location and extent of high-quality peatland areas. Within this dataset, 'Class 1' peatlands are ranked as the most important in terms of their carbon resource, but this approach also broadly aligns with areas of peatland that are the best quality and most actively forming peat. The vegetation survey results within the Survey Area shows a relatively high level of agreement with this approach when compared to the Class 1 peatland data. While this approach is relatively new, it is not novel. It has been used for the assessment of similar projects such as for Teviot wind farm in the borders (Muirhall energy, 2022)¹⁷.

- 9.129 The impacts that similar schemes have on Class 1 peatlands has been used here to assess the cumulative impacts. Cumulative effects have been calculated by cross referencing operational, consented and schemes under construction with class 1 peatland polygons obtained from the Highland Council Open Map Data (2023)¹⁸.
- 9.130 Due to the large size of the Highland council area (c. 25,600km²), this was not considered appropriate for assessing the cumulative impacts of a project of this scale. The Caithness and Sutherland Peatlands Natural Heritage Zone (NHZ) is therefore used to assess cumulative impacts.
- 9.131 The total percentage area of potentially impacted Class 1 peatlands returned a result of 18.26%. However, this figure was not considered representative of the true extent of the potential impacts on Class 1 peatlands within the study area. Further investigation revealed polygons that were represented on the Carbon and Peatland map that contained large areas that were not hydrologically connected to any windfarm infrastructure.
- 9.132 A coarse scale review of polygons with wind farm infrastructure was therefore undertaken. This involved identifying large polygons containing infrastructure and dividing them where clear hydrological separation exists with areas of peatland and windfarm infrastructure (such as a river or a public road). The calculations were then repeated with the renewed data.
- 9.133 Excluding Class 1 peatlands potentially impacted by the Proposed Development, a total of 9.9% of the total area of Class 1 peatlands within the Caithness and Sutherland Peatlands NHZ contained windfarm infrastructure. This figure would rise to 10.26% if the effects on peatlands are considered significant. However, taking into consideration that the impact of the Proposed Development on the peatland and related IEFs has been classed as **not significant**, the Proposed Development will not contribute to a cumulative impact and is therefore classified as **not significant**.

¹⁷ Muirhall Energy (2022) Teviot wind farm Chapter 7: Ecology. Accessed online 11/11/2023: <https://www.energyconsents.scot/ApplicationDetails.aspx?cr=ECU00003249&T=5>

¹⁸ Highland Council (2023) Highland Council Open Map Data Accessed online 09/11/2023: https://map-highland.opendata.arcgis.com/datasets/fdad9392071a477087c9e0cb4184b5d4_0/about

Residual Effects

Construction

- 9.134 The proposed peatland restoration measures outlined in the OHMP consists of restoring of approximately 112.64Ha of blanket bog within the Survey Area. NatureScot currently recommends a ratio of 1:10 for the area of peatland lost to that which is restored. Direct losses of 5.18Ha of blanket bog would therefore require a minimum restoration area of 51.8Ha. The OHMP has proposed an area of restoration of approximately 112.64Ha, which exceeds the recommended ratio of blanket bog lost to that which is proposed for peatland restoration by over double the amount. This is reflected in the SSE Biodiversity Project Toolkit metric, which illustrates an 18% increase in biodiversity units at the site, together with improvements on habitat quality and distinctiveness.
- 9.135 Peatland and related habitats within the Survey Area have been identified as an IEF of national importance. Primarily through the implementation of embedded mitigation, direct and indirect effects on the highest value elements within the assemblage have been avoided. However, impacts regarding potential fragmentation and disruption will potentially occur within **163.54Ha** of blanket bog (67.16% of the blanket bog resource within the Survey Area). The proposed mitigation, including the peatland restoration measures should mitigate for indirect losses from the Proposed Development on peatlands. The effect of construction upon the peatlands within the Survey Area is therefore **not significant**.
- 9.136 The primary IEF of wetlands and related habitats within the Survey area is the three identified M11 GWDTE communities. These communities are widespread throughout the Highland region¹⁹. Taking into consideration the mitigation measures (avoidance, topographical and hydrological details), a low magnitude is predicted, and the effect is **not significant** on wetlands and related habitats.

Operation

- 9.137 Beyond the effects identified with respect to construction, no further effects are predicted.
- 9.138 The low risk of direct mortality of bats cannot be mitigated and as such there remains a **negative significant** effect only at a Local (site) level.

Decommissioning

- 9.139 Beyond the effects identified with respect to construction, no further effects are predicted.

¹⁹ Averis, A., Averis, B., Birks, J., Horsfield, D., Thompson, D. & Yeo, M. (2014) An Illustrated Guide to British Upland Vegetation, JNCC, Peterborough, ISBN 1 86107 553 7.

Summary

9.140 Table 9.10 below summarises the effects on key receptors, together with any mitigation measures and residual effects.

Table 9.10: Summary of Effects

Receptor	Sensitivity	Predicted Impact Characterisation	Significance before mitigation	Summary of Mitigation	Residual Effect
Construction Phase					
Peatlands and related Habitat	Regional Importance	Direct Habitat loss of 5.18Ha of blanket bog	Negative impact. Significant at Regional Level.	Generic Mitigation Outline Habitat Management Plan (OHMP). Outline Peat Management Plan - Reduction of grazing through deer management - Peatland restoration of 112.64Ha - Translocate any surplus excavated peat within the Development Area.	Not Significant
		Indirect effect of construction to 9.73 Ha of blanket bog	Negative impact. Significant at Regional Level.	Generic Mitigation Outline Habitat Management Plan (OHMP). Outline Peat Management Plan - Reduction of grazing through deer management - Peatland restoration of 112.64Ha Translocate any surplus excavated peat within the Development Area.	Not Significant
Lochan na Faolaig and Allt Garbh-airigh mesotopes	Regional Importance	Change to hydrological connectivity.	Negative impact. Significant at Regional Level.	Generic Mitigation Outline Habitat Management Plan (OHMP).	Not Significant

Receptor	Sensitivity	Predicted Impact Characterisation	Significance before mitigation	Summary of Mitigation	Residual Effect
				Outline Peat Management Plan - Reduction of grazing through deer management - Peatland restoration of 112.64Ha Translocate any surplus excavated peat within the Development Area.	
GWDTEs – M11 Communities	Regional Importance	Indirect effect of construction	Negative impact. Significant at Regional Level.	Generic Mitigation Outline Habitat Management Plan (OHMP). Outline Peat Management Plan - Reduction of grazing through deer management - Peatland restoration of 112.64Ha Translocate any surplus excavated peat within the Development Area.	Not Significant
Wetlands and related Habitats	Regional Importance	Indirect effect of construction	Negative impact. Significant at Regional Level.	Generic Mitigation Outline Habitat Management Plan (OHMP). Outline Peat Management Plan - Reduction of grazing through deer management - Peatland restoration of 112.64Ha Translocate any surplus excavated peat within the Development Area.	Not Significant
Otter	Local Importance	Disturbance from Site Clearance and works	Short term, negative impact. Significant at Local (site) Level.	Generic Mitigation	Not Significant

Receptor	Sensitivity	Predicted Impact Characterisation	Significance before mitigation	Summary of Mitigation	Residual Effect
		Pollution due to construction works	Short term, negative impact. Significant at Local (site) Level.	Generic Mitigation	Not Significant
		Direct Mortality due to construction activities	Short term, negative impact. Significant at Local (site) Level.	Generic Mitigation	Not Significant
Operational Phase					
Bats	Local Importance	Direct Mortality due to operations	Permanent, negative impact. Significant at Local (site) Level. Negligible effect on the regional species populations.	-	Permanent, negative impact. Significant at Local (site) Level. Negligible effect on the regional species populations.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 10: Ornithology

April 2024

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10 ORNITHOLOGY

Introduction

- 10.1 This chapter considers the potential effects of Acheilidh Wind Farm (the 'proposed development') on ornithology.
- 10.2 This chapter is also supported by the following figures as contained within ElAR Volume 2: Figures:
- Figure 10.1a: Site and Special Protected Areas
 - Figure 10.1b: Site and Special Area of Conservation
 - Figure 10.1c: Sites of Special Scientific Interest
 - Figure 10.2: Ornithology Survey Areas
 - Figure 10.3: Vantage Point Viewsheds
 - Figure 10.4a: Eagle Flight Activity
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 - Figure 10.4e: Other Species Flight Activity
 - Figure 10.5a: 2021 Breeding Bird Territories
 - Figure 10.5b: 2022 Breeding Bird Territories
 - Figure 10.6: Sensitive Breeding Bird Territories (Confidential)
- 10.3 The chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 10.1: Bird Survey Methods and Survey Conditions
 - Technical Appendix 10.2: Collision Risk Modelling Report
 - Technical Appendix 10.3: Confidential Annex
 - Technical Appendix 10.4 Confidential GET Model
- 10.4 Other relevant chapters include Chapter 3: Project Description, Chapter 9: Ecology (and Technical Appendix 9.3: Outline Habitat Management Plan).
- 10.5 The ornithology survey and assessment have been undertaken by WildLife Consulting Limited and associates. Specifically, Carroll Ecology and Colin Nisbet have undertaken the ornithological surveys. Andy Carroll (Carroll Ecology) and his team have been undertaking bird surveys on wind farm sites for over 20 years. The ornithology assessment has been undertaken by Colin Nisbet MSc, BSc, MCIEEM - Director (WildLife Consulting Ltd). Colin specialises in birds and onshore windfarms and has been an ecological consultant for 19 years.

Legislation, Policy, and Relevant Guidance

- 10.6 Relevant legislation, policy and guidance has been consulted to inform the assessment of impacts. A list of pertinent documents are provided below; where specific documents have been consulted, these are referenced in the relevant section.
- 10.7 Scottish Natural Heritage (SNH) has been rebranded as NatureScot as of the 24th of August 2020. As such some guidance documents or consultation may refer to the original name used at the time of publication.

Legislation

- Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive) 1979;
- The Conservation of Natural Habitats and Wild Flora and Fauna (the Habitats Directive) 1992 (92/43/EEC);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- Nature Conservation (Scotland) Act 2004;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Environmental Impact Assessment Directive 2014/52/EU;
- Chartered Institute of Ecology and Environmental Management. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, and Coastal;
- Institute of Environmental Management and Assessment. (2005). Guidelines for Environmental Impact Assessment; and
- Scottish Natural Heritage (2013) A handbook on environmental impact assessment.

Policy

- 10.8 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development. The policies set out include those from the Highland Council Local Development Plan (LDP) relevant aspects of National Planning Framework 4 (NPF4) (Scottish Government, 2023), Planning Advice Notes and other relevant guidance.
- NPF4: Policy 1 - Tackling the climate and nature crises;
 - NPF4: Policy 2 - Climate mitigation and adaptation;
 - NPF4: Policy 3 - Biodiversity;
 - NPF4: Policy 4 Natural Places;
 - NPF4: Policy 5 – Soils;
 - NPF4: Policy 11 Energy; and
 - The Highland Council LDP: Policy 58 Protected Species.

Guidance

- Developing field and analytical methods to assess avian collision risk at wind farms (Band et al., 2007)¹;
- Scottish Raptor Monitoring Scheme Report (SRMS) 2020 (Challis et al., 2022)²;
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018)³;
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom, Channel Islands and Isle of Man (Stanbury et al., 2021)⁴;
- Wind Energy Developments and Natura 2000 (European Commission, 2011)⁵;
- The Birds of Scotland (Forrester et al., 2007)⁶.
- Bird Monitoring Methods (Gilbert et al., 1998)⁷;
- Raptors: a field guide to survey and monitoring, 3rd edition (Hardey et al., 2013)⁸;
- Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283⁹;
- The Scottish Biodiversity List (SBL)¹⁰;
- Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. (Scottish Natural Heritage (SNH)¹¹, 2000)¹²;
- Recommended bird survey methods to inform impact assessment of onshore wind farms (SNH, 2017)¹³;
- Assessing connectivity with Special Protection Areas (SPAs) (SNH, 2016a)¹⁴;

¹ Band, W., Madders, M. & Whitfield, D.P. (2007) *Developing field and analytical methods to assess avian collision risk at wind farms*. In de Lucas, M., Janss, . & Ferrer, M. (eds.) *Birds and Wind Power*. Quercus, Madrid.

² Challis, A., Eaton, M., Wilson, M.W., Holling, M., Stevenson, A. & Stirling-Aird, P. (2019). *Scottish Raptor Monitoring Scheme Report 2018*. BTO Scotland, Stirling.

³ CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1*. Chartered Institute of Ecology and Environmental Management, Winchester.

⁴ Author(s): Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021). *Birds of Conservation Concern 5*.

⁵ European Commission (2011). *Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'*. European Commission, Brussels.

⁶ Forrester, R.W., Andrews, I.J., McInerney, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C., & Grundy, D.S. (eds) (2007) *The Birds of Scotland*. The Scottish Ornithologists Club, Aberlady.

⁷ Gilbert, G., Gibbons, D.W. & Evans, J. 1998. *Bird monitoring methods*. RSPB, Sandy.

⁸ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). *Raptors: a field guide to survey and monitoring*, 3rd edition. The Stationery Office, Edinburgh

⁹ Ruddock, M. & Whitfield, D.P. (2007). *A Review of Disturbance Distances in Selected Bird Species*. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage

¹⁰ Goodship, N.M. and Furness, R.W. (2022) *Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species*. NatureScot Research Report 1283.

¹¹ Note that SNH changed the name to NatureScot on 24/08/2020.

¹² Scottish Natural Heritage (SNH) (2000). *Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action*. SNH Guidance Note.

¹³ SNH (2017). *Recommended bird survey methods to inform impact assessment of onshore wind farms*, Version 2.

¹⁴ SNH (2016a). *Assessing connectivity with Special Protection Areas (SPAs)*, Version 3.

- Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees (SNH, 2016b)¹⁵;
- Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier *Circus cyaneus*, merlin *Falco columbarius* and short-eared owl *Asio flammeus* (SNH, 2016c)¹⁶;
- Assessing significance of impacts from onshore wind farms on birds out with designated areas (SNH, 2018a)¹⁷;
- Assessing the cumulative impacts of onshore wind farms on birds (SNH, 2018b)¹⁸;
- Environmental Impact Assessment Handbook (SNH, 2018c)¹⁹;
- Natural Heritage Zone Bird Population Estimates (Wilson et al., 2015)²⁰.

Consultation

- 10.9 As part of the Scoping exercise, a consultation exercise was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 10.10 The Scoping Opinion was received from the ECU/ Scottish Ministers on 7th of October 2022.
- 10.11 Consultation relevant to the ornithology assessment was undertaken with Highland Council, NatureScot and the RSPB who commented on aspects of methodology, sources of information, scope of assessment and cumulative development. A summary of these consultation responses is provided in Table 10.1.

Table 10.1: Consultation Responses

Consultee	Date Received	Consultation Response	Where and how is this addressed?
Highland Council	16 th September, 2022	▪ Assessment of relevant SPAs/SPA species, Schedule 1 listed species, will be required. ▪ Assess collision risk, displacement and disturbance to foraging, breeding and roosting birds. ▪ Explain any deviations from survey guidance.	▪ All SPAs within 20km were considered in this assessment, as were schedule 1 listed bird species. ▪ Collision risk, disturbance and displacement to birds is assessed as part of this chapter. ▪ Survey methods together with any deviations are set out in this chapter.

¹⁵ SNH (2016b). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees, Version 2.

¹⁶ SNH (2016c). Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier, merlin and short-eared owl.

¹⁷ SNH (2018a). Assessing significance of impacts from onshore wind farms on birds outwith designated areas, Version 2.

¹⁸ SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note.

¹⁹ 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.

²⁰ Wilson, M.W., Austin, G.E., Gillings S. & Wernham, C.V. (2015) *Natural Heritage Zone Bird Population Estimates*. SWBSG Commissioned report number SWBSG_1504.

Consultee	Date Received	Consultation Response	Where and how is this addressed?
NatureScot	15 th August, 2022	- Assess effects on Strath Carnaig and Strath Fleet Moors, Lairg and Strath Brora Lochs, Dornoch Firth and Loch Fleet and Caithness and Sutherland Peatlands SPAs. - Assess the effects of turbine lighting on birds. - Cumulative assessment is required also.	- Effects on SPAs are considered in the Habitats Regulations Appraisal section of this document. - Effects on turbine lighting on birds are considered. - A cumulative assessment is provided.
RSPB	8 th September, 2022	- Assess effects on Strath Carnaig and Strath Fleet Moors, Lairg and Strath Brora Lochs SPAs. - Two years' worth of bird survey data advised. - Full VP data (flights and conditions) to be shown in EIAR and collision modelling. - GET modelling required for golden eagle. - Assess divers (both species) at the SPA and NHZ level. - Consider available data from other wind farm, grid connection and woodland creation schemes within the NHZ for the cumulative assessment.	- Effects on SPAs are considered in the Habitats Regulations Appraisal section of this document. - Two years' worth of bird data has been collected for the assessment. - Full VP data and collision modelling data is included as part of this assessment. - GET modelling has been undertaken for golden eagle. - Divers are assessed at both the SPA and NHZ levels. - Available data for such schemes has been included for the cumulative assessment.

Assessment Methodology and Significance

Scope of Assessment

10.12 The key issues for the assessment of potential ornithological effects relating to the Development are as follows:

- Direct loss of breeding, foraging and/or roosting habitat through construction of the Development;
- Displacement of birds through direct and indirect loss of habitat as a result of disturbance associated with construction or decommissioning activity, turbine operation and maintenance, or visitor disturbance;
- Death or injury through collision with turbine blades or other types of infrastructure associated with the Development; and

- Cumulative effects on Natural Heritage Zone (NHZ) and Special Protected Area (SPA) populations, resulting from construction, operation and decommissioning of the Development in conjunction with other developments that may also impact on the same populations.

Elements Scoped Out of Assessment

- 10.13 Due to the relatively small scale of the development compared with the wide areas travelled by migratory and commuting birds, potential barrier effects on Important Ornithological Features (IOFs) were also scoped out of the assessment.
- 10.14 The Morangie Forest SPA has been scoped out of the assessment as although it lies within the 20km SPA area of search, it is outwith the core foraging range (assumed to be similar to black grouse at 2km¹⁴) for its qualifying species capercaillie and there is no suitable habitat present for this species within or near to the site.
- 10.15 Bird species considered to be of local or less than local importance (see Table 10-2: Framework for Determining Importance of Ornithological Receptors) have also been scoped out of the assessment.

Survey Areas

- 10.16 Survey areas are based on best practice guidance (SNH, 2017)¹³. All survey areas were based on the original proposed development footprint. Following completion of the surveys the development footprint was amended to avoid the loss of any of the new native woodland plantation located adjacent to the west of the site.
- 10.17 The survey areas were based on best practice guidance as recommended by NatureScot¹³, namely:
- Breeding bird survey area covers all land within 500m of the development site.
 - The black grouse survey area covers all land within 1.5km of the development site.
 - The breeding raptor and diver survey area covers all land within 2km of the development site.
 - The eagle survey area covers all land within 6km of the development site.
- 10.18 It should be noted that the development site footprint was altered in 2024, to allow the retention of a newly planted area of native woodland at the west of the site, as such the buffers described above vary slightly from the current development site footprint. This is described in more detail in the Assumptions and Limitations section of this report. The survey areas are illustrated on Figure 10.2.

Desk Based Study and Data Sources

- 10.19 A request for the background records of raptor species recorded within 2km of the Site in the last five years (extended to 6km for eagle species), was made to the Highland Raptor Study Group.

- 10.20 Background records within the last five years relating raptors, black grouse *Lyrurus tetrix* and wader species within 2km of the Site were requested from the RSPB.

Field Survey Methods

- 10.21 Baseline Ornithology Surveys were completed over a two year-long period between September 2020 and August 2022 (inclusive). Full details of ornithology survey effort and weather conditions are given in Technical Appendix 10.1 and survey areas are illustrated on Figure 10.2.
- 10.22 During each survey, signs and observations of the relevant species were recorded in the field on large scale maps. A description of the methods followed for each survey is provided below.

Flight Activity Surveys

- 10.23 Flight Activity Surveys (FAS) were carried out between September 2020 and August 2022, using a series of watches from two VPs overlooking the Site, to record flight activity of target bird species and allow collision risk to be estimated.

VP Locations

- 10.24 The VP locations and viewsheds used during the FAS are illustrated on Figure 10.2. The viewshed (visible area from each VP) analysis was re-run to take into account the Rotor Swept Height (RSH) of the candidate turbine.

Target Species

- 10.25 Target species included the following:
- All wild swan, goose, heron and duck species;
 - All raptors and owls listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and/or Annex I of the Birds Directive;
 - All wader species;
 - Black grouse; and
 - Divers.
- 10.26 In accordance with NatureScot guidance¹³, flight lines of all target species passing through the VP viewshed (see below) were mapped in the field. Each recorded flight line was numbered and cross-referenced to the following flight information, which was recorded on standardised survey forms:
- Species, age and sex (where identification of age/sex was possible);
 - Number of birds;
 - Time (when first seen);
 - Duration of flight within the viewshed; and
 - Flight height on detection and at 15 second intervals, recorded in the following height band, which are either below, at or above potential collision height (PCH):

- Band 1 - 0 to 30 m (below PCH);
- Band 2 - 30 m to 230 m (at PCH); and
- Band 3 – >230m (above PCH).

Secondary Species

- 10.27 In addition to recording target species flights, the number and activity of 'secondary' species was summarised every 5-minutes during each FAS. Secondary species included the following: cormorant *Phalacrocorax carbo*, sparrowhawk *Accipiter nisus*, buzzard *Buteo buteo*, kestrel *Falco tinnunculus*, all gull species and raven *Corvus corax*. Recording of target species took priority over that of secondary species.

Survey Details

- 10.28 Surveys were stratified to cover all times of day including dawn and dusk periods. Each watch lasted up to three hours with a minimum 30-minute break in between watches. The recommended minimum 36 hours per season¹³ was achieved or exceeded at all VPs, for each of the two breeding and non-breeding seasons covered during the survey period.

Breeding Bird Survey

- 10.29 The Breeding Bird Survey (BBS) follows the Brown and Shepherd methodology²¹. This methodology is used to census upland breeding waders and was adapted to record all other breeding bird species within the survey area. However, territory mapping was not undertaken for passerine species, which are not considered to be particularly susceptible to the effects of onshore wind farms¹³. Surveys took place between 08:00 and 18:00 hours. Four BBS visits were undertaken between April – mid July 2021 and 2022.
- 10.30 The surveyors walked a predetermined transect through 500m × 500m grid squares ensuring that all points within the survey area are approached to within 100 m. Surveyors spent 20-25 minutes surveying each 500m × 500m grid square. All species seen or heard were recorded accurately onto large-scale field maps, using standard British Trust for Ornithology (BTO) Common Bird Census (CBC) notation. This allowed for a distinction between different species and between different behaviours – particularly between behaviours indicative of breeding (e.g. singing, alarm calling, aggressive interactions, distraction displays etc.) and those not related to breeding. The breeding bird survey results were supplemented by records of breeding birds noted during other surveys carried out in the breeding season. If a singing or displaying bird was recorded at a particular location within the survey area on at least one of the four visits, it was assumed to be holding a territory and/or breeding.
- 10.31 Criteria used to classify territorial behaviour included:
- Presence of nest, eggs and/or chicks;
 - Alarm calling indicative of nest, young or territory;
 - Singing males;

²¹ Brown, A.F. and Shepherd, K.B. (1993). "A method for censusing upland breeding waders". Bird Study 40: 189-195.

- Displaying or song-fighting;
- Distraction display;
- Birds aggressively defending territories;
- Birds are seen carrying food to nest or young; and
- Birds carrying faecal sacs away from active nests.

Black Grouse Surveys

- 10.32 Black Grouse Surveys were completed in April and May 2021 and 2022, based on standard methods⁷. All surveys commenced before sunrise and continued for at least two hours after sunrise. Surveys covered all potentially suitable lekking habitat within the Site Boundary and a surrounding 1.5 km Buffer Area.

Breeding Raptor and Diver Surveys

- 10.33 In addition to the BBS, walkovers and short Vantage Point (VP) watches of all accessible areas of habitat within the breeding raptor and diver survey area (Figure 10.2) were carried out on four occasions between April to early July inclusive in each of the 2021 and 2022 breeding seasons to establish whether or not raptors of conservation concern are breeding within or close to the site, following methodologies detailed in Hardey et al. (2006)²² for raptors and Gilbert et al for-diver species. Target species included Birds Directive Annex and WCA Schedule 1 listed raptor species, as well as diver species and Slavonian grebe. The survey area extended to 6km for eagle species. Observations of common raptor species buzzard, sparrowhawk and kestrel were also noted. All surveys were undertaken under Schedule 1 licence.

Assessment of Significance

- 10.34 The approach used for the Ecological Impact Assessment (EcIA) process is in line with guidance produced by CIEEM³ and NatureScot¹⁹, and comprises the following stages:
- Evaluation of the importance of ornithological features through Desk Study and Baseline Ornithology Surveys – those considered to be Important Ornithological Features²³ (IOFs) are scoped into the assessment, while species considered to be of local importance are scoped out;
 - Identification and characterisation of potential effects on IOFs;
 - Assessment of potential effects on IOFs, both from the Development alone and in combination with other developments in the surrounding area (cumulative effects);
 - Identification of any measures required to avoid and mitigate (reduce) these effects; and
 - Assessment of the significance of any residual effects after mitigation.

²² Hardey, J., Crick, H., Werham, C., Riley, H., Etheridge, B., Thompson, D. 2006. Raptors: a field guide to survey and monitoring. SNH, Inverness.

²³ CIEEM guidance³ recommends defining Important Ecological Features (IEFs), but for the purpose of this chapter, IEFs will be referred to as IOFs since only avian species are considered.

- 10.35 Further details relating to the methods used for evaluating the importance of ornithological features, characterising potential impacts, and assessing the significance of residual effects are provided below.

Sensitivity

- 10.36 Ornithological features can be important for a variety of reasons and may relate, for example, statutory designations (for protected sites), or (for species) to rarity, the extent to which they are threatened throughout their range, or to their rate of decline.
- 10.37 The level of importance of ornithological features identified during the Desk Study and Baseline Ornithology Surveys has been determined using the criteria defined in Table 10-9. These criteria have been determined with reference to CIEEM guidance³. For protected sites, this includes a consideration of statutory designations and relevant legislation, as well as potential connectivity to the Site. For species, this includes a consideration of relevant legislation, conservation status, population size and distribution, level and type of Site use and, where not a designated feature of an SPA or Ramsar site (with potential connectivity to the Site), whether the species is identified in NatureScot guidance¹⁷ as a priority for assessment when considering the development of onshore wind farms in Scotland.
- 10.38 Note that, in some cases, information relating to the size (and distribution) of local and regional populations can be limited or unavailable. Where this is the case and it is not clear whether a population is present in locally versus regionally (or regionally versus nationally) important numbers, a precautionary approach is used, and the population is assessed as being of the higher level of importance.
- 10.39 In addition to the importance of each bird species in terms of relevant legislation and conservation listings, the evaluation of species importance levels also considers the value of the Site and immediate surroundings for that species, in terms of the number of individuals using it and the nature and level of use. For example, if one or more pairs of birds listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) was found to be breeding within the Site, the species would likely be assigned a regional or higher importance level (depending on population status and trends).
- 10.40 However, if one–two Schedule 1 birds flew across the site very occasionally, and the species was not considered to be using it regularly²⁴, it would likely be assessed as being of low importance. Similarly, for protected sites, in addition to the statutory designations, the potential for connectivity with the Site is taken into account when determining its importance in the context of the assessment. Thus, a statutory site identified during the Desk Study and designated as being of national or higher importance, but with no potential connectivity to the Site, would likely be evaluated as being of no more than local importance in the context of the assessment, because there is no pathway for the Development to have an effect.

²⁴ Regular presence is based on professional judgement but is broadly defined as breeding, or more than occasional commuting, foraging or roosting.

Table 10-2: Framework for Determining Importance of Ornithological Receptors

Importance of Receptor	Examples
International	- Statutory sites of international ornithological importance (SPAs and Ramsar sites) with potential connectivity to the Site. - The regular presence²⁴ within or around the Site of a cited interest of an existing or proposed statutory site of international ornithological importance, i.e. SPA or Ramsar site, with potential connectivity to the Site. Cited means mentioned in the citation text for the protected site as a species for which the site is designated. Numbers of birds making use of the Site and/or surrounding area are also taken into account. - The regular presence within or around the Site of other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site (such as part of an assemblage where this is a designated feature), where there is potential connectivity with the Site. Numbers of birds making use of the Site and/or surrounding area are also taken into account.
National (Scotland)	- Statutory sites of national ornithological importance (SSSIs and NNRs) with potential connectivity to the Site. - The regular presence within or around the Site of a designated feature of an existing or proposed statutory site of national ornithological importance, i.e. SSSI or NNR, with potential connectivity to the Site. Numbers of birds making use of the Site and/or surrounding area are also taken into account. - The regular presence within or around the Site of a species listed on Annex I of the Birds Directive, where the species is not a cited interest of a statutory site of international ornithological importance but is present in nationally important numbers. - The regular presence within or around the Site of a breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), where the species is not a cited interest of a statutory site of international ornithological importance but is present in nationally important numbers. - The regular presence within or around the Site of nationally important numbers of a species of conservation concern²⁵, where this is identified in NatureScot guidance¹⁹ as a priority for assessment. - The regular presence within or around the Site of nationally important numbers of a migratory species which is either rare or vulnerable, or warrants special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to a proposed development, and which is identified in SNH guidance¹⁹ as a priority for assessment.
Regional	- A cited interest of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, which is present within or around the Site infrequently or in relatively low numbers but could use the Site more regularly post-construction. - Other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, which is present within or around the Site infrequently or in low numbers but could use the Site more regularly post-construction. - Other species listed on Annex I of the Birds Directive, or breeding species listed on Schedule 1 of the Wildlife and

²⁵ An SBL priority species or Red/Amber-listed BoCC

Importance of Receptor	Examples
	Countryside Act 1981 (as amended), that are present within or around the Site infrequently or in low numbers (regionally or locally important numbers) but could use the Site more regularly post-construction. A regionally (i.e. at the NHZ scale) important population/assemblage of a species of conservation concern²⁵ that regularly occurs within or around the Site, where this is identified in NatureScot guidance¹⁹ as a priority for assessment.
Local	- Statutory sites of international or national ornithological importance (SPAs, Ramsar sites, SSSIs and NNRS) with no potential connectivity to the Site. - Sites of local ornithological importance (e.g. Local Nature Reserves (LNRs)). - A cited interest of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, but which is present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. - Other bird species that contribute to the integrity of an existing or proposed SPA or Ramsar site, with potential connectivity to the Site, but which are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. - Other species listed on Annex I of the Birds Directive, or breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), that are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. - Other species identified in NatureScot guidance¹⁹ as a priority for assessment, but which are present within or around the Site infrequently or in low numbers, and Site use is not expected to increase significantly post-construction. - A locally important population/assemblage of a species of conservation concern²⁵ that regularly occurs within or around the Site, but is not identified in NatureScot guidance¹⁹ as a priority for assessment and is unlikely to be at significant risk of impact from the Development.
Less than Local	All other species that are widespread and common and of low conservation concern (e.g. included on the UK BoCC Green-list) and which are not present in locally important (or greater) numbers.

Identifying and Characterising Potential Effects

10.41 In line with the CIEEM EclA guidance³ where possible, consideration is given to the following characteristics when identifying potential effects of the Development on IOFs:

- Nature of effect:** whether it is positive (beneficial) to the IOF, e.g. by increasing species diversity or extending habitat, or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
- Extent:** the spatial or geographical area over which the effect may occur;
- Magnitude:** the size, amount, intensity, and volume of the effect;
- Duration:** the duration of an effect as defined in relation to IOF characteristics (such as a species' life cycle) as well as human timeframes. It should also be noted that the

duration of an activity may differ from the duration of the resulting effect; e.g. if short-term construction activities cause disturbance to breeding birds, there may be long-term implications from failure to reproduce that season;

- **Frequency:** the number of times an activity occurs may influence the resulting effect;
- **Timing:** this may result in an impact on an IOF if it coincides with critical life stages or seasons (e.g. the breeding season); and
- **Reversibility:** a reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation (within a reasonable timescale).

10.42 The criteria for assessing the magnitude of a potential effect are presented in Table 10-3.

Table 10-3: Framework for Determining Magnitude of Potential Effects

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

Significance of Effect

10.43 The latest CIEEM EclA guidance³ avoids and discourages use of the matrix approach to determine significance, and describes only two categories: 'significant' or 'not significant'.

10.44 According to the CIEEM guidance, for the purpose of EclA, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for important ecological features (which in this case would be IOFs) or for biodiversity in general.

10.45 NatureScot guidance (2018a)¹⁷ refers to maintaining the favourable conservation status of a bird species (or not affecting its recovery) when assessing the significance of any wind farm impact. Conservation status is defined in this guidance as:

"The sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest (which for the purposes of the Birds Directive is the EU)."

10.46 Conservation status is considered to be "favourable" under the following circumstances:

- "population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;
- the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and
- there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis".

- 10.47 Effects can be considered significant at a wide range of scales from international to local. NatureScot (2018a)¹⁷ recommends that:

"The concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern. An adverse impact on a species at a regional scale (within Scotland) may adversely affect its national conservation status".

- 10.48 Thus:

"An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status, in Scotland."

- 10.49 For all species, the most relevant scale for assessment of significant effects on conservation status of breeding populations is considered to be the appropriate NHZ.
- 10.50 The Site is located within the east of NHZ 5 (The Peatlands of Caithness and Sutherland)²⁰. For wintering or migratory species that are not designated features of statutory sites, there is limited information on NHZ populations; in this situation effects on the conservation status of the Scottish population have been considered when determining whether potential effects are likely to be significant.
- 10.51 In this assessment, all effects that could threaten the integrity of a statutory site designated for ornithological features or the favourable conservation status of a population have been scoped out.

Embedded Mitigation

- 10.52 The key embedded mitigation with relevance to ornithological features is the implementation of a Breeding Bird Protection Plan (BBPP), as outlined below, to protect breeding birds.
- 10.53 Subsequent sections of this chapter assume that the embedded mitigation described below will be fully implemented.
- 10.54 Under the Wildlife and Countryside Act 1981 (as amended) it is an offence to kill or injure any bird, or to damage or destroy nests and eggs. Breeding species listed on Schedule 1 of the Act are afforded additional protection, as they are also protected from disturbance while breeding. Accordingly, a Breeding Bird Protection Plan (BBPP) will be developed to detail good practice measures aimed at ensuring the safeguarding of breeding birds and legislative compliance during all phases of the Development. Proposed measures are outlined below.

Construction Phase

- 10.55 **Pre-construction survey for breeding divers:** Both red-throated and black-throated divers were recorded within the survey area and red-throated diver attempted to breed in 2022. There are suitable breeding waterbodies for both species in and adjacent to the site.

Furthermore, for black-throated diver the site lies within connectivity to composite features of both Lairg and Strath Brora Lochs and the Caithness and Sutherland Peatlands SPAs for which it is a qualifying species. As such, precautions must be taken to avoid potential disturbance to nesting birds. A pre-construction survey of areas of suitable habitat for breeding divers within 1km of works will be completed ahead of any operations, by a suitably experienced and Schedule 1 licenced qualified Ecological Clerk of Works (ECoW), to check for active nests (or other evidence of breeding).

- 10.56 **Pre-construction survey for breeding hen harrier:** The site lies adjacent to the Strath Carnaig and Strath Fleet Moors SPA and SSSI, which are designated on account of their breeding hen harrier population. As such, precautions must be taken to avoid potential disturbance to nesting birds, or destruction of nests. A pre-construction survey of areas of suitable habitat for breeding divers within 1km of works will be completed ahead of any operations, by a suitably experienced and Schedule 1 licenced qualified Ecological Clerk of Works (ECoW), to check for active nests (or other evidence of breeding).
- 10.57 **Pre-construction survey for other breeding birds:** where construction works are required during the breeding bird season (March to August inclusive), the area within 500m of works will be surveyed ahead of any operations, by a suitably experienced and qualified ECoW, to check for active nests of all bird species.
- 10.58 **Toolbox talk:** a 'toolbox talk' will be delivered by a suitably experienced ECoW to ensure that all contractors working on the Development are aware of ornithological sensitivities and relevant legislation.
- 10.59 **Protection of nesting birds:** if any nests (or breeding territories of Schedule 1 species) are identified during pre-construction surveys, an exclusion zone around the nest/breeding territory will be established (with the distance appropriate to the species and in consultation with NatureScot as deemed necessary)). No works will be permitted within the exclusion zone and no personnel or vehicles will be allowed to enter or pass through until the ECoW has confirmed that the chicks have fledged, or the breeding attempt has failed.
- 10.60 Where this is not feasible, NatureScot will be contacted, and further mitigation measures agreed to ensure that nesting birds are not harmed, and those species listed on Schedule 1 not disturbed either.
- 10.61 **Minimising disturbance from site vehicles:** where construction works are required during the breeding bird season, further mitigation measures to limit the impact of vehicular disturbance will be considered and implemented where necessary.

Operational Phase

- 10.62 Routine maintenance required during operation is expected to be minimal, limited to small areas and of temporary duration. However, should significant operational works be required during the nesting bird season, or any Schedule 1 nesting birds be observed during the operational phase, it is recommended that the mitigation measures outlined above for the construction phase are implemented to protect breeding birds and ensure compliance with the relevant legislation.

Decommissioning Phase

- 10.63 As decommissioning works are likely to be of a similar nature and duration as construction activities, the mitigation outlined above for construction works should also be implemented during the decommissioning phase, in order to protect breeding birds.

Cumulative Effects

- 10.64 A cumulative ornithological assessment has been undertaken following NatureScot¹⁸ guidance and considering the favourable conservation status populations within the relevant NHZ (NHZ 5 – The Peatlands of Caithness and Sutherland).
- 10.65 Note that, as different projects often employ different baseline survey and impact assessment methods, data often cannot be directly compared, and so quantitative assessment of cumulative impacts and effects is often not possible. Furthermore, as there is no compulsion for developers to share commercial data with other companies, it is often impossible to acquire a full dataset. Therefore, a comprehensive and quantitative cumulative impact assessment is rarely possible. However, every effort has been made to provide a qualitative assessment that is as robust as the available data allows.

Assumptions and Limitations

- 10.66 There was a prolonged period of heavy rain in the spring of the 2021 survey season. Although, surveys were timed to avoid this, the water levels in the waterbodies on the site and surrounding area rose considerably, and this may have led to a lack of breeding wildfowl in 2021.
- 10.67 A small section of the access track which comes into the site from Lairg II wind farm in the west lies partially outwith the breeding bird survey area. However, the wider (black grouse, raptor and diver surveys) undertaken for the current development also recorded records of wader species. It is also covered by the VP viewsheds. Accordingly, it is considered that the bird baseline is robust and that this is not a significant limitation to the assessment.

Baseline Conditions

Desk Study Results

Statutory Sites

- 10.68 Information about statutory and non-statutory sites designated for ornithology were sought during the desk study undertaken as part of this assessment. In terms of ornithology, internationally designated nature conservation sites (Special Protected Areas (SPAs) and Ramsar sites) within 20km of the Development and nationally designated sites (SSSIs and National Nature Reserves; NNRs) within 5km of the Development will be identified.
- 10.69 Data relating to non-statutory sites designated for ornithology within 2km of the Development site will be considered for the assessment.

10.70 A summary of known ornithologically designated sites is presented on Table 10-4 below and illustrated on Figure 10.1a-c.

Table 10-4: Ornithologically Designated Sites

Site name	Designation	Distance from site (km)	Reason for designation
Strath Carnaig and Strath Fleet Moors	SPA and SSSI	Composite features bordering the north and southeast of the site.	Breeding hen harrier.
Lairg and Strath Brora Lochs	SPA and SSSI	3.3km North	Breeding black-throated diver <i>Gavia arctica</i> .
Caithness and Sutherland Peatlands	SPA and Ramsar	8km Northwest	Breeding black-throated diver, golden eagle <i>Aquila chrysaetos</i> , dunlin <i>Calidris alpina</i> , common scoter <i>Melanitta nigra</i> , golden plover <i>Pluvialis apricaria</i> , greenshank <i>Tringa nebularia</i> , hen harrier, merlin, red-throated diver <i>Gavia stellata</i> , wigeon <i>Anas penelope</i> , short-eared owl, wood sandpiper <i>Tringa glareola</i> (SPA); Breeding birds, blanket bog greylag goose <i>Anser anser</i> and dunlin (Ramsar).
Dornoch Firth and Loch Fleet	SPA and Ramsar	8.4km East	Bar-tailed godwit <i>Limosa lapponica</i> , curlew <i>Numenius arquata</i> , dunlin, greylag goose, osprey <i>Pandion haliaetus</i> , oystercatcher <i>Haematopus ostralegus</i> , redshank <i>Tringa totanus</i> , scaup <i>Aythya marila</i> , teal <i>Anas crecca</i> , wigeon, non-breeding waterfowl assemblage.
Morangie Forest	SPA	18km South	Capercaillie <i>Tetrao urogallus</i> .

10.71 No non-statutory sites designated for ornithology have been identified within 2 km of the proposed development.

Background ornithological records

10.72 Highland Raptor Study Group confirmed there were no previously known eagle eyries within the search area. No information on any other raptor species has been provided.

- 10.73 The RSPB provided 10 satellite tag fix locations between 2018 and 2022 for single tagged hen harriers for the 10km grid square which includes the site. They also provided observational records of a single snipe *Gallinago gallinago* and a single curlew from 2017.

Baseline Surveys

Flight Activity Surveys

- 10.74 Details of the total number of target species flights are presented in Table 3 in Technical Appendix 10.1, located in EIAR Volume 4. Species specific breeding and non-breeding seasons and the number of flights per season for each species is included in Technical Appendix 10.2. Details of these flights are summarised in Table 10-5: Summary of Target Species Flights below.

Table 10-5: Summary of Target Species Flights

Species	Number of Flights	Number of Birds	Number of Flights at PCH	Number of Birds at PCH
Black-throated diver	10	13	8	10
Cormorant <i>Phalacrocorax carbo</i>	3	3	1	1
Common sandpiper <i>Actitis hypoleucos</i>	1	1	0	0
Golden eagle	82	93	78	88
Goshawk <i>Accipiter gentilis</i>	1	1	1	1
Greylag goose	2	4	1	2
Greenshank	3	5	2	4
Goldeneye <i>Bucephala clangula</i>	2	6	1	1
Golden plover	14	364	12	342
Grey heron <i>Ardea cinerea</i>	6	6	2	2
Hen harrier	33	34	23	24
Red kite <i>Milvus milvus</i>	41	44	40	43
Lapwing <i>Vanellus vanellus</i>	1	1	1	1
Mallard <i>Anas platyrhynchos</i>	4	7	0	0
Merlin	7	7	4	4
Osprey	19	19	19	19
Peregrine <i>Falco peregrinus</i>	4	4	4	4
Pink-footed goose <i>Anser brachyrhynchus</i>	6	442	6	442
Red-throated diver	28	37	26	35
Red-breasted merganser <i>Mergus serrator</i>	1	2	0	0
Short-eared owl	6	7	3	4
Snipe	2	2	2	2
Teal	4	7	0	0
Tufted duck <i>Aythya fuligula</i>	4	7	0	0

Species	Number of Flights	Number of Birds	Number of Flights at PCH	Number of Birds at PCH
White-tailed eagle <i>Haliaeetus albicilla</i>	10	10	10	10
Wigeon	1	2	0	0
Whooper swan <i>Cygnus cygnus</i>	5	49	4	47

- 10.75 Collision modelling was undertaken for species with more than five flights in either year one or year two. As set out within NatureScot guidance, the assumption has been made that turbines are operational for 85% of the time (15% down-time) for comparison with other onshore wind farm collision risk models. However, the Applicant has advised a realistic figure of 40% for turbine operation based on windPRO software analysis for the site, therefore the collision risk calculations have also been prepared with a realistic down-time of 60%.
- 10.76 Full species collision modelling results are presented in Technical Appendix 10.2 and are summarised in Table 10-6 and Table 10-7 below.

Table 10-6: Summary of Target Species Collision Modelling Results (15% downtime)

Species	Mean Collisions Per Year	Mean Years Per Collision
Golden plover	1.201	0.8
Red-throated diver	0.106	9.4
Black-throated diver	0.024	41.9
Osprey	0.033	30.1
Golden eagle	0.090	11.1
Hen harrier	0.058	17.3
Red kite	0.149	6.7
White-tailed eagle	0.036	28.0

Table 10-7: Summary of Target Species Collision Modelling Results (60% downtime)

Species	Mean Collisions Per Year	Mean Years Per Collision
Golden plover	0.565	1.8
Red-throated diver	0.050	20.0
Black-throated diver	0.011	88.9
Osprey	0.016	64
Golden eagle	0.042	23.7
Hen harrier	0.027	36.9
Red kite	0.070	14.3
White-tailed eagle	0.017	59.5

- 10.77 Secondary species flights recorded during the flight activity survey comprised low numbers of common gull *Larus canus*, buzzard *Buteo buteo*, raven *Corvus corax* and kestrel *Falco tinnunculus*.

Breeding Bird Survey

- 10.78 In the 2021 breeding season two pairs of greenshank, four pairs of golden plover, one pair of dunlin and one pair of curlew were recorded within the breeding bird survey area. A colony of common gulls (12 pairs in 2021) is also present on Lochan na Faolaig.
- 10.79 In the 2022 breeding season, three pairs of greenshank, eight pairs of golden plover, two pairs of dunlin, one pair of common sandpiper, three pairs of snipe, one pair of mallard, three pairs of teal, one pair of tufted duck and one pair of wigeon were recorded within the breeding bird survey area. The colony of common gulls (10 pairs in 2022) remained present on Lochan na Faolaig.
- 10.80 The Survey Area also supports a range of non-target breeding species typical of the habitats present.
- 10.81 Bird survey results for which territory mapping was undertaken are presented in Table 10-8: Breeding Bird Survey Results below and illustrated on Figures 10.5a-b and Confidential Figure 10.6 for greenshank due to its Schedule 1 status.

Table 10-8: Breeding Bird Survey Results

Species*	Number of territories in Survey Area	Conservation listings**
2021 Breeding Season		
Greenshank	2	Schedule 1; Amber
Golden plover	5	Annex 1; Green; SBL
Dunlin	1	Red; SBL
Curlew	1	Red; SBL
Common gull	12	Amber
2022 Breeding Season		
Greenshank	3	Schedule 1; Amber
Golden plover	8	Annex 1; Green; SBL
Dunlin	2	Red; SBL
Common sandpiper	2	Amber
Snipe	3	Amber
Mallard	1	Amber
Teal	3	Amber
Tufted duck	1	Green
Wigeon	1	Amber
Common gull	10	Amber
*Species names and order follow the British List maintained by the BOUError! Bookmark not defined. **Red = UK Red-listed Birds of Conservation Concern (BOCC) 5; Amber = UK Amber-listed BoCC 5; Green = UK Green-listed (not of conservation concern) SBL = listed on the Scottish Biodiversity List.		

Black Grouse Survey

- 10.82 In the 2021 breeding season no black grouse were recorded within the survey area. A two bird lek was recorded in the wider survey area and a single lekking bird was recorded to the north of the site over 2km from the site.
- 10.83 In the 2022 breeding season a single male bird was recorded lekking in the southern section of the wider black grouse survey area.

- 10.84 The locations of lekking black grouse are illustrated on Confidential Figure 10.6 and grid references are provided in the Confidential Annex (Technical Appendix 10.3) which accompanies this document.

Breeding Raptor Survey

- 10.85 Male hen harriers were observed holding territory early in the 2021 season on separate occasions approximately 800m and 1.5km to the north of the site respectively (possibly the same bird). However, despite dedicated watches and searches, no evidence of any breeding was recorded.
- 10.86 Two pairs of short-eared owl were considered likely to have bred within the survey area in 2021, near the lochs in the west of the site (see Confidential Annex – Appendix 10.3 and Figure 10.6).
- 10.87 In 2022 a new golden eagle eyrie was recorded, approximately 3.5km east of the site. The nest failed in the spring period however, likely at the early laying or incubation stage. The location of the eyrie is illustrated on Figure 10.6 and the grid reference is provided in the Confidential Annex (Technical Appendix 10.3).
- 10.88 A pair of red kites attempted to breed in a woodland to the north of the site in 2022 (see **Confidential** Technical Appendix 10.3) and Figure 10.6).
- 10.89 A merlin nest was recorded to the east of the breeding raptor survey area in 2022 (see Confidential Annex (Technical Appendix 10.3) and Figure 10.6).

Breeding Diver Survey

- 10.90 In 2021, a pair of black-throated diver and a pair of red-throated diver were present early in the season in the survey area, and additional focal local watches were undertaken where birds had been observed, but subsequently there was no evidence of any breeding for either species. There was an extended period of heavy rain during the late spring, which resulted in significant water level rises in the lochs during late April to mid-May 2021 and it is considered possible any nests may have been flooded out.
- 10.91 A pair of red-throated divers nested in 2022 on a lochan within the developable area. Subsequent monitoring showed that the nest was vacated in June 2022, and at that point was considered to have failed, most likely a result of otter predation.
- 10.92 In 2022, a pair of black-throated diver were observed again early in the breeding season but did not settle to breed within the survey area.
- 10.93 The location of the 2022 red-throated diver nest is illustrated on Figure 10.6 and the grid reference is provided in the Confidential Annex (Technical Appendix 10.3).

Identification and Evaluation of Key Effects

Potential Effects on Birds

- 10.94 The main ways in which the wind farm may affect IOFs are via:
- Habitat loss due to land-take;
 - Disturbance/displacement; and
 - Collision with turbines.
- 10.95 Each of these potential effects, during each phase of the Development life cycle (construction, operation, and decommissioning) in which the effect could occur, is discussed in turn below.
- 10.96 In addition, as noted previously, cumulative effects may arise as a result of the combined effects of multiple developments affecting the same bird population.

Effects during Construction

Habitat Loss

- 10.97 Construction of turbine bases and associated infrastructure will lead to direct habitat loss. The severity of potential effects is dependent on the extent of land-take, the type of habitat affected and the species using the Site and surrounding area. In this case, the extent of habitat loss will be relatively small (16.72 ha in total) and will comprise approximately 1.6% of the habitats located within the habitat survey area. Accordingly, target raptor species and wader species will lose a small amount of foraging habitat to the development as will upland wader species, but this is of a small scale given the proportions of suitable habitats that exist within these species core foraging ranges within and adjacent to the site. As most of the site and the surrounding area is comprised of similar open upland habitats, it is likely that the impacts of habitat loss on birds will be minimal.

Disturbance and Displacement

- 10.98 During the construction phase of the proposed development, there will be increased levels of activity by site personnel, vehicles, and machinery, resulting in increased levels of noise and visual disturbance. This could lead to displacement or disruption of breeding, foraging and/or roosting birds. The severity of potential effects depends on the following:
- The timing of works, with potential effects likely to be greatest during the breeding season;
 - The magnitude of the disturbance (e.g. a vehicle driving slowly along the access track without stopping is likely to result in a relatively low or even negligible magnitude of disturbance, whereas a period of prolonged and noisy machinery operation involving numerous Site personnel is likely to be of high magnitude);
 - The extent of displacement (both spatially and temporally);

- The availability of suitable habitats in the surrounding area for displaced birds to occupy; and
- The behavioural sensitivity of birds using the Site (which is likely to vary between species).

Effects during Operation

Disturbance and Displacement

- 10.99 The operation of turbines and increased human activity associated with maintenance of the proposed development has the potential to cause disturbance and displace birds from the Site. However, disturbance effects during the operational phase are likely to be of a lower magnitude than during construction, as some species become habituated to turbines (Colin Nisbet, Pers. Obs.), and the level of human activity and associated disturbance on Site will be considerably reduced compared to the construction phase.
- 10.100 Individual turbines, or a wind farm as a whole, may present a barrier to the movement of birds, restricting or displacing birds from much larger areas. The effect this would have on a population is subtle and difficult to predict with any degree of certainty. If birds regularly have to fly over or around obstacles or are forced into suboptimal habitats, this may result in reduced feeding efficiency and greater energy expenditure. By implication, this will reduce the efficiency with which they accumulate reserves, potentially affecting survival during migration and/or breeding success. Based on the location and size of the proposed development, presence of other wind farms in the wider area, habitats within the Site and wider area, target species flight activity and potential bird disturbance distances¹⁰ it is considered highly unlikely that there will be any barrier effects on any target species. Potential barrier effects have therefore been scoped out of the assessment.
- 10.101 Disturbance/displacement effects would also include those as a result of the requirement to have aviation lighting on turbines over 150m. Directional lighting will be used at the development, which has a range of 2000 candela (cd), when viewed on a horizontal plane. This brightness figure is reduced significantly as the viewing angle changes. For example, the brightness is reduced by 50% to 1000 cd when viewed from 1 degree below the horizontal (as outlined in Technical Appendix 14.1 within EIA Volume 4).
- 10.102 Distance from aviation lights also reduces their perceived brightness, a phenomenon known as attenuation. Measurements indicate that attenuation is typically in the order of 10 to 20% but can be as much as 75% depending on atmospheric conditions. On the basis that most birds are not likely to be flying on an exact horizontal plane with the turbine lighting the reduction in brightness is considered likely to reduce attractiveness to bird species considered more likely to be drawn towards turbine lighting such as seabirds and nocturnally migrating passerines³¹, which, in any case, are more likely to be affected by offshore wind farms, rather than inland onshore sites like at Acheilidh.

Collision with Turbines

- 10.103 The frequency and likelihood of a collision occurring depends on a number of factors. These include aspects of the size and behaviour of the bird (including their use of a site), the nature of the surrounding environment and the structure and layout of the turbines.

Birds that tend to fly above or below RSH are likely to collide less frequently than species that regularly fly at RSH. Collision risk is also likely to be higher for birds that spend much of the time in the air, such as foraging raptors and species that regularly commute between feeding and breeding or roosting grounds (e.g. geese and gulls), where this involves frequent flights over a site. The risk of bird collisions at wind farms is also higher in areas where large concentrations of birds are present (e.g. on major migration routes or close to roost sites used by large numbers of birds).

- 10.104 It should be noted that operational disturbance and collision risk effects are mutually exclusive in a spatial sense, i.e. a bird that avoids a wind farm due to disturbance cannot be at risk of collision with the turbine rotors at the same time²⁶. However, they are not mutually exclusive in a temporal sense; a bird may initially avoid a wind farm but habituate to it and could then be at risk of collision.

Effects during Decommissioning

- 10.105 Turbine removal may cause disturbance to birds breeding, foraging, or roosting on site. The level of impact will depend on the bird species present at the time of decommissioning and cannot be reliably predicted at this stage. However, as decommissioning activities are generally of a similar type and intensity as construction activities, the assessment considers that the potential effects of decommissioning will be similar in nature to the potential effects of construction, with the exception that habitat is likely to be restored and any displaced birds will be able to return to abandoned territories.

Evaluation of Ornithological Features

- 10.106 An evaluation of the importance of each ornithological feature identified during the Desk Study or recorded during the Baseline Ornithology Surveys is provided in Table 10-9. Sites designated for ornithological interest of bird species evaluated as being of Regional or higher importance are considered to be IOFs, while those of Local or lesser importance are not considered to be IOFs and have been scoped out of the assessment in the following sections.

Table 10-9: Evaluation of Importance of Ornithological Features

Importance Level	Feature	Justification
International	Strath Carnaig and Strath Fleet Moors SPA/SSSI; and Hen harrier	Strath Carnaig and Strath Fleet Moors SPA qualifies under Article 4.1 by regularly supporting a population of European importance of the Annex I species hen harrier. The site supported 12 breeding pairs at the time of designation, representing about 2.5% of a GB population of 483 pairs. It is currently considered to be in unfavourable and declining status. Composite features of the SPA border the north and southeast edges of the site. Hen harriers were not confirmed as breeding within the survey area in either 2021 or 2022, although male birds were recorded holding territory 800m and 1.5km north of the site in 2021. 33 hen harrier flights were recorded over the course of the FAS surveys and this species and collision risk for this species

²⁶ Madders, M. & Whitfield, D.P. (2006). Upland raptors and the assessment of wind farm impacts. Ibis 148, 43-56

Importance Level	Feature	Justification
		modelled as a loss of a single bird every 17.3 years based on a 15% operational downtime, or a single bird every 36.9 years based on a 60% operational downtime.
International	Lairg and Strath Brora Lochs SPA/SSSI; and Black-throated diver	The Lairg and Strath Brora Lochs SPA qualifies under Article 4.1 of the EC Wild Birds Directive by supporting a population of European importance of black-throated diver, an Annex I species. The site supports six pairs of black-throated diver, representing 3% of the British population. Single territories are formed by Lochs Dola & Tigh na Greige and Lochs Beannach (Dalnessie) & na Gainemh The Lairg and Strath Brora Lochs population has a high productivity. During 1986-1998 the SPA averaged one fledged chick per monitored territory every two years in comparison with a national average of one fledged chick per monitored territory every three and a half years. The combination of large population size and high productivity means that the site makes a significant contribution to the production of fledged chicks in Scotland as a whole. The SPA was last assessed in 2008 as being of a 'favourable and maintained' status. Black-throated divers were not recorded as breeding on site in either of the 2021 and 2022 breeding seasons, however, birds were recorded using the lochs within the survey area. Ten black-throated diver flights were recorded over the course of the FAS surveys. Collision modelling for this species equated to a loss of a single bird every 41.9 years based on 15% downtime and one bird every 88.9 years based on 60% downtime.
International	Caithness and Sutherland Peatlands SPA and Ramsar	The Caithness and Sutherland Peatlands SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: ▪ Red-throated diver (2006, 46 pairs, 3.5% of the GB population). ▪ Black-throated diver (1994, 26 pairs, 15% of the GB population). ▪ Hen harrier (1993 to 1997, mean of at least 14 pairs, at least 2.8% of the GB population). ▪ Golden eagle (1992, 5 pairs, 1% of the GB population). ▪ Merlin (1993 and 1994, an estimated 54 pairs, 4% of the GB population). ▪ Golden plover (1993 and 1994, 1,064 pairs, 5% of the GB population). ▪ Wood sandpiper (up to 5 pairs, up to 40% of the GB population). ▪ Short-eared owl (30 pairs, 2% of the GB population); and ▪ Dunlin (1993 and 1994, 1,860 pairs, 20% of the GB population). The Caithness and Sutherland Peatlands SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: ▪ Common scoter (2007, at least 21 pairs, <0.1% of the Western Siberia/Western & Northern Europe/Northwestern Africa

Importance Level	Feature	Justification
		biogeographic population and at least 40.4% of the GB population). ▪ Greenshank (2009, at least 653 pairs, at least 0.9% of the Europe/Western Africa biogeographic population and at least 59.4% of the GB population), and ▪ Wigeon (1993/94, at least 43 pairs, <0.1% of the Western Siberia/Northwestern/Northeastern Europe biogeographic population and at least 10.8% of the GB population). Of the SPA qualifying species recorded on during the surveys for the development only black-throated diver has a core foraging range (up to 10km)¹⁴ within connectivity to the site. Based on the core foraging ranges of the other species recorded during the surveys for the development the remainder of the bird assemblage present is not considered to be part of the SPA or Ramsar species populations.
International	Dornoch Firth and Loch Fleet SPA and Ramsar	The Dornoch Firth and Loch Fleet SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: osprey forage throughout the SPA (up to 6 territories within feeding range, 6% of the GB population, with 1 pair breeding within the site, 1% of the GB population) and bar-tailed godwit (1989/90 to 1993/94 winter peak mean of 1,184 individuals, 2% of the GB population). Dornoch Firth and Loch Fleet SPA further qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species: greylag goose (1989/90 to 1993/94 winter peak mean of 1,146 individuals, 1% of the Icelandic/UK/Ireland biogeographic population) and wigeon (1989/90 to 1993/94 winter peak mean of 15,304 individuals, 2% of the W Siberia/NW & NE Europe biogeographic population). Dornoch Firth and Loch Fleet SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1989/90 to 1993/94, a winter peak mean of approximately 34,500 individual waterfowl was recorded, comprising 22,000 wildfowl and 12,500 waders, including nationally important populations of the following species: curlew (1,397 individuals, 1.0% of the GB population); teal (1,592 individuals, 1.0% of the GB population); scaup (123 individuals, 1% of the GB population), redshank (1,272 individuals, 1% of the GB population), wigeon (15,304 individuals, 5% of the GB population); greylag goose (1,146 individuals, 1% of the GB population) and bar-tailed godwit (1,184 individuals). The assemblage additionally now includes nationally important populations greater than 2,000 individuals of: dunlin <i>Calidris</i> (2005/06 to 2009/10, winter peak mean of 4,088 individuals, 1% of the GB population) and oystercatcher (2004/05 to 2009/10, winter peak mean of a minimum of 2,459 individuals, 0.8% of the GB population). Of the qualifying species recorded on during the surveys for the development only osprey and greylag goose have core foraging

Importance Level	Feature	Justification
		ranges (up to 10km and 15-20km respectively)¹⁴ within connectivity to the site. Based on the core foraging ranges of the other species recorded during the surveys for the development the remainder of the bird assemblage present is not considered to be part of the SPA or Ramsar species populations. Osprey did not breed within the survey area and were only recorded overflying and foraging at lochs within and adjacent to the site.
Regional	Golden eagle	Listed on Annex I, Schedule 1/1A, the SBL. Not considered to be part of an SPA population. Latest SRMS (2020 data)²⁷ cites 116 pairs of golden eagles in Highland. Nearest known eyrie is 3.5km from the site. 88 flights over the FAS survey area, so confirmed use by foraging birds. Collision modelling predicts a loss of a single bird every 11.1 years based on 15% downtime and one bird every 23.7 years based on 40% downtime. GET modelling for previous turbine layouts at the development site, (based on 20 and 33 turbine layouts, as opposed to the 12 turbine layout, which has evolved from design mitigation) was considered to have an insignificant effect on golden eagles (See CONFIDENTIAL Technical Appendix 10.4).
Regional	Red-throated diver	Listed on Schedule 1 and Annex 1, also green listed and an SBL species. NHZ population estimate of 58 pairs in 2013²⁰. A pair nested within the survey area in 2022, but failed early on, likely due to predation. 28 flights recorded during surveys for the development. Collision modelling predicts the loss of a single bird every 9.4 years based on 15% downtime and one bird every 20.0 years based on 60% downtime.
Local	Short-eared owl	Annex 1, Amber and SBL listed species. NHZ population estimate of 55 pairs in 2013²⁰. Two pairs attempted to breed within the survey area in 2021. Short-eared owl are typically a low flying species and, therefore less likely to collide with turbine blades. Short-eared owl are also an irruption type species, with numbers that fluctuate in line with vole numbers (expert judgement based on observed population patterns)). Only one of the pairs was in the 300-500m disturbance range for this species¹⁰ and it is also considered that the second pair could be readily accommodated in the abundant nearby suitable habitat adjacent to the site. Insufficient flight activity to warrant collision modelling.
Local	Greenshank	Schedule 1 and Amber listed species. NHZ population estimate of 421 pairs in 2013²⁰. Two territories were recorded in the breeding bird survey area, site in 2021 and three pairs were recorded within the survey area in 2022. A peak of two pairs were recorded within the potential maximum 500m

²⁷ Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling

Importance Level	Feature	Justification
		disturbance zone ¹⁰ , (in 2022). Insufficient flight activity to warrant collision modelling. The localised displacement of up to two pairs is not considered to be significant at the regional level and, if this occurs, these birds will likely to be accommodated in neighbouring suitable habitat.
Local	Golden plover	Annex 1, SBL and Green listed species. NHZ population estimate of 3,125 pairs in 2013 ²⁰ . Four pairs recorded in the survey area in 2021. Eight pairs recorded in 2022. A peak of five pairs were recorded within the potential maximum 500m disturbance zone ¹⁰ , (in 2022). The localised displacement of up to four pairs is not considered to be significant at the regional level and, if this occurs, these birds will likely to be accommodated in neighbouring suitable habitat. Collision modelling for this species predicts a loss of 0.8 birds per year based on 15% downtime and 1.8 birds per year based on 60% downtime, neither of which are considered to be significant at the regional population level.
Local	Merlin	Schedule 1, Annex 1, Red listed and SBL listed species. NHZ population estimate of 71 pairs in 2013 ²⁰ , declining to 55 pairs in Highland in 2020 based on the latest available SRMS data ²⁷ . Single nest recorded, outwith the 2km breeding raptor survey area when undertaking wider eagle surveys in 2022. In sufficient flight activity for collision modelling.
Local	Red kite	Schedule 1 and 1A, Annex 1, Green and SBL listed species. 37 pairs in Highland in 2020 based on the latest available SRMS data ²⁷ . One territory recorded in the breeding raptor survey area in 2022, well over 1km from the developable area and outwith potential maximum 300m disturbance zone for this species ¹⁰ . Collision modelling predicts a loss of one bird every 6.7 years based on 15% downtime and one bird every 14.3 years based on 60% downtime.
Local	Osprey	Schedule 1, Annex 1, Amber and SBL listed species. 78 pairs in Highland in 2020 based on the latest available SRMS data ²⁷ . No breeding records within survey area. Collision modelling predicted the loss of a single bird every 30.1 years based on 15% downtime and one bird every 64.0 years based on 60% downtime.
Local	White-tailed eagle	Schedule 1, A1 and 1A, Annex 1, Amber and SBL listed species. 54 pairs in Highland in 2020 based on the latest available SRMS data ²⁷ . No breeding records within survey area. Collision modelling predicted the loss of a single bird every 28.0 years based on 15% downtime and one bird every 59.5 years based on 60% downtime.
Local	Black grouse	A red listed and SBL species. Two small leks (two males and a single male) recorded in 2021 and a single male lek recorded in 2022. NHZ population estimate of 30 males ²⁰ .

Importance Level	Feature	Justification
		The closest lek is approximately 1km from the footprint of the development, so outwith the maximum 750m potential disturbance zone for this species ¹⁰ .
Less than local	All other species	All other species are either recorded in very low numbers, or are overflying the site on an occasional basis, or not considered to be priority species for assessment ¹⁹ .

Assessment of IOFs

10.107 Potential effects of the proposed development on each IOF categorised as regionally important or above are assessed below. For SPA qualifying species a Habitats Regulations Appraisal (HRA) is undertaken to assist the competent authority in its determination of the potential effects of the proposed development on following SPAs:

- Strath Carnaig and Strath Fleet Moors;
- Lairg and Strath Brora Lochs;
- Caithness and Sutherland Peatlands; and
- Dornoch Firth and Loch Fleet.

10.108 The assessment considers the significance of potential impacts following implementation of embedded mitigation.

Habitats Regulations Appraisal

Context - Strath Carnaig and Strath Fleet Moors SPA

10.109 Strath Carnaig and Strath Fleet Moors SPA qualifies under Article 4.1 by regularly supporting a hen harrier breeding population of European importance and qualifies as a SSSI on account of its breeding hen harrier population. The site supported 12 breeding pairs at the time of designation, representing about 2.5% of a GB population of 483 pairs. It is currently considered to be in 'unfavourable and declining' status in July 2021, with negative pressures cited to be:

- Agricultural operations;
- Burning;
- Development;
- Forestry operations;
- Game/ fisheries management; and
- Plant pests and diseases

10.110 Strath Carnaig and Strath Fleet Moors SPA and SSSI comprises a total area of 14,703.6ha. The nearest part of the development footprint lies approximately 50m from the boundary of the SPA and the nearest turbine lies approximately 200m from the boundary of the SPA.'

Context - Lairg and Strath Brora Lochs SPA

- 10.111 The Lairg and Strath Brora Lochs SPA qualifies under Article 4.1 of the EC Wild Birds Directive by supporting a black-throated diver breeding population of European importance. It is also notified as an SSSI on account of its breeding black-throated diver population. The area of the SPA and SSSI is 286.3ha. The site supports six pairs of black-throated diver, representing 3% of the British population. Single territories are formed by Lochs Dola & Tigh na Greige and Lochs Beannach (Dalnessie) & na Gainemh.
- 10.112 The Lairg and Strath Brora Lochs population has a high productivity. During 1986-1998 the SPA averaged one fledged chick per monitored territory every two years in comparison with a national average of one fledged chick per monitored territory every three and a half years. The combination of large population size and high productivity means that the site makes a significant contribution to the production of fledged chicks in Scotland as a whole. The SPA was last assessed in 2008 as being of a 'favourable and maintained' status, with no negative pressures identified on the breeding black-throated diver population.

Context – Caithness and Sutherland Peatlands SPA

- 10.113 As noted in Table 10-9 of all of the qualifying species listed under the Caithness and Sutherland Peatlands SPA only black-throated diver has a core foraging range (up to 10km)¹⁴ that lies within connectivity of the site. As such, the remainder of the Caithness and Sutherland Peatlands SPA listed bird species that have been recorded during the bird surveys for the development are not considered to be part of the SPA populations and this HRA considers the effects on black-throated diver only.
- 10.114 The Caithness and Sutherland Peatlands SPA qualifies in part under Article 4.1 by supporting a breeding black-throated diver population of European importance, namely 26 pairs at the time of designation, which was considered to be 15% of the British population. The SPA has a total area of 147,726.54 ha. The black-throated diver population was last assessed in June 2018 and considered to be in 'favourable and maintained' status, with no negative pressures cited on this receptor.

Context – Dornoch Firth and Loch Fleet SPA

- 10.115 As noted in Table 10-9 of all of the qualifying species listed under the Dornoch Firth and Loch Fleet SPA only osprey and greylag goose have core foraging ranges that lie within connectivity of the site. Having said that, for greylag goose only a single flight per year (of two birds in 2021 and 2022) was recorded during the entirety of the FAS surveys. As such, greylag goose and the remainder of the Dornoch Firth and Loch Fleet SPA listed bird species that have been recorded during the bird surveys for the development are not considered to be part of the SPA populations and this HRA considers the effects on osprey only.
- 10.116 The Dornoch Firth and Loch Fleet SPA qualifies in part under Article 4.1 by supporting a breeding osprey population of European importance (up to 6 territories within feeding range, which was considered to be 6% of the British population. The osprey population was last assessed in June 2017 and considered to be in 'favourable and maintained' status, with forestry cited as the only negative pressure for this receptor.

SPA Conservation Objectives

- 10.117 Conservation objectives should define the desired state for a designated site in terms of the features for which it has been designated. The aim of the conservation objectives for a designated site is to maintain the favourable conservation status of the qualifying interests.
- 10.118 This requires definition of “favourable conservation status”. The Habitats Directive²⁸ defines the ‘conservation status’ of a species as *“the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a national level.”*
- 10.119 The conservation status will be taken as ‘favourable’ when:
- “population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
 - the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.”
- 10.120 The conservation objectives for each of the SPAs are identical and are specific to all of their qualifying species. They are:
- To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
 - To ensure for the qualifying species that the following are maintained in the long term:
 - Population of the species as a viable component of the site
 - Distribution of the species within site
 - Distribution and extent of habitats supporting the species
 - Structure, function and supporting processes of habitats supporting the species
 - No significant disturbance of the species

Overview of the HRA Process

- 10.121 The European Union Council Directives on the Conservation of Wild Birds (2009/147/EC) – the Birds Directive – and on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) – the Habitats Directive – are implemented in Scotland by the Conservation of Habitats and Species Regulations 2017²⁹, known as the ‘Habitat Regulations’. The Habitat Regulations place a statutory duty on Planning Authorities to meet the requirements of these Directives.

²⁸ 92/43/EEC

²⁹ <https://www.legislation.gov.uk/uksi/2017/1012/contents/made>

- 10.122 The Habitats Regulations impose specific and strict legal 'tests' that must be met before plans or projects, not directly connected with or necessary to the management of a site, can be approved by the competent authority (in this case the Moray Council).
- 10.123 The competent authority must determine whether the plan or project is likely to have a significant effect on the site. If the plan or project is deemed to have a likely significant effect (LSE), either individually or in combination with other plans or projects, it will be subject to 'appropriate assessment.'
- 10.124 The competent authority may only agree to the proposals after having ascertained that they will not, in combination with other plans or projects, adversely affect the integrity of the site based on its qualifying species and the conservation objectives for the site (required to maintain Favourable Conservation Status). The competent authority may consider any mitigation measures committed to maintain site integrity when undertaking the Appropriate Assessment.
- 10.125 In Scotland, the competent authority must consult NatureScot, as the Statutory Nature Conservation Organisation, for advice during the HRA process prior to making their determination.
- 10.126 The European Commission has provided guidance in relation to the appropriate assessment process³⁰. This guidance sets out the procedure for an appropriate assessment and provides help in defining the terms used in the Habitats Directive. In simple terms, this means that if a proposed development, such as a wind farm, is likely to have a significant effect on an SPA, then the competent authority must undertake an 'Appropriate Assessment'. The mechanism of this is described in more detail below.
- 10.127 The key considerations to inform the appropriate assessment are to:
- Describe the potential impacts of the proposal on the qualifying species detailing which aspects or effects of the proposal could impact them and their conservation objectives.
 - Characterise the potential impacts, e.g. whether short/long term, reversible or irreversible and in relation to the proportion/importance of the interest affected, and the overall effect on the site's conservation objectives, taking into account any possible 'in combination' effects with other plans or projects.
 - Each conservation objective should be considered to determine whether the conservation objective will still be maintained in the event of consent of the development.
 - If an adverse effect on site integrity is concluded there is a requirement to consider alternative solutions which could avoid the effect.
 - Where there are no satisfactory alternative solutions, a project can only proceed where there are imperative reasons of overriding public interest.

³⁰ European Commission 2000. Managing Natura 2000 Sites: The provisions of Article 6 of the "Habitats" Directive 92/43/EEC. Office for official publications of the European Communities, Luxembourg.

Potential Effects on Hen Harrier, Black-throated Diver, and Osprey

10.128 There is the potential for disturbance and increased mortality to these species (via collision) as a result of the installation, operation and decommissioning of the development. These impact pathways are considered in detail in this section. Due to the relatively small-scale nature of the wind farm (12 turbines) barrier effects (i.e. additional energy required by birds to avoid the wind farm) have been scoped out of the HRA. Additionally, there is no land-take from any of the SPAs required for the proposed development and therefore direct habitat loss is also scoped out.

10.129 Effects scoped in are as follows:

- Indirect Habitat Loss – in this case this refers to the loss of roosting, foraging or nesting habitat from disturbance and displacement of birds from the windfarm infrastructure.
- Collision Risk - the proposed wind farm could result in direct mortality of hen harrier, black-throated diver, osprey, and greylag goose associated with the SPA populations when they fly through the wind rotor swept area. There is also the potential for the increase of this risk from birds striking guy lines (such as black grouse) or being attracted to the presence of aircraft warning lights on the turbine towers and nacelles (although this is considered more likely to affect seabirds and nocturnally migrating passerines)³¹. It should be noted that the loss of breeding adult birds may also result in the loss of their unfledged young on a given season.

Summary of Baseline for SPA Species Considered in the HRA

Hen harrier

10.130 Hen harrier is a species which is listed on Schedule 1 and Schedule 1A of the Wildlife and Countryside Act, which affords this species legal protection from disturbance while breeding and from harassment on a year-round basis. Hen harrier is also listed on Annex 1 of the Birds Directive and is a red listed species of conservation concern⁴. The regional (Highland) hen harrier population was estimated to be 40 pairs in 2020 based on the latest available SRMS data²⁷.

10.131 There was no hen harrier breeding in the survey area confirmed in either 2021 or 2022. 33 hen harrier flights were recorded in the FAS over the two-year period. collision risk for this species modelled as a loss of a single bird every 17.3 years based on a 15% operational downtime, or a single bird every 36.9 years based on a 60% operational downtime.

Black-throated diver

10.132 Black-throated diver is listed on Schedule 1 of the Wildlife and Countryside Act, which affords this species legal protection from disturbance while breeding. It is also listed on Annex 1 of the Birds Directive, and is an amber listed species of conservation concern⁴. A recent (within the last five years) regional population is not available for this species, but

³¹ NatureScot (2020). The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures

the NHZ population was considered to be 36 pairs in 2006²⁰ and has likely remained stable based on the 'favourable and maintained' status of this receptor in both the Lairg and Strath Brora Lochs and Caithness and Sutherland Peatlands SPAs.

- 10.133 Black-throated diver were not recorded as breeding on site in either of the 2021 and 2022 breeding seasons, however, birds were recorded using the lochs within the survey area. Ten black-throated diver flights were recorded over the course of the FAS surveys. Collision modelling for this species equated to a loss of a single bird every 41.9 years based on 15% downtime and one bird every 88.9 years based on 60% downtime.

Osprey

- 10.134 Osprey is listed on Schedule 1 of the Wildlife and Countryside Act, which affords this species legal protection from disturbance while breeding. It is also listed on Annex 1 of the Birds Directive, and is an amber listed species of conservation concern⁴.
- 10.135 The regional (Highland) osprey population in 2020 is considered to be 78 pairs based on the latest available SRMS data²⁷.
- 10.136 There are no osprey breeding records within survey area. Collision modelling for this species predicted the loss of a single bird every 30.1 years based on 15% downtime and one bird every 64.0 years based on 60% downtime.

Summary of Development

- 10.137 The development is fully described in Chapter 3 (Project Description) with the key components shown on Figure 3.1.
- 10.138 The development infrastructure is as follows:
- 12 turbines;
 - Associated turbine compound areas including foundations and hardstanding areas for erecting cranes at each turbine location;
 - On-site tracks connecting each turbine;
 - Extension of the consented Lairg II on-site access track to connect Lairg II and the Proposed Development;
 - Two watercourse crossings, as set out in EIAR Volume 4, Technical Appendix 8.1;
 - An energy storage compound to store batteries with a 5MW capacity which would be within the construction compound footprint;
 - Underground cables linking the turbines to the substation;
 - Up to three borrow pit search areas for the extraction of stone on-site (indicated on Figure 3.1 as borrow pit search areas);
 - A temporary construction compound including provision for onsite concrete batching;
 - An on-site 132kV substation to provide a grid connection;
 - Habitat Management provisions as proposed within EIAR Volume 4, Technical Appendix 9.3

- 10.139 The proposed development would be time-limited to 35 years from the first date of final commission. The construction phase would last approximately 18 months and decommissioning would last approximately six months.

Effects Resulting from Indirect Habitat Loss to SPA Species

- 10.140 There is no direct loss of any SPA habitat resulting from the installation of the development. However, there is likely to be some loss of habitat outwith the SPAs used by SPA populations within their core foraging ranges of the SPAs. The land-take within the site is 16.72ha which represents a very small proportion the land available within the core foraging distances for hen harrier (2km), black-throated diver (10km) and osprey (10km); and in the context of the areas of the SPAs. Under the proviso that all three species may be subject to disturbance from human activity within 750m, which is considered to be the upper limit for each of these species¹⁰, there is considered the potential for temporary displacement during the construction and decommissioning phases. During operation it is considered that effects resulting from indirect habitat loss will be reduced. It has been stated in the case of hen harrier that if displacement of foraging occurs then it will likely be limited to within 100m of wind turbines if it occurs at all (and there are also records of hen harrier nesting within 200-300m of operational turbines)³². Accordingly, effects on these breeding birds are very likely to be of a low magnitude and **not significant**.

Collision Risk to SPA Species

- 10.141 Hen harrier: 33 hen harrier flights were recorded in the FAS over the two-year period. collision risk for this species modelled as a loss of a single bird every 17.3 years based on a 15% operational downtime, or a single bird every 36.9 years based on a 60% operational downtime, which is considered to be a realistic 'worst case' based on the windfarm capacity factor, which equates to the potential loss of a single bird over the whole life of the windfarm. However, given the precautionary nature of the model and the lack of actual recorded hen harrier UK windfarm bird fatalities, (two birds at a Perthshire wind farm in 2012)³³, it is unlikely that there will be any collisions at all and accordingly effects on the SPA and NHZ populations are predicted to be negligible.
- 10.142 Black-throated diver: Ten black-throated diver flights were recorded over the course of the FAS surveys. Collision modelling for this species equated to a loss of a single bird every 41.9 years based on 15% downtime and one bird every 88.9 years based on 60% downtime, which under either scenario is extremely unlikely to result in a single collision over the entire operational period. Accordingly, effects on the SPA and NHZ populations are predicted to be negligible.
- 10.143 Osprey: Collision modelling for this species predicted the loss of a single bird every 30.1 years based on 15% downtime and one bird every 64.0 years based on 60% downtime. At such a low-level effects on the SPA and NHZ populations are predicted to be negligible.

³² Whitfield, D.P. & Madders, M. 2006. A review of the impacts of wind farms on hen harriers *Circus cyaneus* and an estimation of collision avoidance rates. Natural Research Information Note 1 (revised). Natural Research Ltd, Banchory, UK.

³³ Haworth, P and Fielding, A (2012). A review of the impacts of terrestrial wind farms on breeding and wintering hen harriers. Haworth Conservation.

Assessment of Development in Isolation

- 10.144 On the basis that none of the effects on hen harrier, black-throated diver and osprey are predicted to elevate beyond the negligible level both at the SPA and NHZ population levels. As such, it is considered that conservation objectives of the SPAs will be maintained based on the assessment of the development in isolation.

In Combination Assessment

- 10.145 On the basis that osprey and black-throated diver have a core foraging distance of 10km, and hen harrier have a core foraging distance of 2km, wind farm sites within 10km of the site considered in the In-Combination Assessment for each of the four SPAs covered in the HRA. The cumulative assessment covers consented developments, developments in planning, under construction and operational developments for which information was available. The results of this are presented in Table 10.10 below.

Table 10-10: In-Combination Assessment

Windfarm	Status	Hen harrier	Black-throated diver	Osprey
Garvary	In planning	Collision risk 0.079 birds per annum Effects on SPA population negligible	Insufficient flight activity for collision modelling No Effects on SPA population.	Collision risk 0.251 birds per annum, assessed as low magnitude and not significant. No Effects on SPA population.
Lairg II	Consented	Collision risk 0.018 birds per annum Effects on SPA population negligible	Insufficient flight activity for collision modelling Effects on SPA population negligible	Insufficient flight activity for collision modelling No Effects on SPA population.

Future Baseline – Hen Harrier (Strath Carnaig and Strath Fleet Moors SPA)

- 10.146 This SPA hen harrier population is considered to be unfavourable and declining and is facing a range of negative pressures. However, with changes in land management, away from burning and other practices related to game management. It is considered that there is the potential for this population to recover.

Future Baseline – Black-throated Diver (Lairg and Strath Brora Lochs and Caithness and Sutherland Peatlands SPAs)

- 10.147 Both SPAs have favourable and maintained black-throated diver populations and this is likely to continue.

Future Baseline – Osprey (Dornoch Firth and Loch Fleet SPA)

- 10.148 The SPA has a favourable and maintained osprey population and this is likely to continue.

Golden Eagle Assessment

Construction Effects of Golden Eagle

Habitat Loss/Change

- 10.149 The extent of habitat loss or change to result from the proposed development will be minimal in that it is not anticipated that any of change in habitat will lead to a significant change in prey availability for golden eagles, either by a reduction in prey availability or by improving conditions for prey species within the Site. The latter situation has occurred at American wind farm sites where removal of grazing livestock has led to an increase in prey around turbines, leading to golden eagle collisions³⁴. It should be noted that this assessment of minimal change pertains to habitat characteristics only; the potential for de-facto habitat loss through displacement is discussed below.
- 10.150 The potential disturbance effects of Habitat Loss/Change on breeding golden eagle during construction are assessed as a negligible magnitude of change. As golden eagle are a medium sensitivity IoF (regional significance), this is a minor effect and **not significant**.
- 10.151 The amount of habitat lost to the development is negligible in relation to the overall size of suitable breeding habitat available either in the local area or within the NHZ. It is predicted that sufficient suitable habitat will remain to maintain the local golden population, therefore there will be a negligible impact on this species as a result of habitat loss. GET modelling (**CONFIDENTIAL** Technical Appendix 10.4) also considers that no significant effects on golden eagle populations.

Disturbance/Displacement

- 10.152 It is anticipated that construction activities may lead to golden eagle avoiding the Site during construction. As this effect is likely to continue throughout the operational life of the proposed development, these effects are discussed below under operational effects.
- 10.153 The potential disturbance effects of temporary disturbance/displacement on breeding golden eagle during construction are assessed as a minor magnitude of change. As golden eagle are a medium sensitivity IoF (regional significance), this is a minor effect and **not significant** and there would be no reduction in the NHZ.

Operational Effects on Golden Eagle

Disturbance/displacement effects on golden eagle during operation

- 10.154 The indirect impact of bird displacement through disturbance and resultant loss of foraging habitat is considered to be greater than collision risk at European wind farms³⁵.

³⁴ Orloff, S. and Flannery, A (1992). 'Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991'. Final Report to Alameda, Contra Costa and Solano Counties and the California Energy Commission by Biosystems Analysis, Inc., Tiburon, CA.

³⁵ Johnson, G.D., Strickland, M.D., Erickson, W.P. and Young, D.P., Jr (2007). 'Use of data to develop mitigation measures for wind power development impacts to birds'. pp 241-257 In: Birds and Wind Farms: Risk assessment and Mitigation. Lucas, M., Guyonne, F.E., Ferrer, J and M. (Eds) Quercus, Madrid.

Golden eagle displacement effects have been well studied in America, which suggest a degree of displacement although these studies are inconclusive, and the confounding issues of land management and prey availability make conclusions difficult.

- 10.155 A study of golden eagle foraging at a site in Argyll before and after wind farm construction concluded that golden eagle avoided former foraging areas following wind farm construction³⁶. The research indicated that the eagles avoided the wind farm footprint. This was not due to access limitations, as turbines were well separated, and larger than tree spacing in forested areas used by foraging eagles. Although the observations conclude that the wind farm construction has led to eagle displacement, it should be recognised that the confounding issues of land management and prey availability make conclusions difficult (for example, adjacent areas were managed to increase prey availability for eagles as mitigation to draw the birds away from the wind farm area).
- 10.156 However, support for the hypothesis that golden eagles avoid wind farms comes from the consensus amongst raptor surveyors that golden eagle is very infrequently seen foraging near or within operational wind farms. Therefore, a precautionary approach taken here is that the footprint of the proposed development will be avoided during the operation life of the wind farm and therefore represent de-facto habitat lost. Whilst this is a favourable outcome with regard to potential collision, the site lies within potential core range (6 km) of a pair of eagles and, as such, an assessment of the effect of lost foraging habitat has been undertaken.
- 10.157 Golden eagle home ranges can be very large, with birds occurring at low densities in remote mountainous country. Resultantly, it is difficult, time-consuming, and expensive to gain an understanding of golden eagle ranging behaviour through field research. Therefore, modelling has been used since the early 2000s to identify important habitat areas within eagle home ranges and avoid the loss of these areas through developments such as wind farms and afforestation.
- 10.158 Until recently, modelling the effects of habitat loss for territorial golden eagles has been undertaken using the Predicting Aquila Territory (PAT) model³⁷. However, the data from satellite tagging of territory holding adult birds, underpinned by previous data from tagged, dispersing, juvenile birds, has greatly improved understanding of golden eagle movements and range use. This data has revealed the PAT model to have key limitations that can make predictions of range loss of limited value. Subsequently, a new model, the Golden Eagle Topographical (GET) model³⁸, has been developed, based on a considerable and growing data set on the movements of satellite tagged golden eagles.
- 10.159 NatureScot now state that in their view, the GET model is superior to the PAT model and that the recommended guidance to inform impact assessment of onshore wind farms will

³⁶ Walker, D., McGrady, M., McCluskie, A., Madders, M., & McLeod, D.R.A. (2005). Resident golden eagle ranging behaviour before and after construction of a wind farm in Argyll. *Scottish Birds* 25: 24-40

³⁷ McLeod, D.R.A., Whitfield, D.P., Fielding, A.H., Haworth, P.F. & McGrady, M.J. (2002). Predicting home range use by Golden Eagles *Aquila chrysaetos* in western Scotland. *Avian Science* 2: 183–198

³⁸ Fielding, A.H., Haworth, P.H., Anderson, D., Benn, S., Dennis, R., Weston, E. & whitfield, D.P. (2019). A simple topographical model to predict golden eagle *Aquila chrysaetos* space use during dispersal.

be updated shortly explaining the discontinuation of the PAT model and recommending GET³⁹.

- 10.160 FAS survey results show a moderate level of golden eagle flight activity over the site, which may be indicative of a pair prospecting a territory as well as foraging behaviour, supported by the fact flight activity for this species was higher in year 1 and that a new eyrie was recorded in year 2. However, given the distance of the new eyrie from the development site no displacement of breeding golden eagle from the nest is predicted, hence a negligible magnitude of change which would not lead to long-term effects on the population and is **not significant**.

Collision risk to golden eagle during operation

- 10.161 Despite the observed tendency for golden eagle to avoid operational wind farms (discussed above), there are several recorded golden eagle collisions with wind farm infrastructure at European wind farms. Dürre (2021)⁴⁰ reports that, as of May 2021, there has been a total of 23 golden eagle deaths at European wind farms, (12 in Sweden, eight in Spain, two in Norway and one in Germany).
- 10.162 Collision modelling predicts a loss of a single bird every 11.1 years based on 15% downtime and one bird every 23.7 years based on 60% downtime.
- 10.163 The potential collision effects of breeding golden eagle during operation are assessed as a slight magnitude of change. As golden eagle are a medium sensitivity IoF (regional significance), this is considered to a minor effect and **not significant** in terms of the NHZ population.

Decommissioning effects on golden eagle

Disturbance/displacement effects on golden eagle during decommissioning

- 10.164 It is predicted that the effects of disturbance on breeding golden eagle during decommissioning will be of a similar level to those experienced during construction and therefore effects are predicted to be of the same level, namely low magnitude and **not significant**.

Summary of potential effects on golden eagle

- 10.165 All effects on golden eagle are considered to be of a minor magnitude and there are **no significant effects** predicted on the NHZ population of this species.

³⁹ <https://www.nature.scot/doc/naturescot-statement-modelling-support-assessment-forestry-and-wind-farm-impacts-golden-eagles>. Statement issued on 13 August 2021.

⁴⁰ Vogelverluste an Windenergieanlagen / bird fatalities at wind turbines in Europe (updated 07 May 2021). Online at <https://ifu.brandenburg.de/ifu/de/aufgaben/natur/artenschutz/vogelschutzwarte/arbeitschwerpunkt-entwicklung-und-umsetzung-von-schutzstrategien/auswirkungen-von-windenergieanlagen-auf-voegel-und-fledermaeuse/#> [accessed 05/12/19].

Red-throated diver assessment

Construction Effects on Red-throated diver

Habitat Loss/Change

- 10.166 The amount of habitat lost to the development is negligible in relation to the overall size of suitable breeding habitat available either in the local area or within the NHZ. It is predicted that sufficient suitable habitat will remain to maintain the local red-throated diver population, therefore there will be a negligible impact on this species as a result of habitat loss.

Disturbance/Displacement

- 10.167 Under the assumption that breeding red-throated divers may be disturbed from areas within 750m of the proposed construction activities, a pair of red-throated diver may be temporarily displaced. This is likely to represent < 1.7% of NHZ population. Due to the temporary nature of the potential impact, it is considered to be of negligible magnitude.

Operational Effects on Red-throated diver

Disturbance/Displacement

- 10.168 Taking a conservative worst-case scenario that red-throated divers breeding within 750m of the development footprint may be affected, a pair may be displaced in the long-term due to operation of the wind farm. It is expected that displaced birds, if this occurs at all, will be accommodated in suitable waterbodies in the locality area outwith the development. As a worst case scenario, the displacement of a pair of red-throated diver to the regional NHZ population is of a low magnitude and is **not significant**.

Collision Risk to Red-throated diver

- 10.169 Collision modelling predicts the loss of a single bird every 9.4 years based on 15% downtime and one bird every 20.0 years based on 60% downtime. Under the realistic (40%) worst case scenario one – two birds may be lost over the 35-year lifespan of the development. This potential impact is likely to be negligible in terms of the local and wider regional population.

Summary of Impacts on Red-throated diver

- 10.170 The direct loss of habitat that would occur as a result development and the indirect loss of habitat through potential displacement due to disturbance are not predicted to result in any more than negligible impacts on the regional population of the NHZ. Collision risk is also likely to be negligible; therefore, the predicted effect of the development on this species is not significant.

Cumulative Effect Assessment

- 10.171 Potential cumulative effects can include direct habitat loss, disturbance, and collision risk. The potential for each of these potential effects is considered in turn below and considered across consented, and operational wind farm sites within the Peatlands of Caithness and Sutherland NHZ. Save for cumulative effects on SPAs, which are discussed above in the HRA, golden eagle and red-throated diver are the only other ornithological receptors taken forward for cumulative assessment.

Cumulative Habitat Loss

- 10.172 The total habitat loss will be 16.72 ha, which is considered to be minimal, and, as such, it is unlikely that there will be any for potential cumulative effects on IOFs due to direct habitat loss.

Cumulative Disturbance

- 10.173 Disturbance effects are predicted to be of low to negligible magnitude for all IOFs. It is likely that any displaced birds will breed in the wider area, and some birds will potentially return to breed on or around a development site post-construction, particularly at those sites where there is abundant suitable habitat. These birds would therefore only be temporarily lost from the breeding population. Furthermore, as developments are at different phases of their life-cycle and most displacement is likely to occur during the construction phase, the numbers of birds displaced annually will be relatively small. It is considered that any disturbance during the construction, operational or decommissioning phases of the proposed development will be so minimal that there is no potential for significant cumulative disturbance impacts on IOFs.

Cumulative Collision Risk

- 10.174 Both golden eagle and red-throated diver collision risk is considered too low to result in any significant effects at the NHZ level. A search for any relevant reports from wind farm applications within their core foraging ranges from the site was conducted to assess the cumulative collision risk to these species. The results of this are presented in Table 11-11 below:

Table 10-11: Summary of Information to Inform Cumulative Effects

Windfarm	Status	Golden eagle	Red-throated diver
Garvary	In planning	Collision risk 0.094-0.118 birds per annum No significant Effects on NHZ population	Insufficient flight activity for collision modelling No Effects on NHZ population.
Lairg II	Consented	Collision risk 0.031 birds per annum No significant Effects on NHZ population	Insufficient flight activity for collision modelling No Effects on NHZ population.

10.175 Given the levels of activity of these species observed at sites where data was available, it is considered that cumulative effects are extremely unlikely to add up to a cumulatively significant effect at the NHZ population levels for these receptors.

Mitigation, Monitoring and Residual Effects

Mitigation

10.176 Following the implementation of embedded mitigation measures, no requirements for further mitigation were identified.

Monitoring

10.177 It is proposed that ornithological monitoring should take place post-construction, as outlined below and committed to in a Breeding Bird Protection Plan (BBPP):

- Year-round collision monitoring via monthly carcass searches in years 1, 2, 3, 5 and 10 of operation, to determine whether actual bird collisions are in line with predicted values; and
- Breeding bird surveys with a focus on hen harrier, divers, golden eagle, and osprey, again in years 1, 2, 3, 5 and 10, to determine the operational impacts on breeding success.

Statement of Significance

10.178 An assessment has been made of the potential for significant effects of the Development on IOFs. Embedded mitigation measures will be implemented under the BBPP. Accounting for this, the magnitude of effects of the proposed development on IOFs both alone and in combination with other schemes are assessed as being of low to negligible magnitude, and thus non-significant in terms of the EIA Regulations.

Summary

10.179 The summary of residual effects on ornithology is present in Table 10-12 below:

Table 10-12: Summary of Effects

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
<i>Construction and Decommissioning Phases</i>				
Strath Carnaig and Strath Fleet Moors SPA/SSSI and hen harrier	Disturbance/displacement to hen harrier	Not significant	BBPP	Not significant
Lairg and Strath Brora Lochs SPA/SSSI and Black-throated diver	Disturbance/displacement to black-throated diver	Not significant	BBPP	Not significant

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Caithness and Sutherland Peatlands SPA and Ramsar (black-throated diver only)	Disturbance/displacement to black-throated diver	Not significant	BBPP	Not significant
Dornoch Firth and Loch Fleet SPA and Ramsar (osprey only)	Disturbance/displacement to osprey	Not significant	BBPP	Not significant
Golden eagle	Habitat loss/change	Not significant	N.A.	Not significant
Golden eagle	Disturbance/displacement	Not significant	BBPP	Not significant
Red-throated diver	Habitat loss/change	Not significant	N.A.	Not significant
Red-throated diver	Disturbance/displacement	Not significant	BBPP	Not significant
Operational Phase				
Strath Carnaig and Strath Fleet Moors SPA/SSSI and hen harrier	Disturbance/displacement to hen harrier	Not significant	BBPP	Not significant
Strath Carnaig and Strath Fleet Moors SPA/SSSI and hen harrier	Collision risk to hen harrier	Not significant	N.A.	Not significant
Lairg and Strath Brora Lochs SPA/SSSI and Black-throated diver	Disturbance/displacement to black-throated diver	Not significant	BBPP	Not significant
Lairg and Strath Brora Lochs SPA/SSSI and Black-throated diver	Collision risk to black-throated diver	Not significant	N.A.	Not significant
Caithness and Sutherland Peatlands SPA and Ramsar (black-throated diver only)	Disturbance/displacement to black-throated diver	Not significant	BBPP	Not significant
Caithness and Sutherland Peatlands SPA and Ramsar (black-throated diver only)	Collision risk to black-throated diver	Not significant	N.A.	Not significant
Dornoch Firth and Loch Fleet	Disturbance/displacement to osprey	Not significant	BBPP	Not significant

IOF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
SPA and Ramsar (osprey only)				
Dornoch Firth and Loch Fleet SPA and Ramsar (osprey only)	Collision risk to osprey	Not significant	N.A.	Not significant
Golden eagle	Disturbance/displacement	Not significant	N.A.	Not significant
Golden eagle	Collision risk	Not significant	BBPP	Not significant
Red-throated diver	Disturbance/displacement	Not significant	N.A.	Not significant
Red-throated diver	Collision risk	Not significant	BBPP	Not significant

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 11: Noise

April 2024

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Version Control Sheet

Date	Version	Prepared by	Checked By	Comments
03/11/2023	1.0	Merlin Garnett	Cameron Sutherland	First Issue
26/11/2023	2.0	Merlin Garnett	Cameron Sutherland	Second Issue
26/03/2024	3.0	Merlin Garnett	Cameron Sutherland	Third Issue

11 NOISE

Introduction

- 11.1 This chapter considers the potential effects of noise immissions from Acheilidh Wind Farm (the 'Proposed Development').
- 11.2 For the purposes of this assessment, the selected candidate turbine model is the Siemens Gamesa SG 6.6-155 with a power output rated at 6.6MW. Two variations of this turbine, at 230m blade tip height (152.5m hub height) and 200m blade tip height (122.5m hub height), have been referenced in the following assessment. This turbine has been selected to assess the worst-case scenario for noise impacts while still aligning with the project proposal of varying blade tip heights at 230m and 200m respectively.
- 11.3 Noise impacts could potentially arise during the construction, operational, and decommissioning phases of the proposed development.
- 11.4 Potential cumulative impacts from nearby operational and consented projects, as well as those under consideration by The Highland Council (THC), have also been evaluated.
- 11.5 The project was assessed using a combination of propagation modelling and cumulative ETSU-R-97 noise limits referenced in support of third-party wind developments.
- 11.6 This chapter is supported by the following figures, included within Volume 2 of the EIAR:
- Figure 11.1: Noise Study Area; and
 - Figure 11.2: Cumulative Noise Study Area
- 11.7 The chapter is also supported by two Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 11.1: Sound Power Levels for Cumulative Developments; and
 - Technical Appendix 11.2: Predicted Immission Levels for Cumulative Developments
- 11.8 The author of this Chapter, Merlin Garnett (MSc, MIOA), is a Principal Noise Consultant with more than 12 years of relevant experience in the production of noise impact assessments for wind turbine and hybrid energy projects of all scales across the UK.
- 11.9 The technical reviewer for this chapter, Cameron Sutherland (MSc), is the Technical Director for Green Cat Renewables and has over 19 years of experience in the renewables industry, including the production of noise impact assessments for wind turbine projects in the UK.

Terminology

- 11.10 Sound pressure level (SPL) is a logarithmic measure of the effective sound pressure of a sound relative to a reference value: 20 μ Pa. It is measured in decibels (dB) above this standard reference level. The SPL descriptors referenced in this report are:
- **L_{A,eq}** is the A-weighted equivalent continuous sound pressure level;
 - **L_{A90,10min}** is the A-weighted sound pressure level exceeded for 90 percent of the time in the averaging time interval specified – in this case 10 minutes – and is the index most widely used for background noise level measurements;
 - **L_{WA}** is the A-weighted sound power level – a measure of the total sound energy emitted by a source of noise (the reference value for sound power is 1x10⁻¹²W).
- 11.11 The IoA GPG states that the **L_{A90,10min}** descriptor should be adopted for the noise assessment and that 2dB(A) should be subtracted from **L_{A,eq}** levels when converting them to **L_{A90,10min}** values.
- 11.12 The wind speeds referred to in this report are:
- **Standardised 10m wind speeds (v₁₀):** Hub height wind speeds translated to 10m height above ground level assuming a standard roughness length of 0.05m. All turbine sound power levels are quoted with reference to standardised 10m wind speeds.

Policy and Guidance

Policy

- 11.13 Chapter 5: Renewable Energy and Planning Policy of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development.
- 11.14 The following sources provide guidance on the assessment of wind turbine noise:
- Scottish Government (2022): Onshore Wind Policy Statement
 - Scottish Government (2014): Onshore wind turbines: Planning Advice
 - Planning Advice Note 1/2011 (PAN1/2011): Planning and Noise
 - The Highland Council (2016): Onshore Wind Energy Supplementary Guidance
- 11.15 Onshore wind turbines: Planning advice endorses the use of ETSU-R-97 and the 'Good Practice Guide' for the assessment of operational wind turbine noise (see below).

Guidance

Operational Phase Noise

- 11.16 Guidance for assessing operational noise from wind farms is given in:

- The Institute of Acoustics, 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'
- 11.17 This guidance was developed to standardise the approach to noise assessment of wind farms in the UK. The guidance also provides advice on the form of planning conditions that should be adopted for wind farm projects. The IoA GPG does not address the question of what noise limits should be applied as this has been determined by government.
- 11.18 The basis for operational wind farm noise limits that have been adopted in the UK is given in: 'ETSU-R-97: The Assessment and Rating of Noise from Wind Farms (1997)'; the Department of Trade and Industry (usually referred to as the Noise Working Group Recommendations). National planning guidance is clear that the IoA GPG and ETSU-R-97 should be followed in the assessment of operational noise from wind farms.
- 11.19 Supplementary Planning Guidance Note Ref: SPG.12 NLLP Policy EDI.3(A)2, refers to consideration of PAN 1/2011 - Planning and Noise. PAN 1/2011 includes an endorsement of ETSU-R-97 as the overarching assessment framework for wind turbine noise.
- 11.20 The Highland Council Onshore Wind Energy Supplementary Guidance (2016) endorses the use of both ETSU-R-97 and the Institute of Acoustics Good Practice Guide (IoA GPG) as representing best practices in the assessment of operational wind turbine noise for turbines with a rotor diameter of 16m and above.

Relevant Standards

- 11.21 The International Standard ISO 9613, 'Acoustics – Attenuation of Sound During Propagation Outdoors - Part 2', noise propagation model has been used for the turbine noise calculations.
- 11.22 IEC/TS 61400-14:2005 - Declaration of apparent sound power level and tonality values. This standard provides a method to derive appropriate sound power level values from a number of independent sources to improve robustness.

Low Frequency Noise

- 11.23 The planning guidance is clear; that there are no grounds to suppose that infrasound or low frequency noise (LFN) is an issue at receptor distances from a wind farm and refers to the 2006 study carried out by Hayes McKenzie on behalf of the Department of Trade and Industry (DTI). The report investigates the potential impact of infrasound or low frequency noise arising from wind turbines. The study concluded that infrasound or low frequency noise arising from the operation of wind turbines did not result in adverse health impacts.
- 11.24 A further research study in 2016 stated the level of infrasound due to wind turbines is low in comparison to other technical and natural sources. The findings concluded '*that adverse effects relating to infrasound from wind turbines cannot be expected on the basis of the evidence at hand.*'
- 11.25 In light of these conclusions, the assessment of infrasound or low frequency noise was considered to be unnecessary.

Vibration

- 11.26 In 2005, the Applied and Environmental Geophysics Research Group at Keele University conducted an extensive study titled 'Microseismic and Infrasound Monitoring of Low Frequency Noise and Vibrations from Windfarms'. The study was requested by the MOD, the DTI, and the British Wind Energy Association with the aim of establishing an acceptable limit that would not interfere with the detection capabilities of the seismic monitoring site located in Eskdalemuir, Scotland. The results of the investigation found that low levels of vibration and infrasound could be detected, with measurement apparatus, at large distances from the wind turbines included in the survey. The report concluded that a 10km buffer zone could be adopted at Eskdalemuir to protect the site from the interference due to wind turbines.
- 11.27 The outcome of this study has since been misinterpreted as the potential for adverse effects at residential receptors. The authors of the paper have clarified that:
- "The levels of vibration from wind turbines are so small that only the most sophisticated instrumentation and data processing can reveal their presence, and they are almost impossible to detect."*
- 11.28 They also confirmed that the level of vibration measured was not unique to wind turbines:
- "Vibrations at this level and in this frequency, range will be available from all kinds of sources such as traffic and background noise - they are not confined to wind turbines."*
- 11.29 A more recent study on the human perception of vibration from wind turbines was published in 2020. The paper presents vibration measurements from inside properties at varying distances from a wind farm. The study compares the results against criteria given in AS 2670-1 (1990) and BS 6472-1 (2008) and suggests there is a low probability of adverse impact.
- 11.30 Therefore, as current research continues to conclude that vibration due to wind farms is very unlikely to disturb residential amenity, an assessment of vibration effects has not been made.

Amplitude Modulation

- 11.31 Amplitude Modulation (AM) as an element of turbine noise has been the subject of considerable research in recent years. The University of Salford conducted a study on behalf of the Department for Business, Enterprise, and Regulatory Reform to investigate whether noise complaints arising from wind farms were due to the presence of AM. The report found that complaints were highly likely to be caused by AM in 4 out of the 27 wind farms included in the study. However, it concluded, *'that the causes of AM are not fully understood, and that AM cannot be fully predicted at current state of the art.'* The findings of the investigation were reconfirmed in 2013 in an updated research report by Renewable UK.
- 11.32 In 2016 the IoA produced 'A Method for Rating Amplitude Modulation in Wind Turbine Noise', in which amplitude modulation is defined as the following:

“Wind turbine amplitude modulation is defined as periodic fluctuations in the level of audible noise from a wind turbine (or wind turbines), the frequency of the fluctuations being related to the blade passing frequency of the turbine rotor(s).”

- 11.33 The report acknowledges that certain levels and/or characteristics of amplitude modulation may lead to disturbance and noise complaints. The guidance does not aim to define the level at which AM could pose an issue but outlines a proposed methodology to assess and rate AM arising from operational wind farms.
- 11.34 Currently, there is no assessment method for amplitude modulation that can be made pre-construction. As such, assessment of AM can only be conducted after the wind farm is operational.

Consultation

- 11.35 As part of the Scoping exercise, a consultation exercise was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 11.36 The Scoping Opinion was received from The Scottish Government Energy Consents Unit on the 7th October 2022 under reference **ECU00004528**. A response was received from Scottish Ministers after consultation from the Local Authority (THC) on the 16th September 2022. A summary of these consultation responses is provided in **Table 11.1**.

Table 11.1: Consultation Responses

Consultee	Consultation Response	Where and how is this addressed?
The Highland Council	A construction assessment should be undertaken if: “the applicant intends to undertake noisy work out-with the aforementioned times, they will be required to submit a detailed construction noise assessment for the written approval of the planning authority.”	As there were no indications that extended working hours would be required, a construction noise assessment has been scoped out of this study.
The Highland Council	An operational noise assessment is required and should be carried out in accordance with ETSU-R-97; Target noise levels should reference: “Either a simplified standard of 35dB LA90 at wind speeds up to 10m/s or 35dB LA90 (daytime) and 38dB LA90 (night-time) or 5dB above background noise levels at up to 12m/s.” “The nighttime lower limit of 43dBLA90 as suggested in ETSU is	The proposed noise limit criteria has been used within the assessment. See Section 11.52 & 11.53 .

Consultee	Consultation Response	Where and how is this addressed?
	not considered acceptable in many areas of the highlands due to very low background levels. These limits would apply to cumulative noise levels from more than one development."	
The Highland Council	A cumulative noise assessment should be undertaken to assess potential cumulative noise impacts at the nearest sensitive receptors to the proposed development. Immission predictions should be made for each cumulative development (existing or consented) at each noise sensitive receptor.	A cumulative noise assessment has been undertaken on this basis. Predictions for each third-party wind development have been made with the latest available data at the time of assessment. See Section 11.71 .

Scope of Assessment

Effects Assessed in Full

11.37 The following effects were considered to be potentially significant in relation to noise at the scoping stage and have been assessed in full within this chapter:

- Operational noise impacts arising from the Proposed Development
- Potential cumulative noise impacts at the nearest sensitive receptors

Effects Scoped Out

11.38 It is understood that construction works will take place during standard working hours and therefore a construction noise assessment has been scoped out of the Noise Impact Assessment (NIA).

Assessment Methodology and Significance

11.39 The assessment of operational noise impacts arising from the proposed development takes the form of an ETSU-R-97 assessment following the IoA GPG.

11.40 Noise impacts from the operation of the Proposed Development have initially been assessed as a singular project; the potential for cumulative effects has then been considered.

Cumulative Effects

11.41 When considering cumulative impact from two or more developments at a given property the IoA Good Practice Guide states:

'If the proposed wind farm produces noise levels within 10dB of any existing wind farm/s at the same location, then a cumulative noise impact assessment is necessary.'

- 11.42 Although no fixed criteria are given within ETSU-R-97, a search area radius of 3km from any of the proposed turbines is considered a suitable distance at which to assess other projects and beyond which, impacts on receptors would be negligible.
- 11.43 Cumulative immission levels, inclusive of those from the proposed development, should be limited to a level that does not exceed the limits set out in ETSU-R-97. For ETSU-R-97 limits to be exceeded, the proposed project levels would need to be within 10dB of those limits.

Significant presented headroom

- 11.44 Where a windfarm already exists, the test for available headroom for further development, described at 5.4.11 on p26 of the Good Practice Guide, is *'where there would be no realistic prospect of the existing wind farm producing noise levels up to the total ETSU-R-97 limits'*. The suggestion is to look for margins of e.g. 5dB to 10dB.
- 11.45 Where a significant margin exists, it is within the capacity of the LPA to agree *"a suitable predicted noise level (including an appropriate margin to cover factors such as potential increases in noise) ["X"] from the existing wind farm to be used to inform the available headroom for the cumulative assessment without the need for negotiation or cumulative conditioning.*
- 11.46 *"...a blanket value of "X" can be agreed with the planning authority. Figures that have been suggested generally range from 2 dB to 5 dB."* It is suggested that a lower figure in this range may be used for a mature site or where compliance with limits may have been demonstrated.
- 11.47 Once presented headroom has been established and a margin "X" applied to the predicted levels for the existing wind farm; what headroom remains is then available to the proposed project. This approach is aimed at resolving the issue where existing projects absorb more operational noise headroom than they credibly require, preventing further development in the area.

Study Area

Noise Sensitive Receptors (NSRs)

- 11.48 The study area criteria adopted for the identification of NSRs was the 35dB(A) noise contour as calculated from the proposed turbines.
- 11.49 Similarly, NSRs with the potential to be impacted by cumulative noise were identified as those located within a 25dB(A) noise contour on the basis that immission levels lower than 25dB(A) would be more than 10dB below the simplified ETSU limit of 35dB(A), and therefore, can be considered as non-cumulative.
- 11.50 Where NSRs were located adjacent to each other or readily formed a grouping, a single Noise Assessment Location (NAL) was selected representing the closest of the adjacent

receptors to the proposed turbines. NALs were positioned at NSRs, 15m from a dwelling façade in the direction of the nearest Project turbine or as far in that direction as the curtilage would allow. It should be noted that Garvary Cottage to the south of the site is abandoned and uninhabited. As a result, it has not been included within the noise assessment however this has been considered within the design with a buffer distance of 1.2km applied.

- 11.51 This approach follows the ETSU-R-97 principle of assessing nearest receptors; focussing on the highest impacts allows for a more concise assessment. The selected NSRs are shown on **Figure 11.1**.

Desk Based Study and Data Sources

Noise Limits

- 11.52 In line with the scoping response from THC, it is recommended that wind turbine noise should be limited to an absolute lower limit of 35dB(A) for quiet daytime periods and 38dB(A) for night-time periods (defined in **Table 11.2**), or 5dB(A) above the background noise levels, whichever the greater. For locations where the resident has a demonstrable financial involvement in the project, a lower fixed limit of 45dB(A) is applicable, or 5dB(A) above the background noise levels, whichever is the greater.
- 11.53 THC Supplementary Guidance states that a night-time lower limit of 43dB(A) suggested in ETSU is not considered acceptable due to the remote nature of many dwellings within the Highlands, resulting in lower background noise levels. As such, THC suggest that 43dB(A) is only considered applicable in the context of a cumulative noise limit.

Table 11.2: ETSU-R-97 assessment periods

The quiet daytime periods (amenity hours) are:	
18:00 - 23:00	Monday to Friday
13:00 - 23:00	Saturdays
07:00 - 23:00	Sundays
Night-time periods are: 23:00 – 07:00 every day	

- 11.54 For a project whose noise immission levels are not expected to exceed 35dB(A) at the closest Noise Sensitive Receptors (NSRs), a simplified approach may be taken that allows the project to be approved with a single fixed 35dB(A) noise limit applicable at all times or 45dB(A) where a resident has financial involvement. Where proposed project noise levels exceed 35dB(A), the ETSU-R-97 noise assessment should be undertaken with reference to noise limits derived from background noise levels.
- 11.55 For the Proposed Development in isolation, a simplified 35dB(A) ETSU-R-97 limit has been adopted to assess operational immission from the proposed turbines.
- 11.56 After review of third-party developments in the area, a cumulative ETSU-R-97 limit of 40dB(A) and 43dB(A), for daytime and night-time periods respectively, has been adopted

- in line with the most recent third-party planning application in the area; Garvary Wind Farm.

Propagation Model

- 11.57 The International Standard ISO 9613, 'Acoustics – Attenuation of Sound During Propagation Outdoors - Part 2', sound propagation model has been used for the turbine immission calculations. LAeq sound propagation was modelled using WindFarm v5.0.1.2 by ReSoft. Predicted wind turbine immission levels were calculated, inclusive of appropriate allowance for measurement uncertainties.
- 11.58 LA90 levels were derived by subtracting two decibels from the LAeq values as per the ETSU-R-97 guidance and subsequent IoA GPG. The input parameters shown in **Table 11.3** have been used and are consistent with the IoA Good Practice Guide.

Table 11.3: Propagation input parameters

Attenuation factor, G (all regions)	
Receptor height (m)	10
Attenuation factor, G (all regions)	70
Receptor height (m)	
Attenuation factor, G (all regions)	0.5 (semi-soft ground)
Receptor height (m)	4.0

- 11.59 The attenuation of sound as it travels through the air varies with frequency. The atmospheric attenuation coefficients used in the assessment, corresponding to the assumptions in **Table 11.3**, are tabulated in **Table 11.4**.

Table 11.4: Attenuation coefficients used for the sound propagation model

Octave Band (Hz)	63	125	250	500	1000	2000	4000	8000
Attenuation Coefficient (dB/km)	0.12	0.41	1.04	1.93	3.66	9.66	32.77	116.88

Barrier effect

- 11.60 Line of sight visibility was checked between proposed turbines and each receptor's assessment position at 4m height. Where a turbine is not visible from any particular assessment position (at 4m height) a -2dB adjustment to the predicted level from the screened turbine(s) is applicable. Any adjustments are reported.

Valley effect

- 11.61 Certain topographic characteristics have the potential to reinforce the propagation of sound between two locations. The IoA GPG refers to these characteristics as a 'valley' to describe a concave topographic profile. Where this criterion is met, instances are reported.

Directivity

- 11.62 Where turbine sound propagates from opposing directions relative to an NSR, the result will be a reduction in predicted noise, as the receptor will not experience simultaneous downwind conditions from both directions. Example reductions are given in Section 4.4 of the Good Practice guide. Any adjustments for directivity are reported.

Sound Power Levels

- 11.63 The proposed candidate turbine for the Proposed Development is the Siemens Gamesa SG 6.6-155 rated at 6.6MW. Two variations of this turbine at 230m blade tip height (152.5m hub height) and 200m blade tip height (122.5m hub height) have been used to align with project constraints. Sound power values for both variations of the SG 155 6.6MW were obtained from the manufacturer's sound power report (Document: D2359800/004) dated 2021-07-29 as given in **Table 11.5** and **Table 11.6**. The SG 6.6-155 incorporates trailing edge serration (TES) as standard, a technology that reduces the sound power of the turbine.

Table 11.5: Octave band sound power level for the SG 6.6 – 155 (152.5m hub height)

Octave Band (Hz)	V10 wind speed (ms ⁻¹)								
	4	5	6	7	8	9	10	11	12
	Sound Power Level [LWA] for a hub height of 152.5m [dB(A)]								
63	81.7	83.3	84.6	83.6	83.6	86.1	86.1	86.1	86.1
125	89.1	90.7	92.0	91.1	91.1	92.3	92.3	92.3	92.3
250	93.7	95.3	96.6	97.0	97.0	97.3	97.3	97.3	97.3
500	96.0	97.6	98.9	98.5	98.5	97.6	97.6	97.6	97.6
1000	95.8	97.4	98.7	99.6	99.6	99.3	99.3	99.3	99.3
2000	96.1	97.7	99.0	98.4	98.4	98.9	98.9	98.9	98.9
4000	89.5	91.1	92.4	92.7	92.7	93.0	93.0	93.0	93.0
8000	74.5	76.1	77.4	76.9	76.9	76.1	76.1	76.1	76.1
Total	102.1	103.7	105.0	105.0	105.0	105.0	105.0	105.0	105.0
Uncertainty	2	2	2	2	2	2	2	2	2
LoA Total	104.1	105.7	107.0	107.0	107.0	107.0	107.0	107.0	107.0

Table 11.6: Octave band sound power level for the SG 6.6 – 155 (122.5m hub height)

Octave Band (Hz)	V10 wind speed (ms ⁻¹)								
	4	5	6	7	8	9	10	11	12
	Sound Power Level [LWA] for a hub height of 122.5m [dB(A)]								
63	81.1	82.7	84.6	83.6	83.6	86.1	86.1	86.1	86.1
125	88.5	90.1	92.0	91.1	91.1	92.3	92.3	92.3	92.3
250	93.1	94.7	96.6	97.0	97.0	97.3	97.3	97.3	97.3
500	95.4	97.0	98.9	98.5	98.5	97.6	97.6	97.6	97.6
1000	95.2	96.8	98.7	99.6	99.6	99.3	99.3	99.3	99.3

Octave Band (Hz)	V10 wind speed (ms ⁻¹)								
	4	5	6	7	8	9	10	11	12
	Sound Power Level [LWA] for a hub height of 122.5m [dB(A)]								
2000	95.5	97.1	99.0	98.4	98.4	98.9	98.9	98.9	98.9
4000	88.9	90.5	92.4	92.7	92.7	93.0	93.0	93.0	93.0
8000	73.9	75.5	77.4	76.9	76.9	76.1	76.1	76.1	76.1
Total	101.5	103.1	105.0	105.0	105.0	105.0	105.0	105.0	105.0
Uncertainty	2	2	2	2	2	2	2	2	2
LoA Total	103.5	105.1	107.0	107.0	107.0	107.0	107.0	107.0	107.0

11.64 In the absence of stated uncertainty, an additional +2dB has been applied to the declared sound power levels to account for uncertainty.

11.65 Sound power details for cumulative projects are given at **Technical Appendix 11.1**.

Baseline Conditions

Operational Phase Baseline

11.66 The Proposed Development is located approximately 7.6km southeast of Lairg, a rural upland village in the Scottish Highlands.

11.67 The proposed layout configuration showing turbine positions and nearest noise sensitive receptors is shown in **Figure 11.1: Noise Study Area**. The red contours enclose areas predicted to receive an L90 turbine noise level in excess of 25dB(A) and 35dB(A) from the Proposed Development; given for a v10 wind speed of 9ms⁻¹ (maximum sound power for the candidate turbine in normal operating mode).

11.68 The nearest sensitive receptors are a cluster of rural cottages and farmsteads located approximately 2km northeast of the Proposed Development. The abandoned Garvary Cottage, although not assessed, is found to lie within the 35dB(A) contour situated approximately 1.2km south-west of the Proposed Development.

11.69 **Table 11.7** lists the names, noise assessment location GPS coordinates and minimum distance to the proposed turbines for each assessment location found to be in excess of 25dB(A) from the Proposed Development.

Table 11.7: Details of noise assessment locations

ID	Easting	Northing	Name	Distance to turbine (m)
NAL 1	264867	905121	Rhaoine	2480
NAL 2	266333	903831	337 Acheilidh	2200
NAL 3	266448	903784	8 Acheilidh	2240
NAL 4	266639	903713	Rowan Cottage	2375

ID	Easting	Northing	Name	Distance to turbine (m)
NAL 5	266993	903572	24 Ardachu	2510
NAL 6	267218	903610	22 Ardachu	2750
NAL 7	267249	903550	20 Ardachu	2715

Cumulative Search Area

11.70 **Figure 11.2: Cumulative Study Area** identifies third-party wind turbines within or bordering a 3km search area from the proposed development.

11.71 Details of each third-party development shown in **Figure 11.2**, are provided in **Table 11.8**.

Table 11.8: Wind developments that include turbines within or bordering the cumulative search area

Name	Status	Council	App ref.	Hub Height (m)	Total No. of Turbines	Distance from Proposed Development (m)
Lairg	Operational	THC	06/00376/FULSU	60	3	2750
Lairg II	Consented	THC	19/01096/FUL - 21/00849/FUL	82, 111 & 121	10	2095
Garvary	In Planning	THC	21/01921/S36	105	25	1000
Balblair	In Planning	THC	ECU00005055	-	9	3540

NB: (The Highland Council) THC

11.72 Each of the cumulative developments listed above is discussed in turn in the following section.

Cumulative Wind Developments

Lairg Wind Farm (06/00376/FULSU)

11.73 Lairg Wind Farm is an existing operational wind farm consisting of 3 Nordex N80 wind turbines with a blade tip height of 99.5m and rated power capacity of 2.5MW each. The site is located 3.5km southeast of Lairg and has been operational since September 2012. Lairg Wind Farm was approved with lower fixed ETSU noise limits set at 35dB(A) L90 and 38dB(A) L90 for daytime and night-time periods respectively as detailed within the projects Planning Conditions.

Lairg II Wind Farm (19/01096/FUL, 21/00849/FUL)

11.74 Lairg II Wind farm was originally consented comprising of 10 wind turbines, with 7 turbines at a maximum tip height of 180m and 3 turbines at a maximum tip height of 150m in June 2020 (19/01096/FUL). A noise impact assessment which formed part of the Environmental

Impact Assessment in support of this application was carried out with a Vestas V136 3.45MW as the candidate turbine for the project. In October 2021, a re-design of the project was consented (21/00849/FUL) which altered the tip height constraints of the project to allow for 5 wind turbines at a maximum tip height of 200m, 2 turbines at 190m and 3 turbines at 150m. It is understood that the developer is progressing with pre-commencement of construction activities and the finalisation of detailed designs. As final designs are subject to change, conservative assumptions based on the previously consented configuration of the site under application 19/01096/FUL have been used in the determination of cumulative operational noise. The project was granted consent based on the assessment for application 19/01096/FUL, adopting a fixed cumulative noise limit of 38dB(A).

Garvary Wind Farm (21/01921/S36, ECU00003251)

- 11.75 Garvary Wind Farm is a proposed wind development located on the Garvary and Achinduich Estates, east of the A836, approximately 4.5km north of Lairg. The project initially applied for consent with a scale comprising of 37 Vestas V150 wind turbines rated at 5.2MW each (21/01921/S36). However, this was later rejected by THC with the developer later submitting a revised layout scaling the project down to 25 turbines to the Scottish Government Energy Consents Unit in April 2021 (ECU00003251). In January 2023, a revised layout was proposed with minor adjustments to turbine positions and a reduced scale of 25 turbines. The candidate machine and dimensions of each turbine remained unchanged. The most recent revised layout has been used in the assessment of cumulative noise in Section 3.8. Garvary Wind Farm adopted a total ETSU-R-97 noise limit of 40dB(A) (or background +5dB) for daytime periods and 43dB(A) (or background +5dB) for night-time.

Balblair Wind Farm (ECU00005055)

- 11.76 Balblair Wind Farm is a proposed wind development located on the Balblair Estate, 2km north-west of Bonar Bridge. Scoping was submitted to the ECU in February 2024 which proposes up to 9 wind turbines with a maximum blade tip height of 180m and battery energy storage facility. The total combined capacity of the site will be in excess of 50MW. The final details of the candidate turbine and proposed BESS are unknown. The site is a joint development between Vestas and Force 9 Energy. It has therefore been assumed that a Vestas machine will be selected as the eventual candidate for the site. For the purposes of assessing cumulative impact with the Proposed Development, the Vestas V150 5.6MW turbine has been selected to represent the development. This turbine has been selected on the basis of representing worst-case noise conditions whilst still fitting in with the constraints of a maximum tip height of 180m.

Identification and Evaluation of Key Effects

Operational Effects

Predicted L90 Project Levels

- 11.77 Topographic screening was found to occur between the proposed turbines and the NSRs. Adjustments to account for these features are shown in **Table 11.9** below.

Table 11.9: Applicable adjustments for screening

L90	Screening											
Location	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
NAL1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
NAL2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
NAL3	0	0	0	0	0	-2	-2	-2	-2	-2	-2	-2
NAL4	0	0	0	0	-2	-2	-2	-2	-2	-2	-2	-2
NAL5	0	0	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
NAL6	0	0	0	-2	-2	-2	-2	-2	-2	-2	-2	-2
NAL7	0	0	0	-2	-2	-2	-2	-2	-2	-2	-2	-2

11.78 No additional topographic corrections for valley effect or directivity have been made.

11.79 The following predicted LA90 immission levels are given for the Proposed Development only, using the octave band sound power levels detailed in **Table 11.10** that are inclusive of the screening adjustments in **Table 11.9** & 2dB(A) uncertainty. The assumed level of uncertainty may overestimate actual uncertainty resulting in an overestimate of immission levels.

Table 11.10: Proposed Development immission levels

L90	dB(A)	V10 wind speed (ms ⁻¹)								
Location	Name	4	5	6	7	8	9	10	11	12
NAL1	Rhaoine	22.0	23.7	25.3	25.2	25.2	25.4	25.4	25.4	25.4
NAL2	337 Acheilidh	23.7	25.4	27.1	27.0	27.0	27.1	27.1	27.1	27.1
NAL3	8 Acheilidh	24.8	26.5	28.2	28.1	28.1	28.2	28.2	28.2	28.2
NAL4	Rowan Cottage	24.0	25.7	27.4	27.3	27.3	27.4	27.4	27.4	27.4
NAL5	24 Ardachu	22.6	24.3	26.0	25.9	25.9	26.1	26.1	26.1	26.1
NAL6	22 Ardachu	22.1	23.8	25.4	25.3	25.3	25.5	25.5	25.5	25.5
NAL7	20 Ardachu	22.1	23.8	25.4	25.3	25.3	25.5	25.5	25.5	25.5

11.80 **Table 11.11** details the exceedance of Proposed Development immission levels relative to a simplified 35dB(A) ETSU-R-97 limit.

Table 11.11: Exceedance of a simplified 35dB(A) ETSU-R-97 limit

L90	dB(A)	V10 wind speed (ms ⁻¹)								
Location	Name	4	5	6	7	8	9	10	11	12
NAL1	Rhaoine	-13.0	-11.3	-9.7	-9.8	-9.8	-9.6	-9.6	-9.6	-9.6
NAL2	337 Acheilidh	-11.3	-9.6	-7.9	-8.0	-8.0	-7.9	-7.9	-7.9	-7.9
NAL3	8 Acheilidh	-10.2	-8.5	-6.8	-6.9	-6.9	-6.8	-6.8	-6.8	-6.8
NAL4	Rowan Cottage	-11.0	-9.3	-7.6	-7.7	-7.7	-7.6	-7.6	-7.6	-7.6

L90	dB(A)	V10 wind speed (ms ⁻¹)							
NAL5	24 Ardachu	-12.4	-10.7	-9.0	-9.1	-9.1	-8.9	-8.9	-8.9
NAL6	22 Ardachu	-12.9	-11.2	-9.6	-9.7	-9.7	-9.5	-9.5	-9.5
NAL7	20 Ardachu	-12.9	-11.2	-9.6	-9.7	-9.7	-9.5	-9.5	-9.5

- 11.81 All noise assessment locations are predicted to receive noise immission levels of less than 30dB(A) from the Proposed Development in isolation. Results in **Table 11.10** show that the Proposed Development is predicted to produce a maximum level of 28.2dB(A) at 9m/s at NAL3 (8 Acheilidh). Immissions from the proposed development are therefore assessed to result in a negligible level of impact.
- 11.82 When assessing the predicted operational immission levels against the simplified 35dB(A) ETSU-R-97 limit (**Table 11.11**), a minimum compliance margin of 6.8dB(A) is shown, demonstrating that immission from the Proposed Development in isolation would comfortably meet a simplified 35dB(A) ETSU limit at all receptors.

Mitigation Measures

Operation

- 11.83 The assessment of operational immission from the Proposed Development assumed that the turbines would operate in their standard mode of operation using rotor blades fitted with trailing edge serration. The results demonstrated that immission from the proposed turbines would be able to meet a simplified 35dB(A) ETSU-R-97 noise limit at all receptors by a comfortable margin.
- 11.84 Therefore, operational noise assessments considering the Proposed Development in isolation demonstrate that no mitigation is required.

Cumulative Effects

Predicted Noise Levels

- 11.85 The review of cumulative wind developments resulted in the identification of 3 potential cumulative developments within a search radius of up to 3km shown in **Table 11.12**.

Table 11.12: Cumulative wind developments within search radius

Name	No. of Turbines	Within 3km Search Area
Lairg Wind Farm	3	3
Lairg II Wind Farm	10	7
Garvary Wind Farm	25	23
Total cumulative turbines	38	33

- 11.86 As the majority of third-party turbines from each of the identified wind farms are situated within 3km of the Proposed Development, all turbines from each wind development (a

total of 38 wind turbines) have been modelled to assess the cumulative baseline at each identified receptor. This approach forms a very conservative assessment, as it is unlikely immissions from turbines identified out with 3km would be significant to contribute to cumulative immissions at the nearest receptors.

- 11.87 Additionally, Balblair Windfarm, although more than 3km from the Proposed Development, was also considered within the context of the cumulative assessment. However, predictions from the proposed wind farm were found to be more than 10dB below the predicted immissions of the Proposed Development, and therefore non-cumulative.
- 11.88 **Table 11.13** shows baseline cumulative immission levels applicable for both daytime and night-time periods assuming simultaneous downwind propagation for all scenarios where a cumulative project produces immission levels within 10dB(A) of that from the Proposed Development at the same receptor location. Predicted operational noise immissions for each third-party cumulative wind site can be found in **Technical Appendix 11.2**.

Table 11.13: Predicted immission levels from all cumulative projects (baseline)

L90	dB(A)	V10 wind speed (ms ⁻¹)								
Location	Name	4	5	6	7	8	9	10	11	12
NAL1	Rhaoine	21.2	25.3	28.5	29.1	29.3	29.4	29.5	29.5	29.5
NAL2	337 Acheilidh	18.1	23.5	26.8	27.8	28.0	28.2	28.2	28.2	28.2
NAL3	8 Acheilidh	17.9	23.3	26.6	27.3	27.4	27.5	27.6	27.6	27.6
NAL4	Rowan Cottage	17.6	22.9	26.2	26.9	27.0	27.6	27.6	27.6	27.6
NAL5	24 Ardachu	17.1	22.4	25.7	26.3	26.9	27.1	27.1	27.1	27.1
NAL6	22 Ardachu	16.7	21.9	25.2	26.2	26.4	26.6	26.6	26.6	26.6
NAL7	20 Ardachu	16.7	21.9	25.2	25.8	26.4	26.6	26.6	26.6	26.6

- 11.89 **Table 11.14** shows total cumulative immission levels (inclusive of the proposed turbines).

Table 11.14: Predicted immission levels from all cumulative projects plus the Proposed Development

L90	dB(A)	V10 wind speed (ms ⁻¹)								
Location	Name	4	5	6	7	8	9	10	11	12
NAL1	Rhaoine	24.6	27.6	30.2	30.6	30.7	30.9	30.9	30.9	30.9
NAL2	337 Acheilidh	24.8	27.6	30.0	30.4	30.5	30.7	30.7	30.7	30.7
NAL3	8 Acheilidh	25.6	28.2	30.5	30.7	30.8	30.9	30.9	30.9	30.9
NAL4	Rowan Cottage	24.9	27.5	29.9	30.1	30.2	30.5	30.6	30.6	30.6
NAL5	24 Ardachu	23.7	26.5	28.9	29.1	29.4	29.6	29.6	29.6	29.6
NAL6	22 Ardachu	23.2	25.9	28.3	28.8	28.9	29.1	29.1	29.1	29.1
NAL7	20 Ardachu	23.2	25.9	28.3	28.6	28.9	29.1	29.1	29.1	29.1

- 11.90 Predicted cumulative immission levels, both exclusive and inclusive of the Proposed Development, remain below the simplified 35dB(A) ETSU limit at all assessment locations, with a maximum predicted cumulative noise immission of 30.9dB(A), expected to occur at NAL1 (Rhaoine) & NAL3 (8 Acheilidh). Cumulatively, this represents a very low level of impact.

Residual Effects

Operation

- 11.91 A cumulative noise impact assessment has been conducted which included noise immissions from three wind developments in the study area. Total cumulative noise immissions were shown to remain below the ETSU-R-97 simplified limit of 35dB(A).

Application of significant presented headroom

- 11.92 The forgoing assessment determined that noise immission from the Proposed Development, both in isolation and considered within a conservative cumulative context, would meet a simplified 35dB(A) ETSU-R-97 noise limit. It is therefore proposed that Immission from the proposed development be constrained by this 35dB(A) limit.
- 11.93 The following analysis given in **Table 11.15** and **Table 11.16** compares predicted immission with the lowest noise limits applicable to each individual project in order to determine the minimum headroom margins in each case. This analysis is presented for NAL1 and NAL2, the latter being representative of NAL2 to NAL7. NAL1 & NAL2 were assessed as having the highest baseline levels in this study.

Table 11.15: Significant presented headroom (NAL1)

Location		V10 wind speed (ms ⁻¹)								
		4	5	6	7	8	9	10	11	12
NAL1	Lairg I	15.0	17.5	19.5	20.2	20.7	21.2	21.5	21.5	21.5
	Lairg II	13.6	18.7	21.8	22.1	22.1	22.1	22.1	22.1	22.1
	Garvary	17.8	22.1	25.5	26.3	26.4	26.6	26.6	26.6	26.6
	Lowest Applicable Noise limits									
	Lairg I	35	35	35	35	35	35	35	35	35
	Lairg II	35	35	35	35	35	35	35	35	35
	Garvary	35	35	35	36.6	38.7	40.9	43.1	45.5	47.8
	Exceedance									
	Lairg I	-20.0	-17.5	-15.5	-14.8	-14.3	-13.8	-13.5	-13.5	-13.5
	Lairg II	-21.4	-16.3	-13.2	-12.9	-12.9	-12.9	-12.9	-12.9	-12.9
	Garvary	-17.2	-12.9	-9.5	-10.4	-12.3	-14.3	-16.5	-18.9	-21.2

Table 11.16: Significant presented headroom (NAL2)

Location		V10 wind speed (ms ⁻¹)								
		4	5	6	7	8	9	10	11	12
NAL2	Lairg I	11.9	14.4	16.4	17.1	17.6	18.1	18.4	18.4	18.4
	Lairg II	11.3	16.4	19.5	19.8	19.8	19.8	19.8	19.8	19.8
	Garvary	17.2	21.5	25.0	25.7	25.9	26.0	26.0	26.0	26.0
	Lowest Applicable Noise limits									
	Lairg I	35	35	35	35	35	35	35	35	35
	Lairg II	35	35	35	35	35	35	35	35	35
	Garvary	35	35	35	36.6	38.7	40.9	43.1	45.5	47.8
	Exceedance									
	Lairg I	-23.1	-20.6	-18.6	-17.9	-17.4	-16.9	-16.6	-16.6	-16.6
	Lairg II	-23.7	-18.6	-15.5	-15.2	-15.2	-15.2	-15.2	-15.2	-15.2
	Garvary	-17.8	-13.5	-10.0	-10.9	-12.8	-14.9	-17.1	-19.5	-21.8

- 11.94 The results in **Table 11.15** and **Table 11.16** demonstrate that each of the cumulative projects has a greater than 5dB margin of headroom between predicted immission and approved or proposed limits. This satisfies the significant presented headroom criteria given in the IoA GPG (Section 5.4.11, p.26) and demonstrates that all three of the cumulative projects have more operational headroom than they can reasonably be expected to utilise.
- 11.95 To complete the cumulative analysis, an operational margin above prediction is ascribed to each cumulative project. As no specific margin has been set by The Highland Council,

the maximum suggested margin of +5dB has been applied, resulting in the most conservative assessment possible.

- 11.96 The analysis given in **Table 11.17** and **Table 11.18** applies a 5dB margin of headroom to the cumulative baseline (**Table 11.12**) at NAL1 & NAL2 to give the expanded cumulative immission levels. This is equivalent to adding 5dB to the predicted immission of all three projects individually and summing the result.
- 11.97 A site-specific noise limit for the Proposed Development of 35dB(A) has then been added to the expanded cumulative immission to arrive at a total cumulative level, inclusive of headroom. The total has then been tested for compliance with cumulative noise limits.

Table 11.17: Expanded cumulative assessment (NAL1)

Location		V10 wind speed (ms ⁻¹)								
		4	5	6	7	8	9	10	11	12
NAL1	Cumulative Baseline	21.2	25.3	28.5	29.1	29.3	29.4	29.5	29.5	29.5
	Cumulative Baseline (+5dB Headroom)	26.2	30.3	33.5	34.1	34.3	34.4	34.5	34.5	34.5
	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
	Total	35.5	36.3	37.3	37.6	37.7	37.7	37.8	37.8	37.8
	QDT Cumulative Limit	40	40	40	40	40	40	40	40	40
	QDT Exceedance	-4.5	-3.7	-2.7	-2.4	-2.3	-2.3	-2.2	-2.2	-2.2
	NT Cumulative Limit	43	43	43	43	43	43	43	43	43
	NT Exceedance	-7.5	-6.7	-5.7	-5.4	-5.3	-5.3	-5.2	-5.2	-5.2

Table 11.18: Expanded cumulative assessment (NAL2)

Location		V10 wind speed (ms ⁻¹)								
		4	5	6	7	8	9	10	11	12
NAL2	Cumulative Baseline	18.0	23.5	26.8	27.4	27.6	27.7	27.8	27.8	27.8
	Cumulative Baseline (+5dB Headroom)	22.9	28.4	31.8	32.8	33.0	33.2	33.2	33.2	33.2
	Site Specific Noise Limit LA90	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
	Total	35.3	35.9	36.7	37.1	37.1	37.2	37.2	37.2	37.2
	QDT Cumulative Limit	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	QDT Exceedance	-4.7	-4.1	-3.3	-2.9	-2.9	-2.8	-2.8	-2.8	-2.8
	NT Cumulative Limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	NT Exceedance	-7.7	-7.1	-6.3	-5.9	-5.9	-5.8	-5.8	-5.8	-5.8

- 11.98 Results in **Table 11.17** and **Table 11.18** show that the expanded baseline cumulative levels, plus the 35dB(A) specific limits for the Proposed Development, could be accommodated by a minimum margin of 2.2dB at NAL1 during quiet daytime periods. This result provides justification that a site-specific noise limit of 35dB(A) is appropriate for the Proposed Development and could be accommodated cumulatively.

Summary

Construction and Decommissioning Phase

- 11.99 The requirement for a construction noise assessment was scoped out of the NIA on the basis that construction activities are expected to be conducted within normal working hours. Decommissioning the Proposed Development would involve less plant, and plant with typically lower emissions than for construction, and would therefore have a lower impact than construction noise. Due to the separation distances between the scheduled construction activities and nearest receptors (approx. 2km) it is unlikely that construction activities would give rise to significant noise impacts.

Operational phase

- 11.100 Using the preceding baseline data, a noise modelling exercise was undertaken to assess potential impacts from the proposed development.
- 11.101 The operational noise assessment was carried out firstly to assess potential impacts that may arise from the Proposed Development in isolation. Predicted immission from the proposed turbines were found to be below 30dB(A) at all assessment locations, with a maximum predicted level of 28.2dB(A), at NAL3 (8 Acheilidh).
- 11.102 Operational noise from the Proposed Development calculated in a conservative cumulative assessment, with predicted immission contributions from all potential third-party wind farms within a search radius of 3km, remained below the minimum applicable threshold of 35dB(A), with a maximum predicted level of 30.9dB(A) at NAL1 (Rhaoine) & NAL3 (8 Acheilidh).
- 11.103 It is proposed that the immission from the proposed development be subject to a simplified 35dB(A) noise limit. Analysis presented to justify this constraint considered an expanded baseline scenario where the calculated cumulative immission was increased by a margin of 5dB. The proposed constraint was then added to the expanded baseline levels before being compared to total cumulative ETSU-R-97 limits of 40dB(A) and 43dB(A) for quiet daytimes and night times, respectively. The results showed that a 35dB(A) constraint for the Proposed Development could be accommodated comfortably and was therefore appropriate to protect the amenity of local residents.
- 11.104 It is therefore concluded that the Proposed Development would result in a negligible noise impact on surrounding receptors.

References

- Australian Standards (1990), 'AS 2670-1:1990 Evaluation of human exposure to whole-body vibration'.
- British Standards (2008), 'BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings'.
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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 12: Traffic and Transport

April 2024

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12 TRAFFIC AND TRANSPORT

12.1 This chapter assesses the likely effects of the Proposed Development on the existing transport network and on sensitive receptors as a result of the construction, operation, and decommissioning phases of the proposed development. The key objectives of the chapter are to:

- Describe the assessment methodology and significance criteria used in completing the assessment;
- Describe the current traffic and transport conditions;
- Identify and assess the likely effects;
- Identify and describe the mitigation measures proposed to address any significant effects; and
- Assess any residual effects post mitigation implementation.

12.2 This chapter has been prepared by SYSTRA Ltd and led by Alan DeVenny. Alan is a Projects Director and Chartered Engineer with SYSTRA. He has a BEng in Civil and Transportation Engineering as well as a PhD in Civil Engineering. Alan has over 24 years' experience in the traffic and transportation industry and over 15 years' experience in the production of EIA transport chapters (and associated studies) for onshore wind farms in Scotland, as well as being responsible for assisting both Transport Scotland and National Highways in the preparation of guidelines for assessing the effects of wind farm developments. Alan is a Chartered Member of the Institution of Civil Engineers (CEng, MICE).

12.3 This chapter is supported by Figure 12.1: Study Area, Figure 12.2: Traffic Counter Locations and Figure 12.3: Abnormal Loads Route. Technical Appendices 12.1 Abnormal Loads Assessment and 12.2 Framework Construction Traffic Management Plan also accompany the EIA and are referenced in the text. All can be found in full within Volume 4: Technical Appendices.

Policy Context

12.4 This Chapter has been prepared taking cognisance of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations). The following policy documents, data sources and guidelines have been used to inform this assessment:

- National Planning Framework 4 (NPF4);
- Planning Advice Notice (PAN) 75 – 'Planning for Transport';
- Institute of Highways and Transportation (IHT) publications - "Guidelines for Traffic Impact Assessment", 1998;
- Institute of Environmental Management and Assessment (IEMA) publication - "Environmental Assessment of Traffic and Movement", 2023 ("the IEMA Guidelines"); and
- Department for Transport (DfT) publication "Design Manual for Roads and Bridges" (DMRB).

Consultation

- 12.5 As part of the EIA Scoping exercise, a consultation exercise was undertaken to inform the design of the Proposed Development, to seek agreement on the scope of the traffic and transport assessment work and to understand if there are any specific issues that need to be addressed for the application.
- 12.6 The Scoping Opinion was received from the Scottish Government Energy Consents Unit (ECU) on 7th October 2022.
- 12.7 Consultation relevant to the traffic and transport assessment was undertaken with the Highland Council, as local roads authority and with Transport Scotland, as managers of the trunk road network. A summary of these consultation responses is provided in Table 12.1 below.

Table 12.1: Consultation Responses

Consultee	Date Received	Consultation Response(s)	How and where is this addressed?
Transport Scotland	10 th August 2022	It is noted that any impacts associated with the operational phase of the proposed development are to be scoped out of the EIAR. We would consider this to be acceptable in this instance.	Operational effects are scoped out of the EIAR as discussed in paragraph 12.14.
		Transport Scotland would request that base traffic data be factored to the peak construction year using National Road Traffic Forecasts (NRTF) low growth.	Base traffic flows have been factored to year of construction using NRTF low growth as detailed in paragraph 12.49.
		A full Abnormal Loads Assessment report should be provided with the Environmental Impact Assessment Report (EIAR) that identifies key pinch points on the trunk road network. Swept path analysis should be undertaken and details provided with regard to any required changes to street furniture or structures along the route.	A full Abnormal Loads Assessment is provided in Technical Appendix 12.1.
The Highland Council	16 th September 2023	They (Transport Planning) have confirmed that the proposed methodology for assessing potential effects associated with the increased road traffic generated during the	A full Abnormal Loads Assessment is provided in Technical Appendix 12.1.

Consultee	Date Received	Consultation Response(s)	How and where is this addressed?
		construction phase of the development as set out in Section 12 'Traffic and Transport' is generally acceptable noting that a Transport Assessment, or a dedicated Access, Traffic and Transport chapter within the EIAR should include an Abnormal Load Route Survey Report.	
		A framework Construction Management Plan shall be submitted as part of the Transport Assessment, setting out the headings and structure – this will be updated completed by the contractor prior to commencement. The formal CTMP shall be prepared in consultation and agreement with Transport Scotland and the Council. No works relating to the development shall commence until the full details of the CTMP have been agreed in consultation with the relevant interested parties.	A Framework Construction Traffic Management Plan (CTMP) is provided in Technical Appendix 12.2.
		The TA should identify all Council maintained roads likely to be affected by the various stages of the development, consider in detail the impact of development traffic on these roads, and propose mitigation measures. The proposed route/s for general construction traffic should be identified and reviewed within the TA, taking cognizance of likely material sources.	Paragraph 12.22 onwards details the road links and routes to Site which form the Study Area. Construction traffic effects on road links within the study area are discussed in detail from Paragraph 12.70.
		Early consultation with the Council's Structures Section is recommended regarding affected Council maintained structures. Contact shall also be made with the Council's Structures	Consultation will be undertaken with the Highland Council's Structures team prior to any Abnormal Loads deliveries being made which is in line with the AL permitting process.

Consultee	Date Received	Consultation Response(s)	How and where is this addressed?
		Team to identify the structures affected and to scope the assessments required for the application.	

Scope of Assessment

- 12.8 The assessment is made with reference to the Proposed Development, as described in Chapter 3: Project Description.
- 12.9 The most identifiable traffic and transport characteristic associated with wind farm developments is the need to transport the wind turbine components to the Site. Turbine components would be delivered to an appropriate Port of Entry (PoE) and then transported as abnormal loads¹ to the Site via the public road network.
- 12.10 It is anticipated that the route via the trunk road network from the port of delivery will generally be of a suitable standard to accommodate the abnormal loads associated with the Proposed Development. The proposed development is proposed to be accessed through the existing Lairg II windfarm, which is a 'tried and tested' route. Therefore, the likely PoE for the turbines would be the Port of Nigg near Tain, from where the abnormal loads vehicles would navigate onto the B9175 towards the A9, then continue on the A9 heading north for approximately 27km until the junction with the A839. The abnormal loads vehicles would turn left onto the A839 and continue west for approximately 23km to Lairg, then turn left onto the A836 heading south for 2.8km before turning left again onto the local road to Torroble opposite Lairg Railway Station. From here the Site is accessed via the Lairg II development. The proposed route is indicated by Figure 12.3.
- 12.11 There is also a need to bring to the Site general construction materials (concrete, aggregates, pipes, cabling, etc.) in standard heavy goods vehicles (HGVs). The characteristic of this form of traffic is a temporary intensification of HGV traffic on the road network. This intensification varies depending on the scale of the development, the construction stage, and operational requirements. A small amount of traffic would also be generated by construction workers commuting to/from the Site during the construction and operational stages.
- 12.12 The potential for a cumulative assessment in respect of the traffic and transport effects has been considered for other wind farm developments within the surrounding area that would potentially utilise the same road network as the proposed development during the construction period.

¹ A vehicle with any one of the following characteristics: weight of more than 44,000 kilograms; an axle load of more than 10,000 kilograms for a single non-driving axle and 11,500 kilograms for a single driving axle; a width of more than 2.9 metres; a rigid length of more than 18.65 metres

- 12.13 It is recognised that the construction period represents the greatest intensification in traffic although it is important to note that this intensification is temporary in nature. The parameters and assumptions used to inform this chapter have been designed to represent a robust and worst-case scenario.

Potential Effects Scoped Out

- 12.14 On the basis of a detailed desktop study, the professional judgement of the Environmental Impact Assessment (EIA) team and experience from other relevant projects and policy guidance, the following characteristics have been scoped out of this Traffic and Transport Chapter:

- The impact of increased traffic associated with the Proposed Development on existing access tracks within the Site is not anticipated to have a discernible environmental effect and is therefore not assessed in this Chapter. The impact and effects of the Proposed Development on the Local Road network is however assessed.
- Environmental assessment of traffic associated with the operational stage;
 - Once the Proposed Development is operational, the amount of traffic associated with the wind farm is minimal, relating to maintenance of wind turbines only. Vehicles used for maintenance are likely to be road-going 4x4s. There may, on rare occasions be the need for HGV access to the wind turbines. It is estimated that on average there would be two 4x4s accessing the Site on a monthly basis and one HGV every 1 – 3 months. It is considered that the impact and effect of vehicle movements during the operational phase would be negligible. In respect of traffic and transport, the operational phase of the Proposed Development is therefore not assessed in this Chapter.
- Environmental assessment of traffic associated with the decommissioning stage;
 - Planning permission for the Proposed Development is sought for a 35-year period, after which the Proposed Development would be decommissioned unless a further application is submitted for an operational extension. Traffic associated with the decommissioning stage is anticipated to be significantly less than that generated during construction. Given the timescales involved and the likelihood for changes to the baseline situation during this period, the traffic and transport impacts and effects of wind farm decommissioning are not assessed in this Chapter.
- The effect of construction related vehicles on the road network, in respect of traffic flows, both in isolation and cumulatively, is considered unlikely to be significant in terms of peak hour congestion. Therefore, full detailed junction capacity assessments have not been undertaken.

- 12.15 It is anticipated that the volume of traffic associated with the construction of the Proposed Development would not have a discernible effect on roads and sensitive receptors out-with the Study Area (see below for definition of the Study Area) as the effects of traffic are diluted with increasing distance from the point of origin.

Assessment Methodology and Significance Criteria

Assessment of Effects

- 12.16 The assessment of effects is based on the project description as outlined in Chapter 3: Project Description and Construction Methods.
- 12.17 This assessment is structured around the consideration of potential environmental effects relating to traffic and transport, as identified by the IEMA Guidelines, and including the following:
- Severance of communities
 - Road vehicle driver and passenger delay
 - Non-motorised user delay and amenity
 - Fear and intimidation on and by road users
 - Road user and pedestrian safety
 - Hazardous and large loads
- 12.18 There are no hazardous loads associated with the Proposed Development.
- 12.19 Guidance for the assessment of the environmental effects of generated traffic is provided in the IEMA document, "Environmental Assessment of Traffic and Movement". The document is the only guidance document currently available that sets out a methodology for assessing potentially significant environmental impacts where a Proposed Development is likely to give rise to changes in traffic flows.
- 12.20 The guidance suggests that in order to determine the scale and extent of the assessment and the level of impact the development will have on the surrounding road network, the following two 'rules' should be followed:
- Rule 1 – Include road links where traffic flows are predicted to increase by more than 30% or where the number of HGVs is predicted to increase by more than 30%; and
 - Rule 2 – Include any other specifically sensitive area where traffic flows are predicted to increase by 10% or more.
- 12.21 These rules are used to identify the road links within the Study Area where a full assessment of environmental effects associated with an intensification in road traffic may be required. It is noted that further consideration should be given to road user and pedestrian safety as well as driver delay effects even if the above thresholds are not exceeded.

Study Area

- 12.22 The Study Area for the assessment of traffic and transport has been identified using the assessment thresholds within the IEMA Guidelines as an aide and is indicated by Figure 12.1: Study Area. The study area has been predicated on the access location to the Site and the proposed routes to the access point from the external road network.

- 12.23 To determine appropriate access routes to the Site, detailed consideration and assessment of the surrounding road network has been undertaken in the form of a comprehensive desk-based study. This has established that the most likely route for general construction HGV traffic is via the A9 from the south, then via the A836 and the Unclassified Road to Torroble, from which the Site is accessed through the Lairg II development. A Construction Traffic Management Plan (CTMP), detailed in Technical Appendix 12.2, will be used to ensure that construction vehicles are kept on the preferred haul routes.
- 12.24 It is expected that the turbine components would be transferred by abnormal load vehicles to the Site via the B9175, A9, A839 and A836 to the site access point.
- 12.25 The identified Study Area is as follows:
- The A9 from Alness in the south to Brora in the north;
 - The A836 between the Dornoch Firth Bridge and Lairg;
 - The A839 between Lairg and the A9; and
 - The unclassified road to Torroble from the A836 where access to the Proposed Development would be taken through the existing Lairg II windfarm.
- 12.26 It is highly unlikely that there will be any significant effects on the road network outside of the Study Area identified above. IEMA Rule 1 will be applied to all road links with regard to the increase in HGV levels.

Desk Based Research and Data Sources

- 12.27 The traffic and transport Study Area characteristics have been determined by a desk-based assessment, using traffic data from a range of sources including 24-hour ATC survey data obtained from the Transport Scotland National Traffic Data System (NTDS), existing traffic counts used in the Lairg II assessment², and commissioned traffic surveys. Described below is the source of the traffic count information at locations identified in the Study Area. These are also indicated by Figure 12.2.
- 1. NTDS ATC01025, A9 at Brora
 - 2. NTDS ATC01334, A9 at The Mound
 - 3. NTDS ATC01020, A9 at the southern extent of the Dornoch Firth Bridge
 - 4. NTDS ATC01333, A9 south of Nigg roundabout
 - 5. 2023 survey data, A839
 - 6. Lairg II traffic counts, A836
 - 7. 2023 survey data, Road to Torroble

Assessment of Significance

- 12.28 The following section sets out the methodology used to assess the significance of effects at locations along the proposed routes within the study area where total traffic levels or the level of HGV traffic exceed the screening thresholds set out by IEMA.

² Lairg II Wind Farm Environmental Impact Assessment Report, Chapter 12: Traffic and Transportation, Table 12-5

Sensitivity

- 12.29 The sensitivity to change in traffic levels of any given road segment and the receptors located along that road segment are generally assessed by considering the residual capacity of the network under existing conditions.
- 12.30 Where there is a high degree of residual capacity, the network may readily accept and absorb an increase in traffic and therefore the sensitivity may be said to be low. Conversely, where the existing traffic levels are high compared to the road capacity, there is little spare capacity, and the sensitivity to change in traffic levels will be considered to be high.
- 12.31 Consideration has been given to the composition of the traffic on the road network, under both existing and proposed conditions. For example, LGVs have less effect on traffic and the road system than HGVs. Similarly, HGVs can have less effect than abnormal load vehicles, depending on the frequency of the abnormal loads.
- 12.32 The criteria that has been used to make judgements on the sensitivity of the receptor(s) and the magnitude of change are presented in Table 12.2.

Table 12.2: Receptor Sensitivity

Sensitivity	Description
High	The receptor/resource has little ability to absorb change without fundamentally altering its present character is of international or national importance. Local residents whose daily activities depend upon unrestricted movement within their environment. Receptors such as schools, colleges, hospitals, and accident hotspots.
Moderate	The receptor/resource has moderate capacity to absorb change without significantly altering its present character, or is of high importance.
Low	The receptor/resource is tolerant of change without detriment to its character; is of low/local importance. Areas such as trunk road or A class roads constructed to accommodate significant HGV volumes.
Negligible	Users not sensitive to transport effects. Includes very small settlements and roads with no significant settlements including new strategic trunk roads or motorways.

Magnitude

- 12.33 The magnitude of traffic effects is a function of the existing traffic volumes, the percentage increase and change due to the Proposed Development, changes in the type of traffic and the temporal distribution of traffic (day of week, time of day).
- 12.34 The determination of magnitude has been undertaken by reviewing the Proposed Development, establishing the parameters of the receptors that may be affected and quantifying these effects utilising IEMA Guidelines and professional judgement.

- 12.35 Consideration is given to the composition of the traffic on the road network, under both existing and proposed conditions. For example, LGVs have less effect on traffic and the road system than HGVs. Similarly, HGVs can have less effect than abnormal load vehicles, depending on the frequency of the abnormal loads.
- 12.36 The criteria that has been used to make judgement on the magnitude of the effect on the receptor(s) is presented in Table 12.3.

Table 12.3: Magnitude of Change

Magnitude	Description
Major	Total loss of, or major/substantial alteration to, key elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed. Generally, a rule of >90% (or >70% at sensitive receptors) change in traffic is considered to be a major magnitude.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed. Generally, a rule of 60% - 90% (or 40% - 70% at sensitive receptors) change in traffic is considered to be a moderate magnitude.
Minor	A minor shift away from baseline conditions. Change arising from the loss / alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-development circumstances/situation. Generally, a rule of 30 – 60% (or 10% - 40% at sensitive receptors) change in traffic is considered to be a minor magnitude.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation. Generally, a rule of <30% (or <10% at sensitive receptors) change in traffic is considered to be a negligible magnitude.

Significance

- 12.37 As a guide to inform the assessment, but not as a substitute for professional judgement, criteria for determining the significance of traffic related effects are set out in Table 12.4. This is based on combining the magnitude of the effect with the receptor sensitivity.

Table 12.4: Significance Criteria Matrix

Sensitivity	Magnitude of Change				
		Major	Moderate	Minor	Negligible
	High	Major	Major/ Moderate	Moderate	Moderate/ Minor
	Moderate	Major/ Moderate	Moderate	Moderate/ Minor	Minor
	Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

- 12.38 The effects recorded in grey highlighted cells are considered to be '**Significant**'.
- 12.39 Significance is categorised as major, moderate, minor, or negligible. Effects judged to be of minor or negligible significance are considered **Not Significant**.

Baseline Conditions

- 12.40 The following paragraphs detail the baseline conditions of the road links identified as being within the Study Area in addition to the Site access tracks.

A9

- 12.41 The A9 is a key route from central Scotland to Thurso via Stirling, Perth and Inverness which extends to a total length of 439km. A section of the route, 399km from junction 11 of the M9 just north of Stirling, to Thurso in the north is classified as a trunk road. The A9 is a good standard single carriageway with stretches of dual carriageway along the route and is subject to varying speed limits with sections of 30/40/50mph through towns/villages and the National Speed Limit elsewhere.
- 12.42 Within the study area, the A9 routes south to north from Alness to Golspie passing the town of Tain before continuing north over the Dornoch Firth Bridge. The A9 would be used by HGVs and general construction traffic to route from the wider road network in the south onto the A836 and the unclassified road to Torroble to the Site access point.

A839

- 12.43 The A839 routes 36.4km in an east-west direction, from the A9 at The Mound, passing through the village of Pittentrail and Lairg and a short section of the A836, and terminating at Rosehall where it connects with the A837. The road is generally a rural single carriageway without footways and has a small number of isolated properties along the route. The A839 is subject to varying speed limits with sections of 30mph through towns/villages and the National Speed Limit elsewhere in rural sections.
- 12.44 All abnormal loads vehicles will travel from the A9 via the A839 to the A836 to reach the unclassified road to Torroble and the proposed site access through the existing Lairg II Windfarm.

A836

- 12.45 The A836 is a route of 196km in length which initially follows a north-south direction from the A9 at the southern extent of the Dornoch Firth Bridge to Tongue on the north coast, passing through the villages of Ardgay, Bonar Bridge, Pittentrail and Lairg. From Tongue, the A836 routes east to John O' Groats where it terminates at the A99.
- 12.46 The road is a rural single carriageway of approximately 6.5m width, without footways and is subject to varying speed limits with sections of 30mph through villages and the National Speed Limit elsewhere.

- 12.47 The majority of construction traffic will utilise the A836 from the south to reach the unclassified road to Torroble and the access to the proposed development through the Lairg II Wind Farm.

Unclassified Road to Torroble

- 12.48 This unclassified road is signposted for Torroble and routes east from the A836 opposite Lairg Railway Station. Access to the Lairg II Windfarm, through which the Proposed Development would be reached, is approximately 300m from the A836. The road is a rural single-track road with passing places and a general width of approximately 3m. All traffic associated with the Proposed Development will utilise this unclassified road to reach the Site access point.

Baseline Traffic Flows

- 12.49 Table 12.5 indicates the two-way Average Annual Daily Traffic Flow (AADF) in the Study Area and the percentage of traffic which is classified as HGVs. The source of the data is described in paragraph 12.27. The table below also indicates the capacity of each road link as per the guidance contained within the DMRB. Future year traffic forecasting to 2027 (assumed as the year construction would begin) using the National Roads Traffic Forecast 'low growth' rate (1.016) has been applied to the data to represent a robust assessment of the baseline conditions.

Table 12.5: Study Area Baseline Traffic Flows

Counter Location	2023 AADF	2023 HGV	2027 AADF	2027 HGV	Percentage HGV
1. A9 Brora ATC01025	3588	728	3645	740	20%
2. A9 The Mound ATC01334	3542	691	3599	702	20%
3. A9 Dornoch Bridge ATC01020	5354	605	5440	615	11%
4. A9 south of Nigg roundabout ATC01333	7833	1574	7958	1600	20%
5. A839 (survey data)	618	125	631	128	20%
6. A836 (Lairg II data)	979	43	1000	44	4%
7. Road to Torroble (survey data)	48	5	49	5	10%

Road Safety

- 12.50 Five-year accident data (2018 – 2022) for the trunk road within the study area (A9) has been obtained from Transport Scotland. The *Crashmap* website has been utilised to determine the number of accidents that have occurred in the five-year period (2017-2021) along the remaining road links within the identified study area. The results of this investigation are indicated by Table 12.6 with additional commentary provided on serious and fatal accidents, if applicable.

Table 12.6: Accident Statistics

Counter Location	Slight	Serious	Fatal	Comment
A9(T)	34	14	3	Fatal accident at A9 junction with Obsdale Road, Alness in 2019 involving 2 casualties and 2 vehicles. Fatal accident approx. 1.3km south of the A9/A839 junction in 2019 involving 1 casualty and 3 vehicles. Fatal accident approx. 100m south of A9 junction with Obsdale Road, Alness in 2021 involving 1 casualty and 2 vehicles.
A836	5	1	2	Fatal accident 1km south of Bonar Bridge in 2019 involving 1 vehicle and 1 casualty. Fatal accident at junction with local road to Ardmore in 2020 involving 1 vehicle and 1 casualty.
A839	1	2	0	Serious accident at Ardachu in 2021 involving 2 vehicles and 2 casualties. Serious accident at Morvich in 2020 involving 1 vehicle and 1 casualty.
Unclassified road to Torroble	0	0	0	No accidents recorded in the last five years.

- 12.51 Table 12.6 indicates that a total of 34 slight, 14 serious, and 3 fatal accidents have occurred on the A9 within the study area over the previous five years. This level of accidents is typical of trunk roads of this rural nature carrying high volumes of traffic and the accidents are generally spread out across the road network with the exception of two fatal accidents in close proximity to the Obsdale Road junction in Alness.
- 12.52 Accident records for the A836 show 5 slight, 1 serious and 2 fatal accidents in the last five years, while the A839 recorded 1 slight and 2 serious. Accidents on these two routes were distributed across the road network with no identifiable accident 'hot spots' or clusters.

The 'Do Nothing' Scenario

- 12.53 If the Proposed Development was not implemented then it is likely that there would be no significant changes to the traffic and transport situation in the vicinity of the Proposed Development, other than changes to background traffic as a result of general traffic growth and any nearby committed developments.

Identification and the Evaluation of Key Impacts

Construction Programme

- 12.54 The construction traffic associated with the Proposed Development would comprise of construction workers, HGVs / LGVs carrying construction materials & plant, and abnormal load vehicles carrying the main wind turbine components.
- 12.55 There is expected to be between 15 and 25 personnel working on-site at any one time. It is important to note that the number of personnel on-site would vary during the construction process. In general, work hours are expected to be between 07:00 to 19:00 on weekdays and 07:00 to 13:00 on Saturdays which means that staff would generally arrive and depart outside the peak hours associated with the surrounding road network (typically 8:00 to 9:00 and 17:00 to 18:00). Turbine delivery, erection and commissioning activities may take place out-with these hours depending on weather conditions.
- 12.56 Estimates of traffic generation associated with the construction phase of the Proposed Development have been calculated from first principles and consider the following activities:
- Installation of construction compound/storage area for Site office facilities and storage of materials and components;
 - The excavation of the borrow pit and extraction of aggregate for new tracks, upgrades existing tracks and hardstandings;
 - Construction of new permanent Site tracks and the upgrading of existing sections;
 - Installation of hardstandings and outrigger pads for the support of the cranes that would be used for the erection of the turbines;
 - Construction of foundations for the support of the turbine structures;
 - Wind turbine delivery and erection;
 - Installation (if necessary) of transformers in separate housings alongside each wind turbine;
 - Installation of on-Site High Voltage (HV) cabling, communication cabling and earthing;
 - Installation of Supervisory Control and Data Acquisition (SCADA) system;
 - Construction of substation;
 - Commissioning of Site mechanical and electrical equipment; and
 - Reinstatement, landscaping, removal of temporary Site offices, reseeding verges, borrow pit and areas around turbine bases.

- 12.57 The works would mainly follow the order detailed above, but many would be carried out concurrently to reduce the overall length of the construction programme. There would be construction phasing, with civil engineering works progressing in some areas whilst turbines are being erected elsewhere. In order to minimise disruption to land use, Site restoration would be undertaken as early as possible in development areas and where possible, existing tracks will be used to minimise the construction required on site.
- 12.58 In order to calculate a robust scenario, information was gathered regarding the materials required and the size of average loads associated with the construction vehicles. Table 12.7 includes an estimate of construction vehicle numbers required for each task during the construction period.

Table 12.7: Estimated No. of HGV Trips during Construction

Construction Task	Vehicle Type	Approximate No. of Loads
Site Access, Site Tracks, Hard Standings etc.*	Dump Truck	2,004
Site Establishment	Various	120
General site deliveries	Low loader and dump truck	120
Foundations	Concrete Wagons	1,125
Foundation Reinforcement Deliveries	Low Loader	30
Cabling deliveries and sand	Low Loader	411
Geotextile Separators	Low Loader	164
Delivery of HV electrical items	Dump Truck	32
Construction of sub-station	Various	148
Cranes and related lifting equipment	Crane vehicles	50
Erection of turbines	Abnormal loads	120
Site reinstatement and restoration	Various	70
Inbound Trips		4,393
Total Trips (inbound + outbound)		8,787

*Assumes 70% stone requirements are imported to the Site

- 12.59 Potential on-site borrow pits have been identified and it is likely that a high proportion of the required stone can be sourced from them. It is the Applicant's intention to win stone in this manner in order to construct access tracks and hardstanding areas. The use of borrow pits will help to reduce HGV levels considerably. For the purpose of this assessment, it is assumed that 70% of the stone estimated to be required to construct the site would be sourced from an off-site location thus the assessment undertaken represents a very conservative and robust approach.

- 12.60 In addition to the construction vehicles identified in Table 12.7, it is anticipated that there would be approximately 60 two-way daily private car/LGV trips to the Site associated with construction staff/welfare. This equates to a maximum of 30 arrivals and 30 departures at the start and end of the working day. In these circumstances, the effects of car/LGV traffic are considered to be negligible, therefore **not significant**, however, to represent a robust assessment this number of non-HGV trips has been included in the assessment.
- 12.61 It is anticipated that the abnormal loads will require car or LGV escort vehicles whilst transporting the turbines. This would equate to approximately six vehicles per week when transporting the abnormal loads. This impact is considered to be negligible and not significant and has therefore not been assessed further.
- 12.62 The construction of the Proposed Development would take approximately 18 months. Using the indicative construction programme, the number of construction trips that are anticipated to visit the Site for each month of the construction period has been calculated and is presented within Table 12.8.

Table 12.8: Estimated No. of HGV Trips per Month

Task	Month																		Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Site Establishment / Removal	20	20	20													20	20	20	120
General site deliveries	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	4	120
Imported stone*	350	350	350	350	350	254													2004
Reinforcement						5	5	5	5	5	5								30
Foundations						188	188	188	188	188	188								1125
Cabling deliveries and sand							82	82	82	82	82								411
Geotextile separators					41	41	41	41											164
Delivery of HV electrical items									8	8	8	8							32
Construction of Sub-station									50	49	49								148
Battery Storage													20	20	20	20			80
Cranes and related lifting equipment								26	12	12									50
Erection of turbines (abnormal loads)												24	24	24	24	24			120
Site reinstatement and restoration																10	30	30	70
Inbound Trips	377	377	377	357	398	494	323	349	352	351	339	39	51	51	51	81	54	54	4,473
Total Trips (Inbound + Outbound)	754	754	754	714	796	989	645	697	703	701	677	78	102	102	102	162	108	108	8,947

*Assumes 70% stone requirements are imported to the Site

- 12.63 The construction Site may be operational 11 hours every weekday (07:00 – 19:00) and 6 hours on a Saturday (07:00 – 13:00), therefore vehicles could be arriving or leaving at any time during this working week of 5.5 days. Construction vehicles would be arriving and departing the Site at regular intervals during expected Site working hours.
- 12.64 Table 12.8 indicates that the HGV trips are relatively well spread out over the duration of the construction period. Months 1-6 have the highest number of trips associated with the importation of stone for the construction and upgrading of the Site access track network. The last seven months are very light in terms of HGV trips when compared with the months with stone importation/access track construction. The peak is in Month 6 where there is an overlap between stone importation and concrete pours for foundations.

Abnormal Load Movements

- 12.65 With regard to the movement of abnormal load vehicles, Table 12.8 indicates that abnormal loads will only be transported over five months of the 18-month construction period. Assuming 24 inbound abnormal load vehicle trips per month, this equates to approximately six inbound trips per week. Abnormal load vehicles are restricted in the hours that they can operate and a maximum of four abnormal loads would be transported on any given day. It is also noted that abnormal load vehicles will retract to the size of an HGV for their return journey once the loads have been delivered to the destination, equating to six inbound abnormal load trips plus six outbound HGV trips per week.
- 12.66 The movement of abnormal loads may be spread out evenly across the day of the week or concentrated over 2 – 3 days within each week, therefore meaning that there would be no movements on the remaining days of the week. The schedule of movements of abnormal loads will be agreed upon following discussions with the hauliers and Police Scotland to ensure the least impact on the road network as possible.
- 12.67 Given this low number of vehicles and the short duration for which abnormal load vehicles will be on the local road network, it is not anticipated that the number of abnormal load vehicles will give rise to any significant environmental effects within the Study Area. As a result, no further assessment of the effect of abnormal load vehicles has been undertaken.

Worst-Case Assessment

- 12.68 The worst-case month for general construction traffic (HGVs) is Month 6 with 989 total (inbound plus outbound) HGV trips estimated. Assuming four weeks per month, this equates to approximately 247 HGVs trips per week (123.5 inbound and outbound respectively). Month 6 is therefore used to assess the impact and effects of the Proposed Development on the transport network. This estimate of HGV movements assumes that 70% of stone requirements are imported; however, there is a high possibility that a significantly higher proportion of stone could be sourced on-site which would significantly reduce the number of HGV movements. It is therefore considered that the traffic levels assessed are maximum case, therefore providing a robust assessment.

- 12.69 The daily vehicle trip generation for Month 6 is therefore estimated to be approximately 45 total trips (assuming 5.5 days per week). This equates to approximately four HGV trips per hour (two inbound and two outbound), assuming an 11-hour working day. It is important to note that this represents a minor number of trips over a temporary period.

Construction Effects

Construction Traffic Distribution

- 12.70 The majority of construction related traffic is anticipated to originate from the south and would approach the proposed development from the A9 south of the Dornoch Bridge. An accurate distribution of where suppliers are located cannot be completed at this stage. General HGV traffic is most likely to use the shorter and more direct A836 route from the A9 to the proposed development. Based on these routing assumptions, the traffic distribution which has been applied is detailed in Table 12.9.

Table 12.9: Construction Traffic Distribution on Routes within the Study Area

Link Number	Route Section	% of Development Traffic Applied
1	A9 Golspie to Brora	50%
2	A9 Poles to The Mound	50%
3	A9 Dornoch Bridge	50%
4	A9 Kildary to Nigg	100%
5	A839	50%
6	A836	100%
7	Road to Torroble	100%

- 12.71 It is important to note that this represents a worst-case scenario for each road link and this impact could not occur simultaneously.

Construction Traffic Impact

- 12.72 Table 12.10 details the daily percentage increases in traffic flows associated with the construction of the Proposed Development at the traffic counters within the Study Area during the worst-case month. The location of the traffic counters is illustrated in Figure 12.2.

Table 12.10: Construction Traffic Impacts on Routes within Study Area

	1. A9 Golspie to Brora	2. A9 Poles to The Mound	3. A9 Dornoch Bridge	4. A9 Kildary to Nigg	5. A839	6. A836	7. Road to Torroble
2027 AADF	3663	3616	5466	7997	631	1000	49
2027 HGV count	744	705	618	1607	128	44	5
2027 HGV Percentage	20.3%	19.5%	11.3%	20.1%	20.2%	4.4%	10.4%
Month 6 total staff vehicle trips	30	30	30	60	30	60	60
Month 6 total HGV trips	22	22	22	45	22	45	45
2027 AADF + Month 6 worst-case traffic	3716	3669	5519	8102	683	1105	154
2027 HGV count + Month 6 HGV traffic	766	728	640	1652	150	89	50

Please note minor differences due to rounding may occur.

- 12.73 Table 12.10 indicates that the temporary increase in daily total traffic levels on links 1 to 4 (A9 links) during the worst-case month is less than 2%, and the increase in HGV traffic is less than 5%. For these links the increase in traffic flow is considered negligible and **Not Significant**.
- 12.74 Table 12.10 also indicates that the total construction traffic increase on link 5 (A839) in the worst-case month of construction is 8% and the total HGV increase is 18%, again representing a negligible increase which is considered **Not Significant**.
- 12.75 In line with the IEMA Guidelines, the effects of safety and driver delay cannot simply be dismissed if the IEMA thresholds for further assessment are required, and further consideration should be given to these effects to see if any detailed assessment is required. For safety, the percentage impact figures indicate that the traffic increases or HGV increases will not exceed 4% for links 1-4 and 18% for link 5. The accident history for the links within the study area do not identify any specific concerns within the identified areas. Taking these two factors together, it is considered that no further detailed assessment of accidents is required. For driver delay, the affected road links are all generally rural roads which do not suffer from congestion. No specific junction capacity issues or link capacity issues have been identified so this coupled with the low percentage impacts of development traffic, leads to the conclusion that no further detailed assessment of driver delay is required.

- 12.76 Link 6 (A836) and Link 7 (Road to Torroble) will both be required to carry 100% of construction traffic as this is the last section of the journey to site. Link 6 (A836) shows a total traffic increase of 10% and an HGV traffic increase of 101% during the worst-case month of construction (month 6). This increase of 101% is primarily due to the very low baseline level of HGV traffic on this route (44 daily HGV trips) rather than a large increase in HGV trips (the increase is 45 daily trips, 22 inbound and 22.5 outbound). This level of increase requires a detailed assessment of effects.
- 12.77 Link 7 (Road to Torroble) shows an increase in total daily traffic of 214% and an increase in HGV traffic of 881% during the worst-case month of the construction period. Again, this large percentage increase is due to the very low baseline levels of total and HGV daily traffic on this link which are 49 and 5 respectively. Notwithstanding this, this level of increase exceeds the IEMA Guidelines Rule 1 threshold (30%) and requires a full assessment of effects to be undertaken for the affected road links which is detailed below.

Severance of Communities

- 12.78 The IEMA Guidelines advise that “*Severance is the perceived division that can occur within a community when it becomes separated by major transport infrastructure*”.
- 12.79 The potential for traffic associated with the Proposed Development to cause severance is assessed on a case-by-case basis using professional judgement where non-negligible traffic increases are predicted on roads through residential settlements.
- 12.80 Increased severance can result in the isolation of areas of a settlement or individual properties. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by infrastructure. Severance effects could equally be applied to residents, motorists, or pedestrians.
- 12.81 With reference to Table 12.3, the magnitude of the change in HGV levels along the A836 and Road to Torroble is considered to be major given that the increase exceeds 90% of baseline levels. As discussed, this is undoubtedly due to the fact that baseline HGV levels are very low rather than there being high traffic volumes associated with the construction of the proposed development. To put the increase in traffic levels into perspective, 45 total (inbound plus outbound) HGV movements per day equates to only four additional HGVs per hour (essentially one every 15 minutes) over the course of a day.
- 12.82 The sensitivity of Link 6, the A836, to an increased severance effect is considered to be moderate in accordance with Table 12.2 due to location of the settlements of Ardgay, Bonar Bridge and Lairg along the route. Combining the major magnitude of the change with the sensitivity of the receptor in accordance with Table 12.4 equates to a likely significance of effect which is classed as major/moderate and **Significant** as per the EIA Regulations, therefore mitigation is required.

- 12.83 The sensitivity of link 7, the Road to Torroble, to an increased severance effect is considered to be negligible in accordance with Table 12.2 as there are very few existing road users, no residential properties accessed from the route, and no facilities which would generate pedestrian movements. Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 12.4 equates to a likely significance of effect which is classed as minor and **Not Significant** as per the EIA Regulations.

Road Vehicle Driver and Passenger Delay

- 12.84 Some driver delay may be experienced when construction traffic is accessing the Site. The IEMA Guidelines advise *"delays are only likely to be significant when the traffic on the network surrounding the Site is already at, or close to, the capacity of the system"*.
- 12.85 Traffic delay to non-development traffic may occur at several points on the network surrounding the Site including:
- At the Site entrance where there will be additional turning movements;
 - At intersections along the local road network which might be affected by increased traffic; and
 - At side roads where the ability to find gaps in traffic may be reduced, thereby lengthening delays.
- 12.86 It is noted that there are no significant areas of congestion within the Study Area at this point in time. With reference to Table 12.3, the magnitude of the change in HGV levels along the A836 and Road to Torroble is considered to be major based on an increase in HGV levels of over 90%.
- 12.87 The sensitivity of these road links to an increased road vehicle driver and passenger delay effect is considered to be low in accordance with Table 12.2 as there are very few junctions and therefore potential areas for the delay of other road users by turning HGVs. Furthermore, the AADF of these road links is low, hence, there is sufficient available capacity to accommodate additional vehicle movements without causing delay to other road users.
- 12.88 Combining the major magnitude of the change with the low sensitivity of the receptor in accordance with Table 12.4 equates to an effect which is classed as moderate and **Significant** as per the EIA Regulations. Mitigation will be required.

Non-Motorised User Delay and Amenity

- 12.89 The IEMA Guidelines advise that *"The assessment of pedestrian delay serves as a proxy for the delay that other modes of non-motorised users may experience when crossing roads"*.
- 12.90 Traffic volumes, traffic composition, traffic speed, the existence of pedestrian footways and the existence of pedestrian crossings all contribute to the level of general pleasantness experienced by pedestrians and other vulnerable road users.
- 12.91 With reference to Table 12.3, the magnitude of the change in HGV levels along the A836 and Road to Torroble is considered to be major.

- 12.92 The sensitivity of the A836 road link to an increased pedestrian delay and reduced pedestrian amenity effect is considered to be moderate in accordance with Table 12.2 due to location of the settlements of Ardgay, Bonar Bridge, Pittentrail and Lairg along the route. Combining the major magnitude of the change with the sensitivity of the receptor in accordance with Table 12.4 equates to a likely significance of effect which is classed as major/moderate and **Significant** as per the EIA Regulations, therefore mitigation is required.
- 12.93 The sensitivity of the Road to Torroble to an increased pedestrian delay and reduced pedestrian amenity effect is considered to be negligible in accordance with Table 12.2 as there is unlikely to be any pedestrian activity along this road link due to the lack of footways present and no amenities within reasonable walking distance.
- 12.94 Combining the magnitude of the change with the sensitivity of the receptor in accordance with Table 12.4 equates to an effect which is classed as minor and **Not Significant** as per the EIA Regulations.

Fear and Intimidation on and by Road Users

- 12.95 IEMA guidelines state that *"a further environmental impact that affects people is the fear and intimidation created by all moving objects"*, with the extent of fear and intimidation dependent upon:
- The total volume of traffic;
 - The heavy vehicle composition;
 - The speed these vehicles are passing; and
 - The proximity of traffic to people.
- 12.96 The 2023 IEMA guidelines provide a weighting system to help quantify the likelihood and level of pedestrian fear and intimidation. Following this process, which is based on average traffic flows and vehicle speeds, the potentially sensitive areas on the A836 such as Ardgay, Bonar Bridge, Pittentrail and Lairg are approximated to have a level of fear and intimidation classed as 'small', which is the lowest level. The magnitude of change due to the increase in construction traffic during the worst-case month of construction is deemed to be negligible. When the small sensitivity is combined with the negligible magnitude, the effect is assessed as negligible and **Not Significant**.
- 12.97 The sensitivity of the Road to Torroble to an increased fear and intimidation effect is considered to be negligible as there is unlikely to be any pedestrian activity along this road link due to the lack of footways present and no amenities within reasonable walking distance. The magnitude of change due to the increase in construction traffic during the worst-case month of construction is deemed to be negligible. When the negligible sensitivity is combined with the negligible magnitude, the effect is assessed as negligible and **Not Significant**.

Road User and Pedestrian Safety

- 12.98 The most recently available accident data for the road links within the Study Area has been provided in Table 12.6 for the period between 2017 and 2021. The data indicates that during that time period, a total of eight accidents occurred on the A836 (five slight, one serious and two fatal), whilst no accidents were recorded on the Road to Torroble.
- 12.99 An approximate calculation has been undertaken to quantify the level of accident risk that could be expected due to an increase in traffic associated with the Proposed Development. The likelihood of an accident occurring is commonly expressed in accidents per million vehicle-km. Accidents that are appraised in relation to transport are predominantly those in which personal injury is sustained by those involved (personal injury accidents (PIAs)).
- 12.100 For the purpose of this calculation, it has been assumed that the length of road is 36.8km for the A836 and 0.3km for the Road to Torroble, making a total of approximately 37.1 km, which can be generally classified as 'rural typical single carriageway' in accordance with the criteria set out within DMRB.
- 12.101 Accident rates from the DMRB for this standard of road are:
- Rural typical single carriageway: 0.190 Personal Injury Accidents (PIA) per million vehicle-km.
- 12.102 Assuming a two-way trip on the 37.1km route for each of the 4,473 vehicles during the construction period (as set out in Table 12.8), a total distance of 331,926km is obtained. Based on the rate above; this suggests 0.0631 accidents during the construction period associated with the additional traffic.
- 12.103 It is considered that the magnitude of this effect is negligible but receptor sensitivity to this effect is always considered as high. When combined, the effect can be classified as moderate/minor and **Not Significant**.

Hazardous and Large Loads

- 12.104 There are no hazardous loads associated with the Proposed Development.
- 12.105 IEMA guidelines state that "The movement of large (abnormal) loads is regulated by National Highways and will be subject to separate agreement with the relevant highway authorities and police". The number and schedule of abnormal load trips associated with the Proposed Development is detailed in Table 12.8 and equates to six abnormal loads per week over weeks 12 to 16 of the construction programme. This impact is considered to be negligible and **Not Significant**.

Cumulative Effects and Interaction of Effects

Cumulative Effects

- 12.106 Cumulative effects have been considered for other wind farm developments in the vicinity of the Proposed Development. These developments have planning consent but are yet to be constructed/ are awaiting a decision and could utilise a common access route for general construction traffic. The potential for cumulative effects has been assessed by reviewing data available from the Traffic and Transport Chapters within the respective EIARs for the relevant developments.
- 12.107 Whilst the developments identified may share a similar route for abnormal load vehicles, the restrictions in place and requirement for Police approval and escort means that abnormal load deliveries would not be permitted to occur at the same time. Therefore, there is no scope for a cumulative effect of abnormal load movements.

Consented Wind Farms

Lairg II Windfarm

- 12.108 The consented Lairg II Windfarm sits adjacent to the Proposed Development and is another project developed by the Applicant. Consent for the erection of 10 turbines for a period of 35 years was granted in October 2021. It is noted that the Lairg II Development and the Proposed Development share the same access point from the road to Torroble, with the Proposed Development being accessed through the Lairg II site. Therefore, the two sites share the same characteristics in terms of abnormal loads route and construction HGV routes.
- 12.109 The Applicant intends to construct the Lairg II development first in advance of the proposed development so there would be no overlap in the construction periods and no cumulative impacts.

Strath Tirry Wind Farm

- 12.110 Strath Tirry Wind Farm gained consent in June 2022, comprising a four-turbine wind farm located approximately 8km north of Lairg and 4km east of Loch Shin, sitting between the two small settlements of Rhian and Dalchork. The traffic generation for the construction of four turbines will be less than that associated with the Proposed Development and the construction programme will be over a relatively short period given the number of turbines. Strath Tirry is likely to commence construction before the timescales of the Proposed Development and therefore cumulative effects are unlikely.

Achany Extension

- 12.111 The proposed extension to the operational Achany Wind Farm gained consent in May 2023 and is located on land adjacent (to the northwest) of Achany and Rosehall Wind Farms, between Glen Cassley and Loch Shin, and is situated approximately 4.5km north of the village of Rosehall and 11km west-north-west of Lairg. Following initial consultation and objection from Highland Council, the number of proposed turbines was reduced from 20

to 18. The Achany extension shares the same access route as the proposed development, primarily the A9 and A836 from the south, with the Achany extension being accessed from the A839 to the west of Lairg. Construction of the Achany extension is likely to commence before the timescales of the Proposed Development and therefore cumulative effects are unlikely.

Application Wind Farms

Chleansaid Wind Farm

- 12.112 ESB Asset Development UK Limited (ESB) have submitted an application in March 2022 to construct and operate for 35 years an onshore wind farm and battery energy storage facility at Chleansaid, located 13 km to the northeast of Lairg in The Highland Council area, near the A836–A838 junction. The proposed development comprises up to 16 wind turbines and includes the potential to host a permanent co-located energy storage facility. Chleansaid shares the same access routes as the proposed development (A9, then A836 or A838) however the proposed year of construction is 2024 (as detailed in the Chleansaid EIA Report³) so there is unlikely to be any overlap in construction phases due to timescales, and Chleansaid is also under the control of the Applicant who will ensure there is no overlap in peak construction periods.

Strath Oykel Wind Farm

- 12.113 The proposed Strath Oykel Wind Farm site is located within Strath Oykel forest in the Sutherland region of the Scottish Highlands, more than 30km northwest of the Dornoch Firth, approximately 1.5km south of Doune. The original March 2021 scoping report comprised 16 turbines of up to 250m in height, plus associated infrastructure. Following a consultation process and several design iterations, the number of turbines was subsequently reduced to 11 with the maximum height reduced to 200m. The application has been referred to the DPEA.

³ Chleansaid Wind Farm: EIA Report, Volume 1, Chapter 12 Traffic and Transportation

- 12.114 The proposed Strath Oykel Wind Farm shares the access route for abnormal load vehicles from Invergordon via the A9 and the A839, and for general construction traffic shares part of the route from the south via the A836 towards Lairg. The A836 is a good standard “A” class road that is suitable for use by HGVs and has sufficient capacity to accommodate temporary increases in traffic levels.

Garvary Wind Farm

- 12.115 The proposed Garvary Wind Farm is located to the south of the consented Lairg II Wind Farm, immediately to the east of the A836, approximately 4.5 km south of Lairg and 5.5 km north of Bonar Bridge.
- 12.116 In April 2021, when the application for consent was submitted, Garvary Wind Farm in Sutherland within the planning authority of the Highland Council comprised of 37 turbines each with a blade tip height of 180 metres, battery storage and various ancillary infrastructure. In November 2022, in response to an objection from the Highland Council, Additional Information was submitted in which the number of turbines was reduced from 37 to 25, the blade tip height and location of each not changing from those in the application of April 2021. The application has been referred to the DPEA.
- 12.117 The location of the proposed Garvary Wind farm in proximity to the Proposed Development means that there will be an overlap in access routes for both general construction traffic and Abnormal Loads Vehicles, with general construction HGVs using travelling to site via the A836 and abnormal loads routing via the A9 and A839. It is unlikely that there would be an overlap in the peak months of construction as both developments are at different stages of the planning process, nevertheless, both wind farm developments will implement a Construction Traffic Management Plan which ensure that deliveries are scheduled appropriately to minimise the impact to the public road network and ensure that discernible cumulative effects are avoided.

Summary

- 12.118 In summary, it is highly unlikely that the peak construction period associated with another wind farm development in the area would overlap with the peak construction period of the Proposed Development as the applications are at different stages in the planning process and each development has varying lengths of construction periods. The high traffic generating activities, such as the importation of stone and concrete, only occur over a few months of the whole construction period for each development. It is unlikely that the local capacity for concrete and stone production could supply several developments at once, therefore, high traffic generating activities would naturally be staggered.
- 12.119 Furthermore, implementation of a CTMP (further details contained within the Mitigation Measures section below) for each development would ensure that there are open lines of communication with THC, Police Scotland, Transport Scotland, other stakeholders, and wind farm developers to monitor the progress of the construction stages. This process would flag whether construction HGV traffic is reaching unacceptable levels and would ensure that action is taken accordingly to minimise effects.

Interaction of Effects

- 12.120 In addition to the effects assessed in full within this chapter (i.e. severance, driver delay etc.), there are also visual and noise effects which are inter-related to the traffic and transport impacts associated with the construction phase of the Proposed Development. These effects are assessed respectively within Chapter 6: Landscape and Visual Amenity and Chapter 11: Noise.

Mitigation Measures

- 12.121 The assessment predicts that, prior to mitigation measures, the effect of severance, driver delay and pedestrian delay and amenity as a result of increased levels of HGVs associated with the Proposed Development would be significant along the road links within the Study Area. Therefore, in accordance with the EIA Regulations mitigation is required to address these potential effects. It is therefore proposed to prepare and implement a comprehensive Construction Traffic Management (CTMP) which is intended to mitigate the identified effects by ensuring that they are minimised as far as possible within the Study Area to a level which is considered to be not significant.
- 12.122 The CTMP (EIA Volume 4, Technical Appendix 12.2) will identify measures to reduce the number of construction vehicles as well as identifying measures to mitigate the impact of vehicles. The CTMP will identify the programme of works, the agreed routes to Site and details of a Site Liaison who would have responsibilities for managing traffic and transport impacts and effects. The CTMP will also identify measures to reduce and manage construction staff travel by private car, particularly single occupancy trips. The CTMP would include the following measures as a minimum:
- Immediately upon commencement, all deliveries, operatives, and visitors to the Site will report to the security gate. This will be communicated to all early works contractors at their pre-start meeting.
 - The main contractor will develop a logistics plan highlighting the access point for the project, loading bay, pedestrian / vehicular segregation, welfare, storage, security, and material handling that would be enforced following full Site establishment.
 - Approved haul routes will be identified to the Site and protocols put in place to ensure that HGVs adhere to these routes and do not pass through areas to be avoided.
 - All contractors will be provided with a Site induction pack containing information on delivery routes and any restrictions on routes.
 - Construction HGV traffic will be restricted between the network peak hours and school run hours which are generally 08:00 – 09:00, 15:00 – 16:00 and 17:00 – 18:00 Monday to Friday, if necessary.
 - Temporary construction Site signage would be erected along the identified construction traffic routes to warn people of construction activities and associated construction vehicles.
 - A construction traffic speed limit (for example, 20mph) could be imposed through Lairg.

- The construction material 'lay down' areas will allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 06:00 and after 22:00).
- An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. All contractors will be required to give details of proposed timing of material deliveries to the Site. At this stage they would be given a specific area for delivery.
- The CTMP and compliance monitoring therein will be included within all trade contractor tender enquiries to ensure early understanding and acceptance/compliance with the rules that would be enforced on this project.
- Under no circumstances will HGVs be allowed to lay-up in surrounding roads. All personnel in the team will be in contact with each other and with Site management, who in turn will have mobile and telephone contact with the subcontractors.
- Roads will be maintained in a clean and safe condition.
- A wheel washing facility would be installed on-site during the construction period in order to reduce mud and debris being deposited onto the local road network.

Residual Effects

- 12.123 Following implementation of the CTMP as a mitigation measure, the following paragraphs assess the likely residual effects of increased traffic levels within the Study Area during construction of the Proposed Development.
- 12.124 The CTMP will ensure that the volume of HGV trips is minimised as much as possible and will include measures such as the recycling/reuse of materials on-site where possible. The CTMP will ensure that there is signage along the construction routes to make residents aware of the additional HGV traffic and to provide the opportunity to plan accordingly. The CTMP will ensure that construction HGVs do not travel during peak periods or at the start/end of the school day and that they adhere to a lowered speed limit. Each of these measures will contribute to minimising the level of effect experienced by residents in Pittentrail, Lairg and Bonar Bridge and the isolated properties along the routes within the Study Area.
- 12.125 Furthermore, it is important to recognise that all effects associated with increased construction traffic will be temporary in nature and that this assessment has considered the worst-case possible impact at each location.
- 12.126 The residual effects of severance, driver delay, pedestrian delay, and amenity after implementation of a CTMP are therefore considered to be minor and **Not Significant**.

Summary

- 12.127 This assessment has considered the effects on the local road network of HGV traffic associated with the construction phase of the Proposed Development.
- 12.128 The construction programme associated with the Proposed Development is anticipated to cover an 18-month period, during which 4,473 HGVs would access the Site equating to 45 daily total HGV trips (22.5 inbound plus 22.5 outbound) during the busiest construction month (Month 6). The movement of abnormal loads is not anticipated to exceed six trips

per week over the course of four months (with no overlap during the busiest construction months).

12.129 A robust assessment was undertaken based on a conservative approach for the total construction traffic movements and the worst-case scenario for each link. The impact of construction traffic could increase total traffic flows along the road links within the Study Area by the following:

- 1% at all assessed locations along the A9;
- 8% on the A839;
- 10% on the A836; and
- 214% on Road to Torroble where the site is accessed Via Lairg II.

12.130 The percentage increase in HGVs associated with the worst-case month of the construction programme for the Proposed Development could increase HGV levels by the following:

- 3-4% at all assessed locations along the A9;
- 18% on the A839;
- 101% on the A836; and
- 881% on Road to Torroble where the site is accessed Via Lairg II.

12.131 The impacts and effects of the Proposed Development represent a conservative approach assuming that 70% stone requirements are imported to the Site while it is anticipated that a much larger proportion of stone will be won from on-site borrow pits. Furthermore, these increased traffic levels are temporary in nature and are likely to be lower during the other 11 months of construction.

12.132 The significance of the predicted effects of the Proposed Development on the traffic and transport resource during the construction phase has been discussed in this chapter and is summarised in Table 12.11.

Table 12.11: Summary of Construction Effects and Significance

Predicted Effect	Significance	Mitigation	Significance of Residual Effect
Severance of Communities	A836: Major/Moderate – Significant Rd to Torroble: Minor – Not Significant	CTMP	Minor – Not significant
Road Vehicle Driver and Passenger Delay	Moderate –Significant	CTMP	Minor - Not significant
Non-Motorised (Pedestrian) Delay and Amenity	A836: Major/Moderate – Significant Rd to Torroble: Minor – Not Significant	CTMP	Minor – Not significant
Road User and Pedestrian Safety	Moderate/Minor – Not Significant	Not required	Not significant
Fear and Intimidation	Negligible – Not Significant	Not required	Not significant
Hazardous and Large Loads	Negligible – Not Significant	Not required	Not significant

12.133 With reference to Table 12.11, this chapter concludes that the environmental effects associated with increased traffic as a result of the Proposed Development are deemed to be **Not Significant** once mitigation is put in place. It is also noted that the increased traffic leads to potential effects that are temporary in nature, can be accommodated by the existing road network within the Study Area, and can be managed effectively by implementation of a Construction Traffic Management Plan.

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 13: Socio-Economic, Tourism and Recreation

April 2024

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13 SOCIO ECONOMICS AND TOURISM

Introduction

- 13.1 This chapter considers the potential socio-economic, tourism and recreational effects potentially arising from the Proposed Development. This assessment has been undertaken on the basis of the Proposed Development consisting of twelve wind turbines, with six at 230m blade tip height and six at 200m blade tip height, with a 'per turbine' capacity of up to 6.6MW and a combined generating capacity of 79.2MW, plus 5MW of additional battery storage capacity. The specific effects considered within this assessment are those affecting:
- The economy;
 - Tourism; and
 - Recreational facilities.
- 13.2 There are other environmental topics that have relevance to aspects considered within this chapter such as Chapter 12: Traffic and Transport, Chapter 11: Noise, Chapter 7: Cultural Heritage, and Chapter 6: Landscape and Visual Amenity. The potential effects of these are provided elsewhere in the EIA as separate chapters and are not reassessed in this chapter.
- 13.3 This chapter will outline the legislation, policy, guidance, and methodology used to assess and determine the potential effects of the Proposed Development on socio-economics, tourism, and recreation. It will then provide an overview of baseline conditions, before identifying the potential effects of the Proposed Development and suggested mitigation measures.

Statement of Competence

- 13.4 This statement has been prepared by Corey Simpson of Green Cat Renewables Ltd. Corey is a Principal Consultant and has over 10 years' experience in the Scottish onshore wind sector. With extensive knowledge of EIA reporting, Corey has written numerous socio-economic chapters for large-scale commercial developments.

Legislation, Policy, and Guidance

- 13.5 There is no recognised legislation, policy, or guidance for assessing the impacts of wind energy development applications on socio-economics, tourism, or recreation. The methods utilised within this assessment will be based upon previous experience and established EIA best practice, including those used in UK Government and industry reports within the renewable energy sector, where possible.
- 13.6 The legislation, policy and guidance noted below is in addition to those referenced earlier in the EIA

Legislation

Land reform Act (Scotland) 2003 (as amended 2016)

- 13.7 This act considers the principles of responsible access, relating to both access users and individuals who manage the land, and the right of access to land by foot, horseback, pedal cycle (or any combination of these) to most land and inland water.¹ It also states that Local Authorities have the obligation to develop and establish a core path plan which will allow for responsible access within that given area. This system may include rights of way, paths, footways, footpaths, or cycle tracks. This legislation will be considered within the tourism and recreation assessment.

National Policy

National Planning Framework 4

- 13.8 NPF4's spatial strategy aims to develop sustainable places in an attempt to reduce the impacts of climate change. This includes decarbonizing industry, reducing community inequalities, and creating a more circular economy, all of which will allow Scotland to play their part in achieving the United Nation's Sustainable Development Goals. Within this, six national developments support the delivery of sustainable places, one of which is strategic renewable electricity generation and transmission structure which will aim to:
- 13.9 "Support electricity generation and associated grid infrastructure throughout Scotland, providing employment and opportunities for community benefit, helping to reduce emissions and improve security of supply."
- 13.10 Under Policy 11(e)(iii), NPF4 addresses that renewable energy developments will only be supported by the Scottish Government when the project's design and mitigation strategy show consideration of any impacts to public access. Policy 11(c) also addresses that renewable energy developments will only be supported where they:

"maximise net economic impact, including local and community socio-economic benefits such as employment, associated business, and supply chain opportunities."

Local Policy

Highland-Wide Local Development Plan

- 13.11 The Highland-wide Local Development Plan (HwLDP) supports the use of onshore renewable energy generation due to the integral role it plays in tackling climate change, increasing energy security and contributing to the local and regional economies of the Highlands. Policy 67 states that all renewable energy developments will be considered

¹ Scottish Government (2016) Land Reform (Scotland) Act 2003 (as amended 2016)

¹ [Highland-wide Local Development Plan | Highland-wide Local Development Plan | The Highland Council](#)

against their contribution to renewable energy generation targets and the positive or negative effects of such proposals on the local and national economy.²

Caithness and Sutherland Local Development Plan

- 13.12 Caithness and Sutherland Local Development Plan (CaSPlan) (2018) lays out several policies aimed at growing communities and increasing employment. The plan actively supports the development of renewable energy and acknowledges the importance of investment in renewables as a means of delivering employment opportunities and sustainable community growth. Specifically aligned with the Proposed Development is the aim of Caplan to create economic benefits by establishing the area as an internationally renowned centre for renewable energy.

Guidance

Onshore Wind Supplementary Guidance (Highland Council)

- 13.13 The Onshore Wind Supplementary Guidance (2016) supersedes the Highland Renewable Energy Strategy (HRES) and complements both the HwLDP and CaSPlan by filling in the detail to ensure that the policy is well understood and is consistently applied throughout the Highlands. The guidance layout a wide variety of objectives which planning authorities should consider minimising negative effects on tourism and recreation.³ These include:
- Population and Human Health - To improve the living environment for all communities and promote improved health of the human population as a means of creating a balanced population demographic.
 - Historic Environment and Cultural Heritage - Protect and where appropriate enhance the historic environment to create valuable tourist, recreational and educational resources.
 - Landscape - Protect and enhance the landscape's character, diversity, and unique qualities.
 - Water – Protecting the quality of the freshwater environment as it is an essential component of local economies and tourism.
 - Material Assets – Manage, maintain, and promote sustainable use of material assets such as public access as a way of improving economic activity and health.

Scottish Government Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments

- 13.14 The Scottish Government's Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments provide a benchmark for the sector and have been widely adopted.⁴ The aim of this piece of guidance is to “*promote transparency*” and encourage communities and developers to work together to ensure renewable energy development continues whilst creating a lasting benefit for the communities based

³[Onshore wind energy: supplementary guidance | Finalised Environmental Report September 2016 \(highland.gov.uk\)](#)

⁴ Scottish Government (2018) Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments

adjacent. This piece of documentation also stresses the importance of providing a community benefits package that relates to *“the specific needs and aspirations of local people, evidenced by some form of the ballot or another mechanism to capture views presented.”*

Onshore Wind Turbine Planning Advice

- 13.15 Although now superseded by web-based renewables advice, the Scottish Government's (2008) Planning Advice Note 45: 'Annex 2: Spatial Frameworks and Supplementary Planning Guidance for Wind Farms' indicated the range of issues that planning authorities may wish to consider minimising adverse local effects that could impact on tourism and recreation. These include:
- The location of the proposed development in relation to tourist routes including designated cycling and walking routes;
 - The relative scale of recreation and tourism in the area (i.e. local and national);
 - Views from accommodation in the area;
 - Potential positive tourism aspects associated with the development;
 - Views of tourist organisations (i.e. local tourist businesses or Visit Scotland); and
 - The visitor population whose recreational interests may be affected.
- 13.16 This piece of guidance has now been replaced by 'Onshore Wind Turbines: Planning Advice'.⁵ This advice does not specify these factors but highlights the importance of assessing the impact of the development on local communities and gaining their support. It is worthwhile to consider both these issues of advice whilst assessing any potential impacts.
- 13.17 The Scoping Opinion was received from the Scottish Government Energy Consents Unit on the 7th of October 2022

Consultation

- 13.18 Consultation relevant to the Socio-Economic, Recreation and Tourism assessment was undertaken with the Highland Council who commented on aspects of methodology, sources of information, scope of assessment and cumulative development. A summary of these consultation responses is provided in **Table 23.1**.

Table 23.1: Consultation Responses

Consultee	Consultation Response	Where and how is this addressed?
The Highland Council	Request for economic information relating to procurement, construction, operation and decommissioning of the Proposed Development at a regional and local scale.	Socio-economic impact assessment conducted. See Section 13.87

⁵ Scottish Government (2014) Onshore wind turbines: planning advice

Consultee	Consultation Response	Where and how is this addressed?
The Highland Council	Request for information on the effects of the Proposed Development on the public access footpaths, bridleways, and cycleways and any access routes from road infrastructure.	Recreational impact assessment conducted. See Section 13.112
The Highland Council	Request for the EIAR to assess the potential impact on the Affric-Kintail Way (long distance route) and other public access routes on or near the Proposed Development.	After consideration, the Affric-Kintail Way was deemed not to be relevant to the assessment. This was due to the route running from Loch Ness to Morvich in Kintail which is approximately 72km south of the Proposed Development. Instead, an impact assessment has been carried out on the Central Sutherland Crater Walk. See Section 13.112

Methodology

Overall Approach

- 13.19 There are no recognised standards or methodologies for assessing the socio-economic, tourism and recreation effects of wind farms.
- 13.20 As such, professional judgment has informed the approach to this assessment. This is set out below:
- Desk studies to establish the baseline conditions of the development site;
 - Consultation with relevant statutory and non-statutory bodies;
 - Completion of a baseline assessment describing the economic baseline and identifying tourist and recreational activities and facilities within the study area;
 - An assessment of the impact of the proposed development on the socio-economic, tourism and recreational value of the area. This was completed using a Sensitivity / Magnitude / Significance matrix as per other sections of the EIAR; and
 - Identification of possible measures to avoid and mitigate against, any potential adverse effects resulting from the proposed development.

Data Sources

- 13.21 The information sources used to acquire baseline information can be seen below:
- National Records of Scotland;
 - Office for National Statistics (NOMIS);
 - The Highland Council;
 - High Life Highland (leisure);
 - Visit Scotland; and
 - Sustrans – Documents – Cycling, Walking & Safety.

Study Area

- 13.22 Economic impacts are considered at a local scale (Sutherland), regional (Highland), and with impacts at a national (Scotland) scale also considered where applicable.
- 13.23 Impacts upon tourism/recreation are considered within a 10km radius of the site in order to capture the receptors that are most likely to be affected by the Proposed Development.

Baseline Studies

- 13.24 The desk study included a review of the following information sources to establish the area's socio-economic and tourism activities and facilities. Key areas that are currently used for recreational activities (e.g., cycle routes and footpaths) were identified. Where applicable, national, and regional information and studies are referenced to provide context on more local results.
- 13.25 The socio-economic baseline assessment includes:
- Up-to-date discourse surrounding the impacts of wind farms on social and economic trends;
 - Population figures;
 - Deprivation rating; and
 - Information on the size and performance of the local economy.
- 13.26 The tourism baseline assessment provides information on:
- Up-to-date discourse surrounding the impacts of wind farms on tourism;
 - Tourist and visitor trends;
 - Tourist trips and expenditure;
 - Tourism employment; and
 - Tourist activities.
- 13.27 The recreation baseline assessment provides information on:
- Core paths; and
 - Cycle routes.
 - Other recreational receptors in the study area.

Study Limitations

- 13.28 Study Limitations Include
- Limited published guidance on socio-economic, tourism and recreation assessments for the EIA process;
 - The most up-to-date data differs on a local and regional basis which may skew comparisons;

- Limited research of the likely effects of wind farm developments on socio-economic, tourism and recreational activity; and
- Much of the evidence for the effects on tourism and recreational activities is based on subjective information sources and there are inherent limitations associated with qualitative data.

Assessment of Impacts

Socio-Economic

13.29 This assessment will consider:

- The local, regional, and national spending per annum;
- The estimated job opportunities; and
- The Local Value Added (LVA) contribution to the local economy and the Gross Value Added (GVA) contribution to the regional, national, and overseas economy.

13.30 This assessment has been based on the RenewableUK study Onshore Wind: Economic Impacts in 2014. This assessment has been undertaken on the basis of the maximum anticipated MW output from the Proposed Development to create a 'best case' scenario. For the purposes of the Proposed Development, the 'best case' scenario will be based on 12 turbines with a potential generating capacity of up to 79.2MW.

13.31 To avoid a biased assessment, this assessment will also make use of the BVG Associates study Economic Benefits from Onshore Wind Farms (2017) to understand how the 'best case' scenario compares with a second assessment.

Tourism

13.32 The criteria used to assess the significance of effects on tourism are qualitative and have been based on any estimated changes to tourism in the local area. This includes changes in the availability, accessibility, and amenity of tourist receptors. For this assessment, amenity refers to a combination of visual amenity, air quality and noise levels experienced by the users of tourist attractions.

13.33 A Zone of Theoretical Visibility (ZTV) will also be used to guide this assessment. The ZTV shows the number of turbines that would be theoretically visible throughout the 10km study area; however, it does not consider the built development and vegetation, which can significantly reduce the area and extent of actual visibility. The figures included in these assessments are:

- Figure 13.1 – Tourist Accommodation ZTV; and
- Figure 13.2 – Tourist Attraction ZTV

Recreation

13.34 The criteria used to assess the significance of effects on recreation is qualitative and has been based on any estimated changes to recreational facilities in the local area. This includes changes in the accessibility and amenity of recreational receptors, which for this

assessment will include core paths, cycle routes and other recreational activities. For this assessment, amenity refers to a combination of visual amenity, air quality and noise levels experienced by the users of tourist attractions.

- 13.35 A ZTV will also be used to guide this assessment. The ZTV shows the number of turbines that would be theoretically visible throughout the 10km study area; however, it does not consider the built development and vegetation, which can significantly reduce the area and extent of actual visibility. The figures associated with this assessment are:

- **Figure 13.3** –Recreation ZTV;

Receptor Sensitivity and Significance of Impact

Sensitivity of Receptors

- 13.36 Sensitivity is determined based on the baseline conditions and their ability to adapt to change. Socio-economic receptors, tourism, and recreation receptors will be assessed in different ways. The sensitivity of socio-economic, tourism and recreation receptors are outlined in **Table 13.3**

Table 13.3: Receptor sensitivity for socio-economics, tourism, and recreational receptors

Sensitivity	Socio-Economic Impacts	Tourism Impacts	Recreation Impacts
High	There is a low/limited availability of labour and/or skills.	The receptor is defined as being of International/National status or having high visitor numbers.	The receptor wholly relies on its present amenity status.
Medium	There is a constrained supply of labour and/or skills.	The receptor/resource is defined as being of regional status or having medium visitor numbers.	The receptor relies somewhat on its present amenity status.
Low	There is a readily available labour force with appropriate skills.	The receptor/resource is defined as being of local status or having low visitor numbers.	The receptor does not rely on its present amenity status.

Magnitude

- 13.37 **Table 13.4** outlines the criteria for assessing the magnitude of the effect on socio-economic, tourism and recreation receptors. This considers the scale of these changes, and more weight is given to permanent changes than to temporary ones. Temporary effects are generally associated with the construction works and may be short, medium, or long-term. Permanent effects are generally those associated with the operation of the Proposed Development.

Table 13.4: Magnitude of Effect

Magnitude of Effect	Socio-Economic Impacts	Tourism Impacts	Recreation Impacts
High	The Proposed Development impacts the economy at a scale which exceeds the local economy.	Visitor numbers and/or economic income is significantly reduced.	There are obvious views of the Proposed Development which will affect a large number of people/activities.
Medium	The Proposed Development creates noticeable impacts on the local economy.	Visitor numbers and/or economic income is somewhat reduced.	There are obvious views of the Proposed Development which will affect a small number of people/activities; or there are minor views of the Proposed Development which will affect a large number of people/ activities.
Minor	The Proposed Development creates minor impacts which are noticeable within the local economy.	Visitor numbers and/or economic income is minimally reduced.	These are minor views of the Proposed Development which will affect a small number of people/activities.
Negligible	The impact is not discernible.	The impact is not discernible.	The impact is not discernible.

Significance of Effects

13.38 The significance of an effects considers both the sensitivity of the receptor and the magnitude of effect. **Table 13.5** below sets out details the levels of significance.

Table 13.5: Significance of Effects Matrix

	Sensitivity		
Magnitude	High	Medium	Low
High	Major	Major/Moderate	Moderate
Medium	Major/Moderate	Moderate	Minor
Low	Moderate	Minor	Minor
Negligible	Not Significant	Not significant	Not Significant

13.39 A description of the different significance levels is noted below. In the context of this EIAR, a moderate or major effect is considered significant within the scope of this chapter.

- Major – The value of the receptor and the magnitude of effects are predicted to give rise to major, detectable impacts and may be fundamental in the decision-making process.

- Moderate – The value of the receptor and the magnitude of effects are predicted to give rise to moderate, detectable impacts but alone will not be fundamental in the decision-making process.
- Minor – The value of the receptor and the magnitude of effects are predicted to give rise to minor, detectable impacts but will not be fundamental in the decision-making process.
- Not significant - The value of the receptor and the magnitude of effects are not predicted to give rise to any discernible or detectable impacts outside the norm of typical variation.

Baseline Conditions

Socio-Economics

- 13.40 The following documents give an overview of up-to-date discourse surrounding the impacts of wind farms on social and economic trends.
- 13.41 The Office for National Statistics published **Wind Energy in the UK: June 2021** to provide an overview of socio-economic data in line with the development of onshore and offshore wind. In 2020, the UK generated 75,610 GWh of electricity, which has risen 715% since 2009 and generated a turnover of £6 billion in 2019.
- 13.42 Employment in onshore wind remains steady, with around 4,400 full-time employees. These jobs are mainly in the production of electricity and the design, production, and installation of infrastructure for wind power, including operations and maintenance.⁶
- 13.43 RenewableUK published **The Onshore Wind Industry Prospectus** in October 2021.⁷ This report provides useful insight into the steps each country within the UK needs to take to reach Net Zero Targets, with a specific focus on the benefits of onshore wind farms. It is estimated that around 80% of the onshore wind energy needed to meet the 30GW by 2030 target can be provided by Scotland, which will create an additional 17,000 jobs and £27.8 billion in GVA for the economy. Of these new jobs, an estimated 10.9 of these will be within the Highlands. It was also stated that 43% of the supply chain for the UK could be provided by Scotland due to the high proportion of developers, civil contractors, and wind farm support services.
- 13.44 RenewableUK were commissioned by BiGGAR Economics to write **Onshore Wind: Economic Impacts in 2014**. It is stated that a typical UK wind farm will invest £2.97 million per MW over its development, constructions and operation and maintenance stages where 47% is spent, and 27% is retained, in the local economy. In these three stages, construction and operations and maintenance of the site will generate the most money for the local economy.

⁶ Office of National Statistics (2021) Wind Energy in the UK: June 2021

⁷ RenewableUK (2021) The Onshore Wind Industry Prospectus

- 13.45 This information informs the socio-economic assessment and is presented further in Section 19.6.1 as it provides an empirical way of calculating the economic contribution of an individual wind farm to the regional and national economy.⁸
- 13.46 BVG Associates' study, **Economic Benefits from Onshore Wind Farms (2017)**, focusses on eight onshore wind farms located in the South-West of Scotland and calculated that most of the project expenditure tends to go towards three key areas within the local economy:
- Local suppliers working on the wind farms;
 - Accommodation for the employees working on the wind farms; and
 - Expenditure from community payments, rent and rates.
- 13.47 The study estimated that a total of £1,276 million gross value added (GVA), and £297 million local value added (LVA), will be generated over the lifetime of the eight projects within the UK. The full-time equivalent years employment (FTE) is estimated to be 31,118 over the lifetime of the projects, with 7,768 estimated to be within the local area. Community benefit funds (CBFs) are estimated to be £2.5 million a year, which would generate £59 million over 25 years. It would also provide 9,300 FTE years from CBFs, which would give additional local area earnings of £213 million, at £23,000 per year.⁹

Population

- 13.48 The National Records of Scotland (NRS) Mid-2021 Population Estimates stated that Scotland had a population of 5,479,900, as of the 30th of June 2021¹⁰. Scotland covers an area of 7.9 million hectares, with an overall population density of 70 people per square kilometre, the most sparsely populated country in the UK.¹¹
- 13.49 As of the 30th of June 2021, the population of the Highlands was 238,060, which is the 7th highest of the 32 council authorities in Scotland and accounts for 4.3% of the total Scottish population.¹² The Highland Council serves a third of the land area of Scotland with a total land area (including islands) of 24,484 square kilometres. The Highlands has the lowest population density at 8 persons per square kilometre.¹³
- 13.50 The area within 10km of the Proposed Development could be described as rugged. Lairg is the largest settlement within the 10km study area with a population of approximately 900. Lairg is located 7.6km north-west of the Proposed Development¹⁴.

Table 13.6 Highlands and Scotland age demographics (Office for National Statistics)

Age Group	Highlands (No.)	Highlands (%)	Scotland (No)	Scotland (%)
0-15	38,130	16%	911,522	17

⁸ Renewable UK (2014) Onshore Wind: Economic Impacts in 2014

⁹ BVG Associates (2017) Economic Benefits from Onshore Wind Farms

¹⁰ National Records of Scotland (NRS) (2021) Mid-2022 Population Estimates

¹¹ Statista (2022) Scotland – Statistics and Facts

¹² Highland Council Area Profile National Records of Scotland (Accessed March 2024)

¹³ [Geography | Highland profile - key facts and figures | The Highland Council](#)

¹⁴ When measured from the centre point of the Site

16-64	144,706	60.8	3,494,517	64
65+	55,224	23.2	1,073,861	19
All Ages	238,060	100	5,479,900	100

- 13.51 **Table 13.6** shows that 60.8% of the Highlands population is aged between 16-64. It also highlights that the Highlands 65+ age demographic (23.2%) is larger than that of the Highlands 0-15 age demographic (16%) suggesting that the Highlands has an ageing population. These numbers are broadly in line with the national average, with the Highland's ageing population being slightly higher.

Employment

- 13.52 The below figures have been informed by NOMIS Labour Market Profiles. The information provided by NOMIS is available at local authority-wide and regional levels to show economic activity, the availability of labour and employment demand. The working age population will be defined as those people aged between 16-64 years in line with NOMIS calculations.
- 13.53 **provides an** overview of the economic activity in the Highlands and Scotland. The most up-to-date data has been used for each area. For the Highlands, this data is from October 2022 – September 2023. For Scotland, this information is derived from between October 2023 – December 2023.
- 13.54 Table 13.7 provides an overview of the economic activity in the Highlands and Scotland. The most up-to-date data has been used for each area. For the Highlands, this data is from October 2022 – September 2023. For Scotland, this information is derived from between October 2023 – December 2023.

Table 13.7 Economic Activity in Highlands, Scotland, and the United Kingdom (2023)

	Highlands (No.)	Scotland (No.)
Employment Activity Rate (age 16-64)	124,700	2,776,000
Unemployment Activity Rate (age 16-64)	3,100	126,000
	Highlands (£)	Scotland (£)
Average Gross Weekly Pay for Full-Time Workers by Place of Residence	705.30	702.40

- 13.55 **Table 13.7** shows that 124,700 are economically active in the Highlands, and around 3,100 or 2.5% of this group, are unemployed. This is below the Scottish unemployment rate of 3.5%. It does reveal that the average weekly pay for full-time workers in the Highlands is £705.30.

13.56 **Table 13.8** provides a breakdown of employment, and employment sectors across the Highlands, Scotland. The Highlands data is from 2022 and data for Scotland is from June 2023.

Table 13.8 Labour Market Profile for Highlands and Scotland (NOMIS 2022-2023)

Areas of Employment	Highlands (%)	Scotland (%)
Agriculture, Forestry and Fishing	0.0	2.3
Mining and Quarrying	0.4	0.9
Manufacturing	5.4	6.3
Electricity, Gas, Steam and Air Conditioning	0.9	0.8
Water Supply, Sewage, Waste Management	2.0	0.5
Construction	7.2	6.2
Wholesale and Retail Trade – repair of motor vehicles and motorcycles	14.4	11.8
Transport and Storage	4.1	4.7
Accommodation and Food Service Activities	13.5	8.4
Information and Communication	2.3	3.1
Financial and Insurance Activities	0.8	3.1
Real Estate Activities	1.4	1.3
Professional, Scientific and Technical Activities	5.4	7.8
Administrative and Support Service Activities	5.4	7.8
Public Administration and Defence – Compulsory Social Security	5.4	6.2
Education	8.1	8.5
Human Health and Social Work Activities	17.1	14.4
Arts, Entertainment and Recreation	3.6	3.8
Other Service Activities	1.4	2.0
Activities of Households as Employers	0.0	0.1

**Note: Figures have been taken from Office for national Statistics (ONS) Business Register and Employment Survey.*

- 13.57 Of importance to this assessment are the numbers of people employed in sectors that could potentially benefit from the construction, operation, and decommissioning of the Proposed Development. **Table 13.7** shows that 7.2% of the Highlands workforce are employed in construction. This is more than the regional average (6.2%). The other sector is those employed in Electricity, Gas Steam and Air Conditioning which employs 0.9% of the Highlands workforce. This is more than the regional average (0.8%). As the Construction

and Electricity, Gas Steam and Air Conditioning sectors employ more than the regional average, there may be increased employment-based opportunities throughout the construction, operation, and decommissioning phases of the Proposed Development within the Highlands.

- 13.58 Individuals employed by sectors relating to tourism and recreation are also relevant to this assessment, as the Proposed Development has the potential to impact visitor numbers, patterns, and trends. From **Table 13.7** Accommodation and Food Service Activities (13.5%), Information and Communication (2.3%) and Arts, Entertainment and Recreation (3.6%) would be the sectors most affected by reductions in visitor numbers and revenue which accounts for 19.4% of workers.

Tourism

- 13.59 Tourism is an integral part of the economy within rural Scotland. The economic contribution from tourism comes in the form of public transport, taxis, accommodation, restaurants, village shops and visitor attractions. This provides wider cash flow into the local economy and supply chains that support the tourism industry.
- 13.60 Prior to the COVID-19 pandemic, tourism had seen a number of years of consistent growth so that by 2019 Highland's 7.5m visitors generated
- £1.13Bn of direct spend by those visiting the area,
 - a further £265m of indirect expenditure by the tourism industry purchasing local goods and services,
 - over 25,000 jobs (including the self-employed)¹⁵.
- 13.61 In 2019 the Highland Council's Tourism Team started work on a Tourism Infrastructure Plan. Due to the negative impact, the Covid-19 Pandemic had on tourism and the subsequent lockdown which followed, the plan was delayed. Between delays, VisitScotland's Rural Tourism Infrastructure Fund (RTIF) launched a pilot programme supporting two national parks and local authorities in highly pressured areas. The Highland Council took the pilot into consideration, and in February 2022 the **Strategic Tourism Infrastructure Development Plan** was published.
- 13.62 The purpose of the Strategic Tourism Infrastructure Development Plan is to identify key priorities for tourism infrastructure in the Highlands over the medium term – broadly defined as being the next two to five years. The plan endeavours to develop tourism within the Highlands and mitigate negative impacts felt by local communities through improving the following areas:
- Roads and parking - with a high level of dependence on car transport
 - Limited public transport and active travel options in many areas
 - Variable or limited access to public toilet facilities. Although many publicly available toilets run by the Council and / or partners are available (well over 100), the sheer size

¹⁵ VisitScotland Highlands Fact Sheet 2019 (Accessed March 2024)

of the area still means facilities may be some distance from popular visitor sites. Some facilities are also dated and may not offer facilities that match today's expectations.

- Increased disposal of waste in public bins or littering
- Outdoor access – notably concentrations of informal / “wild” camping in some locations
- Environmental damage due to cumulative impacts of large numbers of people as well as direct damage from activities such as campfires
- Public health issues particularly around toileting or motorhome waste disposal
- Public information and varying levels of knowledge of guidance / good practice.

13.63 The local council of Caithness and Sutherland is part of the Highlands. Seeking a more locally focused outlook on tourism, Venture North which is the Regional Destination Management Organisation for Caithness and Sutherland has published the **Tourism Destination Recovery Strategy 2021-2024**. The ambition of the Caithness and Sutherland region is to build a highly successful and sustainable tourism destination of the highest quality for visitors and residents alike – increasing year-round visitor numbers, spend and length of stay, spreading this more evenly across the region, and working collaboratively to identify new visitor markets and the creation of added value services and experiences for visitors.¹⁶

13.64 Scotland's Tourism Strategy, **Tourism Scotland 2020 (TS2020)**, is focussed on 4 key areas:

- To attract, develop and retain a skilled, committed, diverse and valued workforce;
- To create and develop Scotland as a sustainable destination;
- Provide the best, authentic, and memorable experiences; and
- Build business resilience, sustainability, and profitability.

13.65 It also states that within their strategy that 'Scotland's tourism sector will make a full contribution to our national ambition to become a net-zero society by 2045'.

13.66 Scotland's Tourism Strategy did not state that wind farms would be a barrier to tourism growth.¹⁷

13.67 In **Wind Farms and Tourism Trends in Scotland (2017)**, BiGGAR Economics examined the trends on local tourism within a 15km radius around 28 windfarms constructed in Scotland between 2009 and 2015 in a report called. They found that for most cases, sustainable tourism appeared to perform better in areas surrounding wind farms compared to tourism at the level of the local authority area. This analysis found no overall pattern between onshore wind development and tourism, which suggests that there was no detrimental impact on the tourism sector. This proposes that tourists are not deterred by the development of onshore wind farms, even at a local level.¹⁸

¹⁶ [caithness and sutherland - tourism destination recovery strategy 2021-24 1.pdf \(venture-north.co.uk\)](#) (Accessed March 2024)

¹⁷ Scottish Tourism Alliance (2020) Scotland Outlook 2030: Responsible Tourism for a Sustainable Future

¹⁸ BiGGAR Economics (2017) Wind Farms and Tourism Trends in Scotland

- 13.68 In 2021, BiGGAR Economics, updated the original study on Wind Farms and Tourism Trends in Scotland, with the addition of 16 wind farms constructed since 2015. The study considered the possibility of local effects on tourism related employment in the immediate vicinity of both original 28 sites (revisited) and newer 16 locations. The study found onshore wind turbine developments have no negative impact on tourism related employment. Most cases showed tourism-related employment within proximity to a wind farm outperformed Scottish and local authority employment trends.¹⁹
- 13.69 VisitScotland issued their **Position Statement (2014)** and stated that they are supportive of renewable energy and there has been limited evidence to suggest that wind farms have any impact of tourism levels. They believe that wind farms in fact attract tourists and that they encourage people 'to spend money in our tourism businesses' and develop sustainable tourism within Scotland.²⁰
- 13.70 In **Onshore Wind – Policy Statement Refresh (2022)**, the Scottish government stated that they want to develop sustainable tourism and believe that wind farms can create significant opportunity to develop this 'we consider the effect that onshore windfarms can have on local and national tourism as a significant opportunity'.
- 13.71 They also state that since the declaration of a climate crisis, the demands of the tourist have changed – in favour of sustainable tourism.²¹
- 13.72 Mountaineering Scotland stated in **Wind Farms and Tourism in Scotland: A Review with Focus on Mountaineering and Landscape (2017)** that most tourism is unaffected by the presence of wind farms. They state that most tourism is driven by attractions, business trips, friends and/or family and events. In some cases, wind turbines may be viewed as a novelty if tourists come from a part of the world where they are uncommon.²²
- 13.73 Despite this, it is acknowledged that some individuals may be discouraged to visit certain areas due to wind farms. The factors that tend to influence this are:
- Visitor type
 - Landscape type and/or character.
 - The nature of the local tourism offers and markets.
- 13.74 VisitScotland's **Wind Farm Consumer Research (2012)** provides an up-to-date study into attitudes to wind farms and their effects on tourism. The study, which was based upon interviews with 1,000 people from within Scotland and 2,000 people from within the UK, found that for most respondents (80% of UK respondents and 83% of Scottish respondents) that the presence of a wind farm would not affect their decision about where to stay when on holiday or on a short break. Other key findings of the study were that at present UK/Scotland consumers do not feel that wind farms spoil the look of the countryside, with

¹⁹ [BiGGAR Economics Wind Farms and Tourism 2021](#) (Accessed March 2024)

²⁰ Visit Scotland (2014) Position Statement – Wind Farms

²¹ Scottish Government (2022) Onshore Wind – Policy Statement 2022

²² Mountaineering Scotland (2017) Wind Farms and Tourism in Scotland: A Review with Focus on Mountaineering and Landscape

81.4% of UK respondents and 80.4% of Scottish respondents claiming to disagree or neither agree or disagree with the statement that wind farms spoil the look of the countryside.²³

Tourism in Scotland

- 13.75 Tourism is one of Scotland's largest industries which supports an estimated 217,100 jobs and 9% of Scotland's population. In 2019, there were approximately 17.6 million overnight trips and 34-million-day drips taken within Scotland, which totalled a visitor expenditure of around £5.7 billion. Tourism is a key aspect in the social, economic, and cultural well-being of Scotland, the industry is usually relied upon for jobs and infrastructure, from cities to rural areas.²⁴

Tourism in Highlands

- 13.76 In 2019 the Highlands experienced its strongest year of tourism since 2013. With an average pre COVID-19 visitor spend of £1.5bn in the region, 3,200 registered tourism businesses locally, and with tourism jobs representing up to 43% of the workforce in some areas of the Highlands and Islands, tourism is central to the rural economy. It sustains many of Scotland's local, regional and island economies and communities.²⁵

Table 13.9: Tourist Trips to Highlands from Great Britain and Overseas (VisitScotland 2023)

	Scotland (000s)	Scotland (%)	Highlands (000s)	Highlands (%)
Scotland	7,692	56	1,541	
Rest of Great Britain (GB)	6,119	44	906	
Total GB overnight	13,810	100	2,488	100
Europe	//	//	243	
North America	//	//	152	
Rest of the World	//	//	64	
Total international overnight	3,718	100	459	100
Total overnight tourism	17,528	12	2,907	
Total day tourism	133,600	88	9,579	
Grand total	151,128	100	12,486	100

- 13.77 The Highlands attracted 17% of all overnight trips and 13% of the total overnight tourism expenditure in Scotland. The number of overnight visits was 2.9 million, 30% higher than in 2018. Overnight spend increase by 23% against 2018 figures with £777 million being spent in 2019. Overnight tourism in the Highlands grew at a higher rate than the national average, where growth was seen at 11%-12%.

²³ Visit Scotland (2012) Wind Farm Consumer Research

²⁴ VisitScotland Research Insights: <https://www.visitscotland.org/research-insights> (Accessed March 2024)

²⁵ VisitScotland Highlands Fact Sheet 2019 (Accessed March 2024)

Accommodation

13.78 There is the potential for tourists to be affected by views of the Proposed Development from their place of lodging, or whilst en-route to their accommodation. The key aspect of this is whether views of the Proposed Development would affect visitor's decisions to visit or return to an area. It is also important to consider if increased traffic will impact a tourist's decision to visit, or return, to a specific accommodation provider.

13.79 **Table 13.10** shows the occupancy of different types of accommodation.

Table 13.10 Monthly occupancy rates by accommodation type in Highlands (VisitScotland, 2023)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Hotel	43%	48%	53%	70%	85%	86%	86%	87%	84%	73%	58%	44%	70%
B&B	11%	7%	5%	45%	63%	67%	77%	85%	59%	30%	23%	8%	44%
Self-Catering	33%	36%	33%	61%	69%	67%	78%	78%	61%	53%	32%	34%	55%
Hostel	37%	46%	43%	63%	77%	71%	76%	80%	66%	52%	35%	33%	60%

13.80 **Table 13.10** shows that the availability of accommodation varies across accommodation types, and at different times throughout the year. Hotels appear to have the highest occupancy rate, with August being the busiest month, reaching 87% occupancy. B&Bs seem to have the lowest occupancy rates, at only 5% in March.

13.81 For the purposes of the assessment, it is important to note the accommodation availability as it is likely that accommodation will be needed for some on-site workers during the construction and operational phases of the Proposed Development. Accommodation types can be avoided at their busiest times by on-site workers, in favour of ones who have a higher occupancy rate, to avoid increasing demand for tourist accommodation.

Tourist Attractions

13.82 There are a variety of different attractions within the Highlands that attract tourists from the UK and overseas. The top rated, paid tourist attractions in Highlands in 2019, according to Visit Scotland²⁶, are listed in **Table 13.11** below.

Table 13.11 Top-rated, paid tourist attractions in the Highlands 2019 (VisitScotland, 2023)

Attraction	Visitor Numbers (2019)
Urquhart Castle	547,518
Glenfinnan Monument	462,235
Loch Ness by Jacobite	321,980
Culloden Visitor Centre	209,011
Dunvegan Castle and Gardens	176,534

²⁶ VisitScotland Highlands Fact Sheet 2019 (Accessed March 2024)

- 13.83 The top-rated, free tourist attractions in the Highlands in 2019, according to Visit Scotland are listed in **Table 13.12** below.

Table 13.12 Top-rated, free tourist attraction in Highlands in 2019 (VisitScotland, 2023)

Attraction	Visitor Numbers (2019)
Glencoe Visitor Centre	436,925
Glenmore Forest Park	427,791
Corrieshalloch Gorge	146,707
Glen Affric	135,710
Inverness Botanic Gardens	105,703

- 13.84 Of the top listed free and paid tourist attractions, none are located within 10km of the Proposed Development.
- 13.85 The following table lists any tourist facilities that are located within 10km of the Proposed Development. There is the potential for tourist facilities to be affected by views of the Proposed Development, especially if that tourist facility relies on its amenity to function, as it may impact visitors' decision to visit a specific attraction. **Table 13.13** shows the available visitor attractions within 10km of the Proposed Development.

Table 13.13 Tourist Attractions within 10km of the Proposed Development

Attraction	Description	Distance to the Site
Ferrycroft Visitor Centre (High Life Highlands)	Ferrycroft is an Information and Heritage Centre with a shop and toilets. There are games, displays, and experiences for all ages. Two walks start from Ferrycroft, Ord Hill archaeological Trail and Ferrywood.	2.2km
Carbisdale Castle	Carbisdale Castle was built between 1906 and 1917. Today the castle functions as a hotel, restaurant and private members club.	7.5km

Recreation

- 13.86 A number of recreational facilities are located within 10km of the Proposed Development. These are listed in **Table 13.14** below, along with a description and the sensitivity of the receptor.

Table 13.14 Recreational facilities within 10km of the Proposed Development and their sensitivity

Recreation Type	Description		Sensitivity
Core Paths	Context		Medium
	SU20.01 Meall Mor Fire Track	5.3km	
	SU20.02 Eiden - Creag A'Bhlair	5.3km	

Recreation Type	Description	Sensitivity
	SU20.03 Pitte trail - Rhemusaig Bridge	5.4km
	SU20.10 Torboll – Eiden	5.3km
	SU20.13 Rovie – Davochbeg	5.4km
	SU20.09 Creag a'Bhata Circuit	5.5km
	SU20.12 Rovie	5.5km
	SU20.08 Little Rogart Brae Milnafua	5.6km
	SU20.07 Little Rogart - Morness	5.7km
	SU20.06 Morness - Mill - Little Rogar	5.7km
	SU20.04 Free Church - Pitfure	5.0km
	SU20.05 Free Church Ardichoncherr - Tressady	5.0km
	SU16.02 Gunn's Wood	8.3km
	SU 16.07 Balloan Liarg	8.4km
	SU 16.06 Clash Breac – Primary School	8.4km
	SU 16.01 Ferry Wood Forest	8.3km
	SU 16.03 Ord Hill	8km
	SU 16.04 Station Gruids Road	8.1km
	SU 16.09 Gruid's Wood	6km
	SU 16.08 Braemore - Achany	6.1km
	SU 21.12 Shin Falls Circular	4km
	SU21.11 Shin Falls Forest Walk	4km
	SU 08.01 Culrain - Invershin	4.1km
	SU 08.02 Carbisdale	4.2km
	SU03.01 Cornhill	9km
	SU08.03 Lochcorie, Lower Track	7km
	SU05.06 Balblair Wood - Invershin	7km
	SU05.04 Balblair Forest Walk	7km
	SU05.03 Kyleside Walk	8.2km
	SU16.05 Loch Shin Hide	8km
	SU 05.01 Loch Migdale	7.8km
	SU 09.06 Achue Track	9.2km
	SU09.05 Ledmore Oak Wood	9km
	SU09.04 Spinningdale – Migdale, Ledmore Oak Wood	9km

Recreation Type	Description		Sensitivity
	SU09.08 Fairy Glen Spinningdale	9.5km	
	SU 09.07 Birchwood Loop	9.6km	
Cycle Routes	Inverness to John O' Groats (National Cycle Route 1)		Medium
Crater Walk	The Central Sutherland Crater Walk is a popular walk which is growing in popularity since its inception in 2017. Part of the route runs from Muie to Little Creich.		Medium
The Ord (Ord Hill)	This route is a combination of two short waymarked walks from the Ferrycroft Visitor Centre, an exhibition giving the chance to find out about the natural history of the area. The walks visit the shores of a loch, a hill-top viewpoint and some archaeological remains.		Medium
Falls of Shin Walk	Falls of Shine Walk is a 2.7 km (2 mile) circular walk that visits the picturesque Falls of Shin, located on the River Shin, near the Kyle of Sutherland.		Medium
Canoeing	Go Wild Highlands is a canoe trips business operating out of Lairg. The business has been trading since 2016 and use the waterways of the Kyle of Sutherland		Low
Golf	Bonar Bridge and Ardgay Golf Club is a nine-hole golf course located approximately 9km south of the Proposed Development. The course is set amongst the rolling hills, purple heather and Scots pine, typical of the area and has views over Loch Migdale.		Medium
Mountain Biking	Balblair Forest have two designated mountain biking trails (blue and black) which are aimed at moderate and advanced riders respectively.		Medium

Assessment of Impacts

- 13.87 The following sections give an in-depth assessment of the impacts of the Proposed Development on socio-economics, tourism, and recreation.

Socio-Economics

- 13.88 This section makes use of the Renewable UK study **Onshore Wind: Economic Impacts in 2014**. This study has been used to calculate:
- The local, regional, and national spend per annum;
 - The estimated jobs created
 - The Gross Value Added (GVA) contribution to the local, regional, national and overseas economy.
 - These socio-economic indicators will be calculated for the construction and operational phases of the Proposed Development.
- 13.89 It should be noted that the RenewableUK calculations used to determine the socio-economic impact of the Proposed Development highlight the anticipated total jobs created as result of the proposed development i.e., the jobs created are presented as new jobs within the relevant industries.

Construction Phase Impacts

13.90 The RenewableUK study estimated that the weighted average cost of an onshore windfarm during construction would be approximately £1.32 million per MW installed capacity per annum. The study also estimated that 36% of construction expenditure typically occurs within Scotland and 12% within the local authority area. These calculations have been used to inform **Table 13.15** based on twelve turbines with a potential generating capacity of 79.2MW.

Table 13.15 Estimated spend during the construction Phase (Green Cat Renewables calculation based on Renewable UK assumptions)

	Percentage of Total Construction (%)	BiGGar Averages Weighted Spend per MW (£)	Acheilidh Wind Farm Calculated Spend (£)
Highlands	12	158,501	12,553,280
Scotland	36	408,182	38,030,414
UK	47	613,312	48,574,310
Outside UK	53	705,563	55,880,590
Total (UK + Overseas)	100	1,318,875	104,454,900

13.91 **Table 13.15** shows that the total estimated spend during the construction phase within the UK is close to £49 million. Of this, 38 million is expected to be spent within Scotland and over £12.5 million is expected to be spent within the Highlands.

13.92 Renewable UK estimated that the three main areas of construction spend are for the turbine, grid connection and 'balance of plant' which accounts for all the facilities/infrastructure of a wind turbine installation except for the turbine itself. The majority of spend within the Highlands would fall within the 'balance of plant' and would comprise:

13.93 Contracts being placed with construction companies, contractors, and civil engineers in terms of:

- Concrete production;
- Civils Contractor;
- Electrical Contractor;
- Haulage and storage of abnormal loads; and
- Hire of physical plant including cranes.
- Accommodation and subsistence costs for work crews

13.94 Research generated by RenewableUK also indicates that, on average, there is one employee for every £137,942 in turnover and a Gross Value Added (GVA) turnover rate of 0.432. Using the assumptions from **Table 13.15**, the employment rate and GVA turnover can be estimated. This is set out in **Table 13.16**.

Table 13.16 Estimated job creation and GVA during the construction phase (Green Cat Renewables calculations based on RenewableUK assumptions)

Geographical Region	Estimated Turnover (£)	Estimated Job Creation (No)	Estimated LVA and GVA (£)
Highlands	12,553,280	Up to 91	5,423,017
Scotland	38,030,414	Up to 276	16,429,139
UK	48,574,310	Up to 352	20,984,102
Outside UK	55,880,590	Up to 405	24,140,415
Total (UK + Overseas)	104,454,900	Up to 757	45,124,517

- 13.95 As shown in **Table 13.16**, it is estimated that the Proposed Development could create up to 91 jobs and contribute up to £5.4 million in LVA during construction phase. It is also estimated that up to 276 jobs could be created across Scotland with an estimated gross GVA contribution of up to £16.4 million.

Operational Phase Impacts

- 13.96 **Table 13.17** shows the calculated average spend during the operational and maintenance phase of the Proposed Development, as taken from the Renewable UK study (2014).

Table 13.17 Estimated spend during the operational phase (Green Cat renewables calculation based on Renewable UK assumptions)

Geographical Region	Percentage of Total Operation & Maintenance Spend (%)	BiGGAR Averages Weighted Spend per MW (£)	Acheilidh Wind Farm Calculated Spend (£)
Highlands	42%	25,244	1,999,325
Scotland	58%	34,587	2,739,290
UK	87%	51,992	4,117,766
Outside UK	13%	7,875	623,700
Total (UK + Overseas)	100%	59,867	4,741,466

- 13.97 **Table 13.17** shows that 58% of operational expenditure tends to occur within the UK, with 42% spent in the local area. This indicates that **over £2.7** million of the operational spend is estimated to be spent within the Scottish economy and just **shy of £2** million estimated to be spent within **the Highlands**.
- 13.98 Research generated by RenewableUK also indicates that, on average, there is one employee for every £121,935 in turnover and a Gross Value Added (GVA) turnover rate of 0.430. Using the assumptions from **Table 13.17** based on construction spend, the employment rate and GVA turnover can be estimated. This is set out in **Table 13.18**.

Table 13.18 Estimated job creation and GVA during the operational phase (Green Cat Renewables calculation based on Renewable UK assumptions)

Geographical Region	Estimated Turnover (£)	Estimated Job Generation (No)	Estimated LVA and GVA (£)
Highlands	1,999,325	Up to 16	859,710
Scotland	2,739,290	Up to 22	1,177,895
UK	4,117,766	Up to 34	1,770,639
Outside UK	623,700	Up to 5	268,191
Total (UK + Overseas)	4,741,466	Up to 39	2,038,830

13.99 As Shown in **Table 13.18**, it is estimated that the Proposed Development could create up to 16 jobs and contribute up to £859,710 in LVA during the operational phase. It is also estimated that up to 22 jobs could be created across Scotland with a gross GVA contribution of up to £1,177,895.

13.100 It is likely that a locally based Highland workforce will be employed for turbine and site maintenance during the operational phase of the development as their geographical advantage would allow for a rapid response due to any unforeseen circumstance.

Socio-Economic Conclusion

13.101 The Proposed Development would consist of twelve wind turbines with a generating capacity of 79.2MW that will generate electricity for the local electricity network. The sections above detailing the construction phase and operational phase effects have shown that the Proposed Development is predicted to provide a range of positive opportunities for the local, regional, national, and overseas economy. It is estimated that over the duration of the construction and operational phase of the Proposed Development that:

- Up to £14.5 million could be spent within the local economy;
- Up to 107 jobs could be created in the Highlands region; and
- Up to 6.2 million in LVA could be contributed to the local economy.

13.102 It should be noted that although construction impacts are one-off in nature they will last for the duration of the project (no less than 12 months), thereby ensuring meaningful benefit to the local economy.

13.103 Overall, the sensitivity of the economy is estimated to be **low** as there is a readily available supply of labour with appropriate skills. The significance of effect is estimated to be **minor** and **beneficial** during both the construction and operational phases as there will be small, noticeable impacts on the local economy in the form of estimated increased LVA/GVA contributions and project spend per annum. As such, there is expected to be a **minor, beneficial** effect on socio-economic receptors as a result of the Proposed Development.

Tourism

13.104 This section will assess how tourism will be affected as a result of the Proposed Development. This will be assessed qualitatively through the use of receptor sensitivity and the anticipated significance of impact to give an estimated significance of effect.

This assessment will consider changes to the availability, accessibility, and amenity of different tourist receptors. This will largely depend on:

- The status of the tourist facility;
- Any anticipated changes to tourist numbers as a result of the Proposed Development; and
- Any anticipated change to the tourism economy as a result of the Proposed Development.

Construction Phase Impacts

13.105 The main impacts that would be experienced during construction are:

- Disruptions on the local road networks during the transportation of abnormal loads; and
- Visual/noise impacts from workers, machinery and on-site activity.

13.106 **Table 13.19** provides a summary of the predicted impacts during the construction phase, along with the receptor sensitivity, significance of impact and the significance of effect.

Operational Phase Impacts

13.107 The main impacts that would be experienced during operation are:

- Views of the turbines and its associated infrastructure.

13.108 **Table 13.20** provides a summary of the predicted impacts during the operational phase, along with the receptor sensitivity, significance of impact and the significance of effect.

Decommissioning Phase Impacts

13.109 The potential adverse and beneficial effects that could arise during the decommissioning phase are predicted to be similar to those identified for the construction phase.

Table 13.19 Construction Phase Assessment of Effects

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
Ferrycroft Visitor Centre (High Life Highlands)	Low	Low	Minor	There is expected to be a minor effect on Ferrycroft Visitor Centre during the construction phase of the Proposed Development. The facility is of local status and attracts a small number of

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
				visitors. Some views may be visible when entering and exiting the facility; however, this is not expected to impact tourist numbers, economic revenue, or the appreciation of the facility. There may be a small increase in traffic if travelling on the A836 as there will be an increase in the number of vehicles visiting the site; however, it is unlikely that there will be a noticeable increase from the standard day-to-day haulage. Construction traffic will be minimised by utilising the on-site borrow pit and a traffic management plan. No noise is anticipated to be audible from the visitor centre.
Carbisdale Castle	Medium	Low	Minor	There is expected to be a minor effect on the Carbisdale Castle during the construction phase of the proposed development. The facility is of regional status and attracts a moderate number of visitors. Some views may be visible when on the facility grounds; however, views of the Proposed Development will not be prominent from within the castle building. The Proposed Development is not expected to impact tourist numbers, economic revenue, or the appreciation of the facility. The closest road of significance to the Carbisdale Castle is the A836 (east) An small increase in traffic is anticipated; however, it is unlikely that there will be a noticeable increase from the standard day-to-day haulage. No noise is anticipated to be audible from the Carbisdale Castle and its grounds.
Accommodation	Low	Low	Minor	There is expected to be minor effects on local accommodation during the construction phase of the Proposed Development. Some views of workers, machinery and

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
				on-site activity may be visible when the accommodation is facing the Proposed Development. There are a range of accommodation providers within the study area, some of which would not be disrupted by the construction of the Proposed Development. Therefore, it is not considered that the construction phase of the Proposed Development would affect accommodation availability. It is likely that during the construction phase, accommodation will be needed for some on-site workers. Attempts can be made to have any on-site workers staying in accommodations with higher occupancy rates to reduce any increase in demand for tourist accommodation. As such, it is not considered that the additional demand would affect the availability of accommodation and any small increase in numbers is expected to have a minor, positive impact on the local economy. There may be a small increase in traffic if travelling on the A836 as there will be an increase in the number of vehicles visiting the site; however, it is unlikely that there will be a noticeable increase from the standard day-to-day haulage. Construction traffic will be minimised by utilising the on-site borrow pit and a traffic management plan. No noise is expected to be audible from the accommodation receptors.

Table 13.20 Operational Phase Assessment of Effects

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
Ferrycroft Visitor Centre (High Life Highlands)	Low	Low	Minor	Effects on the Ferrycroft Visitor Centre are expected to be minor during the operational phase of the Proposed Development. The facility is within the zone of theoretical visibility: however, no views of the Proposed Development will be visible when inside the facility (Figure 13.2). No noise is anticipated to be audible from the visitor centre (Chapter 11: Noise) Any views of the turbines are not expected to impact tourist numbers, economic revenue, or the appreciation of the facility.
Carbisdale Castle	Medium	Low	Minor	There is expected to be a minor adverse effect on Carbisdale Castle as a result of the operational phase of the Proposed Development. The Proposed Development is expected to be visible from within the castle, gardens, and grounds. However, much of the views of the Proposed Development will be blocked and screened due the undulating landscape and woodland (Figure 13.2). No noise is anticipated to be audible from the attraction (Chapter 11: Noise). Any changes to visitor numbers, economic revenue and the appreciation of the facility are expected to be minor.
Accommodation	Low	Low	Minor	Effects on accommodation providers within the study area is expected to be minor during the operational phase of the Proposed Development. Some views of the Proposed Development may be visible if the accommodation is facing the site. There are a range of accommodation providers within the study area, some of which would not be disrupted by views of the Proposed

				Development. Much of the accommodation within the study area is positioned to take advantage of the desirable view of Loch Shin, which is located in the opposite direction to the Proposed Development (Figure 13.1). Therefore, it is not considered that the operational phase of the Proposed Development would affect accommodation availability. No noise is anticipated to be audible from the accommodation receptors (Chapter 11: Noise).

Recreation

- 13.110 This section will assess how recreation will be affected as a result of the Proposed Development. This will be assessed qualitatively through the use of receptor sensitivity and the anticipated significance of impact to give an estimated significance of effect.
- 13.111 This assessment will consider changes to the accessibility and amenity of different recreational receptors. This will largely depend on:
- The extent to which the recreational feature relies on its present amenity status to attract visitors; and
 - Any anticipated changes to visitor numbers as a result of the Proposed Development.

Construction Phase Impacts

- 13.112 The main effects that would be experienced during the construction phase are visual/noise impacts from workers, machinery, on-site activity, and construction traffic.
- 13.113 **Table 13.21** provides a summary of the predicted effects during the construction phase for receptors in the study area, along with the receptor sensitivity, significance of impact and the significance of effect.

Operational Phase Impacts

- 13.114 The main effects that would be experienced during the operational phase are views of the turbines and its associated infrastructure.
- 13.115 **Table 13.22** provides a summary of the predicted effects during the operational phase, along with the receptor sensitivity, significance of impact and the significance of effect.

Decommissioning Phase Impacts

- 13.116 Any potential adverse and beneficial decommissioning phase effects are anticipated to be similar to those identified during the construction phase.

Table 13.21 Construction Phase Assessment of Effects

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
Core Paths	Medium	Low	Minor	The significance of effect on core paths during the construction phase of the Proposed Development are anticipated to be minor and there will be no direct impact on the core paths. Some views of construction will be visible, but it is likely these will only affect a small number of visitors. Figure 13.3 highlights sections of SU20.04, SU20.05, SU20.08, SU20.09 and SU20.08 may experience some views of the construction phase. The ZTV does not consider existing built developments and vegetation, which can significantly reduce the area and extent of actual visibility. As such, it is expected that the settlement of Lairg and surrounding forestry will screen any views on SU16.01, SU16.04, SU16.08 SU16.09 and. The most obvious views will be from SU20.06, SU20.07; however, this is one of the furthest core paths from the Proposed Development so views are unlikely to dominate the landscape. Noise from the construction site is expected to be negligible. Therefore, any anticipated changes are only expected to affect a small number of users/activities.
Crater walk	Medium	Low	Minor	The significance of effect on the Central Sutherland Crater Walk is estimated to be minor. Construction will be visible from the peak points of the walk between Rogart and Bonar Bridge (Vice Versa). Due to the topography of the surrounding landscape, it is estimated that construction activities will be partially screened throughout the route. It is anticipated that noise from construction will not be audible from the Crater Walk. This is only expected to affect a small number of people/activities.
The Ord (Ord Hill)	Medium	Low	Minor	The significance of effect on The Ord is estimated to be minor.

				Construction activities may be visible from the top of the Ord (peak point). Due to the topography of the surrounding landscape, it is estimated that construction activities will be partially screened throughout the route. It is anticipated that noise from construction will not be audible from The Ord. This is only expected to affect a small number of people/activities.
Falls of Shin	Medium	Negligible	Negligible	Effects on the Falls of Shin are expected to be negligible . Due to the topography of the surrounding landscape and the density of the surrounding forestry, it is estimated that construction activities will be screened. Construction noise would not be audible from the Falls of Shin. This is only expected to affect a small number of people/activities.
Mountain Biking	Medium	Low	Minor	The estimated effects on mountain biking are estimated to be minor . Due to the topography of the surrounding landscape, and the density of the surrounding Balblair Forest, it is estimated that construction activities will be screened. Construction noise would not be from the mountain bike trails. This is only expected to affect a small number of people/activities.
Inverness to Johns O'Groats National Cycle Route	Medium	Negligible	Negligible	The estimated effects on the National Cycle Route 1 are estimated to be negligible . Due to the topography of the surrounding landscape, and the density of the surrounding forestry, it is estimated that construction activities will be screened. Construction noise would not be audible from the National Cycle Route.
Canoeing	Low	Low	Minor	The significance of effect on canoeing in the area is expected to be minor . Views of the Proposed development will only be noticeable when facing a south-westerly direction. The majority of Loch Shin is out with the study area and therefore views of the Proposed Development are unlikely to dominate the landscape. Noise from the construction site is expected to be negligible.
Golfing	Medium	Low	Minor	Effects on golfing during the construction phase are estimated to be minor .

				Views of the construction from Bonar Bridge & Ardgay Golf Course will be visible on some parts of the course when facing north; however, these views will not be constant when moving through the course and will not dominate the surrounding landscape. Noise from the construction site is expected to be negligible.

Table 13.22 Operational Phase Assessment of Effects

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
Core Paths	Medium	Low	Minor	Effects on core paths during the operational phase of the Proposed Development are expected to be minor. Some views may be visible but will not be constant as the settlements of Lairg and Bonar Bridge and surrounding forestry/topography will screen most views of the Proposed Development from most core paths within the study area (Figure 13.3). The most obvious views will be from core paths: SU20.04, SU20.05, SU20.08, SU16.09 and SU18.08 located north of Rogart. Any changes are expected to affect a small number of users/activities. No noise will be audible from the core paths (Chapter 11: Noise).
Crater Walk	Medium	Low	Minor	There is anticipated to be a minor significance of effect on Central Sutherland Crater Walk during the operational phase. The Proposed Development's turbines will be visible from the highest points of the route when travelling from Rogart to Bonar Bridge (or vice versa). The undulating landscape provides screening from the Proposed Development for much of the route within the study area. It is not anticipated to further impact the setting, so views will be unlikely to dominate the landscape. Any changes are expected to affect a small number of users/activities. Noise will have a negligible effect on users of the Crater Walk (Chapter 11: Noise).
The Ord (Ord Hill)	Medium	Low	Minor	Effects on core paths during the operational phase of the Proposed Development are expected to be minor. Long-distance views of the Proposed Development will be visible from the summit of The Ord; however, due to the wind farm development's, large-scale landscape and partial landform screening

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
				surrounding the Proposed Development, it is not anticipated to further impact the setting, so views will be unlikely to dominate the landscape. It is also expected that there will be no significant impact on the overall walking experience of The Ord, due to the long-distance nature and panoramic nature of the views throughout the walk and at the summit. Turbine noise is anticipated to have a negligible level of impact on core paths within the study area (Chapter 11: Noise). Any changes are expected to affect a small number of users/activities. Effects on core paths during the operational phase of the Proposed Development are expected to be minor.
Falls of Shin	Medium	Negligible	Negligible	There is estimated to be negligible significance of effect on Falls of Shin during the operational phase of the Proposed Development. Due to the topography of the surrounding landscape and the density of the surrounding forestry, it is estimated that views of the Proposed Development will be screened. This is only expected to affect a small number of people/activities. No noise will be audible from the Falls of Shin (Chapter 11: Noise).
Mountain Biking	Medium	low	Minor	The estimated effects on key mountain biking trails in the Balblair area are estimated to be minor. Views of the Proposed Development are anticipated to be adequately screened by topography of the surrounding landscape, and the density of the surrounding Balblair Forest. No noise will be audible from the mountain biking trails (Chapter 11: Noise).
Inverness to John O'Groats National Cycle Route 1	Medium	Negligible	Negligible	A small number of views will be visible from the National Cycling Route 1 due to screening from the surrounding topography and housing developments of Lairg

Tourist Receptor	Sensitivity	Magnitude	Significance	Discussion
				(Figure 13.3). Effects on the cycling route during the operational phase are estimated to be negligible. No noise will be audible from the cycle route (Chapter 11: Noise).
Canoeing	Low	Low	Minor	There is anticipated to be a negligible effect on The Canoeing activities during the operational phase. Canoeing will take place on Loch Shin, which only a small portion of its southern tip is within the study area. Views of the Proposed Development will only be visible when facing a south-westerly direction and with the section of Loch Shin within the study area being one of the furthest away receptors any views of the Proposed Development won't dominate the landscape. Therefore, it is estimated that no impacts are to be expected as a result of the Proposed Development. No noise will be audible from the canoeing routes (Chapter 11: Noise)
Golfing	Medium	Low	Minor	Views from Bonar Bridge & Ardgay Golf Course will be visible on some parts of the course when facing west; however, these views will not be constant when moving through the course and will not dominate the surrounding landscape. Only a small number of people/activities will be affected. There is estimated to be a minor significance of effect on golfing. No noise will be audible from the golf course (Chapter 11: Noise).

Mitigation

Construction Phase

- 13.117 It has been predicted that there will be a minor beneficial effect on the economy of the Highland region during the construction phase. Therefore, no mitigation will be required.

13.118 No significant effects have been predicted for tourism and recreation during the construction phase therefore no additional mitigation will be required.

Operational Phase

13.119 It has been predicted that there will be a minor beneficial effect on the economy of the Highland region during the operational phase. Therefore, no mitigation will be required.

13.120 No significant effects have been predicted for tourism and recreation during the operational phase, therefore no additional mitigation will be required.

Decommissioning Phase

13.121 As no significant effects have been predicted for socio-economics, tourism or recreation during the construction phase, it is anticipated that there will be no significant effects on socio-economics, tourism or recreation during the decommissioning phase either. No additional mitigation is anticipated at this time.

Community Benefit

13.122 The Applicant will provide a community benefit package in line with prevailing Scottish Government guidance which would be delivered during the operational phase of the proposed development. The Applicant is supportive of all potential uses of the community benefit package but recognises that it will be for local communities to decide on how to achieve the greatest benefits.

Residual Effects

13.123 **Table 13.23** below highlights the residual effects of the Proposed Development in relation to the socio-economic, tourism and recreation receptors within the assessment.

Table 13.23 Residual Effects Assessment

Potential Effect	Pre-mitigation Effect			Mitigation	Residual Effect
	Sensitivity	Magnitude	Significance		
Construction					
Socio-Economic					
Economy	Low	Medium	Minor	None	Minor - Beneficial
Tourism					
Ferry Croft Visitor Centre	Low	Low	Minor	None	Minor adverse – not significant
Highland Shooting Centre	Low	Low	Minor	None	Minor adverse – not significant

Potential Effect	Pre-mitigation Effect			Mitigation	Residual Effect
	Sensitivity	Magnitude	Significance		
Carbisdale Castle	Medium	low	Minor	None	Minor adverse – not significant
Accommodation	Low	Low	Minor	None	Minor adverse – not significant
Recreation					
Core Paths	Medium	Low	Minor	None	Minor adverse – not significant
Crater Walk	Medium	Low	Minor	None	Minor adverse – not significant
The Ord	Medium	low	Minor	None	Minor adverse – not significant
Falls of Shin	Medium	Negligible	Negligible	None	Negligible – not significant
Mountain Biking	Medium	Low	Minor	None	Minor adverse – not significant
National Cycle Route	Medium	Negligible	Negligible	None	Negligible – not significant
Canoeing	Low	Low	Minor	None	Minor adverse – not significant
Golf	Medium	Low	Minor	None	Minor adverse – not significant
Operation					
Socio-Economic					
Economy	Low	Medium	Minor	None	Minor - Beneficial
Tourism					
Ferry Croft Visitor Centre	Low	Low	Minor	None	Minor adverse – not significant

Potential Effect	Pre-mitigation Effect			Mitigation	Residual Effect
	Sensitivity	Magnitude	Significance		
Highland Shooting Centre	Low	Low	Minor	None	Minor adverse – not significant
Carbisdale Castle	Medium	Low	Minor	None	Minor adverse – not significant
Accommodation	Low	Low	Minor	None	Minor adverse – not significant
Recreation					
Core Paths	Medium	Low	Minor	None	Minor adverse – not significant
Crater Walk	Medium	Low	Minor	None	Minor adverse – not significant
The Ord	Medium	Low	Minor	None	Minor adverse – not significant
Falls of Shin	Medium	Negligible	Negligible	None	Negligible – not significant
Mountain Biking	Medium	Low	Minor	None	Minor adverse – not significant
National Cycle Route	Medium	Negligible	Negligible	None	Negligible – not significant
Canoeing	Low	Negligible	Negligible	None	Negligible – not significant
Golf	Medium	Low	Minor	None	Minor adverse – not significant

Summary

13.124 This assessment has considered the effects of the Proposed Development on socio-economics, tourism and recreation during the construction and operation phases. In this assessment, the following aspects have been assessed:

- The estimated local, regional, and national spend per annum.

- i) Up to £14.5 million could be spent within the local economy, £40 million within the Scottish economy and £52 million within the UK economy.
 - The estimated job opportunities;
- ii) Up to 107 jobs will be created across the Highlands.
 - The estimated Local Value Added (LVA) contribution to the local economies and the estimated Gross Value Added (GVA) contribution to the regional, national, and overseas economy; and
- iii) Up to £6.3 million in LVA could be contributed to the local economy and GVA contribution totalling £17.5 million within Scotland, £22.7 million within the UK and £24.4 million within the overseas economy.
 - Impacts on tourism and recreational receptors.

13.125 GCR have undertaken a comprehensive assessment on Socio-Economics and an overall **beneficial** impact on the local economy is predicted as the Applicant looks to maximise the net economic impact of the Proposed Development on the local community. In turn, this highlights how the Proposed Development is aligned with NPF4 and in particular the policies of 11e(iii) and 11(c), which promote community benefit, local and national economic gain and supply chain opportunities through the uptake of renewable energy infrastructure.

13.126 It has been established that the Proposed Development will have an overall **minor** impact on tourism and recreational receptors within the Study Area, which is not significant in EIA terms.

References

Scottish Government (2016) Land Reform (Scotland) Act 2003 (as amended 2016);
Highland-wide Local Development Plan | Highland-wide Local Development Plan | The
Highland Council;
Onshore wind energy: supplementary guidance | Finalised Environmental Report
September 2016
(highland.gov.uk);
Scottish Government (2018) Good Practice Principles for Community Benefits from
Onshore Renewable Energy Developments;
Scottish Government (2014) Onshore wind turbines: planning advice;
RenewableUK (2021) The Onshore Wind Industry Prospectus;
Renewable UK (2014) Onshore Wind: Economic Impacts in 2014;
BVG Associates (2017) Economic Benefits from Onshore Wind Farms;
National Records of Scotland (NRS) (2022) Mid-2021 Population Estimates;
Statista (2022) Scotland – Statistics and Facts;
Highland Council Area Profile National Records of Scotland;
Geography | Highland profile - key facts and figures | The Highland Council;
[caithness_and_sutherland_-_tourism_destination_recovery_strategy_2021-24_1.pdf](#)(venture-north.co.uk);
Scottish Tourism Alliance (2020) Scotland Outlook 2030: Responsible Tourism for a
Sustainable Future;
BiGGAR Economics (2017) Wind Farms and Tourism Trends in Scotland;
BiGGAR Economics Wind Farms and Tourism 202;
Visit Scotland (2014) Position Statement – Wind Farms;
Scottish Government (2022) Onshore Wind – Policy Statement Refresh 2022: Consultative
Draft;
Mountaineering Scotland (2017) Wind Farms and Tourism in Scotland: A Review with
Focus on Mountaineering and Landscape;

Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 14: Other Issues

April 2024

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TABLES

Table 14.1: Consultation Responses

14 OTHER ISSUES

- 14.1 This chapter of the EIA assesses the likely significant effects of the proposed development with respect to 'Other Issues' and includes consideration of existing infrastructure, health and safety, major accidents and disasters, aviation, forestry, telecommunications and carbon balance.
- 14.2 This chapter is not intended to be read as a standalone assessment and should be read in conjunction with the complete EIA, particularly Chapters 1 – 5 and Chapters 6 (Landscape and Visual), 8 (Geology, Hydrology and Hydrogeology) and 10 (Ecology).
- 14.3 The purpose of this chapter is to summarise the relevant subject matters to provide context to other areas of assessment. Topics addressed within this chapter include summaries of:
- Aviation Lighting, which includes a summary of the approach taken and layout agreed with the Civil Aviation Authority (CAA);
 - Results of the carbon calculator exercise to understand and report on the carbon payback of the proposed development, and;
 - Telecommunications.
- 14.4 This chapter does not have any associated figures however the chapter is supported by a number of Technical Appendices (as set out within Volume 4: Technical Appendices), comprising:
- Technical Appendix 1.2: Scoping Opinion
 - Technical Appendix 6.3: Night-time Assessment;
 - Technical Appendix 8.4: Carbon Calculator
 - Technical Appendix 14.1: Aviation Lighting Report

Legislation, Policy and Guidance

- 14.5 Chapter 5 of the EIA Report sets out the planning policy framework that is relevant to the EIA process and the proposed development. The policies set out include those from the Highland-wide Local Development Plan (LDP), the Caithness and Sutherland LDP, relevant aspects of Scottish Planning Policy (SPP) (Scottish Government, 2014), Planning Advice Notes and other relevant guidance.
- 14.6 The principal legislation, policies and guidance relevant to this chapter are listed below. They include relevant local and national planning policy and guidance documents as well as technical guidance relating to the specific issues dealt with herein:
- The Highland-wide Local Development Plan (2012)
 - Caithness and Sutherland Local Development Plan (2015)
 - The National Planning Framework 4 (2023);
 - Scottish Government Onshore Wind: Policy Statement (2017);

- Civil Aviation Publication (CAP) 764 Civil Aviation Authority (CAA) Policy and Guidance on Wind Turbines Version 6 (Feb 2016);
- CAA Policy Statement: Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level (dated 01/06/17);
- Air Navigation Order (ANO) Article 222;
- Onshore wind turbines: planning advice (2014); and
- Carbon calculator: technical guidance.

Consultation

- 14.7 As part of the Scoping exercise, a consultation exercise was undertaken to inform the design of the proposed development and to seek agreement on potential significant environmental effects that result from the proposed development as well as the scope of any assessment work required as part of this EIA.
- 14.8 The Scoping Opinion was received from Scottish Ministers on 7th of October 2022 (see Technical Appendix 1.2).
- 14.9 Consultation relevant to the assessment of 'Other Issues' was undertaken with Defence Infrastructure Organisation, Highlands and Islands Airports Limited, Joint Radio Company, BT and NATS Safeguarding who all commented on aspects of methodology, sources of information, scope of assessment and cumulative development. No responses were received from the Civil Aviation Authority (CAA); therefore, it is assumed they have no comments to make on the scoping report. Aberdeen Airport, Edinburgh Airport, Glasgow Airport and Glasgow Prestwick Airport advised that the development is located outwith their respective safeguarding zones. A summary of consultation responses regarding issues discussed in this chapter is provided in Table 15.1.

Table 14.1: Consultation Responses

Consultee	Response Date	Consultation Response	Where is this addressed?
The Highland Council	16/09/2022	Carbon balance calculations should be undertaken and included within the EIA with a summary of the results provided focussing on the carbon payback period for the wind farm.	Carbon payback periods are discussed within this Chapter. Carbon balance calculations are presented in EIA Volume 4, Technical Appendix 8.4.
		Within the boundary of the application site there are areas of woodland and significant woodland along the access route that may be affected. If any areas of woodland is likely to be affected by the development (including its access) the Scottish Government's Control of	Impacts upon forestry can be found within this chapter. An indication of areas required for felling will be set out within the chapter as well as any offsite works and investigations required. Mitigation measures such as compensatory planting will also be set out in EIA Volume 4, Technical

Consultee	Response Date	Consultation Response	Where is this addressed?
		Woodland removal Policy must be addressed, and compensatory planting calculations provided in the EIA. The EIA should indicate all the areas of woodland / trees that will be felled to accommodate the development, including any off-site works / mitigation. Compensatory woodland is a clear expectation of any proposals for felling, and thereby such mitigation needs to be considered within any assessment.	Appendix 9.3: Outline Habitat Management Plan.
		The EIA should recognise TV, radio, telecommunication links, aviation interests including radar, MOD safeguards, etc.	Noted. This information is presented within this chapter.
		THC request that the applicant demonstrate what interests have been identified and the outcomes of any consultations with relevant authorities such as Ofcom, NATS, BAA, CAA, MOD, Highlands and Islands Airports Ltd, etc. through the provision of written evidence of concluded discussions / agreed outcomes.	The consultation responses from the specified consultees are presented within this table. Ongoing consultation will be carried out with CAA to understand requirements on aviation lighting and will be presented within the EIA.
		If there are no predicted effects on communication links as a result of the development, the EIA should still address this matter by explaining how this conclusion was reached.	Noted. Further information is presented within this Chapter.
Ministry of Defence	29/07/2022	The turbines will be approximately 64km from, detectable by, and will cause unacceptable interference to the ATC radar used by RAF Lossiemouth.	Following the response from the MoD following the submission of Scoping, further discussions with MoD were held. A response issued on 08/09/2022 from the MoD confirmed that there would be no operational impact arising as a result of the proposed development.
Highlands and Islands Limited (HIAL)	29/07/2022	The proposed wind farm may infringe the safeguarding criteria and operation of Inverness Airport.	The proposed development lies approximately 52km (Euclidean distance) from Inverness Airport. Following response from HIAL, a radar

Consultee	Response Date	Consultation Response	Where is this addressed?
			visibility study was conducted, and radars will not be affected by the proposed development.
NATS	09/08/2022	The consultee has no safeguarding objection towards the proposed development.	Noted.
BT	03/08/2022	The proposed development is unlikely to cause interference to BTs current and presently planned radio network.	Noted.
JRC	26/07/2022	The consultee states that they do not foresee any potential problems based on known interference scenarios and the data provided within the Scoping Report.	Noted.

Scope of Assessment

Effects Assessed in Full

14.10 The following effects were considered to be potentially significant in relation to “Other Issues” at the scoping stage. The following have been assessed within this chapter:

- Aviation Lighting;
- Telecommunications, and;
- Carbon Balance.

Effects Scoped Out

14.11 Effects within topics which have been scoped out include the following:

Air Quality

14.12 Given the rural location of the proposed development, the distance from sources of air pollution and the short term, temporary nature of the construction and decommissioning phases, air quality has not been considered further within this assessment.

Ice Throw

14.13 During icing conditions there are two types of risks associated with ice collecting on turbines:

- Fragments are thrown off from the operating turbine due to aerodynamic and centrifugal forces; or

- Ice falls down from the turbine when the blades are stationary.

- 14.14 In addition, measures will be implemented to ensure the safety of both workers and the general public, including notices placed at access points and throughout the Site alerting members of the public and staff of the possible risk of ice throw under certain weather conditions.
- 14.15 Given the remote location of the proposed development, ice throw affecting members of the public and staff is considered to be extremely low.

Major Accidents and Disasters

- 14.16 The proposed development is not located in an area with a history of natural disasters (e.g., earthquakes, volcanic activity, and extreme weather events). The likelihood of peat slide risk occurring during the construction phase is not considered to be significant with Technical Appendix 8.3 indicating that there is a low to negligible risk of peat instability across the site.
- 14.17 With regards to mechanical and structural failure in the event of storms or extreme weather events, modern turbines are fitted with sensors which will shut down operations if wind speeds are too high. This is to prevent damage and excessive wear on both blades and internal mechanisms within the turbine.
- 14.18 With regards to wildfires, a full emergency procedure plan would be in place to deal with the emergency. Turbines are fitted with smoke detectors, to allow detection as early as possible. The turbines installed would also be fitted with a fire suppression system, to help limit the spread of any fire. In the event of a fire, the turbine would be fully shut down and isolated from the grid system, the area around the turbine restricted and fire brigade alerted to deal with the incident until such time as the fire was extinguished.
- 14.19 The construction and operation of the proposed development would be managed within the requirements of a number of health and safety related Regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974.
- 14.20 In conclusion, the development is not considered vulnerable to any major accidents or disasters that could result in likely significant environmental effects.

Shadow Flicker

- 14.21 Shadow flicker is an event where, under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off. It only occurs inside buildings where the flicker appears through a narrow window opening.
- 14.22 The Highland Council Onshore Wind Energy Supplementary Guidance (November 2016) requires wind energy schemes to be designed to avoid causing shadow flicker at regularly occupied buildings not associated with the development.

- 14.23 There is no standard guidance for assessing shadow flicker in Scotland however, as per THC guidance, a shadow flicker assessment is required if any regularly occupied properties not associated with the development lie within 11 x rotor diameter of the wind farm.
- 14.24 With tip heights of 200m and 230m, candidate turbine specifications suggest a likely rotor diameter of 155m. Applying a 11-rotor diameter distance from each turbine gives an allowance of 1705m where effects may occur. The closest inhabited property lies approximately 2.2km from the nearest turbine.
- 14.25 When taking this into consideration, it is unlikely that significant effects would occur, however in the unlikely event of shadow flicker complaints, the Applicant would be willing to commit to a shadow flicker management plan to be agreed with THC post-consent. Mitigation measures could include provision of blinds, curtains or vegetation as deemed appropriate.

Summary of Technical Topics

Aviation Lighting

- 14.26 The proposed development lies approximately 64km to the north-west of RAF Lossiemouth.
- 14.27 The Applicant commissioned WPAC to produce an aviation lighting and mitigation report and agree a lighting scheme that meets all requirements of the Civil Aviation Authority (CAA) and Defence Infrastructure Organisation (DIO).
- 14.28 In correspondence dated 12th March 2024, the CAA agreed to the proposed Aviation Lighting Scheme, the design of which is summarised below and detailed in full in Technical Appendix 14.1.
- 14.29 The site is located within MoD Low Flying Area (LFA) 14, known also as Night Allocated Region 1BE during night-time flying exercises and, as such, has been assessed for Night Vision Device (NVD) compatible and Infra-Red (IR) lighting in accordance with MoD obstruction lighting specifications. The airspace is also used by NATO tactical aircraft and helicopters for day and night training. The site lies outside tactical training area (TTA 14) where aircrafts operate down to 100ft with helicopters routinely flying at 30ft.
- 14.30 To fulfil all MoD requirements, all turbines will be fitted with NVD compatible IR lighting. These lights are invisible to the naked eye and do not have any impact of the surrounding environment.
- 14.31 The proposed development is located under unregulated airspace, which is designated Class G by the CAA and away from any civil or military airfields.
- 14.32 A total of six out of 12 of the proposed turbines will be fitted with visible aviation lights to fulfil the CAA's requirements, which state that all perimeter turbines must be lit unless removing a light leaves a gap of less than 900m between remaining lit turbines. These requirements have allowed for the removal of lights from two perimeter turbines while maintaining a gap of less than 900m between remaining lit turbines.

- 14.33 The visible aviation lights have a maximum brightness of 2000 candela (cd) when viewed on a horizontal plane. This figure is reduced significantly as the viewing angle changes. For example, the brightness is reduced by 50% to 1000cd when viewed from 1 degree below the horizontal (as outlined in Technical Appendix 14.1 within EIA Volume 4).
- 14.34 Distance from aviation lights also reduces their perceived brightness, a phenomenon known as attenuation. Measurements indicate that attenuation is typically in the order of 10 to 20% but can be as much as 75% depending on atmospheric conditions.
- 14.35 Visible aviation lights are only operated at their maximum brightness when visibility is less than 5km in all directions, such as during thick mist or heavy rain. In all other conditions, which account for approximately 96% of the time, visible aviation lights are operated at 200cd, or 10% of their maximum brightness. Assessing Met Office records from Inverness Airport suggests that maximum brightness is only required for approximately 4% of the time.

Telecommunications

- 14.36 Telecommunication links across the Site were investigated as part of initial constraint investigations. A telecommunications tower, owned by Telefonica UK Limited, is located within the site boundary and a 100m buffer was applied.
- 14.37 The Office of Communications (Ofcom) is responsible for the licensing of two-way radio transmitters. It holds a register of most microwave links and will therefore be consulted in order to establish baseline conditions.
- 14.38 However, as not all microwave links are published, system operators will also be individually consulted on the proposed development's potential to cause electromagnetic interference.
- 14.39 Given the distance between the links and the turbine envelope, it is considered that the turbines are located suitably outwith the telecoms links and therefore will not result in any effects upon these assets.
- 14.40 Furthermore, no consultees have raised concerns regarding telecommunication links, as further detailed in the Scoping Opinion (see Technical Appendix 1.2, EIA Volume 4), therefore issues relating to telecommunications have not been considered further within this assessment.

Carbon Balance

- 14.41 This assessment uses the Scottish Government's Carbon Calculator for wind farms on peat to estimate the benefit of displacing conventionally generated electricity in the grid compared to the predicted direct and indirect emissions of carbon resulting from the construction and operation of the Proposed Development over its lifetime, including losses of stored carbon from felled forestry and affected peatland. The Carbon Calculator provides an estimate of the carbon payback time for the Proposed Development.

- 14.42 The results of the Carbon Calculator for the Proposed Development show that the Proposed Development is estimated to produce annual carbon savings in the region of 51,845 to 52,132 tonnes of CO₂e per year.
- 14.43 The assessment of the carbon losses and gains has estimated a total loss of between 126,145 and 182,631 tonnes of CO₂e, mainly due to embodied losses from the manufacture of the turbines and provision of backup power to the grid, which should be minimised through the provision of on-site energy storage.
- 14.44 The estimated payback time of the Proposed Development, using the Scottish Government Carbon Calculator, is estimated at 2.9 years, with a minimum/maximum range of 1.9 to 3.5 years. The carbon intensity of the electricity produced by the Proposed Development is estimated at 0.017 kgCO₂e/kWh. This is below the outcome indicator for the electricity grid carbon intensity of 0.05 kgCO₂e/kWh required by the Scottish Government in the Climate Change Plan (2018-2032) and therefore the Proposed Development is evaluated to have an overall beneficial effect on climate change mitigation.

Cumulative Effects

- 14.45 There is no potential for significant cumulative impacts in relation to aviation and telecommunications when considered alongside other proposed developments in the local area. Cumulative effects are also not relevant to forestry.
- 14.46 There is, however, consideration of cumulative visual effects arising from the requirement for aviation lighting which is addressed further in EIA Chapter 6: Landscape and Visual. Cumulative effects are not relevant to issues surrounding Forestry.

Residual Effects

- 14.47 Following implementation of mitigation through design and best practice as well as the mitigation measures identified above, it is considered that there would be no significant effects on aviation, telecommunications and climate change.

Summary

- 14.48 The topics of Aviation Lighting, Telecommunications and Carbon Balance and have been discussed in this chapter along with associated mitigation where required. This chapter has therefore provided a summary of results, relevant information, and viable solutions agreed with consultees where necessary.

References

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Acheilidh Wind Farm

Environmental Impact Assessment Report Volume 1 Chapter 15: Schedule of Mitigation

April 2024

15 SCHEDULE OF MITIGATION

Introduction

- 15.1 This chapter sets out a Schedule of Mitigation relevant to the proposed development, including all embedded and additional mitigation set out within Chapter 6: Landscape and Visual to Chapter 14: Other Issues.
- 15.2 This chapter therefore acts as a succinct guide as to the mitigation which would be required in order to avoid or reduce likely significant environmental effects so that they would be acceptable. It may act as a basis upon which detailed post-consent mitigation is based upon and would be a founding basis upon which to produce a detailed and comprehensive Construction Environmental Management Plan (CEMP) to be produced and agreed prior to construction.
- 15.3 It also includes monitoring measures to understand future baseline and effects of the proposed development, where relevant and applicable.
- 15.4 Mitigation from each chapter is summarised in the tables overleaf. These tables set out the nature of the mitigation measure, and whether it is required pre-construction, during construction, or relates to post-construction monitoring. Justification for each of the mitigation measures is contained within the relevant section of the EIA Report.

Table 15.1: Schedule of Mitigation

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
Chapter 6: Landscape and Visual		
Construction amenity	Use designated routes around the Site for construction vehicles and operation of construction plant such as cranes. Avoid the creation of any wheel ruts, where practicable, and subsequent reinstatement if these do occur	During construction
	Implementation and monitoring of site management procedures, such as regular litter sweeps of the immediate environs to ensure the removal of all litter arising from the construction activities	During construction
	Removal, reinstatement, and clear up of the Construction Compound and any related construction arisings post-construction	Post-construction
	On completion of Site construction, the Site entrance and access tracks would be cleared of any construction signage and left in a tidy and co-ordinated condition with verges restored and field boundary fencing neatly tied into new gates / access details	Post-construction
Borrow Pits	Upon completion, the borrow pit would be restored and a detailed reinstatement programme developed, drawing upon the advice of a landscape architect and implemented in agreement with THC, SEPA and NS. This will ensure that proposed reinstatement materials and techniques are suitable and may identify appropriate environmental enhancement opportunities. It is anticipated that steep faces would be backfilled and/ or re-profiled to match the surrounding topography, and disturbed surfaces would be covered with soil and re-seeded / re-turfed or left as exposed rock outcrops.	Post-construction
Chapter 7: Cultural Heritage		
Written Scheme of Investigations	The presence of heritage assets within the Site (primarily prehistoric hut circles and postmedieval farmstead remnants) identified in this study indicate a high potential for survival of similar archaeological remains within the Site. Mitigation of adverse direct effects on archaeological features within the area of the proposed development will be through agreement of a Written Scheme of Investigation (WSI) with the THC. This scheme would allow for the identification and recording of archaeological features within the proposed site boundary which would otherwise be affected by the proposed scheme.	Pre-construction
	The WSI will include a targeted pre-start walkover by transect of the intrusive construction areas, with avoidance through micro-siting and/or a watching brief on identified or suspected archaeological features to be agreed with THC.	Pre-construction
	An appropriate archaeological monitoring strategy will therefore be agreed in advance with The Highland Council, and incorporated within the WSI, to be prepared prior to the commencement of the development, for approval by the planning authority.	Pre-construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
Chapter 8: Geology, Hydrology and Hydrogeology		
Buffers	A 50m buffer has been maintained around all surface watercourses, except where watercourse crossings are required .	Design
	Application of appropriate buffers (100m and 250m) around identified GWDTE	Design
Peatland	Avoiding the placement of turbines in peat greater than 1m in depth	Design
	Avoidance of high-quality peatland as identified within the NVC and Peatland Condition Assessment.	Design
	No infrastructure is proposed to be constructed in or near areas of medium or high peat landslide risk.	Design
Floating Tracks	It is proposed that floated access tracks will be placed where peat exceeds 1m in depth.	Design
Construction Environmental Management Plan	Rigorous construction environmental management procedures will be implemented in line with a Construction Environmental Management Plan (CEMP) (see below) to ensure appropriate protection of the above-noted watercourses, and all other surface water receptors.	Pre-Construction
Water Quality	The appointed Contractor will undertake pre-construction baseline water quality sampling and analysis of the principal surface water receptors Allt Ach'na h-Uaighe, Allt Garbh-airigh including Loch Cracail Mor and Loch Cracail Beag and Allt Loch na Saobhaidhe. The Contractor will implement a programme of monthly monitoring and analysis of the water quality of these watercourses during the construction period to ensure that they are not being impacted by the construction works. The full scope of monitoring will be detailed within the CEMP.	Pre-Construction/During Construction
Pre-Construction Site Investigations	To determine ground and groundwater conditions across the site, pre-construction site investigations will be conducted. These investigations will focus on areas where construction is proposed to be undertaken and will allow the turbines and the associated infrastructure to be micro-sited away from any areas considered to be unsuitable, such as areas of contamination (unlikely), areas of deeper peat wherever possible, or where there are significant groundwater flows.	Pre-construction
	Investigations will also include targeted monitoring and assessment of the groundwater levels and flows beneath the site. This will allow for micro-siting and to assist in the detailed design of infrastructure and selection of appropriate materials for use during the construction process. Investigations within the borrow pit search areas will allow appropriate selection of specific extraction areas, to avoid or minimise any adverse effects associated with quarrying activities.	Pre-construction
	No excavation will occur until site investigations have been undertaken to assess the suitability of the areas and refine the assessment of peat slide risk. For example, areas of deeper peat, if found	Pre-Construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
	to be present within the search areas would be avoided, thereby reducing the peat slide risk. If it is determined that no suitable excavation site within any given search area can be identified, then no excavation will occur at that search area.	
Peat Management	Any peat excavated will be re-used on site as set out in the Outline Peat Management Plan (EIAR Volume 4, Technical Appendix 8.2).	During Construction
Pollution Impact	All earthmoving works or similar operations will be carried out in accordance with BSI Code of Practice for Earth Works BS6031:1981.	During Construction
	All watercourse crossings and site discharges will be regulated under the CAR licensing regime and all necessary licences will be sought from SEPA prior to the commencement of any operations on site.	Pre-Construction, During Construction
	While it is acknowledged that best practice to minimise run-off would be to undertake construction and dismantling during the driest period of the year, given the location of the proposed development site, there are likely to be significant periods of rainfall throughout the year. Therefore, site management will check the local weather forecast daily and prime all site staff to ensure that everyone is aware of their responsibilities to maintain the pollution control system during wet weather or suspend sensitive operations during adverse weather conditions.	Pre-Construction, During Construction
	All fuel and other chemicals will be stored in accordance with best practice procedures, including being kept within a designated fuelling site located at a safe distance from existing watercourses and in appropriate impermeable bunded containers/areas, which will be defined within the outline CEMP. These will be designed to capture any leakage, whether from a tank or from associated equipment such as filling and off-take points, sighting gauges etc., all of which will be located within the bunded area.	During Construction
	Oil booms and soakage pads will be maintained in all work areas and spill kits kept in all vehicles to enable a rapid and effective response to any accidental spillage or discharge. All construction staff will be trained in the effective use of this equipment.	Pre Construction, During Construction
	Construction vehicles and plant will be regularly maintained and all maintenance, fuelling and vehicle washing will be undertaken on appropriate impermeable surfaces away from watercourses to minimise risks of leaks to soil and surface waters.	During Construction
	Concrete batching will be undertaken in a designated area within a temporary construction compound. The Contractor will develop a method statement to address the on-site batching of concrete and the transport, transfer, handling and pouring of liquid concrete at foundations. It is likely that water will require to be abstracted to facilitate any on-site batching processes. A separate CAR licence application for any water abstractions required will be made to SEPA at the appropriate point prior to the commencement of construction.	Pre-Construction, During Construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
	Cement, grout and unset concrete will not be allowed to enter the water environment. No operations involving concrete transfer between vehicles or into vehicles will take place within 30m of watercourses and water bodies.	During Construction
	Any vehicles used for delivery of concrete will only be washed out at locations to be agreed with SEPA. Excess concrete or wash-out liquid will not be discharged to drains or watercourses on site or at compounds. Drainage from washout facilities will be collected and treated or removed to an appropriate treatment point / licensed disposal site.	During Construction
	Where topography dictates that working platforms are needed, these will be formed to ensure that surface water drains away from watercourses.	During Construction
	The requirement for dewatering will be minimised in all locations by timely and efficient excavation of the foundation void and subsequent concrete pouring and backfilling.	During Construction
Impact on Integrity of Banking	During the construction phase, construction staff will be instructed to maintain a sufficient distance from the watercourses located on site to ensure there is no incursion towards them.	During Construction
	Water crossing designs will follow best practice to prevent impact on the integrity of the banking of watercourses. Detailed design will be included within a Construction Method Statement to be agreed with The Highland Council and SEPA and detailed watercourse crossing designs will be regulated under the CAR licensing regime.	Design, Pre-Construction
Direct Discharge of Untreated Foul Drainage	Welfare facilities will either connect directly to self-contained storage tanks or to a septic tank, subject to approval from SEPA.	During Construction
	If self-contained or septic tanks are to be used, these will be maintained and emptied on a regular basis by a suitably licensed contractor.	During Construction
Surface Water Drainage	Prior to construction, a detailed Drainage Strategy (DS) will be developed and agreed with SEPA and The Highland Council. The DS will detail the site drainage design, including the type of surface to be used for new access tracks, the soft engineering and habitat enhancement measures proposed to slow surface water flows and any necessary ponds, swales, cross drains and bunds, to ensure that run-off from hard surfaces will be controlled. The DS will also detail the dimensions and final design of proposed watercourse crossings which will be designed to maintain continuous flows.	Pre-Construction
Fluvial Geomorphology	The detailed design for the watercourse crossings, and the requirements for CAR authorisations or licences, will be agreed with SEPA prior to construction in order to ensure that any potential impacts are minimised.	Pre-Construction
Chapter 9: Ecology		

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
Good Practice Mitigation Measures	Generic mitigation measures that would apply during construction and operational phases are outlined below. The following measures represent general best practice and would reduce potential effects on a number of receptors: • Not more than 16 weeks prior to construction of the Proposed Development and within the correct survey season, the Applicant will engage a Suitably Qualified Ecologist (SQE) to undertake a series of repeat ecological surveys to update the baseline data. • The aim of the repeat ecological surveys will be to provide up to date information in order to confirm required mitigation, including the need for protected species licensing and species protection plans for the site. The result of the pre-construction surveys will be communicated to the Contractor by the SQE and will be fed into the CEMP. The recommendations will ensure compliance with the necessary wildlife legislation. • Adherence to SEPA Guidance Pollution Prevention (GPP) in respect to working in and around watercourses. • Adherence to NatureScot (formally SNH) guidance on upland track construction. • All vehicles will be restricted to 5 mph while within 100m of watercourses. • Avoidance of unnecessary disturbance to habitats by minimising the extent of vegetation clearance and other construction practices. • Restriction of plant and personnel to a prescribed working corridor through the use of temporary barriers or fences, minimising damage to habitats and potential direct mortality and disturbance to species. • Adherence to best practice guidance with respect to culvert and bridge design. • Any trenches dug during construction and decommissioning operations will be covered at the end of each day to prevent mammals becoming trapped. Alternatively, mammal ramps will be positioned in such a way that trapped mammals may be allowed to escape. • All exposed pipes and trenches will be checked each morning prior to starting construction activities. If trapped animals are found, the SQE will be contacted. • Ecological toolbox talks will be provided to all new site staff on the potential presence of protected species and any measures that need to be undertaken.	Pre-construction, during construction and post-construction
Outline Habitat Management Plan	An Outline Habitat Management Plan (OHMP) for the site is included in Volume 4: Technical Appendix 9.3, and sets out mitigation measures for peatland, woodland habitats, fish fauna and protected species.	Pre-Construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
Chapter 10: Ornithology		
Ornithological Monitoring	Year-round collision monitoring via monthly carcass searches in years 1, 2, 3, 5 and 10 of operation, to determine whether actual bird collisions are in line with predicted values; and	Post Construction
	Breeding bird surveys with a focus on hen harrier, divers, golden eagle, and osprey, again in years 1, 2, 3, 5 and 10, to determine the operational impacts on breeding success.	Post Construction
Chapter 11: Noise		
Construction times	Construction activities will be scheduled, unless otherwise agreed, from Monday to Friday 07:00 to 19:00 and Saturday 07:00 to 13:00. Unattended plant equipment should be kept to a minimum. Construction activities outside of these times, short term high transient noise events, or activities relatively close to noise sensitive receptors (NSRs) should be scheduled in consultation with the residents to minimise their inconvenience	During construction
Construction Noise Management Plan	As part of a Construction Environmental Management Plan (CEMP) a Construction Noise Management Plan (CEMP) would be produced. The plan would be taken forward for all construction works and any post-construction works of a similar nature that are associated with the proposed development (e.g. maintenance). The plan would include a clear construction schedule detailing the equipment to be used and the following information: - Detailed plan showing how permitted working hours will be adhered to; - Selection of quiet equipment and possibly acoustic barriers near noisy sources to ensure construction noise limits are met - A detailed plan on community relations including a Stakeholder Engagement Plan (SEP) including the setting up of a complaint phone line, a procedure to notify residents and the EHO of any necessary work outside of the permitted working hours and an approach to the investigation of complaints.	Pre-construction and post-construction
Chapter 12: Traffic and Transport		
Construction Traffic Management Plan (CTMP)	The assessment predicts that, prior to mitigation measures, the effect of severance, driver delay and pedestrian delay and amenity as a result of increased levels of HGVs associated with the Proposed Development would be significant along the road links within the Study Area. Therefore, in accordance with the EIA Regulations mitigation is required to address these potential effects. It is therefore proposed to prepare and implement a comprehensive Construction Traffic Management (CTMP) which is intended to mitigate the identified effects by ensuring that they are minimised as far as possible within the Study Area to a level which is considered to be not significant.	Pre-construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
CTMP Contents	Immediately upon commencement, all deliveries, operatives and visitors to the Site will report to the security gate. This will be communicated to all early works contractors at their pre-start meeting.	During Construction
	The main contractor will develop a logistics plan highlighting the access point for the project, loading bay, pedestrian / vehicular segregation, welfare, storage, security and material handling that would be enforced following full Site establishment.	Pre-Construction, During Construction
	Approved haul routes will be identified to the Site and protocols put in place to ensure that HGVs adhere to these routes and do not pass through areas to be avoided.	Pre-Construction
	All contractors will be provided with a Site induction pack containing information on delivery routes and any restrictions on routes.	Pre-Construction, During Construction
	Construction HGV traffic will be restricted between the network peak hours and school run hours which are generally 08:00 – 09:00, 15:00 – 16:00 and 17:00 – 18:00 Monday to Friday, if necessary.	During Construction
	Temporary construction Site signage would be erected along the identified construction traffic routes to warn people of construction activities and associated construction vehicles.	During Construction
	A construction traffic speed limit (for example, 20mph) could be imposed through Lairg.	During Construction
	The construction material 'lay down' areas will allow for a staggered delivery schedule throughout the day, avoiding peak and unsociable hours (i.e. before 06:00 and after 22:00).	During Construction
	An integral part of the progress meetings held with all trade contractors is the delivery schedule pro-forma. All contractors will be required to give details of proposed timing of material deliveries to the Site. At this stage they would be given a specific area for delivery.	Pre-Construction, During Construction
	The CTMP and compliance monitoring therein will be included within all trade contractor tender enquiries to ensure early understanding and acceptance/compliance with the rules that would be enforced on this project.	Pre-Construction
	Under no circumstances will HGVs be allowed to lay-up in surrounding roads. All personnel in the team will be in contact with each other and with Site management, who in turn will have mobile and telephone contact with the subcontractors.	During Construction
	Roads will be maintained in a clean and safe condition.	During Construction
	A wheel washing facility would be installed on-site during the construction period in order to reduce mud and debris being deposited onto the local road network.	During Construction
Notification to residents	During the construction period, a project newsletter, blog, Twitter feed (or combination thereof) would be regularly updated or issued to provide the latest information related to traffic	During construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
	movements associated with vehicle movements to and from the site. This would be agreed with The Highland Council.	
Baseline road condition	Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route would be recorded to provide a baseline of the state of the road prior to any construction work commencing. This baseline would inform any change in the road condition during the construction stage of the proposed development. Any necessary repairs would be coordinated with The Highland Council. Any damage caused by traffic associated with the proposed development, during the construction period that would be hazardous to public traffic, would be repaired immediately.	Pre-construction / during construction
Road condition during construction	During construction a road wear and tear review would be undertaken with Transport Scotland every two months. There would be a regular road edge review and any debris and mud would be removed from the public carriageway to keep the road clean and safe during the initial months of construction activity, until the construction junction and immediate access track works are complete	During construction
Street Furniture	Any damage to road infrastructure caused directly by construction traffic would be made good, and street furniture that is removed on a temporary basis would be fully reinstated.	Pre-construction
Abnormal Indivisible Loads Management Plan	An AIL Management Plan will be developed post-consent. All abnormal load deliveries would be undertaken at appropriate times (to be discussed and agreed with the relevant roads authorities and police) with the aim of minimising the effects on the local road network. It is likely that the abnormal load convoys would travel in mid-morning to avoid school drop off and pick up times. Advance warning signs would be installed on the approaches to the affected road network. This signage will assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist). The Abnormal Load Transport Management Plan would also include: 1. Procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay over areas to allow overtaking; 2. A diary of proposed delivery movements to liaise with the communities to avoid key dates; 3. A protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and 4. Proposals to establish a construction liaison committee to ensure the smooth management of the project / public interface with the applicant, the construction contractors, the local community, and if appropriate, the police forming the committee.	Pre-construction

Subject	Detail of mitigation or monitoring commitment	Stage of Mitigation
	This committee would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.	
Chapter 13: Socio-Economics and Tourism		
No Specific Mitigation Methods are Proposed		
Chapter 14: Other Issues		
Aviation Lighting	Aviation lights will be fitted to specific turbines in line with the Aviation Lighting Strategy (set out in EIAR Volume 4, Technical Appendix 14.1) as agreed with the CAA.	Operation

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