

# Watten Wind Farm

Caithness, Scottish Highlands

## Environmental Impact Assessment Volume 1 of 4: Written Statement

August 2023



Prepared by Natural Power on  
behalf of EDF Energy  
Renewables Limited.

# Volume 1: Written Statement

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# Chapter 1

## Introduction

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations).
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
ECU	Energy Consents Unit
EDF ER	EDF Energy Renewables Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regs	Environmental Impact Assessment Regulations 2017
GW	Gigawatt
IEMA	Institute of Environmental Management and Assessment
LVIA	Landscape and Visual Impact Assessment
m	metres
MW	megawatt
Natural Power	The Natural Power Consultants
NTS	Non-Technical Summary
PAC	Pre-Application Consultation
THC	The Highland Council

## 1.1. Introduction

- 1.1.1. This Environmental Impact Assessment Report (EIAR) has been prepared in support of an application submitted by The Natural Power Consultants (Natural Power) on behalf of EDF Energy Renewables Limited (EDF-ER) (the 'Applicant') to construct and operate Watten Wind Farm and battery energy storage system (BESS) and associated infrastructure. From this point forth the Watten Wind Farm and BESS will be referred to as 'the Proposed Development', which is located in the Scottish Highlands. The EIAR contains four volumes:
- Volume 1: EIAR Written Statement – chapters containing specialist assessments;
  - Volume 2: Supporting Figures and Visualisations;
  - Volume 3: Technical Appendices (3A - A3 page size documents, 3B - A4 page size documents); and
  - Volume 4: Non-Technical Summary (NTS) – a summary of the key details of the project in laypersons language which aims to be accessible to a variety of readers.
- 1.1.2. The Proposed Development is located in Caithness, Scottish Highlands on land to the east of Halsary Windfarm, approximately 3 km south-west of Watten village, see Figure 1.1: Site Location, (Volume 2).
- 1.1.3. The Proposed Development Area lies within a generally flat, gently undulating and generally smooth landform. The Proposed Development Area is currently a very sparsely settled landscape and settlement today takes the form of dispersed crofts, farms and estate buildings. Vehicular tracks within the wider area are used mainly to provide access for deer stalking and to fishing lochs and peat cuttings. The Proposed Development is located within The Highland Council (THC) area.
- 1.1.4. This EIAR describes the natural and human environment of the area in which the Proposed Development would be situated and describes the details and identifies the potential impacts associated with the construction, operational and decommissioning phases. It assesses the potential significant effects that the Proposed Development could have on the biological environment, the physical environment and on human health and population and the alternatives considered (see Chapter 3: Approach to EIA).

## 1.2. Key Project Facts

- 1.2.1. Figure 1.2: Site Layout (EIAR Volume 2) illustrates the site layout of the Proposed Development consisting of up to seven wind turbines with maximum blade tip heights of 220 metres (m), BESS and associated infrastructure. It is expected to have an operational period of up to 35 years, and the generating capacity of the proposed wind turbines is expected to be up to 47.6 megawatts (MW) subject to final wind turbine procurement. There will be a further 20 MW associated with the proposed BESS. The Proposed Development will have a generating capacity in excess of 50 MW.
- 1.2.2. The specific details of the Proposed Development are set out in Chapter 5: Project Description. The application seeks consent for the following:
- Up to seven turbines up to 220 m to tip height each with
    - turbine foundations;
    - external transformer housing;
    - crane hardstandings and erection areas;
  - Onsite substation, control building and compound;
  - BESS;
  - New and floating access tracks; including watercourse crossings;
  - Underground electricity cables connecting infrastructure within the Proposed Development Area;

- Temporary construction and storage compounds and ancillary infrastructure, laydown areas and including cable crossing points;
- Site signage;
- Temporary construction gatehouse;
- Biodiversity enhancement and management (see Chapter 7: Ecology and associated Technical Appendices for details);
- Waste water and surface water drainage; and
- Forestry felling and replanting.

- 1.2.3. Connection of the Proposed Development to the national grid will be at Mybster approximately 3 km north-west of the Proposed Development and will be subject to a separate application.

## 1.3. Application Details

- 1.3.1. The application is submitted in accordance with:
- The Electricity Act 1989; and
  - The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (EIA Regs).
- 1.3.2. As the Proposed Development's generating capacity is in excess of 50 MW the Applicant seeks consent under Section 36 of the Electricity Act 1989. The application also seeks a direction under Section 57(2) of the Town and Country Planning (Scotland) Act 1997 (as amended) that planning permission is deemed to be granted. The application will be submitted to Scottish Government's Energy Consents Unit (ECU).
- 1.3.3. A full Scoping Report was submitted to the ECU on the 26 May 2022. A copy of this can be found in Technical Appendix A1.1 in Volume 3 of this EIAR. The Scottish Ministers' Scoping Opinion was adopted on the 2 September 2022 and is provided in Technical Appendix A1.2 in Volume 3 of the EIAR. It informs the scope of the Environmental Impact Assessment (EIA) undertaken for the Proposed Development. The Scoping Opinion was used during the iterative design evolution along with other assessments of the Proposed Development.
- 1.3.4. The Section 36 application (under the Electricity Act 1989) is accompanied by a Pre-Application Consultation (PAC) Report which is an informative description of the PAC undertaken for the Proposed Development, a Planning and Renewable Energy Policy Statement which considers the Proposed Development against relevant national and regional policies and a Design and Access Statement which highlights the design principles and concepts behind the Proposed Development.

## 1.4. The Applicant

- 1.4.1. EDF-ER is part of one of the world's largest electricity companies and is a joint venture between EDF Energy Renewables Limited Group (EDF's global renewable business) and EDF Energy (EDF's UK generation business).
- 1.4.2. EDF-ER is one of the UK and Ireland's leading renewable energy companies, specialising in wind power, solar and battery storage technology. Through a dynamic team of more than 400 people, EDF-ER develop, build, operate and maintain renewable technologies throughout their lifetime and have over 25 years' experience in delivering renewable energy generation.
- 1.4.3. The EDF-ER team has successfully completed approximately 1 Gigawatt (GW) of projects with a further 5 GW of projects in development. EDF-ER have an operational portfolio of 37 wind farms, including two offshore wind farms, as well as two battery storage units.

- 1.4.4. EDF-ER believe in the importance of working closely with the local communities and strive to benefit the local community by providing support, such as creating new jobs, boosting the local economy, and providing direct community investment through community funds.

Table 1.1: Details of the Applicant

APPLICANT		
EDF Energy Renewables Limited	Registered Address:	Tel: 0131 377 0253
	EDF Energy Renewables Limited, 7th Floor, Atria One, 144 Morrison St, Edinburgh EH3 8EX United Kingdom	Contact: Sarah Dooley

Source: Natural Power, 2022

## 1.5. Project Team

- 1.5.1. The Proposed Development has been designed and assessed by the Applicant in association with their lead consultants, Natural Power (Table 1.2) and the EIA chapter authors in an iterative way to minimise environmental effects as much as possible whilst maximising renewable energy generation potential. Natural Power has been appointed to coordinate and produce this EIAR and associated application documentation.
- 1.5.2. Natural Power has been providing expertise to the renewable energy industry since the company was formed in 1995 and is one of the UK's leading renewable energy consultants. As well as development and EIA services, Natural Power also provide expert advice and due diligence consultancy, site construction management, and site operation and maintenance. Natural Power currently employs over 400 people working full time providing renewable energy services nationally and internationally. Testimony to Natural Power's experience and ongoing commitment to competency and continual improvement, its Consents and Environment Department is accredited by the Institute of Environmental Management and Assessment (IEMA). In addition, Natural Power also operates in formally accredited health and safety (ISO 45001), environmental (ISO 14001) and quality (ISO 9001) management systems. As well as development and EIA services, Natural Power is a competent and experienced consultant to co-ordinate and undertake EIA and prepare the EIAR. Natural Power's office in Stirling, where this project is largely managed, currently employs approximately 100 renewable energy experts.
- 1.5.3. Contact details of other consultants involved in the production of the EIAR are provided in Table 1.3. Competency statements for other consultants involved in the EIA are provided in their respective EIAR Chapters.

Table 1.2: Details of Agent and Lead Consultancy

LEAD EIA AND PLANNING CONSULTANCY; LANDSCAPE AND VISUAL; TRAFFIC AND TRANSPORT; SOCIOECONOMICS, RECREATION AND TOURISM and OTHER MATTERS.		
The Natural Power Consultants Ltd	Ochil House, Springkerse Business Park, Stirling, FK7 7XE	Tel: 01786 542 300 Contact: Alison Sidgwick

Source: Natural Power, 2022

Table 1.3: Other Consultants Involved in the Production of this EIAR

CONSULTANTS		
<b>LEGAL</b>		
Eversheds Sutherland (International) LLP	3 Melville Street, Edinburgh, EH3 7PE	Tel: 0131 476 8370 Contact: Kirsty Smith
<b>PHOTOGRAPHY</b>		
Tom Finnie	Tom Finnie Photography 36 Stonehouse Road, Sandford, Strathaven, ML10 6PD	Tel: 0788767003 Contact: Tom Finnie
<b>ECOLOGY, ORNITHOLOGY, HYDROLOGY, GEOLOGY AND HYDROGEOLOGY</b>		
MacArthur Green	93 South Woodside Road, Glasgow, G20 6NT	Tel: 0141 342 5404 Contact: Nicola Goodship
<b>CULTURAL HERITAGE</b>		
Headland Archaeology	13 Jane Street, Edinburgh, EH6 5HE	Tel: 0131 467 7705 Contact: Owen Raybould
<b>FORESTRY</b>		
DGA Forestry	40 Main Street, New Abbey, DG2 8BY	Tel: 01387 850 497 Contact: Sandy Anderson
<b>ACCESS</b>		
Pell Frischmann	93 George Street, Edinburgh, EH2 3ES	Tel: 0131 240 1270 Contact: Gordon Buchan
<b>AVIATION AND EXISTING INFRASTRUCTURE</b>		
Pager Power	Stour Valley Business Centre, Brundon Lane, Sudbury, CO10 7GB	Tel: 01787 319 001 Contact: Danny Scrivener
<b>NOISE</b>		
TNEI Services Limited	7 <sup>th</sup> Floor,	Tel: 0191 211 1418 Contact: Gemma Clark

CONSULTANTS	
	80 St. Vincent Street, Glasgow, G2 5UB

Source: Natural Power, 2022

## 1.6. Structure of the Environmental Impact Assessment Report

1.6.1. This EIAR has been prepared in accordance with the EIA Regulations and follows the structure presented in Table 1.4. Where relevant each EIAR chapter considers the baseline environment, the likely significant effects for each phase of the Proposed Development and cumulative impacts.

Table 1.4: EIAR Contents

VOLUME	HEADING	DESCRIPTION
1	Chapter 1: Introduction	Presents the Proposed Development and provides a brief overview of the Applicant and the EIAR.
1	Chapter 2: Legal and Policy Context	Identifies the energy and land use policy and outlines the need for the Proposed Development and its benefits within the context of international climate change agreements and UK and Scottish renewable energy policy.
1	Chapter 3: Approach to EIA	Presents a methodology for environmental design and assessment of the Proposed Development through gathering baseline environmental data, mitigation of impacts during site design, final assessment of the significance of residual environmental and human effects of the proposal.
1	Chapter 4: Site Selection and Design Evolution	Provides a detailed description of the site selection process for the proposed site. that has resulted in the Proposed Development. This chapter also discusses the considered alternatives, the design evolution process and mitigation measures that were introduced at the site selection and design stage to reduce environmental impacts.
1	Chapter 5: Project Description	Provides a detailed description of the Proposed Development including details of the construction, operational and decommissioning arrangements.
1	Chapter 6: Landscape and Visual	Provides an assessment of the Landscape and Visual Impacts (LVIA) of the Proposed Development and cumulative LVIA. The Residential Visual Amenity Assessment and night-time effects are also presented in this chapter and mitigation is outlined where it is deemed necessary.

VOLUME	HEADING	DESCRIPTION
1	Chapter 7: Ecology	Provides an overview and assessment of the baseline ecological conditions relating to the habitats and (non-avian) fauna present within the Proposed Development Area and immediate surrounding environment and outlines mitigation where it is deemed necessary.
1	Chapter 8: Ornithology	Describes the ornithological interest Proposed Development and assesses the predicted effects on these interests within the Proposed Development Area and immediate surrounding environment.
1	Chapter 9: Hydrology, Geology and Hydrogeology	Assesses the impacts of the Proposed Development on the hydrological, geological and hydrogeological environment and outlines mitigation where it is deemed necessary .
1	Chapter 10: Cultural Heritage	Considers the potential impacts of the Proposed Development upon cultural heritage assets and outlines mitigation where it is deemed necessary.
1	Chapter 11: Forestry	Considers the potential impacts of the Proposed Development upon Forestry and assesses the predicted effects and outlines mitigation where it is deemed necessary.
1	Chapter 12: Traffic and Transport	Assesses the effects due to transport and access resulting from the construction, operation and decommissioning of the Proposed Development and outlines mitigation where it is deemed necessary.
1	Chapter 13: Aviation and Existing Infrastructure	Assesses the potential impact on aviation, Ministry of Defence interests, communication operations and existing site infrastructure. It demonstrates the consulting process undertaken and outlines mitigation where it is deemed necessary.
1	Chapter 14: Noise	Assesses the findings of the noise assessments that were carried out to assess the noise impact of the Proposed Development and outlines mitigation where it is deemed necessary.
1	Chapter 15: Socioeconomics, Recreation and Tourism	Assesses the predicted socioeconomic and tourism impacts of the Proposed Development on local, regional and national levels and outlines mitigation where it is deemed necessary
1	Chapter 16: Other Matters	Assesses potential effects in relation to shadow flicker, climate and carbon balance, population and human health, major accidents and disasters, ice throw and lightning in the Proposed Development

VOLUME	HEADING	DESCRIPTION
		Area its and outlines mitigation where it is deemed necessary.
1	Chapter 17: Residual Effects and Mitigation	Assesses the potential synergistic effects created by effects from different subject areas in combination and summarises the proposed mitigation and residual effects of the Proposed Development.
2	Figures	EIA figures.
3	Technical Appendices	Provide additional supporting documents and data which inform the EIA.
4	Non-Technical Summary	Provides a high-level summary of the EIA's results in terms that can be understood by a layperson.

Source: Natural Power, 2022

## 1.7. Commenting on the Environmental Impact Assessment Report

- 1.7.1. The EIA Report will be publicised in accordance with Part 5 of the 2017 Regulations and the Electricity (Applications for Consent) Regulations 1990.
- 1.7.2. A notice will be published as follows:
- on the project website <https://www.edf-re.uk/our-sites/watten/>;
  - in The Edinburgh Gazette;
  - The Herald; and
  - in the John O’Groat Journal and Caithness Courier (which covers the area in which the Proposed Development would be located).
- 1.7.3. In addition to the statutory requirements for publicising the EIA Report, EDF-ER has advised Watten and Halkirk Community Councils of the EIA Report being available:
- 1.7.4. A hard copy of the EIA Report can be viewed at the following location:
- Watten Village Hall, Wick, KW1 5YL, 12:00 to 19:00, Monday to Friday for the duration of the consultation period from August 2023.
- 1.7.5. A copy of the EIA Report volumes will be made available for download from the project website at: <https://www.edf-re.uk/our-sites/watten/>.
- 1.7.6. Copies of the EIAR may be obtained from EDF-ER (telephone: [0131 377 0253]/email ([wattenwindfarm@edf-re.uk](mailto:wattenwindfarm@edf-re.uk))) at a charge of £500 for a hard copy. Copies of the full EIAR are available on USB free of charge. Hard copies of the NTS are available free of charge.
- 1.7.7. Paper copies of the full EIAR are available to purchase at a cost of £500. Copies of the full EIAR are available on USB free of charge. Paper copies of the NTS are available free of charge.
- 1.7.8. Requests for documents should be made in writing, including payment if purchase of the full EIAR is required, to Natural Power, Ochil House, Springkerse Business Park, Stirling, Scotland, FK7 7XE or through filling in a form using the link <https://www.edf-re.uk/get-in-touch/>.



# Chapter 2

## Legal and Policy Context

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to of the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm Development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
CaSPlan	Caithness and Sutherland Local Development Plan
EDF-ER	EDF Energy Renewables Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HwLDP	Highland wide Local Development Plan
MW	megawatt
NPF4	National Planning Framework 4
OWESG	The Onshore Wind Energy Supplementary Guidance
PAN	Planning Advice Note
SPP	Scottish Planning Policy
THC	The Highland Council
The Draft Energy Strategy and Just Transition Plan	DES&JTP
The Electricity Act 1989	The Electricity Act
The Town and Country Planning Act (Scotland) 1997	The Planning Act
UK	United Kingdom

## 2.1. Introduction

- 2.1.1. This chapter of the Environmental Impact Assessment Report (EIAR) describes the renewable energy and planning legislative and policy background relevant to the Proposed Development. It refers to energy and planning policy at a national and local level. This chapter does not include an assessment of the accordance of the Proposed Development with reference to planning policy: a separate Planning and Renewable Energy Statement has been prepared to support the application and should be referred to for a detailed planning policy appraisal. As this application is for a development within Scotland this chapter of the EIAR focuses on relevant Scottish policy.

## 2.2. The Legislative Framework

### The Electricity Act 1989

- 2.2.1. In the case of this application which is made under Section 36 of the Electricity Act 1989 (the Electricity Act) the Development Plan does not have primacy in the decision-making process.
- 2.2.2. EDF Energy Renewables Limited (EDF-ER) is a licensed electricity generator in terms of the Electricity Act. As a consequence of this, EDF-ER is obliged when formulating proposals of 10 megawatts (MW) or more to have regard to the duties imposed upon it by Schedule 9 paragraphs (3)(1) and (3)(3). In formulating proposals it shall have “specific regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features or special interest in protecting sites, buildings and objects of architectural, historic or archaeological interest.” pursuant to paragraph (3)(1)(a) of Schedule 9 of the Electricity Act. Furthermore, in terms of paragraph (3)(1)(b), EDF-ER is under a duty to do what it 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. Paragraph (3)(3) imposes a duty to avoid, so far as is possible, causing injury to fisheries or to the stock of fish.
- 2.2.3. Schedule 9 also imposes duties upon the Scottish Ministers when determining Section 36 applications. They are obliged to have regard to desirability of the matters mentioned in paragraph (a) of sub-paragraph (1) and must also have regard to the extent to which the Applicant has complied with their duties to mitigate any effects on those resources, pursuant to paragraph (3)(2) of Schedule 9 of the Electricity Act. The duty under paragraph (3)(3) to avoid causing injury to fisheries or to the stock of fish, so far as is possible, is also applicable to the Scottish Ministers.
- 2.2.4. In terms of determinations under Section 36, there are no specific statutory presumptions that apply. As identified above, there are considerations which have to be taken into account and dealt with both in terms of Schedule 9 and under the Environmental Impact Assessment (EIA) Regulations. In that context, Section 36 decision making incorporates consideration of a wide policy framework which will include elements of National Energy Policy, National Planning Policy and Guidance and also the relevant Development Plan. These features to which regard must be had by the Scottish Ministers have been addressed in the EIA process which is reported in this EIAR.

### The Town and Country Planning (Scotland) Act 1997

- 2.2.5. The principal planning statute in Scotland is the Town and Country Planning Act (Scotland) 1997 (the Planning Act) as amended Section 57(2) of the Planning Act provides:
- “On granting a consent under section 36 or 37 of the Electricity Act 1989 in respect of any operation or change of use that constitutes development, the Scottish Ministers may direct that planning permission for that development and any ancillary development shall be deemed to be granted, subject to any conditions (if any) as may be specified in the direction”.

- 2.2.6. While the Development Plan is not engaged in the case of a Section 36 application the Development Plan it will be a material consideration in determination of the application.

## 2.3. Renewable Energy Policy: Summary

- 2.3.1. In recent years United Kingdom (UK) and Scottish Government policies have focussed increasingly on concerns about climate change. Government has developed targets, policies and actions to achieve targets to address the climate crisis and generate more renewable energy and electricity.
- 2.3.2. The UK Government the Westminster Parliament retains responsibility for the overall direction of energy policy including the achievement of national targets for renewable energy generation. It is however clear that the devolved administrations play an important role in reaching the UK targets for renewable electricity. The Scottish Ministers have powers to set their own targets for energy generation and to consent energy projects.
- 2.3.3. The UK Government has published a series of policy documents setting out how targets can be achieved. Onshore wind generation, located in Scotland, is identified as an important component to achieve these various goals. These documents include:
- The Climate Change Act 2008 as amended by the Climate Change Act 2008 (2050 Target Amendment) Order 2019;
  - The UK Energy White Paper (December 2020);
  - The UK Net Zero Strategy (October 2021); and
  - The British Energy Security Strategy (April 2022).
- 2.3.4. The Scottish Government has published a number of policy documents which include their own targets. The most relevant policy, legislative documents and more recent statements published by the Scottish Government include:
- Scottish Energy Strategy (December 2017);
  - The Scottish Government’s declaration of a Climate Emergency (April 2019);
  - The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 which includes the legally binding net zero target for 2045 and interim targets for 2030 and 2040;
  - The Scottish Climate Change Plan Update (2020);
  - Scottish Energy Strategy Position Statement (March 2021);
  - The Scottish Onshore Wind Energy Policy Statement 2022; and
  - The Draft Energy Strategy and Just Transition Plan 2023 (DES&JTP).
- 2.3.5. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 requires that “*The Scottish Ministers must ensure that the net Scottish emissions account for the net-zero emissions target year is at least 100% lower than the baseline (the target is known as the “net-zero emissions target”).*” The target year is 2045 and the Act also sets out challenging interim targets. It requires that:
- “*The Scottish Ministers must ensure that the net Scottish emissions account for the year—*
- (a) *2020 is at least 56% lower than the baseline,*
- (b) *2030 is at least 75% lower than the baseline, and*
- (c) *2040 is at least 90% lower than the baseline.*”

- 2.3.6. It is important to note that these targets are minimum targets, they are not maximums or aspirations. The targets legally bind the Scottish Ministers and have been legislated to help set the framework for Scotland’s response to the Climate Emergency.
- 2.3.7. The Proposed Development relates to the generation of electricity from renewable energy sources and comes as a direct response to national planning and energy policy objectives.
- 2.3.8. The Proposed Development would make a contribution to the attainment of emissions reduction, renewable energy and electricity targets at both the Scottish and UK levels. Detailed reference to the renewable energy policy context is provided in the Planning and Renewable Energy Policy Statement.

## 2.4. National Planning Policy

### National Planning Framework 4 (NPF4)

- 2.4.1. The final version of NPF4 was laid before the Scottish Parliament in November 2022 and was approved by them in January 2023. The document was then adopted by the Scottish Government in February 2023.
- 2.4.2. This document was accompanied by an explanatory report and delivery programme. NPF4 is a long-term plan for Scotland setting out where development and infrastructure is needed. The delivery programme outlines the approach for implementing NPF4 and includes key actions to be taken forward over the short and medium term.
- 2.4.3. The proposals in NPF4 are intended, amongst other things, to:
  - Enable more renewable energy generation – outside national parks and National Scenic Areas, to support the transition away from reliance on fossil fuels; and
  - Support emerging low-carbon and zero-emissions technologies, including hydrogen and carbon capture, and developments on land that unlock offshore renewable energy, such as the expansion of the electricity grid.
- 2.4.4. At the time the document was laid in front of Parliament the Planning Minister was clear that:
 

*“The window of opportunity to act to reduce emissions and adapt to already locked-in changes is narrowing. Our statutory and moral obligation to tackle climate change means change is necessary and urgent.*

*“This final version of the framework makes clear that we won’t compromise on climate change. It also clarifies what is to be delivered, and how. And it is now clear through the weighting to be applied to different policies, that the climate and nature crises are the priority.*

*“It is timely that we have tabled final proposals during COP27, as we set out to do when Glasgow hosted COP26 last year. This shows that Scotland’s ambition and commitment to delivering on international calls for action are unwavering.*

*“There is now a clear expectation of the role that planning must play in delivering the expansion of renewable energy needed to realise the just transition from reliance on fossil fuels.*

*“This framework creates the foundation upon which to build the fairer, greener Scotland we want to see for the benefit of future generations.”*
- 2.4.5. Part one of NPF4 contains a National Spatial Strategy for Scotland 2045 which identifies six spatial principles which will be used to plan places. It identifies six National Developments which support the delivery of sustainable places. These include Strategic Renewable Electricity Generation and Transmission Infrastructure. Which *“supports electricity generation and associated grid infrastructure throughout Scotland, providing employment and opportunities for community benefit, helping to reduce emissions and improve security of supply.”*

- 2.4.6. Part two of NPF4 contains National Planning Policy. Policy 1 of NPF states that:
 

*“When considering all development proposals significant weight will be given to the global climate and nature crises.”*
- 2.4.7. The key policy against which the Proposed Development should be considered is Policy 11. However other policies relating to biodiversity, natural places, soils and historic assets and places are also relevant. These policies are all considered in the Planning and Renewable Energy Statement.

### National Planning Advice

- 2.4.8. Planning Advice Notes (PANs) and Specific Advice Sheets set out detailed advice from the Scottish Government in relation to a number of matters which are relevant to the Proposed Development. Relevant PANs and Specific Advice Sheets relevant to the Proposed Development are summarised in Table 2.1.

Table 2.1: Relevant PANs and Specific Advice Notes

Title	Summary of Document
PAN 1/2013 Environmental Impact Assessment	Provides information on the role local authorities and consultees play as part of the EIA process, and how the EIA can inform development management.
PAN 60 (2000) Planning for Natural Heritage	Advises developers on the importance of discussing their proposals with the planning authority and Scottish Natural Heritage (now NatureScot) and use of the EIA process to identify the environmental effects of development proposals and seek to prevent, reduce and offset any adverse effects in ecology and biodiversity.
PAN 61 (2001) Sustainable Urban Drainage Systems	Good practice drainage guidance.
PAN 68 (2003) Design Statements	This PAN covers the importance of design statements, and provides flexible guidance on their preparation, structure, and content. The PAN also outlines the principles underpinning the production of design statements, as expected by the Scottish Government.
PAN 75 (2005) Planning for Transport	The objective of PAN 75 is to integrate development plans and transport strategies to optimise opportunities for sustainable development and create successful transport outcomes.
PAN 3/2010 Community Engagement	This document provides advice on how to engage with local communities through the planning process.
PAN 1/2011 Planning and Noise	This PAN provides advice on the role of the planning system in helping to prevent and/ or mitigate any potential adverse effects of noise. It promotes the principles of good acoustic design and promotes a sensitive approach to the location of new development.
PAN 2/2011 Planning and Archaeology	The PAN is intended to inform local authorities and other organisations of how to process any archaeological scope of works within the planning process.

Title	Summary of Document
Online Renewables Planning Advice - On Shore Wind Turbines (updated 2014)	This Specific Advice Sheet provides an overview of the use of the carbon calculator in estimating the carbon savings resulting from wind farm developments.  NB: Please note that this Specific Advice Sheet pre-dates Scottish Planning Policy (SPP), so the areas covered therein in relation to 'spatial framework', 'spatial planning' and 'areas of search' are no longer relevant.
PAN 51 Planning, Environmental Protection and Regulation (Revised 2006)	Details the role of the planning system in relation to the environmental protection regimes.
Online Planning Advice on Flood Risk (2015)	Provides advice on the role of the planning system and the assessment and management of flood risk.

Source: Natural Power

## 2.5. The Development Plan

2.5.1. The Development Plan for the Proposed Development comprises:

- NPF4 2023;
- The Highland wide Local Development Plan 2012 (HwLDP);
- Caithness and Sutherland Local Development Plan 2018 (CaSPlan); and
- The Onshore Wind Energy Supplementary Guidance (2016) and addendum (2017) (OWESG).

### Highland-wide Local Development Plan (HwLDP)

2.5.2. The HwLDP was adopted in April 2012. Preparation of the second HwLDP (HwLDP 2) is underway, with preparatory stages such as the Main Issues Report complete and published. There is no anticipated date that the HwLDP 2 is to be adopted as The Highland Council (THC) has indicated that further review of the current HwLDP will be postponed until after the implications of the Scottish Planning Bill (2017) are better understood. It is understood that following the approval of NPF4, THC will move forward with the preparation of HwLDP 2. The HwLDP is therefore considered to be a relevant Local Development Plan, however, it is noted that the weight to be attached to the HwLDP is decreased as it is over 5 years old.

2.5.3. The HwLDP states:

*'The Highland area has great potential for renewable energy production and to contribute towards meeting ambitious targets set internationally, nationally and regionally'.<sup>1</sup>*

2.5.4. The HwLDP advises that THC will safeguard its environment by ensuring that the development of renewable energy resources are managed effectively with clear guidance on where renewable energy should and should not be located.<sup>1</sup>

2.5.5. The key policy which is relevant to the Proposed Development is Policy 67 Renewable Energy Developments. That policy is considered in detail on the Planning and Renewable Energy Policy Statement. Other policies which are relevant to the Proposed Development include:

- Policy 28 – Sustainable Design;

- Policy 55 – Peat and Soils;
- Policy 57 – Natural, Built and Cultural Heritage;
- Policy 58 – Protected Species;
- Policy 59 – Other Important Species;
- Policy 60 – Other Important Habitats;
- Policy 61 – Landscape;
- Policy 62 – Geodiversity;
- Policy 63 – Water Environment;
- Policy 64 – Flood Risk;
- Policy 66 – Surface Water Drainage;
- Policy 72 – Pollution; and
- Policy 77 – Public Access.

### Caithness and Sutherland Local Development Plan

2.5.6. CaSPlan was adopted in August 2018 and is the second of three new area local development plans that, along with the HwLDP and Supplementary Guidance, form the Highland Council's Development Plan to guide future development in Highland, particularly in the Caithness and Sutherland area.

2.5.7. The 'CaSPlan Strategy Map' seeks to show how the spatial strategy for future development applies across the plan area. The Proposed Development is located in an Area for Energy Business Expansion.

2.5.8. Paragraph 53 of CasPlan states:

*"Investment in renewable energy generation in North Highland is not only helping to meet Council and national climate change targets but it has also delivered economic benefits for the area. Onshore wind energy has grown significantly over recent years, particularly in the south and north east of the Plan area."*

2.5.9. CaSPlan considers the issue of Climate change and paragraph 82 states:

*"The area also has a substantial renewable energy resource, with onshore wind and hydro energy sectors well established and offshore marine energy developments currently emerging."*

2.5.10. Watten is identified as a settlement in CaSPlan and the plan advises on a number of placemaking priorities including the protection of the setting of Loch Watten and avoidance of adverse effects on the Loch Watten Special Area of Conservation, Site of Special Scientific Interest and the Caithness Lochs Special Protection Area.

### Onshore Wind Energy Supplementary Guidance (2017) (OWESG)

2.5.11. Supplementary Guidance forms part of the HwLDP. The relevant Supplementary Guidance pertaining to the Proposed Development is the OWESG. The OWESG sets out a range of matters that THC will consider when determining wind farm applications including landscape, aviation interests, roads, peat, and tourism. It contains a spatial framework for onshore wind energy development that applies to all wind energy development proposals.

2.5.12. The spatial framework presented in the OWESG classifies the Proposed Development Area as both 'Group 3: Areas with potential for wind farm development' and 'Group 2: Areas of significant protection'. These classifications

<sup>1</sup> The Highland Council, 2012. Available from: Highland\_wide\_Local\_Development\_Plan%20(1).pdf [Accessed 26/10/2022]

do not rule out wind farm development, noting that further consideration would be required to demonstrate that any significant effects can be sustainably overcome by siting, design or other mitigation.

- 2.5.13. The Proposed Development is located within a mix of Group 3 and Group 2 areas. The group 2 areas are due to the presence of category 1 peat on the Proposed Development Area.

The OWESG contains an Addendum SG 'Part 2b' (December 2017). Part 2b contains two landscape sensitivity appraisals for Black Isle, Surrounding Hills and Moray Firth Coast and Caithness. The Proposed Development is situated within the Caithness study area.

## 2.6. Conclusions

- 2.6.1. This Chapter has set out the legislative background, a summary of the renewable energy policy framework, and the national and local planning policies and guidance relevant to the consideration of the Proposed Development. It provides a summary of the energy and planning policy considerations that have been taken into account in the preparation of the EIAR in order to ensure that it provides the appropriate information for the consideration of the application.
- 2.6.2. Both the UK and Scottish Governments have set targets to reduce carbon emissions, with the UK aiming to be Net Zero by 2050 and Scotland by 2045. Development of renewable energy projects will help to achieve such targets and align with policy contained within NPF4 that both make it clear that the Scottish Government wants to continue to capitalise on the wind resource of Scotland and ensure such projects can be delivered.
- 2.6.3. The policy appraisal for the Proposed Development is contained in a separate Planning and Renewable Energy Statement.

# Chapter 3

## Approach to EIA

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## Glossary

Term	Definition
Baseline	The existing conditions that prevail against which the effects of the Proposed Development are compared.
EIA Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to of the likely significant environmental effects arising from a proposed development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The Proposed Watten Wind Farm Development.
The Proposed Development Area	The area within the redline boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
DWPA	Drinking Water Protected Areas
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GCN	Great Crested Newt
GWDTE	Groundwater Dependent Terrestrial Ecosystems
IEEM	Institute of Ecology and Environmental Management
IEF	Important Ecological Features
IEMA	Institute of Environmental Management and Assessment
IOFs	Important Ornithological Features
Natural Power	The Natural Power Consultants Ltd
SAC	Special Areas of Conservation
SBL	Scottish Biodiversity List
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
UKBAP	Biodiversity Action Plan



### 3.1. EIA Methodology

#### Overview of the EIA Process

- 3.1.1. This chapter of the Environmental Impact Assessment Report (EIAR) outlines the process and methodology regarding the application of Environmental Impact Assessment (EIA) used during the preparation of this EIAR to guide the specific elements of site assessment and design.
- 3.1.2. This EIA is prepared in compliance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the EIA Regulations) with best practice guidance, Scottish Government Planning Advice Note (PAN) 1/2013 and Planning Circular 1/20174. The EIA Regulations outline the process of an EIA and the criteria that would determine if an EIA is necessary or not, the relevant environmental studies and statements, how the information is evaluated by the Scottish Ministers, Planning Authority and consultative bodies and how this is implemented through the consent under Section 36 of the Electricity Act 1989. Under the EIA Regulations, the Proposed Development is classed as a Schedule 2 development and the Applicant determined that an EIA was required, following an internal screening process.
- 3.1.3. The key stages of the EIA process and methodology, following site selection and definition of the development characteristics are explained in more detail in the following sections of this chapter.

### 3.2. Scope of the EIAR

- 3.2.1. The nature of environmental and social effects can be divided into a number of categories. First, there are categories of environmental and human receptors that may be affected such as:
- Breeding birds;
  - Migrating birds;
  - Ecological habitats;
  - Cultural and archaeological sites and artefacts;
  - Human settlements; and
  - Noise sensitive properties.
- 3.2.2. Secondly, there are the various stages and components of the Proposed Development which may have differing characteristics with relation to the environment (e.g. the construction, operation and decommissioning stages, including the turbines, tracks and power cables). For more details of these characteristics please see Chapter 5: Project Description.
- 3.2.3. Scoping exercises were undertaken to identify the environmental effects that might result from a development with the characteristics defined during the early stages of the development process. An essential part of this involved identifying the sensitive environmental receptors of the Proposed Development and its surroundings.
- 3.2.4. In defining types of environmental effects, the lead consultancy, The Natural Power Consultants Ltd (Natural Power), and its technical associates, have extensive experience in carrying out EIA for onshore wind farm proposals. A list of the consultants involved, and the topics assessed are set out in Chapter 1: Introduction, of this EIAR. In addition, reference was made to guidance documents issued by government agencies and non-government organisations. Specific guidance documents which have been referred to for individual elements of the EIA are detailed in the relevant chapters within the EIAR. This EIAR is based on the Scoping Opinion adopted by the Scottish Ministers. The full Scoping Opinion received from the Scottish Government is also included in Technical Appendix A1.2 in Volume 3 of this EIAR.

- 3.2.5. The consultee responses are available within the Scoping Opinion in full and are summarised in Chapter 4: Site Selection and Design Evolution. Topics that have been scoped out of the EIAR from the Scoping Opinion and follow up consultation where appropriate are set out by technical discipline as follows:

#### Ecology

- Generally common and widely distributed habitats or species which do not fall within the following categories were scoped out of the detailed assessment:
  - 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; and
  - Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.
- Further ecological features and effects have been scoped out of the detailed assessment based on the results of the desk-based study and survey work undertaken for the Proposed Development, due to a lack of potential significant effect at a relevant species population or habitat extent scale. Details of ecological features and effects scoped out after further data searches and post-survey are provided in Section 7.5, Chapter 7: Ecology, of the EIAR.
- Surveys for beaver (*Castor fiber*) and great crested newt (*Triturus cristatus*) were scoped out of field surveys due to the absence of suitable habitat or the Proposed Development Area being located out with the known range or distribution of these species.
- Loch Watten Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI);
- River Thurso SAC;
- Blar nam Faileag SSSI.
- Shielton Peatlands SSSI;
- Effects on otter;
- Ancient Woodland;
- Habitats that are considered to be of low conservation value and are very common habitat types locally and regionally. Within the Study Area these include:
  - broadleaved and coniferous plantation woodland;
  - unimproved and semi-improved acid grassland;
  - unimproved neutral grassland;
  - improved grassland;
  - bracken;
  - amenity grassland; and
  - bare ground.
- Marshy grassland;
- Broadleaved semi-natural woodland;
- Dense/continuous scrub;
- Acid/neutral flush;
- Effects on aquatic habitats including standing water, running water and fisheries interests;

- Aquatic habitats species pollution impacts;
- Effects on Great Crested Newt (GCN), beaver, wildcat, brown hare, mountain hare, badger, pine marten and red squirrel;
- Bats (roosting);
- Operational and cumulative effects arising from collision mortality for low collision risk bat species;
- Effects on water vole;
- Effects on deer;
- Wind farm projects at scoping stage;
- Projects that have been refused or withdrawn;
- All scoped-in Important Ecological Features (IEFs) considered (i.e., blanket bog and wet modified bog) have been scoped out of the cumulative assessment;

### Ornithology

- Barn owl;
- Golden eagle (the wider-countryside population);
- Goshawk;
- Hobby;
- Peregrine falcon;
- Kite;
- Short-eared owl (the wider-countryside population);
- White-tailed eagle;
- Black-throated diver (the wider-countryside population);
- Golden plover (the wider-countryside population);
- Greenshank (the wider-countryside population);
- Whimbrel;
- Woodcock;
- Goldeneye;
- Greylag goose (the wider-countryside population);
- Pink-footed goose;
- Pochard;
- Whooper swan (the wider-countryside population);
- Arctic skua;
- Cormorant (the wider-countryside population);
- Great black-backed gull (the wider-countryside population);
- Caithness and Sutherland Peatlands Special Protection Area (SPA) and Ramsar site black-throated diver population;
- Caithness and Sutherland Peatlands SPA and Ramsar site common scoter and wigeon populations;
- Caithness and Sutherland Peatlands SPA and Ramsar site dunlin, greenshank and wood sandpiper populations;
- Caithness and Sutherland Peatlands SPA golden eagle population;
- Caithness and Sutherland Peatlands SPA and Ramsar site golden plover population;
- Caithness and Sutherland Peatlands Ramsar site greylag goose population;
- Caithness and Sutherland Peatlands SPA short-eared owl population;
- Caithness Lochs SPA and Ramsar site Greenland white-fronted goose population;
- Caithness Lochs SPA and Ramsar site greylag goose population;
- Caithness Lochs SPA and Ramsar site whooper swan population;
- East Caithness Lochs SPA cormorant population;
- East Caithness Lochs SPA great black-backed gull population;
- Dunbeath Peatlands SSSI;
- Loch Caluim Flows SSSI;
- Rumsdale Peatlands SSSI;
- Strathmore Peatlands SSSI;
- Broubster Leans SSSI;
- Loch Calder SSSI;
- Loch Heilen SSSI;
- Loch of Wester SSSI;
- Loch Scarmclate SSSI;
- Loch Watten SSSI;
- Lambsdale Leans SSSI;
- Cumulative/in-combination collision effects for all Important Ornithological Features (IOFs) due to the negligible impact during the 35-year lifespan of the Proposed Development;
- Cumulative/in-combination construction and operational displacement impacts on hen harrier and merlin: no loss of territory or impact on survival rate, no disturbance to roosting hen harrier and at worst some reduction in productivity (hen harrier and merlin);
- Cumulative/in-combination construction and operational impacts on breeding red-throated diver: no loss of nest site or impact on survival rate;
- Cumulative construction and operational impacts on breeding osprey: no loss of nest site or impact on survival rate;
- Cumulative construction and operational impacts on breeding herring gull: no loss of nest site or impact on survival rate;
- Small projects with three or fewer turbines from the cumulative assessment;
- Small-scale renewable projects such as micro-hydro schemes;

### Hydrology, Geology and Hydrogeology

- Impacts on Bedrock geology units;
- Designated sites which are not hydrologically connected to the Proposed Development;

- Designated Drinking Water Protected Areas (DWPA) which are not hydrologically connected to the Proposed Development;

Following initial assessment the following receptors were scoped out from further assessment:

- Geology;
- Private Water Supplies;
- Public Water Supplies;
- Groundwater Dependent Terrestrial Ecosystems (GWDTE); and
- Designated Sites.

### Cultural Heritage

- Assessment of construction phase setting effects;
- Assessment of decommissioning effects;

### Traffic and Transport

- Traffic effects during operation and decommissioning;
- Assessment of the A99 between Wick and Latheron;

### Other Matters

- Ice throw; and
- Lightning.

## 3.3. Identification of the baseline environment

### Data Collection

- 3.3.1. A number of existing data sources were collected and reviewed prior to the initiation of survey work targeted directly on gathering data for the EIA of the Proposed Development. It was understood that existing data sources would, in most cases, be unlikely to provide sufficient data alone to use in the EIA but would provide a valuable initial stage with which to form methodologies for further survey.
- 3.3.2. Details of existing data sources and coverage are presented within the relevant chapters of the EIAR.

### Baseline Surveys

- 3.3.3. Baseline surveys were carried out by specialist consultants in a number of different study areas. These were aimed at gathering sufficient data to form a picture of the current status of the environmental and human elements in the Proposed Development Area. The ultimate aim was to allow the prediction of the potential effects of a subsequent detailed development proposal upon these elements. Baseline survey methodologies and coverage are described in detail in the relevant assessments and chapters of the EIAR.
- 3.3.4. The future baseline under a “do nothing” scenario is also considered within the baseline assessment of each chapter.

<sup>1</sup> IEMA. Available from: <https://www.iema.net/myiema/login?redirect=resources/iema-essential-reading#sts=Delivering%20quality%20development> [Accessed 06/07/2023]

## 3.4. Site Design, Assessment of Potential Effects and Mitigation

### Site Design and Identification of Effects

- 3.4.1. The consultation process, baseline studies and surveys identified technical constraints and any potentially more sensitive environmental receptors within the Proposed Development Area. The overarching aim was to design a wind farm within the boundaries of technical and economic constraints that would avoid any unacceptable environmental and socioeconomic effects.
- 3.4.2. In order to minimise significant adverse environmental effects, the assessment and design of the Proposed Development followed an iterative approach. Within this type of approach, potentially significant adverse effects are identified during the assessment process and the design of the Proposed Development is modified in order to avoid, reduce or mitigate these effects as far as reasonably practical.
- 3.4.3. This section provides the general method of how this EIAR has been approached, then each chapter will explain its own specific methodology on how they assess potential effects.
- 3.4.4. Further details of the site design decision making process are discussed in Chapter 4: Site Selection and Design Evolution.

### Determining Significant Effects

- 3.4.5. The outline methodology for assessing significance was developed after consideration of relevant guidance/regulations including:
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
  - Guidelines for Landscape and Visual Impact Assessment 3rd Edition: E & FN Spon (2013) published by the Institute of Environmental Management and Assessment and the Landscape Institute; and
  - Environmental Impact Assessment Guide to Delivering Quality Development (2016), Institute of Environmental Management and Assessment (IEMA)<sup>1</sup>.
- 3.4.6. In determining the significance of potential residual effects, the magnitude of change arising from the Proposed Development is correlated with the 'sensitivity' of the particular environmental attribute under consideration. An effect is defined as the consequences of an impact in an EIAR development. An impact is a change resulting from an action. Magnitude of change is evaluated in accordance with the definitions set out in Table 3.1.

Table 3.1: Example Definitions of 'Magnitude' of Change

Magnitude	Definition of 'magnitude' of change
High	Total loss or major alteration to key elements/features of the baseline (e.g. pre-development conditions)
Medium	Partial loss or alteration to one or more key elements/features of the baseline (e.g. pre-development conditions)
Low	Minor shift away from baseline (e.g. pre-development conditions)
Negligible	Very slight change from baseline (e.g. pre-development conditions)

Source: Natural Power

- 3.4.7. Where applicable, in carrying out individual assessments, a scale of increasing 'sensitivity' of the environmental or social receptor is defined. This may be defined in terms of quality, value, rarity or importance to other elements,

and can be classed as low, medium or high. Table 3.2 provides an example table to illustrate this concept however each topic chapter will provide its own sensitivity criteria.

**Table 3.2: Example of Sensitivity**

Sensitivity	Example of Sensitivity
High	Elements of international/national importance generally designated for protection through national legislation/policy
Medium	Elements of regional/local importance that are not designated but are generally protected by local policy
Low	Elements of local value that can generally tolerate change

Source: Natural Power

- 3.4.8. For certain assessment topics, guidance can be taken from the value attributed to elements through designation or protection under law (i.e. landscapes, cultural heritage assets or ecological resources). Where assessment of this nature has taken place, the correlation of magnitude against 'sensitivity' determines a qualitative expression for the significance of the effect. This is shown in the example significance matrix in Table 3.3.

**Table 3.3: Example Significance Matrix**

		Level of Significance	
<b>MAGNITUDE OF CHANGE</b>			
	High	Moderate	Moderate/Major
	Medium	Minor/Moderate	Moderate
	Low	Minor	Minor Moderate
	Negligible	Negligible/Minor	Minor
		<b>Low</b>	<b>Medium</b>
<b>SENSITIVITY OF RECEIVING ELEMENT</b>			
			<b>High</b>

Source: Natural Power

- 3.4.9. Those effects highlighted in Table 3.3 indicated as 'Major' and 'Moderate/Major' are regarded as being equivalent to 'significant effects' when discussed in terms of the EIA Regulations<sup>2</sup> for the purposes of this EIAR. Some consultants may take a slightly different approach, and consider effects identified as "moderate" should also be regarded as significant in EIA terms. This is a matter of professional judgement.
- 3.4.10. Following the iterative design process adopted during the design of the Proposed Development, the significance of each effect would be confirmed or reassessed at each stage of the design process. This includes considering how the significance of an effect may also be affected by its duration (e.g. the length of the construction period) and by its reversibility (i.e. the degree to which a site could be returned to its baseline conditions following decommissioning).
- 3.4.11. Each of the impact assessments detailed in the relevant chapters of this EIAR have been generally formulated in a similar way, giving an evaluation of the baseline conditions, the magnitude, sensitivity and significance of impacts. This is followed by the residual impacts, following the implementation of the stated mitigation measures.

<sup>2</sup> EIA Quality Mark Article, EIA and the Search for Significance in EIA, IEMA. Available from: <https://transform.iema.net/article/eia-and-search-significance> [Accessed 06/07/2023]

<sup>3</sup> European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Available from: <https://ec.europa.eu/environment/archives/eia/eia-studies-and-reports/pdf/guidel.pdf> [Accessed 06/07/2023]

- 3.4.12. A view on the acceptability of the Proposed Development in policy terms is provided in the accompanying Planning and Renewable Energy Policy Statement. With regards to this, it must be noted that a significant effect does not mean a proposal should be found unacceptable in policy terms. In addition, significant effects can also be positive as well as negative. Each chapter within this EIAR assesses impacts related to each stage of development where scoped in.

### Cumulative Assessment

- 3.4.13. The EIA Regulations require the likely cumulative impacts of the Proposed Development to be assessed as part of an EIA. These can be broadly defined as impacts that result from incremental change caused by other developments, plans, or projects together with the Proposed Development. The EIA Regulations state that all likely significant cumulative effects resulting from the existence of the development, use of natural resources, the emission of the pollutants, the creation of nuisances and the elimination of waste should be considered in the EIA.
- 3.4.14. The proposed methodology for assessing cumulative impact throughout the EIAR follows the principles outlined in the European Commission Guidelines for the Assessment of Indirect and Cumulative impacts<sup>3</sup> and NatureScot's "Assessing the Cumulative Impact of Onshore Wind Energy Developments"<sup>4</sup>. The detailed approaches to cumulative assessment are varied according to each specific EIAR chapter and are defined within these chapters. Appropriate spatial scales are also defined within these chapters and are defined following their particular methodologies, which follow current available guidance.

### Mitigation by Design (Embedded Mitigation)

- 3.4.15. Measures envisaged to prevent or reduce any significant adverse effects were identified and incorporated into the design as environmental and visual assessments were developed. The design process continued until it was considered by the Applicant and consultants involved in the production of the EIAR that the most appropriate wind farm design had been derived. In this way, the Proposed Development presented here can be seen to have embedded measures, to prevent or reduce significant adverse effects directly into the design process (mitigation by design) and the findings and conclusions of the environmental assessment reflect the incorporation of those measures.
- 3.4.16. The EIA Regulations require "a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development."
- 3.4.17. Unless qualified elsewhere, the following interpretation is applied with regard to effects. Short term effects are those which extend over a short period only and, in the context of the wind farm, are typically those associated with the construction or decommissioning periods or other limited period. Other temporary effects which persist for less than the life of the wind farm are described as medium term, with those extending to the full lifetime of the wind farm described as long term. Any effects which persist beyond the life of the wind farm are considered permanent. Effects with duration of up to long term are considered reversible, whereas permanent effects are considered irreversible.

<sup>4</sup> NatureScot (2021) Assessing the Cumulative Impact of Onshore Wind Energy Developments. Available from: <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed 06/07/2023]

## Impact Mitigation

- 3.4.18. Measures which are envisaged to prevent, reduce or offset significant adverse residual effects unavoidable through design were also identified in the EIA process. The process of assessment has considered the potential effects of the Proposed Development and these effects, where applicable, will have measures proposed which apply best practice and guidance recognised within the industry to attain environmentally acceptable levels, or levels which are deemed acceptable through determination.
- 3.4.19. In some cases, individual effects have not been considered to require automatic input mitigation. However, as a means of best practice and to take into account the views and comments expressed via specialist consultants and consultees, impact mitigation was applied when considered appropriate.
- 3.4.20. Summary tables that outline the predicted effects associated with an environmental impact, the appropriate mitigation measures required to address these effects and subsequent overall residual effects will be provided at the end of each technical chapter of the EIAR. There will also be a table of conclusions summarising all significant effects identified, mitigation, residual effects, and future requirements.

## Assumptions, Uncertainties and Limitations

- 3.4.21. The EIA was undertaken during the design phase of the proposed development and therefore some of the technical aspects of the construction and operation have yet to be determined. The EIA has taken a precautionary approach to adopt conservatism in the assumptions made and any scenarios assumed, so that a reasonable 'worst-case' scenario was assessed. Therefore, inherent uncertainties are accounted for and subsequent modifications to the proposed development during the detailed design phase are less likely to fall outside of the assumed envelope of the assessment parameters. Assumptions adopted in the evaluation of impacts are reported in each of the relevant sections. However, these assumptions are often implicit and rely on expert judgement. Any assumptions and known technical deficiencies have been documented in each chapter.
- 3.4.22. The EIA was undertaken and the resulting EIAR has been compiled using the material made available to the EIA team by the Applicant and members of their project team, together with other readily available and publicly accessible material including existing literature and studies, as well as personal communication with local experts. To the best of knowledge, the information used as a basis for the assessment is accurate and up to date.
- 3.4.23. The project team has also carried out site visits, surveys and investigations at or in the vicinity of the Proposed Development Area to provide more information for the assessments and to fill data gaps. This has resulted in a more complete and up to date set of baseline data to use as the basis for the impact assessment. Although the data have been collected over a period of time, it is considered that the data is relevant and valid at the time of reporting.

# Chapter 4

## Site Selection and Design Evolution

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
AIL	Abnormal Indivisible Load
BESS	Battery Energy Storage System
DAS	Design and Access Statement
dB	decibels
ECU	Scottish Government's Energy Consents Unit
EDF ER	EDF Energy Renewables Limited
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GIS	Geographical Information Systems
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicle
HIAL	Highlands and Islands Airports
HwLDP	Highland wide Local Development Plan
JRC	Joint Radio Company
km	kilometre
LGV	Light Goods Vehicle
LVIA	Landscape and Visual Impact Assessment
NATS	National Air Traffic Services
OWESG	Onshore Wind Energy Supplementary Guidance
PAC	Pre-Application Consultation
PAN	Planning Advice Note
SEPA	Scottish Environment Protection Agency
SNH	Scottish National Heritage (Now NatureScot)
SPA	Special Protection Areas
SSSI	Sites of Special Scientific Interest
SUW	Southern Upland Way
RVAA	Residential Visual Amenity Assessment
THC	The Highland Council
ZTV	Zone of Theoretical Visibility

## 4.1. Introduction

- 4.1.1. The purpose of this chapter is to identify the steps and alternatives that have been considered in the site selection and design evolution of the proposed Watten Wind Farm and Battery Energy Storage System (BESS) (the Proposed Development). This chapter demonstrates how the Proposed Development design and the layout of the Proposed Development evolved through the initial site selection process, discusses the identification of various constraints and site-specific factors, and highlights the key design criteria applied.
- 4.1.2. Planning Advice Note (PAN) 68: Design Statements explains the process of undertaking a design statement. Although not a statutory requirement for the Proposed Development, for which an application will be submitted under Section 36 of the Electricity Act 1989, this chapter nonetheless explains the design process which has been undertaken to arrive at the proposed final layout. A Design and Access Statement (DAS) has been prepared and is submitted with the application.
- 4.1.3. This chapter refers to the following chapters (Volume 1) and figures (Volume 2):
- Chapter 2: Legal and Policy Context;
  - Chapter 5: Project Description;
  - Chapter 6: Landscape and Visual;
  - Chapter 12: Traffic and Transport;
  - Chapter 13: Aviation and Existing Infrastructure;
  - Chapter 16: Other Matters;
  - Figure 1.1: Location Plan;
  - Figure 1.2: Site Layout;
  - Figure 4.1: Constraints to Design; and
  - Figure 4.2: Layout Evolution – (Iterative turbine layouts).

## 4.2. Consideration of Alternatives

- 4.2.1. Paragraph 5(2)(d) of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 requires that the Environmental Impact Assessment Report (EIAR) includes a description of reasonable alternatives studied by the Applicant, 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. As noted in PAN 1/2013, “Whilst the Directive and the Regulations do not expressly require the Applicant to study alternatives, those alternatives which are in any case considered as part of the project planning and design process must be assessed, and an outline of the main alternatives studied by the Applicant included in the EIA Report<sup>1</sup>. The EIA Report must also give an indication of the main reasons for the choice made, taking into account the environmental effects”.
- 4.2.2. The Applicant has considered a number of alternative turbine layouts for the Proposed Development through an iterative design process described below. The finalised layout is shown in Figure 1.2: Site Layout.

## 4.3. The Site Selection Process

- 4.3.1. The Applicant has a portfolio of sites across Scotland which it has investigated over time for wind energy potential. Some are not progressed whilst others make it all the way to application stage and are constructed following

consent. Desk-based feasibility studies and site visits to the area were undertaken at an early stage. Results indicated that this site would be a technically and environmentally appropriate location to develop a wind farm. A Scoping Report was submitted to the Scottish Government in May 2022 by Natural Power on behalf of the Applicant. At that time, it was envisaged the wind farm would comprise of up to 8 wind turbines, up to 220 m in blade tip height.

- 4.3.2. To progress the chosen Watten Wind Farm site, the design process aimed to have a layout that maximised the output of renewable energy whilst limiting the potential for environmental impacts during construction and operation. Factors influencing the suitability of the layout include:
- Has a good wind resource;
  - Suitable wind speeds and quality of wind flow to optimise generation outputs;
  - Suitable separation distance from dwellings so that unacceptable impacts related to potential noise, shadow flicker and residential visual amenity can be avoided;
  - Willing landowner(s);
  - Not located in any national or local landscape designations;
  - Not within a cultural heritage designation including Conservation Area, Historic Garden & Designated Landscape or within proximity to a Scheduled Ancient Monument;
  - Not within ecological designations of international or national importance;
  - Suitable public road network for the transportation of all wind farm components including Abnormal Indivisible Loads (AIL) deliveries of elements such as blades;
  - Reasonably close proximity to a viable grid connection;
  - Potential to use existing infrastructure, as far as practical;
  - Topography of the Proposed Development Area is compatible with the construction and operation of a commercial scale wind farm;
  - Reflective of Scottish Government aspirations for demonstrably better energy yields; and
  - Will significantly contribute to the UK and Scottish Government's renewable energy targets.
- 4.3.3. Figure 4.1: Constraints to Design highlights constraints within the surrounding area that fed into the design process.

## 4.4. Design Constraints

- 4.4.1. The following section provides an overview of the various factors which are relevant to the design of the Proposed Development.

### Policy Context

- 4.4.2. A high level review of legislation, national and local planning policy has been provided in Chapter 2: Legal and Policy Context and an assessment of such material is provided in the accompanying Planning and Renewable Energy Statement, as well as in the individual EIAR chapters. The iterative design process factored in such policy context.

<sup>1</sup> Environmental Statement (ES) hereby referred to as Environmental Impact Assessment Report (EIAR) according to Scottish policy.



## Wind Resource

- 4.4.3. Initial long-term wind resource estimates were derived from multiple sources including measurements collected near the Proposed Development Area.
- 4.4.4. Detailed assessments have been undertaken using WASP modelling software by EDF Energy Renewables Limited (EDF ER) in order to better understand the local wind regime. Natural Power Analytics and Advisory team supported with some of the wind resource assessment. This has led to an improved understanding of the specific complex flow regime that results from the terrain and forestry surrounding the Proposed Development. The turbulence intensity, wind shear, inflow angle and veer across the Proposed Development Area were assessed in order to inform the design process (along with all relevant physical, environmental and technical constraints). The process was undertaken iteratively in order to arrive at the appropriate number, size and location of turbines for the Proposed Development to minimise project risks (turbine performance / operational issues) and maximise project efficiency and energy yield output. A full anemometry monitoring campaign may be appropriate, using industry best practice monitoring techniques (combination of anemometer mast and LiDAR remote sensing) in order to capture detailed wind profiles and further refine the wind resource on site.
- 4.4.5. Wind energy assessments indicate that the Proposed Development Area has excellent wind resource allowing for more efficient energy generation with less infrastructure.

## Grid Connection

- 4.4.6. Capacity in the network was acquired and a grid connection agreed with the network operator for the Proposed Development which led to the Applicant being in a position to progress with scoping of the Proposed Development in 2022.
- 4.4.7. The grid connection offer is, currently, connecting the project at Mybster substation, approximately 3 km from the Proposed Development. The connection date is 2027. Due to the changing nature of grid connections during planning, the method and exact route would be subject to a separate assessment. It is anticipated that the connection would be subject to a separate application for consent under Section 37 of the Electricity Act 1989.

## Access

- 4.4.8. An access study was carried out in June 2020 to determine the feasibility of the proposed public access route from Wick Harbour to the entrance of the Proposed Development Area for wind turbine AIL, using a candidate turbine with a c.57 m blade length as a candidate model at that time. The study assessed the delivery of wind turbine components and carried out a detailed swept path assessment. The access study was used within the initial feasibility study of the Proposed Development and as a result deemed that there was viable access from the A99, onto the A9 and then along on the B870 before reaching the entrance of the Proposed Development on the B870. As an alternative, the loads would exit Wick Harbour onto the A882 and then onto the entrance of the Proposed Development on the B870.
- 4.4.9. Since 2020 the candidate model of turbine has changed and therefore an updated AIL Route Survey report was produced in November 2022 by Pell Frischmann based on 81.1 m blades. This document confirms that the proposed wind turbines can be delivered to the Proposed Development.
- 4.4.10. In the November 2022 AIL Route Survey report an accessibility of ports review was completed. The nearest ports to site are Scrabster and Wick Harbours. Wick Harbour has been discounted due to the limit of vessel length being 90 m. Scrabster harbour is limited by the requirement for loads to transit through the constrained town of Thurso route to site.

- 4.4.11. In light of these considerations, the assessment is being based on two separate access routes; one for tower loads only and one for blade loads only. Blade loads arriving into Scrabster and then using a blade lifting trailer to negotiate Thurso, whilst tower loads would dock at the port of Nigg and be transported north to entrance of the Proposed Development.

### Port of Nigg Route - Tower Loads Only

- Loads would arrive at the Port of Nigg and turn left to join the B9175 northbound;
- Loads would take the third exit at the roundabout north of Tarlogie and join the A9 northbound; and
- Loads would continue on the A9 northbound to the Proposed Development access south of Mybster.

### Scrabster Harbour Route – Blade Loads Only

- Loads would exit the harbour and join the A9 southbound; and
- South of Mybster, loads would turn left into the Proposed Development access.

- 4.4.12. The full Route Survey Report can be found in Technical Appendix A12.1.
- 4.4.13. Access to the Proposed Development Area for Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) will be through Halsary Windfarm and an agreement is being made with Scottish Power Renewables and Forestry Land Scotland. The preferred route options are as follows:
- A882 Wick to Georgemas;
  - A9 Latheron to Georgemas; and
  - B870 Watten to Mybster; and A9 South of Latheron.
- 4.4.14. The condition of the public road along the access route would be surveyed and recorded prior to it being used for wind farm construction. Where required, repair and maintenance work will be carried out on utilised roads during and following the construction period to rectify any identifiable damage which is directly attributable to the Proposed Development.
- 4.4.15. Please see Chapter 12: Traffic and Transport for further information.

## Land Use

- 4.4.16. The Proposed Development Area lies within a generally flat, gently undulating and generally smooth landform. This is currently a sparsely settled landscape and settlement today takes the form of dispersed crofts, farms and estate buildings.
- 4.4.17. The primary land use within the Proposed Development Area is sheep and cattle grazing. The Proposed Development Area is intersected by a number of minor watercourses. There is commercial forestry in the centre and west of the Proposed Development.
- 4.4.18. Landowners have also been consulted during the EIA in particular with relation to establishing appropriate areas for habitat management.

## Proximity of Dwellings

- 4.4.19. The nearest dwelling to the proposed turbines is Shielton, an uninhabited financially involved property owned by the landowners of the Proposed Development area. The property of Acharole is a financially involved property. There are 34 dwellings within 3 km of the proposed turbines, and these have been considered in the Residential Visual Amenity Assessment (RVAA) in Chapter 6: Landscape and Visual. A Shadow Flicker assessment has been

undertaken and is reported on in Chapter 16: Other Matters. A noise assessment has been undertaken and is reported on in Chapter 14: Noise.

## Landscape and Visual

- 4.4.20. The effects on landscape and visual amenity were considered during the EIA process which has included the design development for the Proposed Development, as these were known to be key to the progression of the Proposed Development.
- 4.4.21. A Chartered Landscape Architect, experienced in undertaking siting, design and assessment of onshore wind energy developments in accordance with best practice guidance, has worked closely with the project team from the outset, reviewing the siting and design of the wind turbines and associated infrastructure in order to maximise, as far as practical, the potential effects on landscape and visual amenity.
- 4.4.22. Initially, an eight-turbine layout using turbine tip heights of 220 m was developed across the Proposed Development Area (Design 1, Figure 4.2). Zone of Theoretical Visibility (ZTV) mapping was analysed to gain an appreciation of the theoretical visibility of these turbines within the 45 km study area.
- 4.4.23. The first step of the Landscape and Visual Impact Assessment (LVIA) was to establish the extent of the study area. In accordance with NatureScot guidance (2017), for turbines in excess of 150 m in tip height, a 45 km study area is recommended. This was offset from the outermost turbines of the Proposed Development.
- 4.4.24. A ZTV map has been produced to illustrate the potential extent of visibility of the Proposed Development based on the layout at both hub and tip height (Figures 6.3 and 6.4). The ZTV has been produced with an extent of 45 km based on NatureScot guidance for ZTV production in relation to turbines greater than 150 m in height. ZTVs were used throughout the design evolution of the Proposed Development. See Chapter 6: LVIA for further information.
- 4.4.25. Consideration has also been given to other wind farms that are operational, consented or currently the subject of applications for consent in the context of the potential for cumulative effects.
- 4.4.26. For the cumulative assessment, an initial study area of 60 km was identified in accordance with the relevant guidance (SNH, 2012). Following a review, this was refined to 45 km from the outermost turbines and data collected for sites currently in operation/under construction, consented and submitted applications which would likely be experienced in conjunction with the Proposed Development.

## Ecology and Ornithology

- 4.4.27. Pre-planning ecology assessments were conducted to assess the Proposed Development connectivity with local statutory designated sites and to uncover existing records of raptor activity within the Proposed Development Area. A desk study of the Proposed Development Area was conducted, the results of which state that there are no designated ecological or ornithological constraints, such as Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPA) or Ramsar sites, within the Proposed Development boundary. As a result of the pre-planning ecology assessment, the layout was considered unlikely to impact on designations and have a significant impact on any target species, and as such the Proposed Development was considered potentially suitable for wind energy development, subject to further detailed assessment.
- 4.4.28. Potential effects upon ecology and ornithology are fully assessed in the EIA and the findings are presented in Chapter 7: Ecology and Chapter 8: Ornithology.

## Hydrology, Geology and Hydrogeology

- 4.4.29. Hydrologically, the Proposed Development is located within the wider surface water catchment of the Wick River and within the sub-catchment of the Upper Wick River (source to Loch Watten Burn). The Burn of Acharole flows south-west to north-east across the southern boundary of the Proposed Development Area. The Burn of Acharole is a tributary of Scouthal Burn which drains into Wick River to the north-east. There are multiple smaller tributaries of the Burn of Acharole draining predominantly south towards the main channel of the watercourse.
- 4.4.30. The Loch of Toftingall is located approximately 400 m to the west of the Proposed Development at its closest point. The loch drains to the south into the Proposed Development Area to join the Burn of Acharole.
- 4.4.31. The Proposed Development is not located within an area designated as a Drinking Water Protected Area. Drinking Water Protected Areas are bodies of water and their catchments which are used for the abstraction of water intended for human consumption as public water supplies.
- 4.4.32. As part of the hydrology assessment all watercourses shown on a 1:50,000 scale Ordnance Survey (OS) map were marked as a constraint from the outset and a 50 m buffer was applied to them to protect watercourses from disturbance and potential effects on water quality during construction and operation. These buffers were adhered to as much as possible however minor encroachment of the buffers has occurred in some places.
- 4.4.33. Desk-based surveys indicated potential for carbon rich soils and deep peat which were corroborated through on-site hydrological and geotechnical surveys. The results of these surveys were used to avoid sensitive areas (where practical) through the design evolution. Ground Water Dependent Terrestrial Ecosystems (GWDTE) were also identified using existing Phase 1 NVC surveys conducted in 2015 and avoided where possible. A detailed assessment of hydrological elements is provided in Chapter 8: Hydrology, Geology & Hydrogeology, with details on GWDTE presented in Chapter 6: Ecology.
- 4.4.34. The Applicant has sought to minimise the potential impacts on peat through an iterative design process, optimising the distribution and orientation of the proposed infrastructure following the completion of each phase of surveying.
- 4.4.35. Where the results of detailed design indicate that micro-siting within the allocated micro-siting distance could achieve a reduction in the requirement for peat excavation, this would be investigated by the Principal Contractor and where possible, implemented following approval with the Environmental Clerk of Works (ECoW), the Highland Council (THC) and the Scottish Environment Protection Agency (SEPA).

## Cultural Heritage

- 4.4.36. The presence of cultural heritage receptors was investigated within and out with the Proposed Development boundary. There are no designated heritage assets within the Proposed Development Area. There are three known non-designated heritage assets recorded within the Proposed Development Area on the Highland Council Historic Environment Record. These are all later historic period assets relating to agricultural exploitation. In addition, 19th century OS mapping of the Proposed Development Area identifies 10 possible further later historic period agricultural remains.
- 4.4.37. A baseline survey was undertaken which identified cultural heritage assets in the Proposed Development Area. These were accounted for during the design evolution and direct effects thus avoided. A full cultural heritage assessment is provided in Chapter 10: Cultural Heritage.

## Aviation and Existing Infrastructure

- 4.4.38. The potential for the Proposed Development to interfere with military and civil aviation assets has been considered. Preliminary analysis was completed for the Proposed Development which indicated:

- The Proposed Development is located within a low priority military low flying area;
- The Proposed Development is located within 14.4 km of Wick VOR/DME Beacon;
- The Proposed Development is located within 14.8km of the Wick Aerodrome; and
- Three radar installations were identified (Lossiemouth Primary Surveillance Radar, Allanshill Primary Surveillance Radar and Buchan Air Surveillance and Control System).

These have all been assessed further within the EIA and full details are provided in Chapter 13: Aviation and Existing Infrastructure.

- 4.4.39. The presence of existing infrastructure such as service pipes and cables, TV transmission and electromagnetic paths were considered. Geographic Information Systems (GIS) data used within the initial feasibility study indicated there was existing infrastructure within the Proposed Development Area which have been avoided during the design process. Full details are provided in Chapter 13: Aviation and Existing Infrastructure.

## 4.5. The Consultation Process

- 4.5.1. The consultation process commenced prior to Scoping in May 2022. In accordance with the Scoping Guidelines provided by the Scottish Government's Energy Consents Unit (ECU), the Applicant undertook initial pre-Scoping meetings with THC on 17<sup>th</sup> May 2022 and the ECU on 5<sup>th</sup> May 2022 via MS Teams to provide a general introduction to the Proposed Development. The Scoping Report was submitted on 26<sup>th</sup> May 2022, after which statutory consultation responses were received. Non-statutory consultees were also engaged during the scoping process; a full list of which can be found within the Gate Check Report. Community consultations also began during the scoping period with the offer of meetings; email and telephone communications; and two rounds of public exhibitions.
- 4.5.2. The consultation process was carried out to:
- Identify any further key considerations and highlight concerns from statutory consultees;
  - Clarify the key points raised during the initial feasibility assessment;
  - Promote communication with both statutory and non-statutory consultees and other stakeholders concerning key issues; and
  - To confirm and agree the proposed methods for survey, evaluation and assessment.
- 4.5.3. Natural Power and the Applicant considers consultation with the community to be a crucial part of the development process and will engage with the local community throughout the application process. As this is a Section 36 application there is no formal requirement to follow the procedures for major developments under the Planning etc. (Scotland) Act 2006, however this application will follow the processes and standards set by the legislation and best practice guidelines (PAN 3/2010 - Community Engagement)<sup>2</sup>.
- 4.5.4. There were two rounds of public exhibitions in 2022, scheduled to contribute to the design evolution process, the first round was held in June 2022 over two days (20<sup>th</sup> and 21<sup>st</sup>) at 2pm – 7pm. across two venues: Spittal and Watten Village Halls. The second round was in November 2022 and held over two days (8<sup>th</sup> and 9<sup>th</sup>) across two venues at the same locations as the summer exhibitions. These exhibitions showcased the Proposed Development and provided a chance for the public to learn more about the proposal and provide feedback.
- 4.5.5. All information presented at the November 2022 public exhibition was also made available online in a virtual exhibition which went live on 10<sup>th</sup> November and was available until 25<sup>th</sup> November which gave those members of

the public who were not able to attend the in person exhibitions further opportunity to learn about and provide feedback on the Proposed Development.

- 4.5.6. A Pre-Application Consultation (PAC) Report will be submitted with the application which provides full details on the consultation process and the DAS will detail how responses informed the design of the Proposed Development.

## 4.6. Design Evolution

- 4.6.1. This section describes the design alternatives for the Proposed Development and discusses how the site design and layout continued to evolve throughout the EIA Process. The layout of the Proposed Development was designed under the guidance, requirements and considerations of the Applicant, specialist contributions from within Natural Power and from other expert contractors. The site design process was also guided by the findings of the baseline surveys, by the recommendations of the specialist consultants and by issues raised by statutory and non-statutory consultees in line with Scottish Planning Policy (2014) which was relevant during much of the EIA process. The policies which are contained in National Planning Framework 4 have been considered since its publication.
- 4.6.2. The aim of the siting and design process was to arrive at a design that would minimise environmental effects, limit significant landscape and visual effects, be technically feasible, and economically viable using the best available techniques and engineering principles. The design optimised the Proposed Development for the generation of low carbon and low-cost electricity to contribute to national targets to decarbonise energy sources. The design process included the selection in number and size of turbines, placement of turbines, tracks and other associated infrastructure whilst taking account of topographical, landscape and visual, cultural heritage, ecology, ornithology, hydrology and peat concerns.
- 4.6.3. The location of individual turbines was guided by the technical requirements for construction and operation including the potential manufacturer's warranty requirements, slope angles and the nature of the topography in which the turbine is to be located. Siting was also guided by the results of the baseline studies and scoping exercise, with particular attention given to the likely landscape and visual effects, residential amenity and the hydrology and peat resource at the Proposed Development.
- 4.6.4. Computer modelling of wind resource and constraints was used as a tool to aid the development of the designed layout. Additionally, wirelines were generated for views from sensitive locations around the Proposed Development and used to 'test' the design in key views from the surrounding area.
- 4.6.5. A number of different site layouts were devised and, following extensive investigation and consultation, an optimum layout was chosen through numerous design iterations. The site layout evolution has been illustrated in Figure 4.2 which shows the evolution from the Scoping layout (Design 1) through to the Design Freeze (Design 3) as shown in Figure 1.2.
- 4.6.6. The remainder of this chapter highlights the site design considerations and the key stages in the site design evolution, illustrating the iterative process that has resulted in the Proposed Development. Through each of the design iterations considered, key technical and environmental constraints and design criteria have been applied.

## Influence of the Policy Context

- 4.6.7. The full range of predicted impacts have been considered throughout this EIAR. A review of legislation and planning policy has been provided in Chapter 2: Legal and Policy Context and an assessment of such material is provided in the accompanying Planning and Renewable Energy Statement, as well as in individual EIAR chapters.

<sup>2</sup> Scottish Government (2010), *Planning Advice Note (PAN) 3/2010 on community engagement* [Online] Available at: [Planning Advice Note 3/2010: community engagement - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/planning-advice-note-3-2010-pan-3-2010-on-community-engagement/pages/1-introduction-and-objectives.aspx). [Accessed 14/07/2023]

A review was undertaken of design guidance documents and other standard texts on wind farm development such as the NatureScot (then Scottish National Heritage (SNH)) guidance on '*Siting and Designing Windfarms in the Landscape*' (Version 3a August 2017). These are considered further in Chapter 6: Landscape and Visual.

- 4.6.8. The iterative design process was concluded, and the final seven-turbine design fixed, when it was considered that an acceptable balance had been struck between the requirements of the Proposed Development in the context of the policies and the various other environmental constraints and influences identified in this chapter.

### Design Strategy Principles

- 4.6.9. The design strategy for the key elements of the Proposed Development has considered the following objectives:
- To maximise site efficiency and low carbon electricity production;
  - To provide a turbine layout with simple form, which reflects the scale of and relates to the landscape character of the Proposed Development and its surroundings;
  - To avoid areas of constraint where practical;
  - To avoid an overly complex and visually confusing layout;
  - To achieve a balanced composition of the turbines against the landscape and skyline from key viewpoint locations;
  - To give due consideration to turbine proportions; and
  - To reflect the pattern of nearby existing and proposed wind farms as far as practical.
- 4.6.10. In addition, noting the current economic climate which is influencing greater efficiency in electrical generation within a very competitive energy market and turbine availability from manufacturers, turbines of up to 220 m tip height are considered within the design of the Proposed Development. Wind farm design with turbines up to 220 m tip height is considered reflective of Scottish Government aspirations for demonstrably better energy yields from sites optimised with higher tip heights. This scale of turbine with larger rotor diameters are capable of significantly increasing the total energy output and represent a realistic candidate turbine to allow this development being realised if planning can be secured. In addition, the land take of the Proposed Development is reduced as fewer turbines are required to generate a greater total energy output than turbines with lower tip heights. This also reduces the environmental impacts and the carbon footprint of the Proposed Development.

### Constraints to Development

- 4.6.11. The main environmental considerations on site which have influenced the final design of the Proposed Development are:
- Hydrology and peat;
  - Ornithology; and
  - Landscape and visual.

### Public Consultation

- 4.6.12. The principles of effective public engagement have been followed as described in PAN 3/2010: Community Engagement:
- Access to information;
  - The opportunity to contribute ideas;

- The opportunity to take an active part in developing proposals and options;
- The opportunity to be consulted and make representations on formal proposals and policies; and
- The opportunity to receive feedback and be informed about progress and outcomes.

- 4.6.13. The Applicant has liaised with the local community. The Applicant has liaised with the local community, ensuring that communities were given additional information if required and ensuring that all queries from community councils, community groups and members of the community were answered and followed up if required.

- 4.6.14. Details of exhibitions and other stakeholder engagements can be found in the accompanying PAC Report submitted with the application for the Proposed Development.

### Iterative Design Process

- 4.6.15. The iterative design approach aimed, as far as practically possible, to avoid and then mitigate significant effects through the careful siting and design of the Proposed Development, which was repeatedly assessed and amended, balancing different environmental issues and consultee concerns expressed during early consultation. This embedded mitigation design process has also considered advice contained within SNH's (now NatureScot) current guidance '*Siting and Designing Wind Farms in the Landscape*' (Version 3a August 2017).

### Design 1: Scoping Layout (May 2022)

- 4.6.16. As detailed in Section 4.3 the design process began with a layout consisting of up to eight turbines, tip heights of up to 220 m (Design 1, Figure 4.2). A full infrastructure layout was presented to The Highland Council and other statutory consultees including NatureScot at a Pre-Application workshop in May 2022, before Scoping was submitted.

### Scoping Responses (June 2022)

- 4.6.17. The eight turbine layout was presented to the ECU, THC and consultees in the scoping report in May 2022. A copy of this can be found in Technical Appendix A1.1, Volume 3. The full Scoping Opinion was issued by the ECU on 2<sup>nd</sup> September 2022 and is provided in Technical Appendix A1.2 of this EIA and contains a copy of all the consultee scoping responses. This consultation helped identify and clarify key issues, promoted dialogue with both consultees and stakeholders, and confirmed methods for survey, evaluation and assessment going forward. The consultee responses were reviewed in partnership with the specialist sub-consultants in order to make sure all relevant issues identified were assessed as part of the Proposed Development survey work and were addressed in the relevant EIA chapters.

- 4.6.18. In addition to the formal scoping and consultation, further discussions took place with THC, Historic Environment Scotland (HES), SEPA, NatureScot, National Air Traffic Services (NATS), Highlands and Islands Airports (HIAL), Joint Radio Company (JRC), and Defence Infrastructure Organisation Ministry of Defence (MoD) to agree the specifics of survey methodologies, potential mitigation should the Proposed Development gain consent and to update these consultees on progress.

### Public Consultation (June 2022)

- 4.6.19. Detailed analysis of written feedback from the 1<sup>st</sup> round of public consultations can be found in the PAC Report. Key concerns raised in design terms, in summary, related to the size, visual impact, proximity and relationship of turbines to dwellings and communities, but also possible impacts to ecology, ornithology and hydrology specifically peat. Turbine noise and flickering was also referred to by some of those attending the events.

### Design Review Day #1 (July 2022)

- 4.6.20. The first formal design review day was held virtually (due to COVID-19) via Microsoft Teams in July 2022 between the Applicant and specialist consultants from relevant departments of expertise including; ecology and ornithology, hydrology, civils, landscape and visual, wind analysis, noise, forestry, cultural heritage, traffic and transport, and aviation. The aim of the design review day was to review the layout following receipt of the scoping opinion, consultee responses and collection of more desk study and site survey data.
- 4.6.21. Ahead of the design review day consultants reviewed the proposed layout from scoping (Design 1) which included assessing the proposed turbine locations together with preliminary infrastructure locations.

### Design 2: Post Scoping Consultation and Surveys (July 2022)

- 4.6.22. Based on the comments received from scoping, design review day #1, public consultation and further survey work the Applicant amended the layout to produce Design 2. Changes that were made are summarised below:
- Turbine 1 was deleted due to a combination of factors:
    - LVIA – residential amenity concerns, potential overbearing effects on the property located to the north-west;
    - Ornithology – potential nearby hen harrier roost record in 2013/14 however possibility of hen harriers returning;
    - Noise – properties to the north of turbine 1 could exceed noise limits by approximately 10 decibels (dB). The level of curtailment required to meet the limits would make the turbine unviable; and
    - Hydrology – area south known as Black Pools which SEPA requested a 50 m buffer from any development and this area is known to be boggy.
  - Turbine 2, moved north east to be outside of the turbine over sail buffer.
  - Turbine 3, moved north west outside of ornithology buffers for merlin and hen harrier.
  - Turbine 4, moved west outside of turbine over sail buffer, water course buffer and to avoid hardstand infrastructure impacting cultural heritage historic quarry.
  - Turbine 5, moved south to avoid watercourse buffer.
  - Turbine 6, moved south east to avoid Class 1 peatland and create distance from neighbouring forest boundary to reduce potential impacts on bats.
  - Turbine 7, moved south to avoid very deep peat still located within an area of deep peat (Class 1 peatland); mitigation will be required, including piled foundations and hardstand considerations to minimise peat displacement and removal and to create distance from neighbouring forest boundary to reduce potential impacts on bats.
  - Turbine 8 moved north east to be outside of the turbine over sail buffer.
- 4.6.23. As one turbine was deleted the remaining turbines were renumbered. The revised turbine numbering and locations are set out in Table 4.1 below:

Table 4.1: Design 2 layout changes

Original number	Original Easting	Original Northing	Number	Design 2 Easting	Design 2 Northing
1	320987	952728	Deleted	N/A	N/A
2	321126	952090	1	321129	952309
3	321537	951859	2	321465	951935
4	320921	951062	3	320867	950938
5	320470	951529	4	320502	951367
6	320410	952101	5	320436	951917
7	319849	951479	6	319849	951396
8	319953	950803	7	319985	950821

Source: Natural Power

### Design Review Day #2 (September 2022)

- 4.6.24. Following the first design review day there were some outstanding issues concerning peat. Therefore, in September 2022 a second design review day was held via Microsoft Teams between the Applicant and relevant departments of expertise including; ecology and ornithology, hydrology, civils, landscape and visual, wind analysis, noise, forestry, cultural heritage, traffic and transport, and aviation. The design review day again revisited all seven turbine locations and adjustments were made where necessary. The aim of the design review day was to review the layout following receipt of further correspondence with consultees and collection of more site survey data.
- 4.6.25. Ahead of the design review day consultants reviewed the proposed layout from Design Review Day #1 which included assessing the proposed turbine locations together with preliminary infrastructure locations.

### Design 3: Design Chill (September 2022)

- 4.6.26. Based on further correspondence with consultees and further survey work the Applicant amended the layout to produce Design 3. Changes that were made are summarised below:
- Turbine 1, moved south west to be further away from 50 m hydrology buffer around Black Pools.
  - Turbine 2, moved south west to accommodate move of T1 away from Black Pools buffer.
  - Turbine 3, no change.
  - Turbine 4, moved south to accommodate movement of T5 out of deep peat.
  - Turbine 5, moved south west to avoid deep peat.
  - Turbine 6, moved south west to avoid class 1 peatland and deep peat areas.
  - Turbine 7, moved back south west as over sail buffer no longer a concern as land to the south owned by landowner.

### Pre-Application Design Meeting (September 2022)

- 4.6.27. A Pre Application Design meeting was held with THC on 12 September 2022. Feedback was received on 12 October 2022. At this meeting the key design view points were considered. The constraints which have influenced the design were also discussed and included deep peat, ornithology, noise and cultural heritage. As a result of the

discussions a number of recommendations were made by THC and were considered as part of the design review process and are addressed as follows:

- Identify if the development can sit within a specific cluster (Halsary / Bad a Cheo etc., or, Bilbster / Camsters etc.). Reassess outlier turbines – more of an issue in longer distant views and strive to achieve a consistent rhythm of turbines as gaps between turbines may be an issue from longer distant views.
  - The design intention is to utilise the OSWESG guidance and respect the existing pattern and separation between windfarm developments in this site design.
- Look at different sizes of turbines to reduce jarring visual effects of noticeable different turbine scales – this could reduce the effects of topography where turbines are sited on different AODs.
  - Many potential solutions have been considered in the layout design to minimise visual effects whilst also having consideration for other constraints and economic viability.
- Consider the criteria identified in the Onshore Wind Energy Supplementary Guidance (2017) (OWESG) to refine the design of the development.
  - OWESG has been referred to in this chapter, site design.

**Public Consultation (November 2022)**

4.6.28. Detailed analysis of written feedback from the round two public consultations can be found in the PAC Report. Whilst generalised concerns, particularly around visibility, continued to be raised, with the reduction in local visual impacts from Design 1 as one turbine was deleted there were few tangible or actionable comments on specific turbine locations or views.

**Design 3: Design Freeze (November 2022)**

- 4.6.29. Following the pre-application design meeting with THC and further community engagement, no changes to turbine or built infrastructure locations were considered necessary so the layout remained unchanged from the design chill in September 2022.
- 4.6.30. The most common concerns raised by the public through consultations included the size of turbines as well as visual impact on surrounding settlements. By deleting one turbine the visual impact from a number of locations has been improved therefore the Applicant recognises concerns raised at public consultation were considered as part of the design evolution.
- 4.6.31. This concluded the design process, and the Proposed Development was frozen at seven turbines. Figure 1.2 contains a detailed site turbine layout with associated infrastructure for the Proposed Development after design freeze. This current layout is considered a well-balanced design from key viewpoints and receptors, whilst also giving due consideration to other key environmental constraints and sensitives, as well as construction limitations and is the layout which is applied for and this EIAR describes.
- 4.6.32. Table 4.2 details the turbine locations and maximum tip heights in the design freeze layout.

**Table 4.2: Design Freeze Layout**

Number	Easting	Northing	Max Tip Height (m)
1	321106	952238	220
2	321504	951907	220
3	320867	950938	220
4	320510	951280	220
5	320401	951839	220
6	319828	951255	220
7	319938	950772	220

Source: Natural Power

4.6.33. The final maximum tip height is proposed at up to 220 m for all turbines. At this early stage of a project the final turbine selection isn't known and therefore a possible range of turbines that could fit the maximum turbine height criteria is selected. Further information on turbine dimensions is discussed in Chapter 5: Project Description and included in Figure 5.2 (representing largest rotor and largest hub within the tip height criteria). It is expected that detail of final turbine dimensions and appearance will be a requirement of a condition to be agreed with THC prior to commencement of construction.

**4.7. Environmental Benefits**

- 4.7.1. The essential benefits of using wind energy for the generation of electricity are that it is renewable, safe and does not release any gaseous emissions into the atmosphere during operation. It also provides diversity and security of supply which remain part of the Government's energy policy.
- 4.7.2. The total power output of the Proposed Development would be around 67.6 MW which includes 47.6 MW generated by the wind turbines and 20 MW of battery storage. A 67.6 MW development requires consent under Section 36 of the Electricity Act (1989) in accordance with The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. The Proposed Development would generate enough electricity to meet the average annual domestic needs of over 28,926<sup>3</sup> average UK households (based on average electricity consumption per household in the UK, quoted by the Department of Business, Energy and Industrial Strategy, of 3,748 kWh per year, 2021<sup>4</sup>).
- 4.7.3. When generating electricity, the wind turbines would offset the generation of a similar amount of electricity that would otherwise be generated by conventional power stations. While the displacement or offset figure would change as the generation mix changes, the Proposed Development would, based on the current UK generation mix, offset the production of over 46,834,848 kg of carbon dioxide-equivalent per year<sup>5</sup> and so the Proposed Development would contribute towards international and national targets for the generation of renewable energy and reductions in greenhouse gas emissions.

<sup>3</sup> Installed capacity (wind turbines only, BESS not included = 47,6 MW) x number of hours in a year x BEIS's long term average load factor for (onshore + offshore) wind. Divide the total by average electricity consumption per household in the UK.

47.6 MW x 8760 (hours per year) = 416,976 MWh/p.a.

416,976 x 0.26 = 108,414 MWh.

108,414,000 kWh/3,748 kWh = 28,926 households

<sup>4</sup> Wind Energy Statistics Explained, RenewableUK, Available at: <https://www.renewableuk.com/page/UKWEExplained/Statistics-Explained.htm> [Accessed 14/07/2023]

<sup>5</sup> BEIS 'Digest of United Kingdom Energy Statistics', July 2022. Table 5.14 "Estimated carbon dioxide emissions from electricity supplied". BEIS's "all non-renewable fuels" emissions equate to 432 tonnes of carbon dioxide per GWh. This is an estimate of the current UK generating plant mix but may change over the lifetime of any project at Watten.

108,414,000 kWh x 432g-CO<sub>2</sub>/kWh = 46,834,848 kg /year. Figures all rounded to nearest 100.

Based on the findings of a Carbon Balance Assessment, see Technical Appendix A9.6, the construction, operation and decommissioning of the Proposed Development is expected to result in the net emissions of 64,141 tonnes of carbon dioxide equivalent. The carbon payback time for the wind farm is then calculated by comparing the net loss of CO<sub>2</sub> from the Proposed Development due to wind farm development with the carbon savings achieved by the wind farm while displacing electricity generated from coal-fired generation, grid-mix generation or fossil-fuel mix electricity generation. On the basis of the methodology used in that assessment, this could result in a carbon-payback time for the Proposed Development of 1.4 years (for the expected scenario based on replacement of fossil fuel-mix electricity generation). (For this assessment a conservative approach has been adopted using the UK 5 year average capacity factor between 2017-2021 of 26%. In reality, the Proposed Development is likely to have a notably higher capacity factor, anticipated to be above 35%, due to the greater tip heights proposed when compared to the operational wind farms in the UK during the 2017-2021 period.)

- 4.7.4. The carbon dioxide offset would make an important contribution towards the government target to reduce carbon dioxide emissions by 100% by 2050. The Proposed Development would also offset emissions of the other greenhouse gases from conventional power stations; in particular coal fired generating plant. These gases including sulphur dioxide and oxides of nitrogen cause environmental problems such as acid rain.
- 4.7.5. Onshore wind farms, particularly those close to areas of electricity demand, provide an important contribution towards making Scotland and the UK more energy self-sufficient. If constructed, the Proposed Development would help improve this self-sufficiency and narrow the energy supply gap.

## 4.8. Conclusion

- 4.8.1. In line with good practice advice from the Scottish Government and procedures normally required for Section 36 of the Electricity Act (1989) applications, the Proposed Development has been subject to a detailed and iterative design process. Alternative layouts and access routes have been considered. The final design has sought to balance the technical requirements of the Applicant with the environmental considerations highlighted by consultees and the public during early consultation. The residual impacts of the design process are considered in the technical EIAR chapters.

# Chapter 5

## Project Description

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## Glossary

Term	Definition
Environmental Clerk of Works	The Environmental Clerk of Works will monitor compliance with the ecological, ornithological commitments of the Proposed Development
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The Proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located. (application area)

## List of Abbreviations

Abbreviation	Description
AIL	Abnormal Indivisible Load
BESS	Battery Energy Storage System
BS	British Standards
CAA	Civil Aviation Authority
CDM	Construction Design Management
CEMP	Construction Environmental Management Plan
CMS	Construction Method Statement
COSHH	Control of Substances Hazardous to Health
EnvCoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FCS	Forestry Commission Scotland
FLS	Forestry and Land Scotland
HGV	Heavy Goods Vehicle
HIAL	Highlands and Islands Airport
HSE	Health and Safety Executive
IEC	International Electrotechnical Commission
kV	Kilovolt
LGV	Light Goods Vehicle
MoD	Ministry of Defence
MW	Megawatt
O&M	Operations and Maintenance
OEM	Original Equipment Manufacturer
OS	Ordnance Survey
PA	Planning Authority
PC	Principal Contractor
PD	Principal Designer
PPG5	Pollution Prevention Guidelines 5
PPG6	Pollution Prevention Guidelines 6
RAMS	Risk Assessments and Method Statements
SCADA	System Control and Data Acquisitions
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage
SuDS	Sustainable Drainage System
THC	The Highland Council

## 5.1. Introduction

- 5.1.1. This chapter describes the components of the Proposed Development for which consent is being sought and which have been assessed through the Environmental Impact Assessment (EIA) process, as summarised in Chapter 1: Introduction. It includes specifications of turbines, access tracks and electrical infrastructure. It also describes the general construction methodology, timescales and typical construction equipment likely to be used. Operational and decommissioning phases are also described within this chapter.
- 5.1.2. A number of figures have also been prepared to support the chapter, which provide an overview of the key components of the Proposed Development which can be found in Volume 2: Supporting Figures and Visualisations, 5.1-5.13.
- 5.1.3. The construction methods detailed below build on best practice methodologies developed at other wind farms to comply with Health and Safety requirements for construction and operations in addition to relevant environmental guidance including:
- Scottish Environment Protection Agency's (SEPA) Pollution Prevention Guidelines;
  - Scottish Natural Heritage's (SNH) (now known as NatureScot however SNH branding still appears on some guidance documents) Good Practice During Wind Farm Construction; and
  - SNH/Forestry Commission Scotland's (FCS) (now known as Forestry and Land Scotland (FLS) however FCS branding still appears on some guidance documents) Floating Roads on Peat Guidance.
- 5.1.4. Further construction details and mitigation are provided below in Section 5.4: Construction Phase. The Construction Method Statement (CMS) incorporating a Construction Environmental Management Plan (CEMP) are described setting out in detail the individual items of works associated with the construction of the Proposed Development. These, along with other forms of embedded mitigation, have been designed in as part of the Proposed Development to avoid and reduce the potential environmental impacts of the proposal as far as it is practical to do so. The effect of this on the EIA process is discussed throughout the remainder of this Environmental Impact Assessment Report (EIAR).

## 5.2. Development Location and Description

- 5.2.1. Figure 1.1 shows the location and extent of the Proposed Development. The Proposed Development is situated in the Scottish Highlands on land to the east of Halsary Wind Farm and approximately 3 km to the south-west of the settlement of Watten. The access route to site for Heavy Goods Vehicles (HGV) and Light Goods Vehicles (LGV) will be via the A9 past the Halsary Wind Farm. The route then progresses north along the A9 to the existing site access of Halsary Wind Farm, through Halsary Wind Farm to the Proposed Development Area, situated to the east of Halsary Wind Farm.
- 5.2.2. There are two access routes proposed for Abnormal Indivisible Loads (AIL). One route for tower loads only from the Port of Nigg which will travel northbound down the B9175 before taking the third exit at the roundabout north of Tarlogie and join the A9 northbound to the site access south of Mybster. The second AIL route proposed is for blade loads from the Port of Scrabster, where loads would exit the harbour and join the A9 southbound, then south of Mybster loads would turn left into the site access.
- 5.2.3. The Proposed Development Area is centred on Ordnance Survey (OS) grid reference 320769E, 951676N and covers an area of approximately 509 ha. Habitat management will be undertaken in the Proposed Development Area.
- 5.2.4. The application is for a wind farm comprising of up to 7 wind turbines with a blade tip of up to 220 m (based on a candidate turbine V162, 6.8 megawatt (MW)), giving approximately 47.6 MW and battery energy storage system

(BESS) compound with a maximum capacity of 20 MW. Therefore, the Proposed Development has a total generating capacity of 67.6 MW. The lifespan of the Proposed Development is proposed to be 35 years following which decommissioning of the turbines and other infrastructure would be undertaken as required.

- 5.2.5. The application also has associated infrastructure, including:

- Associated infrastructure specific to each turbine:
  - turbine foundations;
  - external transformer housing;
  - crane hardstandings and erection areas;
- Onsite substation, control building and compound;
- New and floating access tracks; including watercourse crossings;
- Underground electricity cables connecting infrastructure within the Proposed Development Area;
- Temporary construction and storage compounds and ancillary infrastructure, laydown areas and ancillary infrastructure including cable crossing points;
- Site signage;
- Temporary construction gatehouse;
- Biodiversity enhancement and management (see Chapter 7: Ecology and associated Technical Appendices for details);
- Waste water and surface water drainage;
- Forestry felling and replating.

## 5.3. Proposed Development Layout

- 5.3.1. Chapter 4: Site Selection and Design Evolution provides details of the design process that resulted in the final layout. After detailed design iterations it was considered that the Proposed Development provides a reasonable and proportionate balance between optimising efficient wind capture to ensure economic viability and a meaningful contribution towards renewable energy targets (in the context of "net zero") whilst for the most part safeguarding against potential adverse environmental effects.
- 5.3.2. The turbine layout and associated infrastructure is presented in Figure 1.2. This figure illustrates the relevant elements, including locations for the proposed 7 turbines, BESS, site tracks, crane pads, substation, construction compound area, and batching plant.
- 5.3.3. Micro-siting has been assessed to allow the exact turbine location and infrastructure to be modified post consent, following detailed ground investigation and ground clearance (within 50 m). Table 5.1 gives the centre point coordinates for each of the proposed turbines.

Table 5.1: Turbine co-ordinates

Turbine	Easting	Northing
1	321106	952238
2	321504	951907
3	320867	950938
4	320510	951280
5	320401	951839
6	319828	951255
7	319938	950772

Source: Natural Power, design freeze layout 06097L\_A, 2022

5.3.4. This layout, including the micro-siting allowance was developed taking into account the ecological, ornithological, geological, hydrological, archaeological, topographical, landscape, visual and noise constraints whilst ensuring optimal wind resource (see Chapter 4: Site Selection and Design Evolution for further details on site constraints which were taken into consideration).

5.3.5. For the purpose of assessment a maximum turbine height of 220 m to tip has been used. Where necessary for assessment purposes a maximum rotor blade diameter of up to 162 m has been used although the blade length may vary (within the maximum turbine tip height) depending on turbine availability at the time of construction.

## 5.4. Construction Phase

### Construction Timetable

5.4.1. The construction period for the whole of the Proposed Development would last for approximately 12 months, from commencement of construction through to installation and commissioning of the turbines. Site reinstatement (as shown on the construction programme) would be ongoing to ensure reinstatement of any removed peat or habitat occurs as soon as possible and to minimise the duration of construction related cut and fill impacts on setting and views. Construction would consist of the following phases which, although presented in a typical sequence, may overlap or occur concurrently:

- Public highway improvements;
- Forest felling and export;
- Construction of a site storage compound for off-loading materials and components, and to accommodate site offices and mess facilities. Depending on where the site storage compound is, normally some tracks would be required;
- Construction of site tracks and excavation of cable trenches;
- Construction of turbine foundations and crane pads;
- Delivery and erection of turbine towers, and installation of nacelles and blades;
- Laying of on-site cabling;
- Installation of turbine transformers;
- Works to the on-site substation and control building;
- BESS installation;
- Testing and commissioning of the turbines and the wind farm electrical system including BESS; and

- Site reinstatement (on-going during works).

5.4.2. A typical 12-month construction programme is presented in Table 5.2.

Table 5.2: Construction timeline for a typical windfarm with 7 turbines

Month > Task Name	1	2	3	4	5	6	7	8	9	10	11	12
Mobilisation & site setup	█											
Forest felling and export	█	█										
Access and site tracks		█	█	█	█	█	█	█				
Crane pads			█	█	█	█	█	█	█			
Foundations			█	█	█	█	█	█	█			
Substation construction and BESS installation							█	█	█	█	█	
Cabling/ electrical installation								█	█	█	█	
Turbine deliveries and erection				█	█	█	█	█	█			
Site reinstatement*											█	█

Month >	1	2	3	4	5	6	7	8	9	10	11	12
Commissioning of wind farm												
Demobilisation												

Source: Natural Power, 2022

\* Restoration work around track edges, turbine bases and other areas of infrastructure will be on-going to ensure reinstatement of any peat substrate occurs as soon as possible.

### Typical Equipment Used at Site

5.4.3. The following is an indicative list of equipment that would be required to construct the Proposed Development. The equipment would be in use on the site or stored on-site within the construction compound. Where appropriate, vehicles such as cranes, trucks, excavators and bulldozers may be secured and left on the track at appropriate working areas overnight.

- One 800/1000 tonne capacity crane and 400/500 (or less) tonne capacity cranes. The 400/500 tonne cranes would be used for general construction duties such as the preparation of the reinforcement cages at the turbine bases and as tailing cranes for steerage during the turbine erection. The larger crane would be used for the turbine erection to lift the heavy components into place.
- 30/40 tonne 360-degree excavators. These would be used for the transportation of general construction material to the relevant areas of site.
- Smaller excavators in the range of 10 to 20 tonnes. These would be used for road construction and profiling, and restoration of verges, turbine foundations and for excavation of cable trenches.
- Tracked bulldozers would be used for a number of tasks such as stockpiling material from turbine excavations, road construction, crane pad preparation and re-grading of the track running surface.
- Dumper trucks would be used for moving general material around the site, e.g. for moving excavated peat or soils from cut site tracks to any stretches of floating track over deeper peat.
- Heavy duty vibrating rollers will be used to compact new roads, turbine foundation formations and are essential in compacting the crane pads and turbine backfill to the appropriate densities.
- Mobile concrete pumps would be used on-site during the concrete works for the turbine foundations and the metering building. The pump would be lorry mounted and have a large boom to enable placement of the concrete within the turbine base excavations. The concrete wagons would reverse up to the rear of the pump and deliver the concrete into a hopper which would be connected to the pump. Using the pump allows a controlled and highly flexible method of pouring foundations.
- Cable laying vehicles will comprise typically of a lorry or tractor with a revolving drum attachment for laying of cables in trenches alongside site tracks and a tracked excavator with drum attachment for the offsite cabling on stretches where it is not routed alongside a new or existing track.
- Small trucks or four-wheel drive vehicles with trailers would be used for transporting of small loads around the site i.e. ducting pipes for cables in turbine foundations.

- Minibuses and four-wheel drive vehicles would be used for transporting construction workers and site managers around the site. These would be likely to leave the site on a regular basis transporting workers to and from their billets off-site.
- A number of other vehicles would bring loads to the site but would not themselves be stored at the site. These would include lorries with flatbed extendable trailers carrying all turbine components including transformers, lorries carrying cabling, steel rods for concrete reinforcement and concrete lorries with revolving drums.
- To prevent mud entering the public road system, if necessary, the wheels of all lorries leaving the site would be washed either using a manual spray or a wheel washing drive through unit.
- Cabins/Welfare Facilities - Due to the requirement under Health & Safety Legislation and the Construction Design Management (CDM) Regulations for welfare facilities on-site and the exposed nature of the site, a number of cabins would be needed in the construction compound(s). These would have offices, canteens, drying-rooms, toilets and washing facilities. The units would be self-contained, and no discharge of drainage would be made to the surrounding land unless otherwise agreed with SEPA and the local authority. Smaller, mobile self-contained units are likely to be required as work progresses throughout the site. These would be placed at suitable locations to tie in with the work interfaces as required. A typical layout of the construction compound area is presented in Figure 5.10.
- Fuel & Chemical Storage. Fuel would be required for the vehicles, generators and other equipment on-site. The storage facilities would typically comprise of a bunded concrete pit containing a lockable, bunded fuel tank and a separate lockable housing for the storage of construction chemicals. In addition, there would typically be a wheeled, double skinned bowser for transport of fuel to tracked vehicles. Drip trays would be used when refuelling vehicles on the site. Emergency spill kits would be kept on-site adjacent to the fuel storage area and with the mobile bowser. A Principal Contractor (PC) would have a 24-hour emergency response company on standby in the event of a spillage incident. Vehicles would be refuelled at their working location to prevent loss of time and use of fuel returning to any designated refuelling areas. All previous stated measures would be used when refuelling vehicles, taking into account all guidance and pollution prevention measures, and the bowser operator would be suitably trained to deal with any spillage.
- Construction Materials. A variety of materials would be utilised during the construction of the Proposed Development including, but not limited to; concrete, reinforcing steel, timber for joinery work and shuttering, stone and sand for road construction, general construction sundries and electricity cables. Wherever possible, the re-use of materials would be carried out, i.e. formwork to be re-used, excavated material from foundations to be reused in the preparation of crane pads and roads, topsoil for re-instatement and landscaping, etc. An indication of the materials used and the amount of resources (plant and labour) is generally included in the preparation of the CMS. Handling of potentially hazardous materials would be carried out in accordance with SEPA Pollution Prevention Guidelines, but particularly; Pollution Prevention Guidelines 6 (PPG6): Working at Construction and Demolition-sites concerning the delivery, handling and storage of materials. For example, the preparation of contingency plans and briefing operatives on the procedure to follow if a spillage occurs would be covered by the appointed civil engineering contractor, displayed on-site and contained within the CMS document prior to construction commencing.

### Construction Method Statement (CMS)

- 5.4.4. Prior to the commencement of construction, a CMS incorporating a CEMP would be produced setting out in detail the individual items of works associated with the construction of the Proposed Development and is considered mitigation.
- 5.4.5. The CEMP shall include:

- Practical measures (both physical measures and sensitive working practices) to avoid or reduce impacts during construction (may be provided as a set of method statements), including a Pollution Prevention Plan outlining measures to control pollution and a Drainage Management Plan outlining measures for management of surface and groundwater;
  - The location of sensitive works to avoid harm to ecological features;
  - The times and locations during construction when specialist ecologists need to be present on site to oversee works;
  - Species Protection Plans outlining specific measures to avoid and reduce impacts on protected species;
  - Responsible persons and lines of communication; and
  - The role and responsibilities on site of an Environmental Clerk of Works (EnvCoW) or similarly competent person.
- 5.4.6. The CMS would be prepared in accordance with the detail provided in this EIAR and relevant deemed planning conditions. This would ensure that each activity is carried out safely, in accordance with best practice and the relevant guidelines, and to minimise environmental impact, in accordance with SEPA's pollution prevention guidance. Typically, the document would cover the following topics:
- Site health and safety plan;
  - Risk Assessments and Method Statements (RAMS) to include for environmental considerations, e.g. sympathetic construction methodology with regard to weather and ground conditions;
  - Location and description of project;
  - Consent and regulation approvals e.g. discharge of planning conditions;
  - Pre-construction survey work undertaken;
  - Turbine description/specification;
  - Construction schedule;
  - Public highway works;
  - Forestry felling;
  - Site tracks;
  - Temporary construction compound;
  - Crane pads;
  - Cable trenches;
  - Foundation works;
  - On-site substation, Battery/Energy Storage System and control building;
  - Monitoring - ecological, hydrological and geotechnical, and archaeological;
  - Emergency procedures; and
  - Pollution control and waste management – potential waste material, materials that can be reused onsite or elsewhere and mitigation measures.
- 5.4.7. A site Waste Management Plan will be drawn up as part of the CMS prior to the commencement of construction. See Section 5.22 for detail on waste management.
- 5.4.8. Previous experience of agreeing the construction methodology during the post-consent/pre-construction stage has proved effective in securing accurate and realistic method statements. At this stage in the project, additional data is available for consultation in the form of detailed site investigations. Furthermore, the civil engineering and the turbine supply contractors would have been chosen by this stage, enabling more detailed preparation of individual method statements. During the preparation of the CMS, correspondence and meetings with NatureScot, SEPA, planning authority (PA) and other relevant consultees would be undertaken to review the working methods proposed and if necessary, incorporate changes. This iterative process of preparing the CMS ensures that when construction commences there is a documented procedure and risk assessment. This makes monitoring of the construction activities, either by the appointed site representative or by the various bodies associated with the preparation of the document, more straightforward.
- 5.4.9. Each section of the CMS will provide a detailed description of the tasks to be completed along with risk assessments, where necessary, covering items such as waste management, pollution prevention, control of waters, nuisance and material use.
- 5.4.10. A section of the CMS regarding the handling and storage of peat would be prepared in accordance with recommendations from a suitably qualified geotechnical designer, ecologist and hydrologist following a detailed site investigation. Additional detailed ground investigation would be conducted prior to construction. In respect of matters regarding construction methodology and peat stability at the site, the following general recommendations would be adhered to and would form part of the overall CMS documentation:
- Environmental awareness training to be provided to all staff entering on to site which will include a basic environmental site induction;
  - Avoid placing excavated material and local concentrated loads on peat slopes;
  - Avoid uncontrolled concentrated water discharge onto peat slopes identified as being unsuitable for such discharge;
  - Avoid unstable excavations. All excavations would be suitably supported to prevent collapse and development of tension cracks;
  - Avoid placing fill and excavations in the vicinity of steeper slopes;
  - During construction install and regularly monitor geotechnical instrumentation as appropriate, in areas of possible poor ground such as deeper peat deposits;
  - Implement site reporting procedures to ensure that working practices are suitable for the encountered ground conditions. Ground conditions are to be assessed by a suitably experienced geotechnical engineer;
  - Form a contingency plan to detail the level of response to observed poor ground conditions;
  - Routine inspections of the wind farm site by maintenance personnel including an assessment of ground stability conditions;
  - Carry out an annual inspection of the site following completion of works by suitably experienced and qualified geotechnical personnel;
  - Maintain stored peat in a suitable condition to minimise the peat drying out; and
  - Minimise the need to handle stored peat so as to reduce any drying or changes to the peat.
- 5.4.11. All turbines have been located in peat depths <1.0 m other than T6 which was recorded as 1.04 m. Although the Proposed Development has largely avoided areas of deep peat, it should be noted that the T6, T5 and T2 crane hardstanding and crane pads encroach marginally into the deeper peat areas (up to 2.5 m depth) and similarly short access track sections leading to T2; discrete pocket of peat within conifer plantation south of T4 junction and site access track boundary west of T7 encroach areas of deeper peat (up to 3.0 depth). Of these encroachments of deeper peat, only the site access track boundary west of T7 area is mapped as Class 1 Peatland and the remaining areas as Class 5 Peatland. See Chapter 9: Hydrology, Geology and Hydrogeology for the full

assessment on peat and Figure 9.10 for an interpolated peat map of the site. All procedures will follow best practice guidelines.

- 5.4.12. Other sections relating to site-specific items, including landslide hazard and geotechnical risk register identified during the pre-construction phase, could also form part of the CMS. It is intended that the CMS will be an evolving document and staged completion would be undertaken in line with the progression of construction. Updating of the document to reflect changes in the methods to be used would also be carried out, as and when necessary.

### Wind Farm Construction

- 5.4.13. Construction of the Proposed Development would begin within a defined period following consent granted by the Scottish Government. The Applicant seeks a minimum 5-year period to allow time for the discharge of conditions, procurement of the turbine equipment and associated infrastructure delivery, and reaching an investment decision for the project.

Table 5.3: Construction Elements

Construction Elements
Site investigation
Mobilisation of civil and electrical contractor
Construction and upgrades to access and site tracks
On-site temporary construction compound and site storage compound
Track reinstatement
Excavation and construction of turbine foundations
On-site cabling
Construction of the substation control building
Installation of battery/energy storage
Preparation of crane pads
Installation of turbine transformers
Mobilisation of turbine supply contractor
Turbine delivery
Turbine erection
Reinstatement around turbines
Turbine fit-out
Connection to substation and grid connection
Commissioning of wind farm
Reliability testing
Demobilisation

Source: Natural Power

- 5.4.14. Table 5.3 represents a simplistic process of the different construction elements given in chronological order. It should be noted that there will be a degree of overlap between individual elements. It should also be noted that these elements relate to permanent infrastructure, i.e. infrastructure which would be in situ for the life time of the Proposed Development. Some temporary works are required during the construction phase which are not included

in this description due to their minor nature and duration, such as, temporary hardstanding areas for crane components, pads for supporting the rotors during construction in addition to the permanent crane pads and drainage measures in turbine excavations.

## 5.5. Turbine Specifications

### Description

- 5.5.1. The application seeks permission to construct up to 7 wind turbines with blade tips of up to 220 m. Table 5.4 provides worst case dimensions for various visible turbine components. Final constructed turbines will measure no more than 220 m to tip. The worst case for each technical EIA discipline will be assessed in each chapter (i.e., some assessments will use highest hub height others the largest rotor diameter). Each chapter will state assumptions made within their methodology sections.

Table 5.4: Approximate Turbine Dimensions (worst case)

Component	Size
Hub Height	Up to 139 m
Blade Length	Up to 81m
Rotor Diameter	Up to 162 m

Source: Natural Power

- 5.5.2. The selected turbines would be of a modern design with three blades mounted on a horizontal axis, attached to a nacelle, housing the generator, gearbox and other operating equipment. The nacelles would be mounted on a tubular tower which allows access to the nacelle. It is expected that the turbine cut in wind speed will be around 3 m/s and will rotate clockwise.
- 5.5.3. Through consultation with the Ministry of Defence (MoD) and Wick Airport – safeguarded by Highlands and Islands Airport (HIAL) it has been agreed aviation lighting will be a requirement, and a lighting scheme should be established post-consent. See Chapter 13: Aviation and Existing Infrastructure for more detail. It is proposed that visibility sensors are installed on relevant turbines to measure prevailing atmospheric conditions and visibility range. Should atmospheric conditions (for example an absence of low cloud cover, rain, mist, haze or fog) mean that visibility around the site is greater than 5 km from the Proposed Development, Civil Aviation Authority (CAA) policy permits lights to operate in the lower intensity mode of 200 ca (being a minimum of 10% of their capable illumination). If visibility is restricted to 5 km or less, by weather conditions, the lights would operate at their full 2,000 ca. In effect, the CAA policy allows ‘dimming’ of the lights depending on meteorological conditions, which has the effect of reducing the perceived intensity of light in clear conditions.
- 5.5.4. Wind turbine towers will likely be constructed from steel and the blades from fibreglass. It is proposed that the turbine tower, nacelle and blades be finished in a semi-matte, off-white/pale grey colour. Typical turbine specifications, of the type being considered for use on the site, are presented in Figure 5.2. In order to comply with Health and Safety requirements for the site the Applicant would propose to apply identification numbers to the sides of the turbines. Numbers would be approximately 500 mm tall by 500 mm wide and would be positioned approximately between 1 m and 3 m from ground level so to be visible from the approaching access track. Details of these would be agreed as part of the CMS.
- 5.5.5. There may be a need for transformer housings to be situated adjacent to each of the turbine towers. The requirement for such structures, along with their dimensions, will vary based on the final turbine choice (some

turbine types require two stacked transformer housings). Indicative design for typical transformer housing is shown in Figure 5.3.

## Erection of Turbines

- 5.5.6. Two types of cranes are required for the erection of the turbines; 800/1000-tonne capacity cranes and 400/500-tonne capacity tailing cranes. The cranes would use the crane hardstanding area as indicated in Figure 5.4.
- 5.5.7. Where possible, the delivery of the turbine components would be scheduled, weather dependent, to allow for direct lift off the transport trailers. Otherwise, turbine components would be stored on, or adjacent to, the crane pad areas. Alternatively, components may be delivered to the construction compound for internal distribution by a separate tractor unit. The tower sections would be erected, followed by the nacelle and hub. Following erection of the tower sections and the nacelle, the blades would either, be lifted and attached individually to the hub in position, or the hub and blades would be raised together, as a unit, and attached to the nacelle. The cranes would then move to the next turbine location.

## Operation

- 5.5.8. Once installed and fully commissioned, the wind turbines would operate automatically and can be controlled remotely or from the on-site metering building. Regular visits will be made by technicians to the infrastructure and turbines in four-wheel drive vehicles or similar. In addition, longer servicing visits would be required, typically every six months, along with reasonable unscheduled maintenance, as may be necessary. Occasional use of larger vehicles, such as cranes or lorries similar to those used during construction, may be necessary should there be a requirement for replacement of major turbine components.
- 5.5.9. Wind farm performance would be remotely monitored using a Supervisory Control and Data Acquisition system (SCADA) that would monitor the individual turbines and the grid connection.

## Environmental Considerations

- 5.5.10. All turbine transformers would be sited on banded foundations that are able to contain 110% of the oil contained within it. Any leaks from equipment within the nacelle would be contained within the turbine.
- 5.5.11. Construction of the Proposed Development will have a direct impact on some sensitive habitats, mainly blanket bog and wet modified bog resulting in some habitat loss. However, a Outline Biodiversity Enhancement Management Plan (as part of a unified land use plan) will be implemented to reduce any impacts from construction and to restore and enhance habitats during the operational phase of the project. This is provided within Chapter 7: Ecology.

## 5.6. Turbine Foundations

### Construction

- 5.6.1. Reinforced concrete gravity foundations are envisaged for use on the proposed turbines. This foundation type is typically an inverted T shape consisting of a large pad with a protruding upstand with approximately 300 mm proud of the finished ground level. The pad is back filled with selected as-excavated material or stone material placed and compacted over the foundation. The base tower section of the turbine is subsequently connected to the foundation by using holding down bolts that are cast into the upstand section of the foundation. Stability of the turbine is provided through the weight of the foundation and the material replaced and compacted over it.

- 5.6.2. A typical turbine foundation specification is presented in Figure 5.5. Detailed design specifications for each foundation would depend on the site-specific factors such as ground conditions, the specific turbine used and various other engineering considerations. Typically, a circular concrete base of approximately 29 m diameter usually suffices for turbines with the dimensions identified in Figures 5.5. Combined with the protruding upstand, the overall depth of the foundation would be around 3 m - 4 m. Following construction of the foundations, a layer of peat, peat turfs and/or mineral soils that was excavated from the turbine foundation area would be reinstated. Transformers would be located within housings, as shown in Figure 5.3, adjacent to the turbines with power cables from the turbines passing through ducts cast into the foundation.

## Environmental Considerations

- 5.6.3. Depending on the height of the water table at the foundation location, a drainage system may be installed around the foundation to prevent the build-up of water pressure under the foundation. Alternatively, in locations that were particularly sensitive to hydrological disturbance, a submerged foundation design could be employed which would not require a drainage system around the foundation.
- 5.6.4. Cement entering a watercourse can have a detrimental effect by drawing oxygen from the water and increasing its alkalinity. If an on-site batching plant is utilised it would be situated away from water courses, in a secure location which would be agreed in advance with SEPA. Particular care would be taken when pouring concrete at turbine foundations in the vicinity of watercourses and in areas of deeper peat. SEPA's Pollution Prevention Guidelines 5 (PPG5): Works In, Near or Liable to Affect Watercourses as well as PPG6: Working at Construction and Demolition Sites would be adhered to and SEPA would also be consulted during the preparation of the CMS to ensure that the appropriate measures are put in place. This may include construction of a settlement pit within the construction compound or elsewhere for treating rinse water from concrete lorries, and measures to prevent water from entering excavations in the vicinity of watercourses.
- 5.6.5. Depending on the height of the water table at the foundation location, a drainage system may be installed around the foundation to prevent the build-up of water pressure under the foundation. Alternatively, in locations that were particularly sensitive to hydrological disturbance, a submerged foundation design could be employed which would not require a drainage system around the foundation.

## 5.7. Permanent Crane Hardstandings

### Description

- 5.7.1. Permanent crane hardstandings (pads) as well as temporary lay down areas will be constructed to facilitate the cranes required for the erection of turbine components. To provide stable, firm ground for safe operation of the cranes, areas of hardstanding would be laid down on one side of each turbine foundation. These would need to be suitable for the outriggers of the respective cranes, leading to an area for simultaneous use of both cranes (as illustrated in Figure 5.4). Their locations will be finalised following further site investigation, but will maximise use of the access tracks, where possible, to minimise the carbon footprint of the Proposed Development.

### Construction

- 5.7.2. Typically, construction of the hardstanding areas would be similar to construction of the site tracks (on shallow soils) with 100 mm - 150 mm of topsoil removed and stored adjacent to the sites and remaining soil removed down to a suitable bearing stratum. Geotextile material would be laid down with crushed stone on top, to a depth of around 700 mm.

- 5.7.3. Additional temporary hardstandings may be required at various stages during turbine construction and erection. This may include temporary hardstanding to facilitate the erection of crane components, lattice boom or turbine components e.g. rotor assembly.

### Environmental Considerations

- 5.7.4. Prior to excavation for the crane pad, the vegetation layer would be carefully removed followed by any underlying peat. The crane pad will be excavated to form a level, solid platform with suitable graded stone. On completion of erection and installation works, it is proposed that the areas of hardstanding will remain as it may be required during the operational phase of the proposed development. It is envisaged that the surrounding grassland vegetation will re-colonise the area. A diagram of a typical crane hardstanding can be found in Figure 5.4, although the final detail may vary depending on the exact make and model of turbine chosen.

### 5.8. Public Road Access

- 5.8.1. Chapter 12: Traffic and Transport fully details the public road network proposed for the transportation of turbine components. The turbine delivery routes are expected to arrive to the Halsary Windfarm existing site entrance via two routes along the A9. Tower loads only coming from the south along the A9, passing through Latheron from the Port of Nigg. The other for blade loads only, arriving from the north along the A9, passing through Halkirk and Mybster if Scrabster Harbour were to be utilised. General construction deliveries are expected to be sourced locally using the A9, A99, and A882 and B870 where applicable.

### 5.9. Wind Turbines, Foundations & Crane Pads

- 5.9.1. The turbines will be fixed reinforced concrete foundations. The foundations will be formed in excavations approximately 3 m - 4 m deep. Detailed design specifications for each foundation were dependent on site-specific factors such as ground conditions, the specific turbine used and various other engineering considerations.
- 5.9.2. Crane pads would be left in-situ following erection of turbines to allow for maintenance and replacement of parts as necessary during the lifetime of the project.

### 5.10. Access Tracks

- 5.10.1. Existing wind farm tracks within Halsary Windfarm which will require some upgrades are utilised as part of the access route to site and new track is proposed to join Halsary existing track to the Proposed Development. The tracks within the Proposed Development Area will be all new tracks. The routes for the tracks were chosen to minimise potential impacts on the environment, while taking account of other site-specific constraints. The final location of the access tracks was decided by evaluating track length, cut and fill balance, avoidance of deep peat and minimising tree felling whilst balancing against the turbine transportation specifications.
- 5.10.2. Watercourse crossings were minimised as far as possible and where they could not be avoided, suitable water crossings were identified and assessed.
- 5.10.3. Infrastructure and access tracks have been designed to avoid identified heritage assets within the Proposed Development Area.

### 5.11. Substation, External Transformer and Grid Connection

- 5.11.1. The wind turbines would produce electricity at 690 – 1,000 Volts. The electricity would then be transformed to 33,000 Volts (33 kV) via a transformer which is likely to be immediately adjacent to the tower of each turbine. The transformers would be linked to the onsite substation via high voltage underground cables placed in trenches which would generally follow the route of the onsite tracks (dimensions to be determined by the ground conditions but typically 0.5 m x 1 m deep). Where trenching alongside onsite tracks was not feasible, the transformers would connect to the substation via underground cables across open ground with electrical marker posts used to identify their locations.
- 5.11.2. The on-site substation and control building compound will accommodate metering equipment, switchgear, transformers, the central computer system and electrical control panels. A spare part storeroom and domestic facilities will also be located in the control building. Figure 5.6 shows a typical compound and layout. Although not permanently staffed, the buildings would be visited periodically by maintenance personnel. There is no requirement for any other permanent buildings on the site.
- 5.11.3. The exact location of the transformer may differ depending on the final turbine model used.
- 5.11.4. The underground 33 kV cables routed from the turbines would be brought together via the existing substation at Mybster. The detailed construction methods, layout of cables and contents of the onsite substation compound would be provided within the Proposed Development CEMP.
- 5.11.5. Connection of the Proposed Development to the national grid will be subject to a separate application under Section 37 of the Electricity Act 1989. It is expected that the application would be made by the grid operator. It is expected that the grid connection will be made using underground cabling to Mybster.

### Construction

- 5.11.6. The transformers would be linked to the on-site electrical substation and metering/control building via 33 kV underground cables placed in trenches. The cable route within the site would generally run adjacent to the route of on-site tracks where possible. The underground cables between the turbine infrastructure and the on-site substation and battery/energy storage will likely be routed across open ground away from site tracks. The route would be marked above ground with clearly identified posts, spaced at suitable intervals along the length. This would be agreed as part of the CMS.
- 5.11.7. Cables would be laid from a drum attached to a suitable vehicle. Each 33 kV cable would arrive as three insulated cores. These would be gathered in the trench and bound together along the entire length of the trench in a trefoil arrangement. Communication cables and earth tapes would also be laid in the same trench. The cables would be protected from mechanical damage by a sand bed and surround. Two layers of marker tape and/or tiles would be buried above the cables to prevent accidental excavation, and concrete marker posts would be placed at regular intervals to enable the cables to be located in the future.
- 5.11.8. Silt, scour and run-off could pose a problem as the cable trench can act as a preferential drainage channel. Backfilling of the trench should be carried out as soon as is practicable and the road drainage installed should be set up with suitable silt traps as the construction proceeds. In steep sections, impermeable plugs should be used in the cable trench to prevent the channel becoming a preferential drainage run, ideally using locally won clay material.



## Environmental Considerations

- 5.11.9. Where cabling is required, pre-commencement surveys will be undertaken to give a contemporary assessment of any ecological and other environmental sensitivities and will inform the CMS. Pre-construction surveys, as per the rest of the development, will be carried out by the on-site EnvCoW to ensure construction is not having an unacceptable impact on any species of concern. Cabling will be carried out in a staged process, with vegetation and topsoil temporarily removed to be back filled as soon as the cables are laid. This method ensures vegetation is replaced as soon as possible and any disturbance during the works is kept to an absolute minimum and is temporary in nature.
- 5.11.10. Following the pre-commencement and pre-construction surveys (and due to the staged nature of the cabling process) the impact on habitats, the wider environment and any species of concern will be reduced to a minimum and will be a short-lived disturbance where it exists.
- 5.11.11. In areas where the surrounding soils are very coarse gravel or peat, the cable trench footprint shall have a geotextile wrap placed within it to prohibit fines migrating from the backfill into the surrounding sub-soils. These areas shall be identified on-site during the commencement of the works. Where surplus mineral soil material is present, this shall be transported to other areas of the site for reinstatement and final profiling.
- 5.11.12. On-site cable trenches would be located to minimise the area of disturbance, up to 5 m beyond the edge of the site track in case of multiple circuits. Trench excavation, cable laying and backfill would be carried out in a continuous operation (minimising the length of trench open at any one time) and may occur subsequent to the construction of on-site tracks or after the erection of turbines. Prior to excavation, the topsoil/turfs would be stripped and placed to the side in a temporary stockpile. A trench would then be dug with a small excavator or backhoe to approximately 1 m in depth and up to 1.5 m in width.
- 5.11.13. Where cables cross contours on steeper areas of ground, clay plugs would be placed at intervals within the trench to prevent the trench acting as a water conduit. Figure 5.7 gives an indicative outline of the cable trench. The final cable positions would be surveyed and supplied in 'as built' drawings for the Operations and Maintenance (O&M) team.
- 5.11.14. Alternatively, cable ploughing may be adopted if ground conditions permit. The final choice of method will depend on the appointed contractor and the results of further site investigation.
- 5.11.15. Indicative details of the cable/service trenches are shown in Figure 5.7. Cables would be laid in sand for protection with warning tapes/boards placed above to mitigate the risk of unintentional excavation. Impermeable barriers (plugs) would be placed in the sand layer at regular intervals to prevent the trench acting as a water conduit with more frequent spacing between plugs on steeper gradients.
- 5.11.16. In all cases, the cables would be buried to a depth of approximately 1 m. Reinstatement would be carried out to relay the previously stripped top layer of peat turfs containing the seed bank, over the top of the cable trench. This reinstatement would be conducted following the backfilling of each cable trench section.
- 5.11.17. At track crossings and within concrete foundations, the cables would be laid within plastic ducts.
- 5.11.18. Existing watercourses should be monitored during the works, both to prevent water entering the excavation, and also for runoff and silt escaping and entering these. These may need temporary diversions/piping until the track is complete and the watercourses can be reinstated.
- 5.11.19. On decommissioning of the Proposed Development, on-site cabling will be left in-situ, unless ducted. Most modern cables are aluminium and are relatively benign and inert; over time these will break down to clay. These can be electrically isolated and left in-situ, as is common practice.

## 5.12. Access Tracks

### Description

- 5.12.1. The Proposed Development will require crushed stone to construct the new tracks, improve the existing tracks, if necessary and create hard standing areas for the cranes and lay the foundations. Suitable stone and aggregate would be sourced from local suppliers where possible.
- 5.12.2. Existing wind farm tracks within Halsary Windfarm which will require some upgrades are utilised as part of the access route to site and new track is proposed to join Halsary existing track to the Proposed Development, this section of the access route will be subject to a separate planning application. The Applicant is not applying for consent to complete works on this section of track outwith the redline, it would be subject of a separate application, however this section of track has been assessed to show that it can be delivered. The tracks within the Proposed Development will be all new tracks approximately 4.8 km in length. The main on site access track follows a general direction of south-west to north-east with individual turbines access tracks branching from this main track. AIL delivery is discussed and assessed in Chapter 12 and Technical Appendix 12: Traffic and Transport. The routes for the tracks were chosen to minimise potential impacts on the environment, while taking account of other site-specific constraints. The final location of the access tracks was decided by evaluating track length, cut and fill balance, avoidance of deep peat and other constraints and minimising tree felling whilst balancing against the turbine transportation specifications.
- 5.12.3. Watercourse crossings were minimised as far as possible and where they could not be avoided, suitable water crossings were identified and assessed.
- 5.12.4. The detailed assessment for component delivery (AIL Route Survey Report which can be found in Technical Appendix 12) minimises uncertainties or potential problems with delivery of abnormal loads using public roads. Figure 1.2: Site Layout shows the proposed turbine layout and the proposed new access track. The tracks allow plant to dig new cable trenches and thereafter to access the site for operational and eventual decommissioning purposes.
- 5.12.5. Worst case traffic volumes for importing all required stone are assessed in Chapter 12: Traffic and Transport.
- 5.12.6. After construction is complete the tracks will be left in place for routine maintenance of turbines and for multi-use trails leading to the top of Watten to improve recreational access for walking and a carpark will be cleared and maintained for visitors. This is further discussed in Chapter 15: Socio-economic, Recreation and Tourism.

### Construction

- 5.12.7. There are three watercourse crossings between turbines one and two, turbines one and five and and turbines six and seven. The crossings are a peat drain from the acrotelm (one layer in an undisturbed peat bog) and are not major watercourse crossings and are assessed in Chapter 9: Hydrology, Geology and Hydrogeology.
- 5.12.8. Approximately 4.8 km of new on-site tracks would link the proposed turbines and infrastructure to the existing onsite track network at Halsary Wind Farm. The design philosophy behind the track layout has taken into account a number of factors including topography, hydrology, watercourse crossing, ground conditions and construction parameters and has been based on best practice methodology developed at other wind farm sites. The proposed track layout has been designed following an onsite review and minimised the number of watercourse crossings necessary.

## Environmental Considerations

- 5.12.9. The initial stripping of topsoil for the new tracks and placement of stone material for construction of new tracks has the biggest potential to release sediment into watercourses. Therefore, using methods consistent with industry best practice would be put in place ahead of the track construction activities. Sediment would be transported the furthest by existing surface water channels and manmade drainage systems, therefore proactive mitigation measures would require these to be identified prior to the track construction. Within the channels and drains and any necessary settlement ponds, silt traps would be constructed prior to track construction. The silt traps would likely be constructed using straw/hay bales or specialized siltation fencing, pinned into place, allowing water to either percolate through the bale or flow over. Where machinery is required for any of these up-front activities, they would have low pressure bearing tracks. Sediment transport mitigation drainage systems would be subject to regular maintenance during the lifetime of the proposed wind farm. Chapter 9: Hydrology, Geology & Hydrogeology provides an assessment of the potential effects on hydrology.
- 5.12.10. For construction of new sections of track, alternative methods would be utilised for different areas of the Proposed Development Area, depending on-site specific conditions. For each method, the track running width (excluding drainage channels and cable trenches) would be approximately 4.5 m wide, with the exact width depending on the local ground conditions. Track widths may be wider for short sections such as lengths with passing places and at sharp bends and track junctions. Excavated road would be used for the majority of the access tracks, where overlying soil or peat material would be removed with a foundation formed on the underlying glacial till or the weathered rock horizon, as shown in Figure 5.8.
- 5.12.11. In addition, there would be a requirement for drainage channels along one or both sides of each section of track depending on the ground conditions along each track segment (see Figure 5.13) to prevent the track itself acting as a watercourse. Tracks would be designed with a crossfall, towards the drainage ditches, to prevent build-up of water on the running surface. It is important that the water flowing along the drainage ditch is not able to build up enough volume and velocity to act as a major sediment transport route. To prevent this happening, cross drainage pipes would be placed under the road at regular intervals. This also helps minimise the effect the road construction would have on the hydrology in the adjacent area and prevent concentration of water flow higher in the catchments' area than would necessarily occur. The drainage ditch would also be blocked just above the cross drainage inlet, thus preventing water from simply flowing past the inlet. Using stone available onsite, a head wall would be constructed to prevent erosion around the inlet. A silt trap would also be constructed at the inlet to the cross drainage, to minimise sediment entering the pipes. The outlet of the cross drainage would allow the water to filter through the adjacent vegetation.
- 5.12.12. Site visits have confirmed the presence of peat of variable condition and depth across the site area, with deeper peat present on plateaus and other shallow slope areas. Where possible, the turbines and tracks have been positioned to avoid areas of deepest peat. Where this has not been possible, the construction of floating tracks would be required. It is anticipated that approximately 840 m of floating track would be required, associated with areas of shallow topography where peat has been consistently identified at depths greater than 0.7 m. In areas of shallow peat i.e. depths less than 0.7m, track formation would be via more traditional cut & fill construction. Cut & fill track construction would also be used on areas where gradients are unsuitable for installation of floating track.
- 5.12.13. Floating road construction comprises the laying of a geosynthetic (geotextile mat or geogrid reinforcement) across the soils prior to constructing the road. Where required, risk from run-off would be mitigated by directing drainage to settlement ponds. Erosion processes on the roadside embankments and cuttings would be mitigated by ensuring that gradients are below stability thresholds, which would also enable effective regeneration of vegetation. Sediment traps would be required in the early years following construction until natural regeneration is established.

- 5.12.14. The tracks would be left in place following construction to provide access for routine maintenance of turbines, repairs and eventual decommissioning of the proposed development. At the end of the construction period the edges of all new tracks would be restored using materials stripped from excavations.
- 5.12.15. For safety reasons, marker posts may be placed in the ground by the edge of the track in order to guide on-site vehicles during times of poor visibility or at night.

## 5.13. Temporary Construction and Storage Compounds and Ancillary Infrastructure

### Description

- 5.13.1. During the construction phase of the Proposed Development, temporary compound and laydown areas will be required. The construction compounds will be built by carefully removing topsoil or peat turfs down to a firm substrate, laying down geotextile material and then constructing a working surface of stone. The topsoil/peat would be stored adjacent to the site for reinstatement or used elsewhere on the site. The compounds will be reinstated with topsoil such that they can be re-used if needed during the operation phase for major maintenance or emergency works.
- 5.13.2. To facilitate construction, temporary compounds will be required, located strategically across the site. Infrastructure ancillary to the construction and operation of the Proposed Development will be required. These would be constructed in accordance with best practice and relevant guidelines, to minimise environmental impact.
- 5.13.3. Where potentially significant impacts were identified, mitigation measures have been proposed.
- 5.13.4. The preferred mitigation option is always to avoid or reduce impacts through design, or through precautionary measures such as fencing off assets during construction works. Effects which cannot be eliminated in these ways will lead to residual effects.

### Construction Compounds

- 5.13.5. The dimensions of the compound would be approximately 50 m x 50 m and would be surrounded by a security fence. Due to the requirement under health and safety legislation, the CDM Regulations for welfare facilities on-site, and the exposed nature of the site, a number of cabins would be needed in the construction compound. These would have offices, canteens, drying-rooms, toilets and washing facilities. Smaller mobile, self-contained units are likely to be required as work progresses throughout the site. These would be placed at suitable locations to tie in with the work interfaces as required. A typical layout of the compound area is presented in Figure 5.10.
- 5.13.6. The compound would be used, where necessary, for temporary storage of the various components and materials which are required for construction.
- 5.13.7. A settling pit/concrete washout bay and wheel wash may be included near the construction compound. When concrete lorries have deposited their loads, there is a requirement to wash out the inside of the concrete drum. This requires a few gallons of water that would then be washed out from the drum into a settlement pit. The size of this pit would depend upon the flow of concrete lorries up to the site (or within the site if an on-site batching plant is employed) but would be lined with an impermeable sheet and granular fill to assist in the settling process. The construction compound will be reinstated at the end of the wind farm construction period. The stored subsoil and the stored topsoil would be laid over the geomembrane separating it from the underlying stone surface and then reseeded using a seed mix selected or, where possible, turfs would be reinstated.

- 5.13.8. The settlement pit would be located away from watercourses with details included as part of the CMS following consultation with SEPA. Any drainage from these facilities would be collected and treated prior to discharge via a Sustainable Drainage System (SuDS). The washout bay would be maintained as necessary by replacing the granular fill with clean stone. At close of construction, all material within the washout bay would be removed from site and the area reinstated.

### Concrete Batching Plant

- 5.13.9. A concrete batching plant allows for concrete to be mixed in-situ for use throughout the site and relieves pressure on the road network by avoiding additional transportation of materials onto the site during construction. This is proposed to be located alongside the construction compound.

### Environmental Considerations

- 5.13.10. Fuel would be required for the vehicles, generators and other equipment on-site. The storage facilities would typically be comprised of a bunded concrete area containing a lockable, bunded fuel tank and a lockable housing for the storage of construction chemicals. In addition, there would typically be a wheeled, double-skinned bowser for transport of fuel to tracked vehicles. All construction equipment would be inspected on a daily basis to check for spillages. Drip trays would be used when refuelling vehicles on the site. Emergency spill kits would be kept on-site adjacent to the fuel storage area and with the mobile bowser. Site operatives would be briefed on the emergency procedures to be undertaken in the event of a large spillage. The PC would have a 24-hour emergency response company on standby in the event of a spillage incident. Vehicles would be refuelled at their working location to prevent loss of time and use of fuel returning to any designated refuelling areas. All previous stated measures would be used when refuelling vehicles and the bowser operator would be suitably trained to deal with any spillage. The units would be self-contained, and no discharge of drainage would be made to the surrounding land unless otherwise agreed with SEPA and the local authority.
- 5.13.11. Cement entering a watercourse can have a detrimental effect by drawing oxygen from the water and increasing its alkalinity. If an on-site batching plant is utilised during construction, it would be situated a suitable location away from watercourses and agreed with SEPA prior to construction (an indicative diagram of a typical batching plant is shown in Figure 5.9).

### 5.14. Battery Energy Storage System (BESS)

- 5.14.1. The BESS will store excess electricity generated by the Proposed Development and discharge to the grid when required. The BESS compound will be approximately 47 m x 29 m, enclosed by security fencing, and will house approximately 32 BESS container units and external ancillary equipment including four transformers and eight invertors. The BESS units, similar in size to a 10 ft container, will be situated in rows of 4-8, on an area of hardstanding with small concrete foundations. Cabling will then be routed from each BESS container to a transformer which will then be routed to the substation compound. An indicative BESS layout compound is shown in Figure 5.12.

### 5.15. Construction Environment Management Plan (CEMP)

- 5.15.1. A CEMP will be created and agreed with The Highland Council (THC) prior to construction commencing through an appropriately worded suspensive condition in order to ensure the impacts from construction are kept to a practical minimum. The CEMP would set out the method statements for constructing site infrastructure, measures that would be undertaken by contractors to ensure good site practice with regards to construction practices and

environmental management. Such measures would include for the transport and storage of potentially polluting substances such as oils and lubricants as well as waste management, for example.

- 5.15.2. Should the Proposed Development be consented, best practice guidelines and method statements will be adopted to ensure that the development does not impact negatively on the local environment. No development shall take place (including demolition, ground works, vegetation clearance) until a CEMP, incorporating a CMS, has been submitted to and approved in writing by the PA.
- 5.15.3. No development shall commence until the role and responsibilities and operations to be overseen by an appropriately competent EnvCoW have been submitted to and approved in writing by the PA. The appointed person shall undertake all activities, and works shall be carried out, in accordance with the approved details. The EnvCoW will ensure that during construction impacts to ecological features are minimised through best practice, including ensuring water quality is maintained and the potential for disturbance or risk of injury/death is minimised for protected species which may be using the site on an occasional basis.

### 5.16. Signage

- 5.16.1. Due to the isolated location of the Proposed Development and the industrial operations occurring during construction, signs are required on-site for safe day-to-day navigation for works traffic and personnel; access for emergency vehicles; and for the health and safety of the public. To further protect the health and safety of all those visiting the site a comprehensive risk assessment for visitors will be produced. Signage would consist of non-illuminated post and panel sign locations and non-illuminated turbine identification signs with a maximum of three signs per post facing at the Proposed Development. Signs would also be placed on the turbines to help identify them as indicated in Figure 5.1.
- 5.16.2. The signage on-site would comprise of two elements; directional signs and roundels displaying the site speed limit. The directional and speed roundel sign measure 300 mm x 400 mm x 3 mm and 300 mm x 300 mm x 3 mm respectively, which will be mounted on a 2500 mm x 76 mm grey aluminium pole as shown on Figure 5.11. The poles will be set within a 460 mm deep concrete foundation. This will ensure the stability of the signs, in line with current guidance for such installations.
- 5.16.3. The sign fixtures allow back-to-back mounting and are used on sign locations where more than two signs are specified. The signs will be hard wearing using tamperproof fixtures, securing the signs in place. A high-quality typeface is used to maximise readability. The signage is uncluttered and designed to be legible from vehicle or from foot.
- 5.16.4. The exact number of signs required at any of the post locations will be decided post-consent, following a full review of the health and safety requirements and will be confirmed in the CMS.

### 5.17. Employment During Construction

- 5.17.1. During the construction period there will be construction operatives carrying out the works on-site which have been described. There would be indirect local benefits arising from the construction phase, including use of hotels, Bed & Breakfasts and other accommodation, hire of local equipment and plant, temporary employment of local work force and potential contracting of local subcontractors. The Applicant seeks to spend a minimum of 30% of the contract value locally and will host a local supply chain event to support this. The construction mobilisation would likely be spread over a 2-3 month period. Such effects are assessed in Chapter 12: Traffic and Transport and Chapter 15: Socio-economic, Recreation and Tourism.

## Site Representatives and Support Staff

- 5.17.2. It is envisaged that the Proposed Development would be constructed employing a number of main contractors; likely one for the civil infrastructure works, one for the electrical works, and one for the supply, erection and commissioning of the wind turbines - all of whom would be coordinated and overseen by a project manager. In order to monitor the progression, a number of site representatives would be employed full-time to ensure the quality and health and safety aspects of the construction, and to ensure the development is carried out in accordance with the CMS methodologies. The site representatives would be individuals with previous experience of wind farm construction and would, as required, be supported on-site by a suitably qualified ecologist. The site representatives would carry out daily checks on the site to monitor on-going activities, particularly when subcontractors are being used on-site. In addition to this, and in conjunction with the ecologist, and hydrologist, environmental audits of the site operations would be undertaken on a regular basis accompanied by representatives of the relevant contractors. Where necessary, additional specialists may attend the site including geotechnical and archaeological representatives.
- 5.17.3. In line with guidance, appropriately competent operatives would be employed for handling, storing and arranging for the disposal of potentially polluting substances. Licensed waste disposal companies would be used to dispose of potentially polluting wastes.

## 5.18. Site Reinstatement

### Access Tracks

- 5.18.1. During track excavation works, where possible the vegetated top layer of material, which holds the seedbank, will be stripped and carefully set to the side of the worked area for re-use in the re-profiling and track verge reinstatement works. Where practical, if storage is required, the layers will be correctly stored in their respective soil/peat horizons, i.e. in the layers that they were stripped in, so when reinstated they can be put back in the correct order. If temporary storage of excavated materials is required, then such material will be stored safely, and the method of storage will not lead to any areas of additional disturbance.

### Cable Trenches

- 5.18.2. The reinstatement and storage of any excavated materials for the cable trenches will involve replacement of previously stripped soils, vegetated layers or turves. Timing of trench reinstatement works will also take into account adjacent construction activities which may disturb any reinstatement works already carried out. The amount of time between the excavation of the trench and subsequent reinstatement following cable laying will be minimised as much as practically possible. The reason for this is that the longer the stripped turves are stored for the more they will degrade and become unsuitable for successful reinstatement. The optimum scenario for the cable trench works will be to ensure that no cable trenches are excavated until the electrical contractor has their cables ready for installation on-site.

### Turbine Foundations

- 5.18.3. Reinstatement methods associated with turbine foundations will include where practical the storage of turves and topsoil around the perimeter of the foundation excavation. A plan showing where the material is to be stored will be created prior to the works commencing. In areas where storage of the turves or excavated material adjacent to the works is not possible, then the material will be taken to the nearest agreed storage areas as soon as possible.

## Crane Hardstandings

- 5.18.4. Due to the requirement for crane hardstandings to remain in place, reinstatement of the crane pad will not take place. There will however be reinstatement of the area around the crane pad and any exposed batters using the stripping, storage and reinstatement methods described.

## Construction Compound

- 5.18.5. All temporary construction areas will be reinstated as quickly as possible following construction. Following removal of temporary site accommodation, storage, equipment and materials, all areas will then be reinstated. Suitable materials i.e. topsoil will be replaced over the area in appropriate horizons i.e. in the correct order. The material used for the reinstatement works (often that which was excavated for the temporary construction area), will be stored and managed adjacent to the temporary construction areas but away from watercourses and other sensitive receptors. It is highly probable that the temporary construction areas, such as the site compound will be required for the duration of the construction period and may be required at times during the operation and decommissioning phases. Therefore it is unlikely that any stripped turves would be suitable for reinstatement, as the vegetation would have decomposed if stored for any length of time. Vegetation will therefore be allowed to regenerate naturally.

## 5.19. Operational Phase

- 5.19.1. Operation of the Proposed Development would be mostly automated. Each individual turbine would operate independently of the other turbines. Turbine operation would be managed by control and monitoring systems. These systems control the rotational speed of each individual turbine and ensure its continued safe operation. Should any malfunction in operation occur or should wind speeds exceed safe limits, then the braking system of the wind turbine would automatically be applied, and each turbine would shut down to a safe condition.
- 5.19.2. The control of the battery storage system is also automated. It will receive signals through a communication link determining when to deliver power to the grid and when to recharge. This will be controlled via the trading agent. The system will undertake its own condition and alarm monitoring and take steps to either shutdown, limit operation or advise the control room of any issues.
- 5.19.3. If the cause of the shutdown is due to high wind speeds, then the turbine would automatically begin operation again once average wind speeds reduce to below 25 m/s. Under other causes of shutdown, for example through malfunction, the turbine would remain shut down in a safe condition (e.g. with the rotor blades orientated 90 degrees to the wind direction) until manually restarted by a member of the O&M team, following satisfactory inspection and/or repair.
- 5.19.4. The lifetime of the project is envisaged to be up to 35 years from completion of commissioning to commencement of decommissioning. To ensure that turbines continue to operate with acceptable reliability (i.e. with each turbine capable of operating on average, between 95% and 98% of the time), regular pre-planned maintenance and servicing programmes will be performed on each turbine. A typical maintenance programme is outlined below. Additionally, there may be a need to conduct irregular, ad hoc maintenance in the event of mechanical breakdowns.
- 5.19.5. Tracks giving access to turbines will be required during the operational period of the wind farm to allow for routine maintenance operations and occasional replacement of larger components.

## Maintenance Programme

- 5.19.6. Maintenance regimes commonly begin shortly after commissioning with a 'post-construction' check on the torque levels of all bolts within the structure. This is normally performed 10 days after commissioning and again, three months after commissioning.
- 5.19.7. After this, minor and major service regimes continue on a six-monthly basis with both services being performed annually throughout the lifetime of the turbine.
- 5.19.8. Routine oil sampling and testing of lubricant maintains awareness of the integrity and condition of these lubricants. This allows cost-effective oil changes to be performed as the oil quality degrades. Routine oil sampling and testing of transformer oils is also performed in order to maintain awareness of the integrity of the electrical properties of these oils.
- 5.19.9. Maintenance of the high-voltage switchgear will also be conducted routinely, and annual checks will be performed.
- 5.19.10. The BESS maintenance comprises ongoing monitoring of alarms and operational data, periodic maintenance and reactive maintenance, if and when failures occur. Periodic maintenance primarily comprises of a visual inspection of equipment and replacement of any minor equipment required. Any periodic or reactive maintenance shall be based on Original Equipment Manufacturers' (OEM) recommendations and as per agreed in the O&M contract.
- 5.19.11. In the case of major component maintenance being required, such as generator or blade replacement, large vehicles similar to those used during construction may need to return to site. These would be subject to similar conditions of planning as agreed for the initial construction period. From time to time, when such maintenance is being undertaken, it may be necessary to restrict access to areas close to the replacement turbine components in order to maintain the health and safety of visitors. In such cases, the areas affected would be clearly marked and fenced and alternative routes would be provided for any visitors seeking passage through the wind farm, where necessary.
- 5.19.12. All maintenance of any equipment item would be performed according to the OEM stated schedules, and health and safety procedures.
- 5.19.13. All maintenance would also occur according to the environmental procedures aforementioned in this chapter.

## Storage and Use of Polluting Substances

- 5.19.14. Storage of polluting substances at the site during the operational period of the Proposed Development would only take place where agreed with the relevant authorities in accordance with Control of Substances Hazardous to Health (COSHH) regulations. Generally, substances of this nature are transported in minimum quantities on an 'as required' basis.

## 5.20. Employment during the Operational Phase

- 5.20.1. It is envisaged that the turbines at the Proposed Development would be included within a wider portfolio of operational wind turbines and that persons and/or technicians would be on-site as required. For the first few years of operation the turbines would be under warranty and maintenance would be performed by the turbine manufacturer. During annual servicing thereafter, the number of technicians on-site would increase. The site would also support a site manager to be based in the local area. Other contract personnel would attend the site as required to maintain the civil and electrical infrastructure as well as carrying out duties in relation to ecological monitoring and reporting. Site personnel would make use of the onsite control building, which has been designed to include office space and welfare facilities. Chapter 15 assesses the socio-economic effects of the Proposed Development.

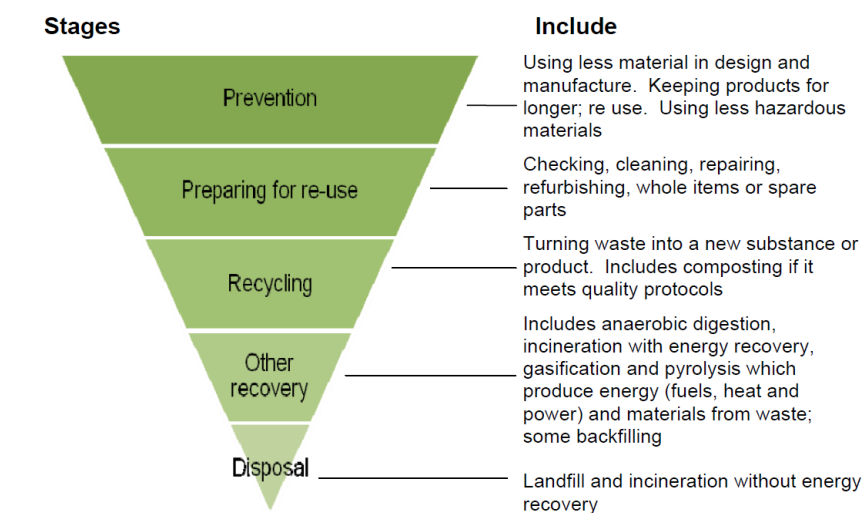
## 5.21. Decommissioning

- 5.21.1. At the expiry of the consent or the end of the Proposed Development's life, it is proposed that the turbines and transformers would be removed. The upper sections of the turbine foundations, to a depth of at least 1 m, would be removed and backfilled with appropriate material. Peat or topsoil would be replaced and the area reseeded. Tracks will be left and allowed to grass over or would be covered with soil and reseeded. Cabling would be left in-situ, unless ducted. At least six months prior to the decommissioning of the site, a Decommissioning Method Statement would be prepared, for agreement with the PA and relevant consultees.

## 5.22. Waste Management

- 5.22.1. The Proposed Development will produce small amounts of general, municipal and hazardous waste during its construction, operation and decommissioning. Where waste is generated, the waste hierarchy will be applied as shown in Figure 5.a (embedded in this chapter).

Figure 5.a: Waste Hierarchy



- 5.22.2. Waste materials generated during the construction phase include excavation waste such as vegetation, forestry residues, soil, stone, rock and similar materials. Excavated materials can be reused on-site or elsewhere if it is deemed suitable for reuse. Excavated peat associated with development on peatland is not classed as waste if it is deemed suitable for a required and predetermined end-use as part of construction works and reinstatement on a site. Other construction waste streams include municipal waste from welfare facilities, including food waste, paper, plastics, glass, cardboard, paper, and other typically domestic refuse. Industrial waste chemicals, fuel, oil and polluted water from plant, vehicle and wheel washes may also be generated as a result of the Proposed Development.
- 5.22.3. The operational phase of the Proposed Development is unlikely to generate significant amounts of waste except for minor quantities of material collected during routine maintenance inspections. Waste streams during this phase include municipal waste, waste chemicals, fuel and oil, sewage and polluted water from vehicle and wheel washes.
- 5.22.4. During the decommissioning phase of the Proposed Development wastes includes demolition waste, turbine components, electrical cabling as well as municipal waste, waste chemicals, fuel and oil, sewage and polluted water. Wind turbines and electrical cables can be reused subject to potential ready markets for the material.

- 5.22.5. Measures will be put in place to ensure waste generated from the Proposed Development is kept to a minimum and does not have a significant cumulative effect on local waste management infrastructure. Such measures will be detailed fully within the CMS.
- 5.22.6. Embedded mitigation to reduce the quantity of waste from the Proposed Development will include the design of the Proposed Development in such a way that new turbines can be accessed by existing access tracks wherever possible, minimising the need to construct additional access tracks and reducing the potential for waste. All construction and decommissioning activities will be planned effectively to ensure that any materials associated with these activities are predicted well in advance, reducing the chance of over-ordering of materials which would result in waste.
- 5.22.7. Materials will be reused on-site or elsewhere, and materials will be sent for recycling where recycling facilities are available. Other measures to ensure that waste materials sent to local waste management facilities and to landfill are kept to a minimum include the nomination of an approved person(s) to be responsible for waste management on-site; this will include the coordination of waste collection to suitable disposal and/or recycling facilities. In addition, a system to record and monitor waste will be implemented, keeping a record of reuse, recycling and disposal. It may also be possible to schedule certain activities that generate large volumes of waste to avoid overloading local infrastructure if other construction projects in the area are also producing large volumes.
- 5.22.8. Pollution prevention measures will also be put in place, and these will be detailed fully within individual chapters of the EIA and within the CMS. Pollution prevention measures include:
- Storage of waste materials within the construction compound only. If waste materials are generated outside the construction compound they will be taken to the compound on a daily basis;
  - All waste products will be removed from site by registered waste carriers and taken to a waste management facility permitted to receive each specific waste type;
  - Bonfires and the burning of waste products will be prohibited on-site;
  - Labelled, double skinned waste tanks will be utilised for the storage of waste oils on-site;
  - The waste storage area will be isolated from surface drains and bunded to contain any spillages; and
  - A wastewater collection system will be used to prevent contamination of local water courses.

## 5.23. Health and Safety

### Health and Safety of Construction Workers

- 5.23.1. The construction-site will be managed and operated in accordance with Health and Safety at Work etc. Act 1974 and comply with relevant Health and Safety Regulations, including:
- The Management of Health and Safety at Work Regulations 1999;
  - Construction (Design and Management) Regulations 2015; and
  - Electricity Safety, Quality and Continuity Regulations 2002.
- 5.23.2. In awarding any civil, electrical or other contracts for the construction of the proposed wind farm, the appointed contractor is obligated by law to follow the CDM Regulations implemented by the Health and Safety Executive (HSE). These are based on standard procedures that are adapted to take account of all site-specific requirements. The Regulations require due consideration is given to construction workers and the public, with risk assessments and method statements created to cover all risks identified including access rights across the site.

- 5.23.3. A Principal Designer (PD) will be contracted by the Applicant to take overall control of the pre-construction phase, and are responsible for planning, managing and coordinating health and safety for any pre-construction activities. The PD ensures all relevant information is provided to other CDM duty holders, seeking to identify, eliminate or control foreseeable risks, ensuring Designers comply with their duties as well as liaising with the PC to help with planning, management and monitoring of the construction phase, including compiling of the Health and Safety File.
- 5.23.4. Under CDM 2015, the Applicant is not expected to manage the project themselves, however they remain ultimately responsible and must ensure all required duty holders are appointed and that suitable arrangements are in place for the work to be carried out safely.

### Safety of the Public

- 5.23.5. Throughout the construction phase of the Proposed Development the relevant statutory requirements would be adhered to. All potentially hazardous areas would be fenced off and all unattended machinery would be stored in the site compound or immobilised to prevent unauthorised use. In addition, temporary construction safety signs would be placed at each possible entrance to the site and in areas where there may be further danger, e.g. around settling lagoons and compound areas.
- 5.23.6. Throughout construction, measures to manage diversion routes would be put in place. The diversion routes would be clearly marked and for safety reasons would direct the user away from any areas of construction.

### Operational Phase

- 5.23.7. Wind farms have a proven track record for safety. A very small number of wind turbines have been known to suffer from mechanical damage through lightning strikes or mechanical failure. Experience on existing sites has shown that allowing the public to access an operating wind farm does not lead to a compromise in safety.
- 5.23.8. Companies supplying products and services to the wind energy industry operate to a series of international, European and British standards (BS). A set of product standards for wind energy equipment has been developed by the International Electrotechnical Commission (IEC) – IEC 16400. There are a number of BS that correspond to it, for example BS EN 61400-1: 1995 “Wind turbine generator systems – safety requirements”.
- 5.23.9. The Applicant would commit to installing wind turbines and components that meet BS EN 61400-1: 1995 or IEC 16400 as appropriate.
- 5.23.10. Public access and ice throw have been assessed in Chapter 13: Aviation and Existing Infrastructure and Chapter 16: Other Matters. Turbine procurement together with good practice site management procedures, including the use of visual warnings signs and curtailment during periods of ice build-up on blades, will mitigate and manage this potential hazard.
- 5.23.11. It is intended that the Proposed Development will include a small area for car parking and a walking route within the Wind Farm. These would improve public access to the site.
- 5.23.12. Appropriate warning, directional and identification signs would be installed on the turbines, transformers and on-site electrical control building, and access to these would be restricted to wind farm personnel. At all times these facilities would be locked. Additionally, safety and/or directional signs would be placed at strategic points across the site area to inform members of the public that they are entering a wind farm area, to make them aware of potential hazards and provide direction for emergency services should the need arise. Any signage would be agreed with the relevant authorities prior to installation.

- 5.23.13. No resulting safety risks are expected as a result of public access to the proposed wind farm site. Turbine models being considered for the site would operate automatically and have sensors to detect any instabilities or unsafe operation during high wind speeds. Should sensors placed on the nacelle and tower of the turbine detect any other malfunction in operation or should wind speeds increase over maximum operational thresholds, the brakes would be automatically applied in order to rapidly shut the turbine down.
- 5.23.14. If the cause of the shutdown was high wind speeds, then the turbine would automatically begin operation once the average wind speed reduced to within operational levels. Under other causes of shutdown, e.g. through malfunction, the turbine would remain shut down and in a safe condition (i.e. commonly with the blades oriented 90° to the wind direction) until restarted by a member of the O&M team following satisfactory investigation. This procedure ensures safe operation of turbines to protect members of the public walking, cycling or riding past turbines during the operational phase. In addition, the vibrometers in the nacelles would detect rotor imbalance in blades caused by icing and the wind turbine's control and monitoring system would shut the turbines down under these conditions. The turbines are also equipped with lightning protection equipment so that strikes will be conducted from the nacelle down the tower into the earth.
- 5.23.15. The safety features and record of wind turbines are identified, and it is concluded that the Proposed Development would not present a significant safety risk to the public.

## 5.24. Conclusion

- 5.24.1. This chapter has set out a description of the Proposed Development and provided details of the activities that will be undertaken throughout the construction, operation and decommissioning phases of the Proposed Development.
- 5.24.2. There is sufficient detail to provide consultees with a reasonable understanding of the Proposed Development. Further construction details will be provided in the CMS, which will be submitted by the PC for approval by THC prior to the construction of the Proposed Development.

# Chapter 6

## Landscape and Visual

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## Glossary

Term	Definition
Baseline studies	'Work done to determine and describe the environmental conditions against which future changes can be measure or predicted and assessed'
Characteristics	'Elements or combinations of elements, which make a contribution to distinctive landscape character.'*
Compensation	'Measures devised to offset or compensate for residual adverse effects which cannot be prevented/avoided or further reduced.'*
Cumulative Landscape & Visual Impact Assessment (CLVIA)	To identify, predict and evaluate potential key effects arising from the addition of the Proposed Development to a theoretical baseline which includes the existing baseline situation of operational wind farms, those under construction and additionally wind farms currently being considered within the planning system that may or may not be present in the landscape in the future.
Direct effect	'An effect that is directly attributable to the proposed development.'*
'Do nothing' situation	'Continued change or evolution in the landscape in the absence of the proposed development.'*
Enhancement	'Proposals that seek to improve the landscape resource and the visual amenity of the proposed development site and its wider setting, over and above it's baseline condition.'*
Environmental Impact Assessment (EIA)	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to an assessment of the likely significant environmental effects arising from a proposed development
Environmental Impact Assessment Report (EIAR)	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
Geographical Information System (GIS)	'A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.'*
Indirect effects	'Indirect effects that result indirectly from the proposed project as a consequence of the direct effects., often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects.'*
Iterative design process	'The process by which project design is amended and improved by successive stages of refinement which respond to growing understanding of environmental issues'*
Key characteristics	'Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place'*
Landcover	'The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.'*
Land Use	'What land is used for, based on broad categories of functional land cover, such as urban and industrial use and the different types of agriculture and forestry.'*
Landform	'The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.'*
Landscape	'An area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors.'*
Landscape & Visual Impact Assessment (LVIA)	'A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.'*
Landscape character	'A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.'*

Term	Definition
Landscape Character Areas (LCAs)	'A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.'*
Landscape Character Assessment (LCA)	'The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscape distinctive. The process results in the production of a Landscape Character Assessment.'*
Landscape Character Types	'These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.'*
Landscape effects	'Effects on the landscape as a resource in its own right.'*
Landscape quality (condition)	'A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.'*
Landscape receptors	'Defined aspects of the landscape resource that have the potential to be affected by a proposal'*
Landscape value	'The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.'*
Magnitude (of effect)	'A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is reversible or irreversible and whether it is short or long term in duration.'*
Panorama	'An image covering a horizontal field of view wider than a single 50mm frame. Wirelines and photomontages may also be produced as panoramas.'**
Perception	'Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources an experiences).'*
Photomontage	'A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs'*
Protected and designated landscapes	'Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.'*
Receptors	'See Landscape receptors and Visual receptors.'*
Scoping	'The process of identifying the issues to be addressed by an EIA. It is a method of ensuring that an EIA focuses on the important issues and avoids those that are considered to be less significant.'*
Sensitivity	'A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.'*
Significance	'A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to environmental topic'*
Susceptibility	'The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.'*
The Applicant	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).
Developer	In the event of the Proposed Development being granted Section 36 Consent, this is the Company developing the Project

Term	Definition
Tranquillity	'A state of calm and quietude associated with peace, considered to be a significant asset of landscape.'*
Visual amenity	'The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.'*
Visual effects	'Effects on specific views and on the general visual amenity experienced by people.'*
Visual receptors	'Individuals and/or defined groups of people who have the potential to be affected by a proposal.'*
Visualisation	'A computer simulation, photomontage or other technique illustrating the predicted appearance of a development.'*
Wirelines	These are also known as wireframes and computer generated line drawings. These are line diagrams that are based on DTM data and illustrate the three-dimensional shape of the landscape in combination with additional elements such as the components of a proposed wind farm.'**
Zone of Theoretical Visibility (ZTV)	'A map, usually digitally produced, showing areas of land within which a development is theoretically visible.'*

\* Taken from Guidelines for Landscape and Visual Impact Assessment, Third Edition. 2013

\*\* Taken from Visual Representation of Wind Farms, Guidance. 2017

## List of Abbreviations

Abbreviation	Description
BESS	Battery Energy Storage System
CMLI	Chartered Member of the Landscape Institute
CMS	Construction Method Statement
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, Third Edition
HES	Historic Environment Scotland
IEMA	Institute of Environmental Management & Assessment
km	Kilometre
LCT	Landscape Character Type
LVIA	Landscape & Visual Impact Assessment
m	Metre
NC500	North Coast 500 (Scenic Coastal Road route)
NP	Natural Power
NSA	National Scenic Area
OUVs	Outstanding Universal Values
PAN	Pre-Application Notice
PLI	Public Local Inquiry
SAC	Special Area of Conservation
SNH	Scottish Natural Heritage (now NatureScot)
SPG	Supplementary Planning Guidance
SSSI	Site of Special Scientific Interest
THC	The Highland Council
WHS	World Heritage Site
WLA	Wild Land Area
ZTV	Zone of Theoretical Visibility

## 6.1 INTRODUCTION

- 6.1.1 This Chapter of the Environmental Impact Assessment Report (EIAR) provides a summary of the Landscape and Visual Impact Assessment (LVIA) of the proposed Watten Wind Farm described in Chapter 5 of this EIAR (herein referred to as the Proposed Development) on the landscape resource and visual amenity within an identified study area.
- 6.1.2 The landscape and visual aspects of the Proposed Development Area have been a key consideration throughout the design process and fed into the design evolution of the Proposed Development and are described in Chapter 4 of this EIAR: Site Selection and Design Evolution.
- 6.1.3 This Chapter of the EIAR should be read in conjunction with the following chapters (Volume 1):
- Chapter 2: Legal and Policy;
  - Chapter 4: Site Selection and Design Evolution;
  - Chapter 5: Project Description;
  - Chapter 7: Ecology;
  - Chapter 9: Hydrology, Geology & Hydrogeology;
  - Chapter 10: Cultural Heritage; and
  - Chapter 13: Aviation and Telecommunication.
- 6.1.4 This Chapter is also supported by the following Technical Appendices (Volume 3), Figures and Visualisations (Volume 2).
- Technical Appendix A6.1: Landscape and Visual Impact Assessment (LVIA) Methodology;
  - Technical Appendix A6.2: Operational and Cumulative Sites;
  - Technical Appendix A6.3: Landscape Character Review and Assessment;
  - Technical Appendix A6.4: Protected & Designated Landscapes Review and Assessment;
  - Technical Appendix A6.5: Wild Land Assessment;
  - Technical Appendix A6.6: Viewpoint Assessment;
  - Technical Appendix A6.7: Sequential Routes Assessment;
  - Technical Appendix A6.8: Settlement Assessment;
  - Technical Appendix A6.9: Residential Visual Amenity Assessment; and
  - Volume 2: LVIA Figures & Visualisations and Cultural Heritage Figures.

## 6.2 PROPOSED DEVELOPMENT

- 6.2.1 The Proposed Development is described in Chapter 5: Project Description and the elements likely to lead to landscape and visual effects are summarised below:
- Up to seven wind turbines with a maximum blade tip height of 220 m (including aviation lights installed on the hubs);
  - Turbine foundations and hardstandings;
  - Onsite substation;

- Battery Energy Storage System (BESS);
- External transformer housing;
- Crane pads;
- New and floating access tracks;
- Underground electricity cables;
- Temporary construction and storage compounds and ancillary infrastructure;
- Site signage;
- Temporary construction gatehouse;
- Habitat management and biodiversity enhancement (see Chapter 7: Ecology for details);
- Waste water and surface water drainage; and
- Forest felling and replanting.

- 6.2.2 Minor further refinement (micrositing) may be required post consent in order to construct the project, this will follow detailed ground investigations and ground clearance and will be allowed up to 50 m from the consented infrastructure locations.

## 6.3 METHODOLOGY

### Statement of Competency

- 6.3.1 This LVIA has been undertaken by Chartered Members of the Landscape Institute (CMLI) from Natural Power Consultants Limited (Natural Power), experienced in undertaking LVIA's of wind farms throughout the United Kingdom and Ireland. This has included providing advice on siting and feasibility of sites, capacity studies for local authorities, detailed wind farm layout design, assessment, mitigation, and preparation of material for Public Local Inquiries (PLI).
- 6.3.2 This LVIA has been prepared in accordance with the principles set out in the *Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3)* (Landscape Institute, Institute of Environmental Management and Assessment (IEMA), 2013), and professional judgement is applied to the assessment of effects and a reasoned justification presented in respect of the findings.
- 6.3.3 Photography has been undertaken by a professional photographer experienced in undertaking specialist day and night-time viewpoint photography to NatureScot and The Highland Council (THC) photography standards for LVIA's and to support evidence at Public Local Inquiry (PLI).
- 6.3.4 Visualisations and supporting LVIA figures have been produced by members of Natural Power Geographical Information Systems (GIS) team, experienced in the provision of GIS mapping, visualisations, and analytical services to all stages of the renewable energy project life cycle.
- 6.3.5 A detailed description of the LVIA process and methodology is included in Technical Appendix A6.1 and summarised in the following section.

### Guidance

- 6.3.6 In addition to GLVIA3, this LVIA takes account of the following guidance documents:
- *GLVIA3 Statement of Clarification 1/13 10-06-13* (Landscape Institute, 2013)<sup>1</sup>;

<sup>1</sup> Landscape Institute. (2013) *GLVIA3 Statement of Clarification 1/13 10-06-13* Available from – <https://www.landscapeinstitute.org/technical-resource/glvia3-clarifications/> [Accessed 02/08/2023]

- *Siting and Designing Wind Farms in the Landscape, Guidance, Version 3a* (SNH, 2017)<sup>2</sup>;
- *Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.* (SNH, Historic Environment Scotland, 2018)<sup>3</sup>;
- *General pre-application and scoping advice for onshore wind farms, Guidance* (NatureScot, 2022)<sup>4</sup>;
- *Landscape Character Assessment, Guidance for England, and Scotland,* (The Countryside Agency and Scottish Natural Heritage (SNH) 2002 Edition)<sup>5</sup>;
- *Technical Guidance Note 02/21, Assessing landscape value outside national designations* (Landscape Institute, 2021)<sup>6</sup>;
- *Technical Information Note 01/2017 (Revised), Tranquillity – An overview* (Landscape Institute, 2017)<sup>7</sup>;
- *Assessing impacts on Wild Land Areas – Technical Guidance* (NatureScot, 2020)<sup>8</sup>;
- *Assessing the Cumulative Impact of Onshore Developments* (SNH, 2021)<sup>9</sup>;
- *Technical Guidance Note 2/19, Residential Visual Amenity Assessment (RVAA)* (Landscape Institute, 2019)<sup>10</sup>;
- *Visual Representation of Wind Farms, Version 2.2,* (SNH, 2017)<sup>11</sup>;
- *Technical Guidance Note 06/19, Visual Representation of Development Proposals* (Landscape Institute, 2019)<sup>12</sup>;
- *Visualisation Standards for Wind Energy Developments* (The Highland Council, 2016)<sup>13</sup>;
- *Guidance on Undertaking Environmental Lighting Impact Assessments* (Institution of Lighting Professionals, 2013)<sup>14</sup>; and
- *Guidance Note 01/21 The Reduction of Obtrusive Light* (Institution of Lighting Professionals, 2021)<sup>15</sup>.

<sup>2</sup> SNH (2017) *Siting and Designing Wind Farms in the Landscape, Guidance, Version 3a* Available from - <https://www.nature.scot/doc/siting-and-designing-wind-farms-landscape-version-3a> [Accessed 02/08/2023]

<sup>3</sup> SNH, Historic Environment Scotland (2018) *Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.* Available from - <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf> [Accessed 02/08/2023]

<sup>4</sup> NatureScot (2022) *General pre-application and scoping advice for onshore wind farms, Guidance* Available from - <https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms> [Accessed 02/08/2023]

<sup>5</sup> Land Use Consultants., Swanwick. C. (2002) *Landscape Character Assessment Guidance for England and Scotland.* Cheltenham. The Countryside Agency, Scottish Natural Heritage.

<sup>6</sup> Landscape Institute (2021) *Technical Guidance Note 02/21, Assessing landscape value outside national designations.* Available from – <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/05/tgn-02-21-assessing-landscape-value-outside-national-designations.pdf> [Accessed 02/08/2023]

<sup>7</sup> Landscape Institute (2017) *Technical Information Note 01/2017 (Revised) Tranquillity – An overview.* Available from - <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2017/02/Tranquillity-An-Overview-1-DH.pdf> [Accessed 02/08/2023]

<sup>8</sup> NatureScot (2020) *Assessing impacts on Wild Land Areas – technical guidance* Available from - <https://www.nature.scot/doc/assessing-impacts-wild-land-areas-technical-guidance> [Accessed 02/08/2023]

<sup>9</sup> NatureScot (2021) *Assessing the Cumulative Impact of Onshore Developments* Available from - <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed 02/08/2023]

### Key Stages of the LVIA

6.3.7 Assessing the potential effects of the Proposed Development on landscape and visual amenity requires a number of stages. These are broadly summarised as follows:

- Establish a suitable study area for undertaking the assessment of the Proposed Development;
- Identify the landscape and visual receptors affected by the Proposed Development;
- Determine the sensitivity of each receptor or group by evaluating the value and susceptibility of the receptor to the Proposed Development;
- Establish the magnitude of change that would result from the Proposed Development considering factors such as the size and scale of the proposed change, the geographical extent, duration, and reversibility of the change; and
- Determine and evaluate the nature of the effect, ultimately forming a judgement with respect to the significance of the effect in the context of the Electricity Works (Environmental Impact Assessment (Scotland) Regulations (2017). An EIA Report is required where significant effects are considered likely and therefore the focus of the LVIA. This does not however mean that non-significant effects are not considered.

### Study Areas

#### LVIA Study Area

6.3.8 The first step of the LVIA is to establish the extent of the study area where significant landscape and visual effects are likely to arise. NatureScot guidance (2017)<sup>16</sup>, recommends an initial study area based on the maximum turbine tip-height. For turbines in excess of 150 m, a 45 km study area is recommended from the outermost turbines. Figure 6.1 of the EIAR shows the extent of the LVIA study area for the Proposed Development.

6.3.9 Therefore, for the purposes of this assessment, a 45 km study area has been applied offset from the outermost turbines of the Proposed Development. It should be noted that the boundary of the study area is not the limit of

<sup>10</sup> Landscape Institute (2019) *Technical Guidance Note 2/19 Residential Visual Amenity Assessment (RVAA).* Available from - <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf> [Accessed 02/08/2023]

<sup>11</sup> Scottish Natural Heritage (2017) *Visual Representation of Wind Farms, Guidance.* Available from - <https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf> [Accessed 02/08/2023]

<sup>12</sup> Landscape Institute (2019) *Technical Guidance Note 06/19 Visual Representation of Development Proposals* Available from - [https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI\\_TGN-06-19\\_Visual\\_Representation.pdf](https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf) [Accessed 02/08/2023]

<sup>13</sup> The Highland Council (2016) *Visualisation Standards for Wind Energy Developments.* Available from – [https://www.highland.gov.uk/downloads/file/12880/visualisation\\_standards\\_for\\_wind\\_energy\\_developments](https://www.highland.gov.uk/downloads/file/12880/visualisation_standards_for_wind_energy_developments) [Accessed 02/08/2023]

<sup>14</sup> Institution of Lighting Professionals (2013) *Professional Lighting Guide 04: Guidance on undertaking Environmental Lighting Impact Assessments..* Rugby. Institution of Lighting Professionals.

<sup>15</sup> Institution of Lighting Professionals (2021) *Guidance Note GN01/21 The Reduction of Obtrusive Light.* Rugby. Institution of Lighting Professionals

<sup>16</sup> Scottish Natural Heritage (2017) *Visual Representation of Wind Farms, Guidance.* Available from - <https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf> [Accessed 02/08/2023]

potential visibility and unlikely to result in significant effects in the professional opinion of Natural Power's Principal Landscape Architect.

### Cumulative Study Area

6.3.10 For the cumulative assessment, an initial study area of 60 km has been identified in accordance with NatureScot guidance (2021)<sup>17</sup>. Data has been collected for sites within 60 km and a review undertaken of sites that are likely to be experienced in conjunction with the Proposed Development through analysis of Zone of Theoretical Visibility (ZTV) mapping and wirelines. Following a site visit, the cumulative study area has been refined to 20 km (see Figure 6.2 and Technical Appendix A6.2) as it is within this area that it was considered that significant cumulative effects are likely to occur.

6.3.11 The extent of the LVIA study area was agreed through consultation with The Highland Council (THC) at Scoping stage.

### Identification of Landscape and Visual Receptors

6.3.12 Once the study area has been defined, the next step is to establish how the Proposed Development may give rise to landscape and visual effects. This is established through an understanding of the following:

- **Integrated Design:** Evolution of the design and layout of the Proposed Development (see Chapter 4: Site Selection and Design Evolution);
- **ZTV mapping:** to establish the extent of theoretical visibility (see Figures 6.3a – b, 6.4, 6.5 and 6.6a-g);
- **Desk-based Study:** A desk-based study has been undertaken to identify landscape and visual receptors, using data listed in Section A6.4 of Technical Appendix A6.1, and shown on supporting figures (Volume 3);
- **Field work:** to verify landscape and visual receptors identified in the desk-based study;
- **Understanding of Project components:** through construction, operation and maintenance, and decommissioning phases (see Chapter 5: Project Description); and
- **Consultation:** with THC and NatureScot through scoping, a pre-application design meeting and subsequent post-scoping correspondence (see Table 6.5, Chapter 6: Landscape and Visual).

6.3.13 This forms the basis of the assessment and aids the identification of the landscape (Landscape Character Types (LCTs), and designated landscapes), and visual baseline likely to be affected, referred to as landscape and visual receptors.

### Field Survey

6.3.14 Site visits were undertaken periodically between September 2022 and April 2023 during periods of good visibility and included visits to the following locations:

- Proposed Development Area to verify landscape features within the application boundary;
- Publicly accessible locations within the wider 45 km study area to identify and assess landscape character and protected and designated landscapes;
- Viewpoint locations to micro-site for photography, undertake baseline photography, record baseline views, and assess the potential changes to the view (including those selected for night-time assessment). These were supported by wirelines showing the proposed turbines;
- Settlements identified by the ZTV as potentially receiving theoretical visibility;

- Route receptors including driving on roads and walking on Core Paths; and
- Residential properties within 3 km of the Proposed Development where access was granted, and where access was denied from the nearest publicly accessible location.

### Identification of Landscape Effects

6.3.15 Assessing effects of the Proposed Development on the landscape requires a number of steps broadly summarised as identifying sensitivity of the landscape receptor, establishing the magnitude or scale of the change likely as a result of the Proposed Development and ultimately forming a judgement with respect to the significance of the effect in the context of The Electricity Works (EIA) (Scotland) Regulations 2017). The identification of significant effects is important because those are the effects that are likely to carry more weight in the decision making (or often referred to as the planning balance). This does not however mean that non-significant landscape effects are not considered.

6.3.16 Combining these judgements together forms an overall evaluation of the significance of the effect.

### Sensitivity of Landscape Receptors

6.3.17 The sensitivity or nature of landscape receptors is defined by the professional judgement of the interaction between the value of the landscape and its susceptibility to the form of change likely to result from the Proposed Development. Definitions of Very High, High, Medium, and Low are used in this LVIA to evaluate sensitivity.

### Landscape Value

6.3.18 Landscape value can be indicated by designation with reference to their importance (international, national, regional, and local level), or with reference to a specific feature or element of the landscape. Landscape value may also be expressed by other factors described in Box 5.1 (GLVIA3, page 84) which can aid the identification of valued landscapes.

6.3.19 Landscape receptors may be valued at an international, national, local and community level. Evaluating landscape value can be very subjective but landscape designations including the designation of landscape elements such as Ancient Woodland for example provide a useful starting point to this process.

6.3.20 Other areas of landscape or landscape elements may not be formally recognised by designation but may still have value, particularly in the local context by most sectors of the community. Landscape planning policy including landscape character assessments and landscape capacity studies can also give an indication of value.

6.3.21 The criteria of factors in the identification of landscape value are set out in Technical Appendix A6.1.

### Landscape Susceptibility to Change

6.3.22 Susceptibility is defined in paragraph 5.41 of GLVIA3 by the ability of a landscape receptor to accommodate the Proposed Development without undue consequences for the following:

- Overall character or quality/condition of a landscape type/area;
- An individual element and/or feature; and
- A particular aesthetic/perceptual aspect.

6.3.23 The criteria of factors in the identification of landscape susceptibility are set out in Technical Appendix A6.1.

<sup>17</sup> NatureScot (2021) Assessing the Cumulative Impact of Onshore Developments Available from - <https://www.nature.scot/doc/guidance-assessing-cumulative-landscape-and-visual-impact-onshore-wind-energy-developments> [Accessed 02/08/2023]

**Landscape Magnitude of Change**

- 6.3.24 GLVIA3 advises that judgements of magnitude of change are assessed in terms of the size and scale, geographical extent, duration, and reversibility of the change likely to result from the Proposed Development. However, the process of combining all three considerations can lead to a distortion of significant effects. For example, a significant effect may be downgraded if a higher rating of magnitude of change based on size and scale is applied, combined with a small geographical area being affected across a short duration. Therefore, for the purposes of this LVIA, the magnitude of change will focus on the size and scale of the change occurring and geographical extent over which the change occurs. The duration and reversibility will be stated separately when reporting effects.
- 6.3.25 The worst-case scenario is considered for the assessment of magnitude of change of all landscape effects. All changes to visibility are considered as they would occur in winter conditions with minimal screening by vegetation and deciduous trees.

*Size & Scale*

- 6.3.26 The size and scale of the proposed change can refer to individual elements and features (including aesthetic and perceptual elements) that will be lost or changed and the proportion this represents of the total extent within the landscape, and the contribution that the feature or element makes to the character of the landscape. At a broader scale, the size and scale of the change to landscape character is dependent on the degree to which the character of the landscape is changed or alteration to the key characteristics and is subject to the distance from the Proposed Development.

*Geographical Extent*

- 6.3.27 This refers to the geographical extent over which the landscape change will occur. It is described as being limited at site level, to the immediate site setting (or local area) and to the wider area, across some or all of the Proposed Development Area, LCTS or protected and designated landscape affected.

*Determination of Magnitude of Landscape Change*

- 6.3.28 The relationship between the size, scale and geographical extent are assessed to determine the overall nature of the change resulting from the introduction of the Proposed Development. The duration and reversibility of the change are stated separately.
- 6.3.29 Six levels of magnitude. High, High-medium, Medium, Medium-low, Low and Negligible/No Change are outlined in Table 6.1.

Table 6.1: Levels of Landscape Magnitude of Change

Level of Magnitude	Definition of Magnitude
<b>High</b>	The introduction of the Proposed Development would lead to large-scale changes and/or major losses of key landscape features / characteristics, or the addition of large scale or new uncharacteristic features or elements that would alter the character of the landscape or affect the special qualities of a designated landscape. A large geographical extent or area close to the Proposed Development would be affected.
<b>High-medium</b>	An intermediate rating where both the High and Medium magnitude of change criteria apply.
<b>Medium</b>	The introduction of the Proposed Development would lead to a medium scale change or loss of some key landscape features / characteristics, or the addition of some new medium scale uncharacteristic features or elements that would partially alter the character of the landscape or affect the special landscape qualities of a designated landscape. A localised geographical extent at an intermediate distance from the Proposed Development would be affected.
<b>Medium-low</b>	An intermediate rating where both the Medium and Low magnitude of change criteria apply.
<b>Low</b>	The introduction of the Proposed Development would lead to a small-scale change and minor loss of a few landscape features / non key characteristics, or the addition of some new small-scale uncharacteristic features or elements of limited characterising influence on the character of the landscape or special qualities of a designated landscape. A small partial change to a localised geographical extent at some distance from the Proposed Development.
<b>Negligible/No Change</b>	The introduction of the Proposed Development would result in a very small-scale change that may include the loss or addition of some landscape features of limited characterising influence. The landscape characteristics and character would be unaffected. A very small geographical extent at greater distances from the Proposed Development would be affected.

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- 6.3.30 The determination of the magnitude of effect additionally considers the distance from the site at its closest point, potential changes to principal views from within and towards the LCT and designated landscape, and potential effects on the integrity of the designated landscape, including the extent to which it could affect the for the key characteristics of the LCT and special qualities/attributes of the designation.

**Identification of Visual Effects**

- 6.3.31 Assessing the significance of visual effects of the Proposed Development requires several steps including identifying the sensitivity of the visual receptor, identifying the magnitude or scale of the change to the receptors view, prior to forming a judgement with respect to the significance of the effect in the context of the Electricity Works (EIA) (Scotland) Regulations 2017.
- 6.3.32 Combining these judgements together forms an overall evaluation of the significance of the effect.

**Sensitivity of Visual Receptors**

- 6.3.33 The sensitivity of visual receptors is defined by the relationship between the value of views and the susceptibility of different types of viewer to the proposed change. This is not formulaic and can be a complex relationship with different combinations possible. Professional judgement is used to evaluate this complex relationship between value and susceptibility to determine the overall sensitivity of the visual receptor to the Proposed Development. Definitions of Very High, High, Medium, Medium-low, Low or Negligible are used in this LVIA to evaluate sensitivity.

*Value of View*

- 6.3.34 Different groups of people attach different levels of value to particular views. Determining the value of a view therefore takes account of the following factors:
- Formal recognition of the view through the presence of planning designations;
  - Importance in relation to heritage assets (such as designed views);
  - Popularity of the viewpoint; and
  - Indicators of the value attached to views by visitors through appearances in promotional tourist literature and the provision of tourist facilities.

6.3.35 Value can also be attributed to the numbers of people using a route receptor or visiting an attraction. For example, a popular attraction is often considered more sensitive than a less visited attraction. However, there are exceptions to this such as motorways and some railway lines which have a higher number of people but are considered to be of lower value; or more remote locations with fewer people visiting but are considered to be of higher sensitivity.

6.3.36 Definitions of Very High, High, Medium, Low, and Very Low are used in this LVIA to evaluate the value of view.

*Susceptibility of View*

6.3.37 This aspect of the nature of the receptor refers to the susceptibility of the viewer to the proposed change, not the view. The susceptibility of visual receptors to changes in views is a function of the occupation or activity of people experiencing the view and the extent to which their attention is focused on views.

6.3.38 Viewers of higher susceptibility to changes in views are generally those whose attention or interest is focused on their surroundings, such as residents, walkers, and visitors to attractions.

6.3.39 Viewers of lower susceptibility to changes in views include people travelling on non-scenic routes and people at their place of work whose attention is not on their surroundings and where setting is not important to their quality of working life.

**Visual Magnitude of Change**

6.3.40 In accordance with the principles set out in GLVIA3, the nature or magnitude of the change on visual receptors considers the size and scale, geographical extent, duration, and reversibility of the change likely to result from the Proposed Development.

6.3.41 Similar to the landscape assessment of magnitude of change, the visual assessment focusses on the size and scale of the change occurring within the view and the geographical extent over which the change occurs. Duration and reversibility are stated separately in significance of effects.

6.3.42 A worst-case scenario is considered for the assessment of magnitude of visual change. All changes to views are considered as they would occur in winter conditions with minimal screening by vegetation and deciduous trees. ZTVs and wireframes are similarly displayed on the basis of bare ground and therefore demonstrate the maximum extent of visibility possible, in the absence of buildings or vegetation.

6.3.43 The relationship between all of the above factors is assessed to determine the overall nature of the visual change resulting from the introduction of the Proposed Development. This results in six levels of magnitude: High, High-medium, Medium, Medium-low, Low and Negligible/No Change as follows:

**Table 6.2: Levels of visual magnitude of change**

Level of Magnitude	Definition of Magnitude
<b>High</b>	Major visual change which causes a complete or substantial change in the view as a result of loss of important features or the addition of significant new ones, to the extent that the composition of the view is substantially altered. The change is experienced from many locations across the study area, from the majority of a linear route or from most areas within a specific location and/or by a large number of viewers.
<b>High-medium</b>	An intermediate rating where both the High and Medium magnitude of change criteria apply.
<b>Medium</b>	Moderate visual change which causes a noticeable change in the view as a result of the loss of features or the addition of new ones, to the extent that the composition of the view is altered to a moderate degree. The change is experienced from a moderate number of locations across the study area, from a moderate part of a linear route or proportion of an area within a specific location and/or by a moderate number of viewers.
<b>Medium-low</b>	An intermediate rating where both the Medium and Low magnitude of change criteria apply.
<b>Low</b>	Minor visual change which causes a perceptible change in the view as a result of the loss of features or the addition of new ones, to the extent that this partially alters the composition of the view. The change is experienced from a small number of locations across the study area, from only limited sections of a linear route or from a small proportion of an area within a specific location and/or by a small number of viewers.
<b>Negligible/No Change</b>	Negligible visual change which causes a barely perceptible change or no change in the view as a result of the loss of features or the addition of new ones, to the extent that this barely alters the composition of the view. The change is either not visible or seen by viewers from only one or two locations across the study area, from very limited sections of a linear route or from hardly any locations within a specific area and/or by only a very small number of viewers.

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**Cumulative Assessment**

6.3.44 The aim of the Cumulative Landscape and Visual Impact Assessment (CLVIA) is to identify, predict and evaluate potential key effects arising from the addition of the Proposed Development to a theoretical baseline which includes the existing baseline situation of operational wind farms, those under construction and additionally wind farms currently being considered within the planning system that may or may not be present in the landscape in the future.

6.3.45 The methodology for CLVIA follows good practice guidance as set out in the GLVIA3 and *Assessing the Cumulative Effects of Onshore Wind Energy Developments* (NatureScot, 2021).

**Differences between LVIA and CLVIA**

6.3.46 Although both LVIA and CLVIA look at the effects of the Proposed Development on landscape character and visual amenity, there are differences in the baseline against which the assessments are carried out. For the LVIA, the baseline includes operational wind farm developments which are present in the landscape at the time of undertaking the assessment, which may be either operational or under construction. In CLVIA the baseline is partially speculative.

6.3.47 For the purposes of this assessment, the cumulative baseline is divided into different scenarios which reflect which groups of wind farm developments are assumed to be present in the landscape. The existing scenario of operational wind farms and those under construction is assessed in the LVIA and is referred to as **Scenario 1**. The CLVIA considers the following scenarios:

- **Scenario 2:** considers the addition of the Proposed Development in the context of operational wind farms, those under construction and additionally those developments currently consented. This represents the likely future scenario; and
  - **Scenario 3:** the addition of the Proposed Development in the context of operational, under construction, and consented schemes, together with undetermined planning applications i.e., a less certain future scenario.
- 6.3.48 Operational, consented and application sites are listed in Technical Appendix A6.2.
- 6.3.49 An initial search area of 60 km from the Proposed Development (see Figure 6.13) was delineated and a list was prepared including all operational schemes, those schemes under construction, consented schemes, those schemes in the planning system as valid applications. Recently withdrawn sites have not been included and those sites registered with a Pre-Application Notice (PAN), are not finalised applications and have therefore not been included as a valid application and are up to date as of 1st March 2023.
- 6.3.50 Using this initial Search Area list of developments, an initial cumulative desktop and site assessment was carried out by a CMLI to identify a suitable cumulative baseline (or Cumulative Study Area). In accordance with NatureScot guidance (2021), the initial Search Area list was therefore refined to establish which turbine developments were of most relevance to the cumulative assessment for the proposal. As the guidance states *'the key principle for all cumulative impact assessments is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process'*. (NatureScot, 2021).
- 6.3.51 The Cumulative Study Area or cumulative baseline for windfarms was therefore defined to include those developments it was considered required further cumulative assessment. These included all consented, and valid planning applications within an approximate 20 km radius (see Figure 6.14) from the proposed site with additional developments to reflect potential sequential and cumulative viewpoints.
- 6.3.52 It should be noted that the cumulative baseline represents the *'maximum development scenario.'* It considers the effects of the Proposed Development in addition to other developments that do not yet exist in the current landscape, but which may exist in the future. This results in a high level of uncertainty in the cumulative baseline as not all of the other undetermined proposals will necessarily gain planning approval.
- 6.3.53 The methodology for the CLVIA follows that of the LVIA as set out in Technical Appendix A6.1. The key additional steps in the CLVIA are as follows:
- Preparation of ZTV maps for each of the other existing or proposed wind farms and combining them to inform the assessment of scenarios and relationships (see Figures 6.15 – 6.16b); and
  - Particular attention to the relationships between wind farms in the baseline for each scenario, and how those relationships will change with the addition of the Proposed Development.
- 6.3.54 The susceptibility of receptors may be affected by the presence of other wind energy developments. Some viewers may consider that susceptibility is reduced because other wind farms are 'already there', but for others it may be that sensitivity is increased because more development would be 'too much'. However, to retain a consistent and objective approach, the susceptibility of receptors used for the cumulative assessment is taken to be the same as that identified in the LVIA. The value of the receptor would also remain the same in the cumulative assessment and therefore the overall sensitivity of the receptor is considered to be the same as judged in the LVIA.
- 6.3.55 In this CLVIA, cumulative effects are reported as the additional effects of the introduction of the Proposed Development, should other cumulative schemes be present in the different baseline scenarios, over and above the effects identified in the LVIA (Scenario 1). For each receptor, it is clarified as to whether the effect has increased or decreased relative to the LVIA assessment, and where necessary the CLVIA states where there will be no cumulative effects over and above those identified in the LVIA assessment.

## Effects from Aviation Lighting

- 6.3.56 The International Civil Aviation Organisation (ICAO) set out the recommended standards and practices for aviation which is implemented in European airspace by the European Aviation Safety Agency (EASA) and includes the practices for lighting of obstacles such as wind turbines. ICAO (2018) indicates a requirement for no lighting to be switched on until 'Night' has been reached, as measured at 50cd/m<sup>2</sup> or darker.
- 6.3.57 Aviation lighting requirements will be discussed and agreed with the Irish Aviation Authority (IAA) and will give due consideration to the most up to date IAA guidance in relation to marking of offshore wind farms. Therefore, the Proposed Development will require aviation lighting to be deployed on the nacelles of the wind turbines. For the purposes of the LVIA, all turbines are assumed to be lit.
- 6.3.58 The assessment of aviation lights mounted on wind turbines on the night-time baseline follows the same methodology used for the assessment of landscape, visual and cumulative effects. This includes the study area, and combines the sensitivity of the receptor at night-time, with the magnitude of change to determine the level of effect likely to result from the aviation warning lights. The evaluation of significance and the nature of these effects is also described following the methodology set out in this Technical Appendix A6.1.
- 6.3.59 The only difference is that the assessment is conducted during periods of dawn to dusk and assesses the baseline night-time environment against the proposed aviation warning lights, fitted to the Proposed Development wind turbines. It is important to note, the LVIA night-time assessments are not technical lighting assessments based on quantitative measurements of light levels but rely on professional judgement of what the human eye can perceive.
- 6.3.60 GLVIA 3 (para 6.12, page 103) provides the following guidance on the assessment of lighting effects:
- 'For some types of development the visual effects of lighting may be an issue. In these cases it may be important effects of lighting and these effects need to be taken into account in generating the 3D model of the scheme. Quantitative assessment of illumination levels, and incorporation into models relevant to visual effects assessment, will require input from lighting engineers, but the visual effects assessment will also need to include qualitative assessments of the effects of the predicted light levels on night-time visibility.'*

## Night-time Sensitivity

- 6.3.61 Landscapes can be recognised as places of exceptional dark night skies where people have committed to keep skies dark through the control of light pollution. Similar to landscape designations, this can be recognised through designation at international level such as Dark Sky Parks, or at a local level through the special qualities of a national or local e designation. Similarly, some landscapes may not be formally designated for their dark skies but may be promoted as tourist destinations based on their dark sky attributes or through community led projects.
- 6.3.62 At night-time, the existing baseline lighting will influence the susceptibility of people experiencing the landscape. For example, receptors within settlements or travelling along roads where artificial lighting occurs in the form of street lighting, lights on properties and travelling vehicles is likely to be lower than from rural areas where artificial lighting is limited.

## Night-time Magnitude of Change

- 6.3.63 Changes occurring at night-time assume a worst-case scenario during clear moonlight or summer nights when the levels of darkness are at the lightest. Table 6.3 provides a detailed description of night-time magnitude of change.



Table 6.6.3: Magnitude of Change for Night-time Assessment

Level of Night-time Magnitude of Change	Definition of Magnitude of Change
<b>Very High</b>	A complete or substantial change to the night-time baseline as a result of experiencing aviation/navigation lights at close distances where light intensities will be greatest, and/or where there is a high degree of contrast. The addition of aviation lights will be obtrusive and diminish the night-time baseline.
<b>High</b>	A high to moderate scale change to the night-time baseline as a result of experiencing aviation/navigation lights at relatively close distances, and/or where there is a high degree of contrast. The addition of aviation lights will be obtrusive and diminish the night-time baseline.
<b>Medium</b>	A moderate scale change to the night-time baseline as a result of experiencing aviation/navigation lights at middle distances where light intensities will be greatest, and/or where there is a moderate degree of contrast. The addition of aviation lights may diminish the night-time baseline.
<b>Low</b>	A small-scale change to the night-time baseline as a result of experiencing aviation/navigation lights at longer distances where light intensities will be reduced, and/or where there is a small degree of contrast. The addition of aviation lights will not be obtrusive or diminish the night-time baseline.
<b>Very Low</b>	There would be no or barely perceptible change to the night-time baseline as a result of aviation/navigation lights being distant, or partially screened, and/or where there is no degree of contrast. The addition of aviation lights is not considered to be obtrusive.

and experience. The matrix below is considered as a guide only, and any deviation is clearly explained in the assessment.

**Night-time Effects**

6.3.64 Night-time effects are assessed through a combination of night-time sensitivity, combined with a night-time magnitude of change. Significant effects will occur where the aviation lights would substantially to moderately change the character of the current baseline environment.

**Judging the Levels of Significance of Effects**

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

6.3.66 An overall judgement is made on the nature of the receptor and the likely change resulting from the Proposed Development. This judgement is based on evaluations of the individual aspects of value, susceptibility (sensitivity), size and scale, geographical extent, duration, and reversibility (magnitude). The table below illustrates the main levels of effect that are used in this LVIA; Major, Moderate, Minor and Negligible / No change. Two intermediate combinations are also used for determining effects; Major-moderate and Moderate-minor. The table is not a prescriptive tool, and the evaluation of potential effects makes allowance for the use of professional judgement

Table 6.4: Determination of Significance of Effect Matrix

Sensitivity of Receptor	Magnitude of Change					
	High	High-medium	Medium	Medium-low	Low	Negligible/No Change
Very High	Major (significant)	Major (significant)	Major-moderate (significant)	Moderate (significant / not significant)	Moderate-minor (not significant)	Minor (not significant)
High	Major (significant)	Major-moderate (significant)	Moderate (significant / not significant)	Moderate (significant / not significant)	Moderate-minor (not significant)	Minor (not significant)
Medium	Major-moderate (significant)	Moderate (significant / not significant)	Moderate (significant / not significant)	Moderate-minor (not significant)	Minor (not significant)	Minor (not significant)
Low	Moderate (significant / not significant)	Moderate (significant / not significant)	Moderate-minor (not significant)	Minor (not significant)	Minor (not significant)	Negligible / No Change (not significant)
Very Low	Moderate (significant / not significant)	Moderate-minor (not significant)	Minor (not significant)	Minor (not significant)	Negligible / No Change (not significant)	Negligible / No Change (not significant)

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- 6.3.67 Once the level of effect has been established, a judgement is then made as to whether the level of effect is considered significant or non-significant as required by the EIA Regulations. For the purposes of this LVIA, effects of **Major, Major-moderate** and **some Moderate** are all considered **significant** in the context of the EIA Regulations. Levels of effect judged to be Moderate shown in the light green boxes have the potential to be either significant or not significant. This is dependent on the level of sensitivity and magnitude of change and based on professional judgement. A full justification for level of significance is provided where this occurs.
- 6.3.68 As a precautionary approach, effects on landscape character and visual amenity are considered in this LVIA to be adverse. It should be noted that not all people would experience effects on landscape character, views, and visual amenity as adverse, as people’s perception of wind turbines vary between negative and positive attitudes. An additional point is that simply because wind turbines are visible from a particular location or receptor, this does not mean that the effect is significant. In some instances, there may be likely significant effects on the landscape resource, but the Proposed Development may be in a location that does not affect visual amenity in a significant way. It is also possible that there may be likely significant effects on visual amenity without effects on the landscape resource.

### Duration and Reversibility

- 6.3.69 The duration and reversibility of landscape and visual effects is based on the period over which the Proposed Development is likely to exist (during construction and operation), and the extent to which it would be removed (during decommissioning) and the effects reversed at the end of that period. Long-term, medium-term, and short-term landscape effects are defined as follows:
- Permanent: The introduction of project components that will not be decommissioned, removed, or reinstated;
  - Temporary: The introduction of project components that will be time limited such as during construction or decommissioning works as follows:
    - Long-term: more than 10 years;
    - Medium-term: six to 10 years; and
    - Short-term: one to five years.
- 6.3.70 Reversibility is related to whether the change can be reversed at the end of the development’s lifecycle (including the end of construction or decommissioning which would be short term reversible). For example, operational effects related to the presence of turbines are considered to be reversible as they will be removed during decommissioning at the end of the operational lifespan.

### Supporting Figures and Visualisations

#### Zone of Theoretical Visibility

- 6.3.71 ZTVs have been generated to aid the understanding of the extent of theoretical visibility of the Proposed Development from the initial feasibility stages, through the evolution of the layout design, and have informed the extent of the study area and identification of landscape and visual receptors that are likely to be affected.
- 6.3.72 ZTVs have been produced to show the maximum overall tip height and hub height of the proposed turbines, and to predict where aviation lighting will potentially be visible. The ZTVs are based on bare-ground and takes no account of the potential screening effects of intervening factors such as buildings, vegetation, recent modifications to landform, or weather conditions.
- 6.3.73 This represents the worst-case scenario and over represents the extent of visibility of the Proposed Development. It is important to note, ZTVs indicate areas from where the Proposed Development is theoretically visible within the study area and does not indicate the nature or magnitude of change to landscape or visual amenity.
- 6.3.74 A series of ZTV maps have also been produced to support the night-time assessment (see Figures 6.6 and 6.6a-g). The ZTVs provide an illustration of potential light intensities from the aviation lights, both as an overview, and individually for each lit turbine.

#### Supporting Figures

- 6.3.75 Supporting figures have been produced to show the extent of the study areas considered, LCTs, protected and designated landscapes, visual receptors and cumulative developments located within the study area. The data for these figures has been obtained from publicly accessible websites, fieldwork and a desk review of relevant literature and guidance concerning the identified landscape and visual receptors likely to be affected by the Proposed Development.

**Photography**

6.3.76 Baseline photography has been undertaken by a professional photographer for viewpoint locations used in the LVIA and Cultural Heritage assessments, and for the Residential Visual Amenity Assessment (see Technical Appendix A6.9).

**Wirelines and Visualisations**

6.3.77 A series of wirelines and visualisations for both the LVIA and Cultural Heritage viewpoint assessments have been produced (see Volume 3). Additionally, a separate Volume of visualisations has been produced to THC visualisation requirements.

6.3.78 Technical Appendix A6.1 sets out details regarding the photography and the production of ZTVs, wirelines and visualisations.

**6.4 CONSULTATION**

6.4.1 A scoping request was submitted to the Energy Consents Unit (ECU), on the 7th of June 2022 (Ref ECU 00 00 45 09) This contained detailed and focused LVIA questions pertaining to the overall methodology of the LVIA and the landscape, visual and cumulative receptors to be assessed. A Scoping Opinion was issued by the ECU on the 2nd of September 2022 which included a response to the LVIA questions from relevant consultees as summarised below in Table 6.5 along with details of how these have been addressed in the LVIA.

**Table 6.5: Summary of Consultation Responses**

Consultee	Comment	Response
The Highland Council	<i>THC expects the EIAR to consider the landscape and visual impact of the development. The Council makes a distinction between the two. While not mutually exclusive, these elements require separate assessment and therefore presentation of visual material in different ways.</i>	The assessment of landscape and visual amenity is set out in separate sections in the Chapter and supporting appendices. Volume 2 of the EIAR and follows the principles set out in GLVIA3 (see Technical Appendix A6.1).
	<i>All elements of the development should be included in the photomontages (including borrow pits and access roads) and should be considered within the EIAR.</i>	Due to the low-lying nature of landform combined with nearby forestry, the supporting infrastructure would not be visible from the viewpoints assessed.
	<i>Cumulative Landscape and Visual Impacts should take into account the existing and planned local windfarms. Up to date info can be found on THC windmap.</i>	The operational and cumulative wind farms considered were informed by the most recent information available from THC wind farm map (see Technical Appendix A6.2).
	<i>The finalised list of viewpoints and wireframes must be agreed with THC and NatureScot in advance of preparation. It must include sequential route analysis wirelines for the A9, A882 and B870.</i>	Further consultation with THC and NatureScot regarding viewpoint locations was undertaken post-scoping. Viewpoints have been chosen to reflect sequential effects. Additionally, a sequential route assessment has been undertaken (see Appendix A6.7).

Consultee	Comment	Response
	<i>Viewpoints should correspond with the viewpoints used for existing local wind energy schemes.</i>	Viewpoint locations have been informed by those chosen for assessment of nearby wind farms.
	<i>Viewpoints should have a purpose and be labelled accordingly. E.g., Landscape Assessment, Visual Impact Assessment, Cumulative assessment, Sequential Assessment, Representative View, Designated site, Community, Individual Property.</i>	Details of representation have been provided for each viewpoint assessed, see Technical Appendix A6.6.
	<i>Recreational Route Assessment should include Core paths, National Cycle Network, Long Distance Trails.</i>	Noted, recreational route receptors have been included in the sequential route assessment, see Technical Appendix A6.7.
	<i>The study area for the cumulative LVIA (CLVIA) should extend to a minimum of 60km.</i>	An initial 60 km study area has been considered for cumulative developments and refined following a field visit.
	<i>Images for this project should be presented using the THC Panoramic Digital Viewer.</i>	Noted.
	<i>The LVIA will be assessed against the criterion set out in the OWESG document.</i>	The OWESG document was considered during the layout design and considered in Section 6.10.
	<i>The turbine heights are above 149.5m therefore aviation lighting on the turbines will be required. The LVIA should include a proportionate night-time assessment of the aviation lighting. Methodology for this must be agreed with THC and NatureScot.</i>	The potential effects of aviation lighting have been assessed for both landscape and visual receptors.
NatureScot	<i>Landscape and Visual Impacts. The proposal has the potential to significantly impact on the nearby wildland areas (Knockfin flows, and East Halladale Flows). A Wild Land Assessment is therefore required.</i>	A Wild Land Assessment has been undertaken for both the Knockfin Flows and East Halladale Flows WLA, see Technical Appendix A6.5.
	<i>The assessment of Landscape and Visual Impacts (including cumulative impacts) with other wind turbine developments in this area will also be required. In particular the in combination effects with nearby and existing turbines will need to be carefully considered given the exceptionally large scale of turbines proposed.</i>	Noted, the Wild Land Assessment has considered operational and cumulative developments as detailed in Appendix 6.5: Wild Land Assessment.
	<i>We do not agree that a Wild Land Assessment is scoped out of the EIA...Predicted visibility will extend into both the Causeymire-Knockfin Flows WLA and East Halladale Flows WLA.</i>	A Wild Land Assessment has been undertaken for both the Knockfin Flows and East Halladale Flows WLA, see Technical Appendix A6.5.
NatureScot	<i>The Landscape Sensitivity Appraisal for Caithness (2017)<sup>18</sup> advises that turbines should concentrate and consolidate with existing development, continue the scale, form and proportions of existing and consented</i>	Consideration of the layout and tip heights of operational wind farms has been considered during the design stages, see Chapter 4.

<sup>18</sup> Development guidance- onshore wind energy: Addendum supplementary Guidance: ' Part 2b' December 2017 [online] , available from [Development guidance - Onshore wind energy | The Highland Council.](#) [Accessed 02/08/2023]

Consultee	Comment	Response
	development and avoid unnecessary cumulative effects. We highlight this specifically as the proposed turbine heights for this development are of very large scale in comparison to the existing turbines in this area.	
	With reference to our comments above we are in broad agreement with the proposed approach to the LVIA. We welcome the developer's intention to undertake a turbine lighting assessment.	Noted

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6.4.2 Natural Power (NP) on behalf of EDF Energy Renewables Ltd (the Applicant) undertook a pre-application meeting with THC and NatureScot. This reviewed a number of different layouts described in Chapter 4: Site Selection. Table 6.5 provides details of the concerns raised by THC and the response provided within this EIAR.

**Table 6.5: Summary of Pre-Application Consultation and Response**

Consultee	Comment	Response
<b>The Highland Council Pre-application Meeting 12<sup>th</sup> September 2022</b>	Key design viewpoints should include all within 5km (8, 10,13) and extend to Nos 1,2 and 9 beyond 5km.	The viewpoints highlighted have been used during the design process.
	<i>The gap between Halsary and Watten isn't so much of an issue (within 10km?)</i>	Noted.
	<i>Dunnet Head should be considered, distance versus height of proposed turbines should be taken into account, worthwhile running a wireframe to understand the relationship of the development with Halsary and Bad a Cheo cluster from the SLA etc... This is a panoramic viewpoint and SLA, sensitive to views looking inland from the SLA.</i>	The ZTV shown in Figure 6.3a shows that there will be theoretical visibility of seven turbines within parts of the Dunnet Head SLA. The Proposed Development is 16.0km from the southern edge of the SLA and 24km from the panoramic viewpoint itself. An extra viewpoint (Viewpoint 20) has been added at the Dunnet Head.
	<i>The relationship between the Proposed Development and existing windfarm clusters should be considered from the SLA (The Flow country and Berriedale Coast SLA). Especially cluster 1 (Halsary, Bad a Cheo etc...) and Cluster 2 (Bilbster, Camster etc...).</i> <i>"Amalgamating clusters is considered a negative impact."</i>	The Flow Country and Berriedale Coast SLA is assessed in Technical Appendix A6.4: Protected and Designated Landscapes.
	<i>The main site constraints are: Deep peat, Aviary, watercourses, flood risk, noise, Cultural Heritage, OHL, T8 over sail of boundary, access to site (likely to be via Halsary WF to southwest of site).</i>	Noted, these are considered in other chapters of the EIAR.
	<ul style="list-style-type: none"><li><i>The initial wireframes have highlighted a few key issues with the site design from the following viewpoints of the site (VP4, 5, 7, 8, 11, 13, 18).</i></li></ul>	Noted, these considerations have been considered in the layout design.

Consultee	Comment	Response
	<i>Main issues are outlier turbines, unbalanced composition, foremost turbines appear noticeably larger than the rest.</i>	The overall size of the turbines is dependent on the elevation of the viewer and is highlighted in the LVIA.
	<i>No immediate or obvious issues from VP 9 or VP13.</i>	Noted
	<i>The farmed and settled landscape to the north and east of the site will have extensive visibility of site due to topography.</i>	Noted, the character of this area and views to the south and south west have been considered in this LVIA.
	<i>Foremost turbines appear noticeably larger in scale to the rest of the turbines in the array.</i>	
	<i>The wirelines show this site looks like a 'infill development between different clusters (Halsary/Bad a Cheo, and Bilbster/ Camster when viewed from several places).</i>	The design intention is to utilise the OSWESG guidance and respect the existing pattern and separation between windfarm developments in this site design.
	<i>In terms of the pattern of development and the retention of the identity of the proposed and existing wind farms is not considered to be of concern at this time in so far as it related to the spacing between Halsary and Watten.</i>	Noted
	<i>Core paths within a 45km study area should be identified</i>	Following a site visit, Core Paths within 15 km have been considered in the assessment (see Appendix 6.7) as this is the area where likely significant effects are likely to occur.
	<i>Routes including railways should be included.</i>	Noted. There are two viewpoints at railway crossings: Scotsclader Station (VP 5) and Georgemas Station (VP 3) and the railway line has been considered in the sequential route assessment (see Technical Appendix A6.7).
	<i>The 45km study area includes offshore windfarms, these should be included in the sequential assessment of routes.</i>	Offshore wind farms have been included in the assessment of sequential effects on route receptors (see Technical Appendix 6.7).
	<i>Can the development sit within a specific windfarm cluster (Halsary/Bad a Cheo or Bilbster/Camster).</i>	This location has been chosen as a potential wind farm due to its location to existing operational sites and grid connection.
	<i>Potential solutions to improve the design: reassess outlier turbines, create even gaps between turbines is preferred, consider different sizes of turbines to reduce effects of topography. Identify if the development can sit within a specific cluster (Halsary/ Bad a Cheo, or Bilbster / Camster</i>	The layout has been developed with consideration to technical constraints detailed in this EIAR.
	<i>Use the criteria in the OSWESG Onshore wind energy supplementary guidance to refine the design of the development.</i>	Noted, this document will be referred to in the site design and this assessment.

Consultee	Comment	Response
	Ten criteria in the OWESG that need to be considered.	Noted, this document has been considered during the layout design, see Section 6.10 of this chapter.
	1. Relationship between settlements/key locations and wider landscape is respected.	
	2. Key gateway locations and routes are respected.	
	3. Valued natural and cultural landmarks are respected.	
	4. The amenity of key recreational routes and ways is respected.	
	5. Amenity of transport routes is respected	
	6. The existing pattern of Wind energy Development is respected.	
	7. The need for separation between developments and /or cluster is respected	
	8. The perception of landscape scale and distance is respected.	
	9. Landscape setting of nearby wind energy developments is respected.	
	Distinctiveness of Landscape Character is respected.	

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## 6.5 LEGISLATION POLICY AND GUIDANCE

6.5.1 The relevant national and local planning policies are considered in detail in Chapter 2: Legal and Policy Context.

6.5.2 The Development Plan for the Proposed Development comprises:

- NPF 4 2023;
- The Highland wide Local Development Plan 2012 (HwLDP);
- Caithness and Sutherland Local Development Plan 2018 (CaSPlan); and
- The Onshore Wind Energy Supplementary Guidance (2016) and addendum (2017) (OWESG).

### Highland-wide Local Development Plan (HwLDP)

6.5.3 The HwLDP was adopted in April 2012. Preparation of the second HwLDP (HwLDP 2) is underway, with preparatory stages such as the Main Issues Report complete and published. There is no anticipated date that the HwLDP 2 is to be adopted as THC has indicated that further review of the current HwLDP will be postponed until after the implications of the Scottish Planning Bill (2017) are better understood. It is understood that following the approval of NPF4, THC will move forward with the preparation of HwLDP 2. The HwLDP is therefore considered to be a relevant Local Development Plan; however, it is noted that the weight to be attached to the HwLDP is decreased as it is over 5 years old.

6.5.4 The HwLDP states:

*'The Highland area has great potential for renewable energy production and to contribute towards meeting ambitious targets set internationally, nationally and regionally.'*

6.5.5 The HwLDP advises that THC will safeguard its environment by ensuring that the development of renewable energy resources is managed effectively with clear guidance on where renewable energy should and should not be located.

6.5.6 The key policies that are relevant to LVIA include:

- Policy 28 – Sustainable Design;
- Policy 55 – Peat and Soils;
- Policy 57 – Natural, Built and Cultural Heritage;
- Policy 60 – Other Important Habitats;
- Policy 61 – Landscape;
- Policy 62 – Geodiversity;
- Policy 63 – Water Environment; and
- Policy 77 – Public Access.

### Caithness and Sutherland Local Development Plan

6.5.7 CaSPlan was adopted in August 2018 and is the second of three new area local development plans that, along with the HwLDP and Supplementary Guidance, form THC Development Plan to guide future development in Highland, particularly in the Caithness and Sutherland area.

6.5.8 The 'CaSPlan Strategy Map' seeks to show how the spatial strategy for future development applies across the plan area. The Proposed Development is located in an Area for Energy Business Expansion.

6.5.9 Watten is identified as a settlement in CaSPlan, and the plan advises on a number of placemaking priorities including the protection of the setting of Loch Watten and avoidance of adverse effects on the Loch Watten Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI) and the Caithness Lochs Special Protection Area (SPA).

### Onshore Wind Energy Supplementary Guidance (2017) (OWESG)

6.5.10 Supplementary Guidance forms part of the HwLDP. The relevant Supplementary Guidance pertaining to the Proposed Development is the OWESG. The OWESG sets out a range of matters that THC will consider when determining wind farm applications including landscape, aviation interests, roads, peat, and tourism. It contains a spatial framework for onshore wind energy development that applies to all wind energy development proposals.

6.5.11 The spatial framework presented in the OWESG classifies the Site as both 'Group 3: Areas with potential for wind farm development' and 'Group 2: Areas of significant protection'. These classifications do not rule out wind farm development, noting that further consideration would be required to demonstrate that any significant effects can be sustainably overcome by siting, design or other mitigation.

6.5.12 The Proposed Development is located within a mix of Group 3 and Group 2 areas. The group 2 areas are due to the presence of category 1 peat on the Proposed Development Area.

6.5.13 The OWESG contains an Addendum SG 'Part 2b' (December 2017). Part 2b contains two landscape sensitivity appraisals for Black Isle, Surrounding Hills and Moray Firth Coast and Caithness. The Proposed Development Area is situated within the Caithness study area.

## 6.6 BASELINE

### Landscape Baseline

6.6.1 The assessment of landscape effects of the Proposed Development considers the effect on the landscape as a resource or a group of identifiable receptors. This is undertaken by the establishment of the landscape baseline defined in GLVIA3 as follows:

*'For the landscape baseline the aim is to provide an understanding of the landscape in the area that may be affected – its constituent elements, its character and the way this varies spatially, its geographic extent, its history (which may require its own specialist study), its condition, the way the landscape is experienced, and the value attached to it.'* (Paragraph 3.15, GLVIA3)

6.6.2 For the purposes of this assessment, the landscape baseline will comprise following:

- Desk-top review of LCTs identified in NatureScot's Landscape Character Database (2019);
- Caithness and Sutherland – Landscape Evolution and Influences (2019)<sup>19</sup>;
- Caithness and Sutherland landscape character assessment (1998)<sup>20</sup>;
- Causeymire – Knockfin Flows Wild Land Area (2017)<sup>21</sup>;
- East Halladale Flows Wild Land Area (2017)<sup>22</sup>;
- Assessment of Highland Special Landscape Areas (2011)<sup>23</sup>;
- Landscape fabric and character of the Proposed Development Area: confirmed through a site visit and review of Chapters 7: Ecology, Chapter 9: Hydrology, Chapter 10: Cultural Heritage, and Chapter 11: Forestry; and
- Site visit to viewpoint locations shown on Figure 6.10 and assessed in Technical Appendix A6.6.

### Landscape Character

6.6.3 Landscape character is defined as a distinct, recognisable, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. LCTs refer to distinct types of landscape that are relatively homogenous in character. They are generic in nature and can occur more than once in different parts of the country but wherever they occur they share broadly similar combinations of geology, soils, climate, flora, and fauna, interact and perceived alongside cultural and social components of historical and cultural heritage land use, settlement, enclosure, and other human interventions.

6.6.4 Within the 45 km study area, a total of 20 LCTs and two isolated islands were identified from NatureScot's Landscape Character Database (2019). This complex landscape character baseline is illustrated on Figure 6.8. The first stage initial assessment of potential effects on the landscape character baseline identified those LCTs with the potential to experience significant effects and therefore requiring detailed assessment (see Technical Appendix A6.3: Landscape Character Review and Assessment). This was based on a combination of factors

including the distance between the Proposed Development and the LCT, the extent of theoretical visibility predicted, and sensitivity of the LCT.

6.6.5 Of the 20 LCTs and two isolated islands reviewed within the 45 km study area, the following have been taken forward for detailed assessment:

- LCT 134: Sweeping Moorland and Flows; and
- LCT 143: Farmed Lowland Plain.

### Proposed Development Area

6.6.6 The Proposed Development Area covers approximately 509 ha and comprises low lying and gently undulating acidic grassland, conifer plantation and bog habitat. The majority of the Proposed Development Area is located within the South and West Caithness sub-unit of the Sweeping Moorland and Flows LCT, approximately 107.8 ha of the northern and eastern side being located within the Farmed Lowland Plain LCT. As such, the Proposed Development Area forms a transitional landscape that displays characteristics of both LCTs. This was confirmed following a site visit to the Proposed Development Area.

### Landscape Sensitivity

6.6.7 A detailed assessment of landscape value and susceptibility is provided in Technical Appendix A6.3 for the Proposed Development Area and summarised as follows.

6.6.8 Landscape value is considered to be **Medium** for the Proposed Development Area due the lack of any formal landscape designation within the red line boundary. The Proposed Development Area forms part of a larger low-lying area that forms a transitional area between the Sweeping Moorland and Flows, and Farmed Lowland Plain LCTs and has limited notable landscape features of quality.

6.6.9 The Proposed Development Area displays many characteristics that are suitable for accommodating tall vertical structures, these include open, and large in scale, simple landform that has no distinctive pattern, and limited distinctive landscape features. Landscape susceptibility is considered to be **Medium** for the Proposed Development Area.

6.6.10 Overall, the Proposed Development Area is considered to have a **Medium** sensitivity to change on account of both landscape value and susceptibility being assessed as Medium.

### LCT 134: Sweeping Moorland and Flows

6.6.11 Four sub units of this LCT are located within the study area as follows:

- South and West Caithness;
- Dunnet Head;
- Battens of Brabster; and
- Moss of Kirk / Moss of Killimster.

<sup>19</sup> NatureScot (2019) Landscape Character Assessment: Caithness and Sutherland – Landscape Evolution and Influences. Available from - <https://www.nature.scot/doc/landscape-character-assessment-caithness-and-sutherland-landscape-evolution-and-influences>. [Accessed 04/08/2023]

<sup>20</sup> Stanton, C. (1998) Caithness and Sutherland landscape character assessment. Scottish Natural Heritage Review No. 103. Available from <https://www.nature.scot/sites/default/files/2018-01/Publication%201998%20-%20SNH%20Review%20103%20-%20Caithness%20and%20Sutherland%20landscape%20character%20assessment.pdf> [Accessed 04/08/2023]

<sup>21</sup> NatureScot (2017) Causeymire – Knockfin Flows Wild Land Area. Available from - <https://www.nature.scot/sites/default/files/2021-06/Wild%20land%20Description%20Causeymire-Knockfin-Flows-July-2016-36.pdf> [Accessed 04/08/2023]

<sup>22</sup> NatureScot (2017) East Halladale Flows Wild Land Area. Available from - <https://www.nature.scot/sites/default/files/2021-06/Wild%20land%20Description%20East-Halladale-Flows-July-2016-39.pdf> [Accessed 04/08/2023]

<sup>23</sup> The Highland Council in partnership with Scottish Natural Heritage (2011) Assessment of Highland Special Landscape Areas. Available from - [https://www.highland.gov.uk/downloads/file/2937/assessment\\_of\\_highland\\_special\\_landscape\\_areas](https://www.highland.gov.uk/downloads/file/2937/assessment_of_highland_special_landscape_areas) [Accessed: 04/08/2023]

- 6.6.12 As well as receiving direct impacts as a result of the Proposed Development Area being located within the South and West Caithness sub-unit, it is predicted that indirect effects would also occur as a result of visibility of the project components.
- 6.6.13 The remaining three LCTs are all predicted to receive visibility of the Proposed Development resulting in potential indirect effects to character. The Moss of Kirk / Moss of Killimster sub-unit has been included in the assessment due to being located 6.2 km to the north east of the Proposed Development. The Dunnet Head sub-unit located 18.8 km to the north, and the Battens of Brabster sub-unit situated 13.4 km to the north east have not been included as it was considered in the initial review that significant effects on the key characteristics would not occur due to distance from the Proposed Development.
- 6.6.14 Several operational wind farms are located within the South and East sub-unit of this LCT, this includes Achlachan I, Causeymire, Bad a Cheo, Halsary forming a large cluster to the west of the Proposed Development (Group 1), and Camster, and Bilbster, Burn of Whilk (Group 2) further to the east and south east. Strouster and Lochend are also located within the Battens of Brabster unit of the LCT to the north east. Stroupster and Lochend are located within the Battens of Brabster sub-unit to the north east of the Proposed Development.

#### Key Characteristics

- 6.6.15 NatureScot identify the key characteristics of Sweeping Moorland and Flows LCT as follows:
- *'Gently sloping or undulating landform which lies generally below 350 metres.*
  - *Occasional isolated hills of limited height form local landmark features.*
  - *Lochs and mature, meandering rivers.*
  - *Very distinct flora, dominated by sphagnum mosses, produced by the wetness and infertility of the flows.*
  - *Areas of peat cuttings and haggling.*
  - *Pockets of improved grazing, mainly within the outer fringes of sweeping moorland.*
  - *Coniferous forest forming a dominant characteristic within some parts of this landscape character type.*
  - *Ribbons of broadleaf woodland occasionally run along the water courses and loch edges.*
  - *Very sparsely settled with dispersed crofts, farms and estate buildings largely found on the outer edges of this landscape or near a strath.*
  - *Vehicular tracks within parts of the landscape.*
  - *Wind farms, transmission lines, the A9 and a network of minor roads are key features within the more modified outer fringes within Caithness.*
  - *Long, low and largely uninterrupted skylines offering extensive views across this landscape and result in a feeling of huge space.*
  - *Consistent views to the distant Lone Mountains and Rugged Mountain Massif – Caithness & Sutherland.*
  - *Great sense of exposure on areas of flat peatland on upland plateau.*
  - *A strong sense of remoteness is associated within the largely uninhabited, inaccessible core flows and moorlands of this landscape.'* (NatureScot, 2019)<sup>24</sup>
- 6.6.16 The following figures provide baseline context from viewpoint locations within the Sweeping Moorland and Flows LCT:
- Figures 6.22 a-f: Viewpoint 6: Ben Dorrery;

- Figures 6.28 a-f: Viewpoint 12: Westerdale;
- Figures 6.29 a-f: Viewpoint 13: Minor Road North of Grey Cairns of Camster;
- Figures 6.30 a-g: Viewpoint 14: Loch More Cottage;
- Figures 6.32 a-f: Viewpoint 16: A9, North of Rangag; and
- Figures 6.34 a-f: Viewpoint 18: Ben Alisky.

#### Landscape Sensitivity

- 6.6.17 A detailed assessment of landscape value and susceptibility is provided in Technical Appendix A6.3 for the Proposed Development Area and summarised as follows.
- 6.6.18 Overall landscape value for the South and Caithness sub-unit is considered to be **Very High** on account of the international, national, and local level designations, and **High** for the Moss of Kirk / Moss of Killimster sub-unit due to only being partially designated for ecological reasons.
- 6.6.19 The Sweeping Moorland and Flows LCT displays many characteristics that are suitable for accommodating the Proposed Development, these include the open, large scale, and simple landform that has no distinctive pattern. Landscape susceptibility is considered to be **Medium** for the Proposed Development
- 6.6.20 Overall, the Sweeping Moorland and Flows LCT is considered to have a **High** sensitivity to change. This is due to landscape value being considered to be Very High on account of the international, national, and local level designations which indicates a landscape of high quality.

#### LCT 143: Farmed Lowland Plain

- 6.6.21 Approximately 107.8 ha is situated within the northern and eastern side of the Proposed Development Area; however, none of the Proposed Development components would be located in these areas which would remain undisturbed.
- 6.6.22 Several operational wind farms are located within this LCT including Baille to the north east, Shebster and Forss to the north west, Wathegar I and II, and Achairn to the east which form Group 2 developments.

#### Key characteristics

- 6.6.23 NatureScot identify the key characteristics for the Farmed Lowland Plain LCT as follows:
- *'A generally open, low-lying plain, gently undulating to form shallow broad valleys, which are often filled with lochs and mosses, and subtle low ridges.*
  - *Occasional smooth hills rise above the more low-lying plain forming local landmarks.*
  - *The broad and shallow valley of the River Wick forming the largest of a series of valleys generally aligned south-east/north-west across the plain.*
  - *Agriculture the predominant land cover.*
  - *More intensively managed farmland near the coast around Thurso and Wick, and close to Loch Watten.*
  - *Distinctive Caithness flagstone fences in some parts, creating low, sharp edges to fields.*
  - *Sparse woodland, mainly comprising small angular coniferous plantations planted for shelter on farms.*
  - *Larger conifer woodlands located at the transition with the Sweeping Moorland and Flows standing out where they are planted on poorer wetter ground on low ridges.*

<sup>24</sup> NatureScot (2019) SNH National Landscape Character Assessment, Landscape Character Type 134 SWEEPING MOORLAND AND FLOWS – CAITHNESS & SUTHERLAND. Available from -

<https://www.nature.scot/sites/default/files/LCA/LCT%20134%20-%20Sweeping%20Moorland%20and%20Flows%20-%20Caithness%20&%20Sutherland%20-%20Final%20pdf.pdf>  
[Accessed 04/08/2023]

- Farm buildings and houses forming focal points within the landscape.
- Occasional loose clusters of croft houses located on more marginal upper slopes and near the coast.
- A number of historic environment features, including conspicuous castles, Baronial mansions and tall 'Lairds' houses, usually with broadleaf shelter woods planted around them.
- Roads reinforce the settlement pattern, often following the field and property boundaries, running straight and then swinging around sharp corners.
- A number of large settlements, including the towns of Thurso and Wick, situated on the coast, as well as several smaller settlements.
- Many historic features, including brochs and cairns, dotted across farmland and situated on hills within, or adjacent to, this area.
- Small groups of large wind turbines sited on some of the low ridges and hills and prominent visibility of larger wind farms in adjacent Landscape Character Types.
- Extensive views due to the openness of the landscape, and the clarity of northern air and light.
- Dramatic views from the northern part of this landscape to Dunnet Head and the distant Orkney islands, and views from the A9 on the western edge of this landscape of the Lone Mountains of Morven and Scaraben seen across the low-lying Sweeping Moorland and Flows.' (NatureScot, 2019)

6.6.24 The following figures provide baseline context from viewpoint locations within the Farmed Lowland Plain LCT:

- Figures 6.17 a-f: Viewpoint 1: Thurso;
- Figures 6.18 a-f: Viewpoint 2: North of Hoy;
- Figures 6.19 a-f: Viewpoint 3: Georgemas;
- Figures 6.20 a-f: Viewpoint 4: North Watten;
- Figures 6.21 a-f: Viewpoint 5: Scotscalder;
- Figures 6.23 a-f: Viewpoint 7: Harpsdale Crossroads;
- Figures 6.24 a-f: Viewpoint 8: Watten;
- Figures 6.25 a-f: Viewpoint 9: A882, east of Watten; and
- Figures 6.27 a-f: Viewpoint 11: North Wick, A99 Road.

#### Landscape Sensitivity

- 6.6.25 A detailed assessment of landscape value and susceptibility is provided in Technical Appendix A6.3 summarised as follows.
- 6.6.26 Overall, landscape value is **Medium** due to the lack of any formal landscape designation and predominantly agricultural land use.
- 6.6.27 Landscape susceptibility is **Medium** due to balance between the large open scale of the landscape combined with the settled nature and existing small-scale landscape features.
- 6.6.28 Overall sensitivity for the Farmed Lowland Plain LCT is **Medium**, due to having a Medium value and susceptibility

#### Protected and Designated Landscapes

- 6.6.29 Protected and designated landscapes within the study area have been identified following a review of NatureScot designations and *The Highland Council Highland-wide Local Development Plan 2012*. Analysis of the tip height ZTV mapping established which of the protected and designated landscapes would potentially be affected.
- 6.6.30 Of the eight national level and four regional level protected and designated landscapes identified within the study area, the following have been taken forward for detailed assessment:
- The Flow Country and Berriedale Coast Special Landscape Area (SLA);
  - No. 36 Causeymire – Knockfin Flows WLA; and
  - No. 39 East Halladale Flows WLA.
- 6.6.31 Additionally, in early 2023, a nomination for World Heritage Site (WHS) status for Scotland's Flow Country was submitted to UNESCO by the Flow Country Partnership, via the UK Government. The Flow Country Partnership anticipates a decision on whether to award WHS status within 2024. There are currently no finalised, inscribed Outstanding Universal Values (OUVs), however information available from the nomination draft dated December 2022 has been published on the Flow Country Partnership website and it describes the Flow Country as, "a vast expanse of peatland in Caithness and Sutherland", being nominated for WHS status for its, "blanket bog landscape and the biodiversity it holds". The Flow Country website notes that the boundary aims to encompass, "the blanket bog that is in the best condition and displays the attributes that make it outstanding on a global scale".
- 6.6.32 Protection for The Flow Country is provided through international and national designations, as well as national and local planning policies, and there is scope for future expansion of the Proposed Development Area through restoration of adjacent degraded blanket bog. The area is also considered to be the type-locality for the description of blanket bog and so represents a significant research and educational resource."
- 6.6.33 The Draft Management Plan also states that "Although the Site is not being proposed for its natural beauty (UNESCO WH criterion vii), the visual impact of wind farm developments needs to be considered as this can be relevant for the way people experience the Site in respect to its setting.". It also states that "...there is no explicit link between OUV and important views, visual relationships or natural beauty. This is not to rule out any importance attributed to views in terms of appreciation of OUV, but technically there is only a very marginal link to the OUV..."
- 6.6.34 A detailed assessment of The Flow Country and Berridale Coast SLA is provided in Technical Appendix 6.4, and a Wild Land Assessment for the Causeymire – Knockfin Flows and East Halladale Flows WLA has been undertaken in Technical Appendix A6.5. The following provides a summary of the baseline of each designation.

#### The Flow Country and Berriedale Coast SLA

- 6.6.35 The SLA covers approximately 363 km<sup>2</sup> of the Caithness and Sutherland landscape and is located between 6.8 and 39.5 km to the south west of the Proposed Development. Considered to be regionally valuable, this landscape is designated to protect and enhance its landscape qualities and promote their enjoyment in *Policy 57 Natural, Built and Cultural Heritage of the Highland-wide local development plan (2012)*.
- 6.6.36 The special qualities of the Flow Country and Berriedale Coast SLA are set out in the *Assessment of Highland Special Landscape Areas* (THC, 2011)<sup>25</sup> as follows:

<sup>25</sup> The Highland Council in partnership with Scottish Natural Heritage (2011) Assessment of Highland Special Landscape Areas. Available from -

[https://www.highland.gov.uk/downloads/file/2937/assessment\\_of\\_highland\\_special\\_landscape\\_areas](https://www.highland.gov.uk/downloads/file/2937/assessment_of_highland_special_landscape_areas) [Accessed: 04/08/2023]



### **'Distinctive Mountain and Moorland Skyline**

- The distinctive combination of expansive peatland and isolated mountains is unique within the UK. The isolated and tall mountains emphasise the simplicity, flatness and low relief of the surrounding Flow Country peatland and vice versa.
- The conspicuous mountain profiles, from striking cones to rolling masses, are visible from most of Caithness and serve as distinctive landmarks. They are typically seen from a distance and it is difficult to perceive their size or distance due to the simplicity of the intervening peatland.
- Morven forms a prominent conical landmark feature which is visible from both the north coast and the Morayshire coast. It stands in strong contrast to its long-backed neighbour Scaraben but is echoed on a smaller scale by the rocky profile of the nearby Maiden Pap. The latter is an especially striking landscape feature and backdrop when viewed from the Braemore area.
- Ben Alisky is a remote, isolated peak north of the main range of mountains. Whilst not particularly high (349 metres), it forms a distinctive landmark feature for a wide area of Caithness.

### **Exposed Peaks, Vast Openness and Intimate Glens**

- The mountain summits offer rare opportunity to view a panorama of wide ranging characteristics – extending over the Flow Country peatlands, out to sea and as far south as the Cairngorms in clear conditions.
- The vast open sweep of the peatlands with the long, low horizon evokes strong feelings of isolation and wildness. The mountains on its southern edge and the isolated peak of Ben Alisky are welcome orientation features in a landscape otherwise lacking in landmarks.
- Experience of the open peatlands area is strongly affected by big skies with rapidly changing light and weather conditions. Views from local roads are particularly important along the higher sections of the A9 around Achavanich and Berriedale and from the road into Braemore. Views from the railway which skirts the area's north western side, from the valley tracks, from the mountain peaks, or even from aircraft all give different perspectives. Views of the Flow Country from elevated viewpoints, including from air, best reveal the distinctive pattern of the pool systems.
- In further contrast to the elevation and exposure of the mountain summits and the wide expanse of the peatland, the deep wooded sections of the Berriedale and Langwell glens provide an intimacy of scale and shelter and are dotted with buildings and other welcoming signs of human habitation.
- Berriedale, at the wooded confluence of Langwell Water and Berriedale Water, is a dispersed settlement with buildings sandwiched between the Berriedale Water and the steep cliffs of the Berriedale Braes. Over these braes is a series of tortuous blind bends upon the A9 that are notoriously difficult to manoeuvre, particularly for long vehicles that occasionally get stuck on this section of the road.
- Within the glens, there is a concentration of architecturally and historically important buildings including a pair of Telford bridges, the Berriedale post office on west side of the A9, mills, smithys and a row of terrace estate workers houses on the south side of Berriedale Water, with the contrasting redundant salmon bothy, ice house and terraced fisherman cottages on the opposite side of the Water.

### **The Historic Landscape**

- Recognising that the inland waterways were a vital method of transport and communication in prehistory monuments are predominantly located along Langwell and Berriedale Waters and their tributaries. The remains represent the full range of major prehistoric features and include chambered cairns, roundhouses,

*brochs, souterrains, burnt mounds etc; the density of monuments increases as one gets closer to the confluence of the two Waters and their eventually outlet at Berriedale.'* (The Highland Council, 2011) <sup>26</sup>.

6.6.37 The assessment of the Flow Country and Berridale Coast SLA is supported by the following documents:

- Technical Appendix A6.3: Landscape Character Assessment;
- Technical Appendix A6.5: Wild Land Assessment;
- Figure 6.6a-g – Aviation Lighting Intensity ZTV;
- Figure 6.8 – Landscape Character;
- Figure 6.9 – Protected and Designated Landscapes;
- Figure 6.30a-g – Viewpoint 14: Loch More Cottage;
- Figure 6.33a-e – Viewpoint 17: Coire na Beinne;
- Figure 6.34a-f – Viewpoint 18: Ben Alisky; and
- Figure 6.35a-f – Viewpoint 19: Scaraben.

### **Landscape Sensitivity**

6.6.38 Overall, landscape value for the Flow Country and Berriedale Coast SLA is considered to be **Very High** on account of the quality of the landscape which is considered one of the largest intact bog systems in the world reflected in its designation at both national (WLA) and regional level for landscape, important ecologically internationally and is proposed for WHS status.

6.6.39 This SLA is highly susceptible to the introduction of tall vertical structures which have the potential to be prominent in views both internally within the SLA, and the interaction between the distinctive skyline of the SLA and neighbouring landscapes. This has the potential to affect the perception of scale of the Lone Mountains and surrounding peatlands. Landscape susceptibility is therefore considered **Very High**.

6.6.40 Overall landscape sensitivity for the Flow Country and Berridale Coast SLA is considered **Very High**.

### **No 36. Causeymire – Knockfin Flows WLA**

6.6.41 The Causeymire – Knockfin Flows WLA is located 5.7 km to the south west of the Proposed Development. Occupying approximately 514 km<sup>2</sup>, the WLA comprises a large area of low-lying peatland covering part of Caithness and the eastern fringes of Sutherland in an area known as The Flow Country. This area extends between Forsinard in the north, Causeymire in the east, the hills above Helmsdale in the south, and the Strath of Kildonan in the west.

6.6.42 NatureScot identify the following key attributes and qualities specific to the Causeymire – Knockfin WLA:

- 'Awe inspiring simplicity of wide open peatland from which rise isolated, arresting, steep mountains;
- Irregular peatland and dubh lochan, comprising a complex mix of hidden pools, bogs and lochans that contribute to perceived naturalness and limit access;
- An extensive remote interior with few visitors in contrast to the margins of the area from which many people view into the WLA;
- Wide glens containing meandering rivers that limit access and are often the focus for isolated historic features; and

<sup>26</sup> The Highland Council (2011) Assessment of Highland Special Landscape Areas. Available from - [https://www.highland.gov.uk/downloads/file/2937/assessment\\_of\\_highland\\_special\\_landscape\\_areas](https://www.highland.gov.uk/downloads/file/2937/assessment_of_highland_special_landscape_areas) [Accessed 02/08/2023]

- *Rolling interlocking hills in the south containing remote, sheltered glens with limited visibility.* (NatureScot, 2017).

#### Landscape Sensitivity

6.6.43 Overall, landscape value for the Causeymire – Knockfin Flows WLA is considered to be **Very High** on account of the quality of the landscape which is considered one of the largest intact bog systems in the world reflected in its designation at both national and regional level for landscape, important ecologically internationally and is proposed for World Heritage Site status.

6.6.44 The Causeymire – Knockfin Flows WLA is highly susceptible to the introduction of tall vertical structures which have the potential to be prominent in views both internally within the WLA, and the interaction between the distinctive skyline of the WLA and neighbouring landscapes. This has the potential to affect the perception of scale of the lone mountains and surrounding peatlands. Landscape susceptibility is therefore considered **Very High**.

6.6.45 Overall landscape sensitivity for the Causeymire – Knockfin Flows WLA is considered **Very High**.

#### No. 39 East Halladale Flows WLA

6.6.46 The East Halladale Flows WLA is located 13.6 km to the west of the Proposed Development and occupies 159 km<sup>2</sup> of low-lying bog in Caithness and the eastern edge of Sutherland known as The Flow Country.

6.6.47 NatureScot identify the following key attributes and qualities:

- *'An awe-inspiring simplicity of landscape at the broad scale, with a strong horizontal emphasis, 'wide skies' and new foci;*
- *A remote, discrete interior, with limited access and a strong sense of solitude;*
- *A rugged and complex pattern of hidden burns, lochans and pools at the local level, despite the landscape's simple composition at the broad scale;*
- *A remarkably open landscape with extensive visibility, meaning tall or high features in the distance are clearly visible.'* (NatureScot, 2017)

#### Landscape Sensitivity

6.6.48 Overall, landscape value for the East Halladale Flows WLA is considered to be **Very High** on account of the quality of the landscape which is considered one of the largest intact bog systems in the world reflected in its designation at both national and regional level for landscape, important ecologically internationally and is proposed for WHS status.

6.6.49 The East Halladale Flows WLA is highly susceptible to the introduction of tall vertical structures which have the potential to be prominent in views both internally within the WLA, and the interaction between the distinctive skyline of the WLA and neighbouring landscapes. This has the potential to affect the perception of scale of the lone mountains and surrounding peatlands. Landscape susceptibility is therefore considered **Very High**.

6.6.50 Overall landscape sensitivity for the East Halladale Flows WLA is considered **Very High**.

### Visual Baseline

6.6.51 The assessment of visual effects of the Proposed Development considers the effect on visual amenity throughout the 45 km study area. Visual receptors are people who will be affected by changes in views or visual amenity at different places. They are usually grouped by what they are doing at these places and include:

- People living and working in the area, such as residents and farm workers;
- People who view the Proposed Development sequentially such as those travelling through the area on road, rail, or other forms of transport;
- People visiting promoted tourist attractions and landscapes; and
- People pursuing other recreational activities.

6.6.52 These visual receptors comprise the visual baseline.

#### Selected Viewpoints

6.6.53 Analysis of the ZTVs (see Figures 6.3a – 6.5), together with site knowledge and verification were used to identify a provisional list of viewpoints which were investigated during scoping stage consultation with the THC and NatureScot.

6.6.54 The finalised list of selected viewpoints includes a variety of different types of view to represent the worst-case scenario of views of the Proposed Development. These are referred to as representative views, specific views, and exemplifying views from publicly accessible locations, which are defined in paragraph 6.19 of GLVIA3 as:

- *'Representative viewpoints: selected to represent the experience of different types of visual receptors, where larger number of viewpoints cannot all be included individually and where the significant effects are unlikely to differ. For example, certain points may be chosen to represent the views of users of public footpaths and bridleways;*
- *Specific viewpoints: chosen because they are key views and sometimes promoted viewpoints within the landscape, including for example scenic viewpoints from roads, specific local visitor attractions, viewpoints in areas that are particular noteworthy for visual and/or recreational amenity, such as landscapes with statutory landscape designations, or viewpoints with particular cultural landscape associations; and*
- *Illustrative viewpoints: chosen specifically to demonstrate a particular effect or specific issue, which might be the restricted visibility at certain locations.'*

A6.1.1 Viewpoints were selected to take account of the viewing experience (such as static views from settlements and sequential views from routes) cumulative views of other developments and as far as possible are representative, illustrative, and specific of the range of key visual receptors and view types (including panoramas, vistas, glimpsed views), as well as being located at varying distances, elevations and orientations from the Proposed Development.

Although these selected viewpoints primarily represent visual receptors, their location within certain designated landscapes or character types illustrate potential changes in the experiences from these landscapes, giving an indication of potential landscape effects. The predicted views from the selected viewpoints may therefore be cited as examples of such landscape effects within Landscape Assessment detailed in Section 6.9 of this chapter.

6.6.55 The selected viewpoints assessed in the LVIA are identified in Table 6.6 below and described in detail in Technical Appendix A6.6: Viewpoint Assessment.

Table 6.6: Selected Viewpoints

VP No.	Viewpoint Name	Coordinate		Distance to the Proposed Development (km)	Direction to the Proposed Development	Landscape Character Type	Protected and Designated Landscape	Visual Receptor	Sensitivity
		Easting	Northing						
1	Thurso	310620	967007	18.0	South east	LCT 143: Farmed Lowland Plain	None	Road users	This viewpoint is representative of views from properties on the edge of Thurso, all residential receptors are considered to be of <b>High</b> sensitivity to change in their view. This considers that people at their home attach High value to their existing view and visual amenity and are more susceptible to being affected by changes in their visual amenity.
2	North of Hoy on B876	321651	964988	12.8	South	LCT 143: Farmed Lowland Plain	None	Road users	The B876 road is not a promoted tourist route and is mainly used as a short-cut avoiding longer journeys around the north east corner of Caithness on the busier A836 and A99 roads via John o Groats. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.  Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.  The overall sensitivity of the viewpoint location is considered to be <b>Medium</b> .
3	Georgemas	315578	959171	8.8	South east	LCT 143: Farmed Lowland Plain	None	Road users	The A9 road is not a promoted tourist route and is mainly used as a main route through Caithness. Similarly, the railway line also forms the main route joining the northern towns of Thurso and Wick with Inverness to the south. However, the line is scenic and popular amongst rail enthusiasts and visitors to the north highlands. Value is considered to be high overall, but low for Georgemas junction due to not being a requested stop and rail infrastructure present.  Susceptibility is also considered to be Medium, as road and rail users on this route are expected to have less appreciation of the surrounding landscape.  The overall sensitivity of the viewpoint location is considered to be <b>Medium</b> .
4	North Watten	324777	957723	6.7	South west	LCT 143: Farmed Lowland Plain	None	Residents	This viewpoint is representative of views from properties at North Watten, all residential receptors are considered to be of High sensitivity to change in their view. This considers that people at their home attach <b>High</b> value to their existing view and visual amenity and are more susceptible to being affected by changes in their visual amenity.
5	Scotscalder	309630	956104	11.3	South east	LCT 143: Farmed Lowland Plain	None	Residents	This viewpoint is representative of views from properties at Scotscalder, all residential receptors are considered to be of <b>High</b> sensitivity to change in their view. This considers that people at their home attach High value to their existing view and visual amenity and are more susceptible to being affected by changes in their visual amenity.
6	Ben Dorrey	306304	955053	14.0	South east	LCT 134 Sweeping Moorland and Flows	None	Walkers	Value and susceptibility are both considered to be High for the Ben Dorrey summit as walkers' attention will be focussed on the views of the surrounding landscape, overall visual sensitivity is <b>High</b> .
7	Harpsdale Cross Roads	313275	954658	7.4	South east	LCT 143: Farmed Lowland Plain	None	Residents	This road is not a promoted tourist route and is mainly used to access nearby settlements and properties. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.  Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.  The overall sensitivity of the viewpoint location is considered to be <b>Medium</b> .
8	Watten	323859	954413	3.4	South west	LCT 143: Farmed Lowland Plain	None	Residents	This viewpoint is representative of views from properties at Watten, all residential receptors are considered to be of <b>High</b> sensitivity to change in their view. This

VP No.	Viewpoint Name	Coordinate		Distance to the Proposed Development (km)	Direction to the Proposed Development	Landscape Character Type	Protected and Designated Landscape	Visual Receptor	Sensitivity
		Easting	Northing						
9	A882, east of Watten	326872	953616	5.6	South west	LCT 143: Farmed Lowland Plain	None	Road users	<p>considers that people at their home attach High value to their existing view and visual amenity and are more susceptible to being affected by changes in their visual amenity.</p> <p>The A882 road is not a promoted tourist route and is mainly used to access settlements and individual properties. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.</p> <p>Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Medium</b>.</p>
10	Spittal	335973	951944	14.5	West	LCT 143: Farmed Lowland Plain	None	Residents	<p>The A9 road is not a promoted tourist route and is mainly used to access settlements and individual properties as well as the main route between Inverness and Thurso. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.</p> <p>Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Medium</b>.</p>
11	North Wick, A99 Road	335973	951944	14.5	West	LCT 143: Farmed Lowland Plain	None	Road users	<p>This location is on the A99 road which forms part of the North West Coast 500 tourist route, as well as a War memorial and the views are considered to be of High value.</p> <p>Susceptibility is also considered to be High, as road users on this route are expected to have some appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>High</b>.</p>
12	Westerdale	313273	951908	6.6	East	LCT 134 Sweeping Moorland & Flows	None	Residents	<p>This road is not a promoted tourist route and is mainly used to access settlements and individual properties. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.</p> <p>Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Medium</b>.</p>
13	Minor road north of Grey Cairns of Camster	324217	948493	4.1	North west	LCT 134 Sweeping Moorland & Flows	None	Road users	<p>This road is not a promoted tourist route or designated but is used to access the Camster Cairns. Views from the road are considered to be High.</p> <p>Susceptibility is also considered to be High, as road users on this route are expected to have less appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>High</b>.</p>
14	Loch More Cottage	308413	946109	12.4	North east	LCT 134 Sweeping Moorland & Flows	Causeymire – Knockfin Flows WLA Flow Country and Berriedale Coast SLA	Recreational users	<p>This viewpoint is located on the periphery of the Causeymire – Knockfin Flows WLA and Flow Country and Berriedale Coast SLA and value is considered to be Very High.</p> <p>Susceptibility is also considered to be High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Very High</b>.</p>
15	Loch of Yarrows Trail	330436	943207	12.3	North west	LCT 144 Coastal Crofts & Small Farms	None	Recreational users	<p>This viewpoint is located on an Archaeological Trail promoted locally and value is considered to be High.</p>

VP No.	Viewpoint Name	Coordinate		Distance to the Proposed Development (km)	Direction to the Proposed Development	Landscape Character Type	Protected and Designated Landscape	Visual Receptor	Sensitivity
		Easting	Northing						
									<p>Susceptibility is also considered to be High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>High</b>.</p>
16	A9, North of Rangag	317698	945611	5.4	North east	LCT 134 Sweeping Moorland & Flows	None	Road users	<p>The A9 road is not a promoted tourist route and is mainly used to access settlements and individual properties as well as the main route between Inverness and Thurso. The road passes through low-lying farmland and peatland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.</p> <p>Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Medium</b>.</p>
17	Coire na Beinne	315109	940170	11.6	North east	LCT 134 Sweeping Moorland & Flows	Causeymire – Knockfin Flows WLA, Flow Country and Berriedale Coast SLA	Walkers	<p>This viewpoint is located on the periphery of the Causeymire – Knockfin Flows WLA and Flow Country and Berriedale Coast SLA and value is considered to be Very High.</p> <p>Susceptibility is also considered to be High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Very High</b>.</p>
18	Ben Alisky	304559	938626	19.6	North east	LCT 134 Sweeping Moorland & Flows	Causeymire – Knockfin Flows WLA, Flow Country and Berriedale Coast SLA	Walkers	<p>This viewpoint is located on the periphery of the Causeymire – Knockfin Flows WLA and Flow Country and Berriedale Coast SLA and value is considered to be Very High.</p> <p>Susceptibility is also considered to be Very High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Very High</b>.</p>
19	Scaraben Peak	306608	926834	27.4	North east	LCT 138 Lone Mountains	Causeymire – Knockfin Flows WLA, Flow Country and Berriedale Coast SLA		<p>This viewpoint is located on the periphery of the Causeymire – Knockfin Flows WLA and Flow Country and Berriedale Coast SLA and value is considered to be Very High.</p> <p>Susceptibility is also considered to be Very High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>Very High</b>.</p>
20	Dunnet Head	320532	976491	24.3	South	LCT 141 High Cliffs & Sheltered Bays	Dunnet Head SLA	Recreational users	<p>This viewpoint is located on Dunnet Head, a popular visitor attraction to see the former remains of World War Two buildings, coastal walks, Dunnet Head Lighthouse, and adjacent cliffs that are popular for bird watching. Value is considered High.</p> <p>Susceptibility is also considered to be High, as recreational users are expected to appreciate the surrounding landscape.</p> <p>The overall sensitivity of the viewpoint location is considered to be <b>High</b>.</p>

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**Sequential Routes**

- 6.6.56 Route receptors have been identified within 15 km of the Proposed Development following a desk-top review of Ordnance Survey 1:50,000 and 1:25,000 mapping, ZTVs, and site visit to route receptors and viewpoint locations to verify the extent of visibility of the Proposed Development.
- 6.6.57 An initial review of route receptors was undertaken (see Technical Appendix A6.7) which identified which routes would potentially receive theoretical visibility and was subsequently verified on site.
- 6.6.58 Route receptors identified as potentially receiving a significant effect are set out in Table 6.7.

Table 6.7: Route Receptors Assesed

Route Receptor	Nearest Point to Proposed Turbines	Sensitivity
<b>Roads</b>		
A9	2.8 km	The A9 road is not a promoted tourist route and is mainly used to access settlements and individual properties as well as the main route between Inverness and Thurso. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium. Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape. The overall sensitivity is considered to be <b>Medium</b> .
A99	12.05 km	This road is on the A99 road which forms part of the North West Coast 500 tourist route, as well as a War memorial and the views are considered to be of High value. Susceptibility is also considered to be High, as road users on this route are expected to have some appreciation of the surrounding landscape. The overall sensitivity is considered to be <b>High</b> .
A882	3.3 km	The A882 road is not a promoted tourist route and is mainly used to access settlements and individual properties. The road passes through low-lying farmland that is not designated as a sensitive

Route Receptor	Nearest Point to Proposed Turbines	Sensitivity
B870	1.7 km	landscape. Views from the road are considered to be Medium. Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape. The overall sensitivity is considered to be <b>Medium</b> .
B874	5.4 km	The B876 road is not a promoted tourist route and is mainly used to access the various settlements between Thurso and Wick. Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape. The overall sensitivity is considered to be <b>Medium</b> .
B876	9.6 km	The B876 road is not a promoted tourist route and is mainly used as a short-cut avoiding longer journeys around the north east corner of Caithness on the busier A836 and A99 roads via John o Groats. The road passes through low-lying farmland that is not designated as a sensitive landscape. Views from the road are considered to be Medium.

Route Receptor	Nearest Point to Proposed Turbines	Sensitivity
		Susceptibility is also considered to be Medium, as road users on this route are expected to have less appreciation of the surrounding landscape. The overall sensitivity is considered to be <b>Medium</b> .
<b>Railway Line</b>		
Inverness – Thurso/Wick	4.6 km	The railway line is the main route through Caithness between Inverness and Wick/Thurso and promoted as a tourist route. Value is therefore High. Susceptibility is also considered to be High, as rail users on this route are expected to appreciate the views of the surrounding landscape. The overall sensitivity considered to be <b>High</b> .
<b>Core Paths</b>		
8 – Loch More to Altnabreac	11.3 km	All walking routes are assessed as having a <b>High</b> sensitivity to change as it is considered that the receptors' attention will be on the surrounding landscape.
10 – Loch More to Dalnawillan	13.4 km	High
17 – Hill Orlig	13.9 km	High
60 – Ben Dorrery	12.9 km	High
61 – Causeymire Wind Farm	3.0 km	High
64 – Achnarras Quarry	4.2 km	High
65 – The Old Quarry	4.0 km	High
70 – Dirlot Gorge Egress / Ingress	6.5 – 8.7 km	High
105 – Achavanich and Munsary	5.6 km	High
126 – Blingrey Forest	7.4 km	High
127 – Camster Cairns Boardwalk	8.4 km	High
158 – Watten Roadside Link to Loch Watten	3.6 km	High
160 – Sports Pitch	3.4 km	High
161 – Watten to Camster Roadend Link	3.7 km	High
162 – Watten Riverside Link	3.8 km	High

Route Receptor	Nearest Point to Proposed Turbines	Sensitivity
173 – Wick to Milton Roadside Link	12.3 km	High
177 – Wick to Ackergillshore by Roadside Footway	13.6 km	High

Source: Technical Appendix A6.7: Sequential Route Assessment

6.6.59 A detailed baseline review for each route receptor is provided in Technical Appendix A6.7.

### Residential Properties

#### Settlements

- 6.6.60 Settlements were considered within 15 km following a site visit which concluded that significant effects were likely to occur within this area from the Proposed Development.
- 6.6.61 An initial review of settlements was undertaken (see Technical Appendix A6.8) which identified which settlements would potentially receive theoretical visibility and was subsequently verified on site.
- 6.6.62 A total of twelve settlement/groups were carried forward for assessment as follows:

Table 6.8: Settlements Assessed

Settlement	Distance from Proposed Turbines	Direction to Proposed Development	Sensitivity
Watten	3.5 km	North east	All settlements are assessed as having a <b>High</b> sensitivity to change as it is considered that people value the view from residential properties and their attention is likely to be on the surrounding landscape.
Bylbster Mains	4.6 km	North east	<b>High</b>
Spittal	4.2 km	North west	<b>High</b>
North Watten / Cachory / Brabertdorran / Myrelandhorn	6.6 km	North east	<b>High</b>
Westerdale	6.6 km	West	<b>High</b>
Georgemas Junction	9.0 km	North west	<b>High</b>
Durran	11.8 km	North	<b>High</b>
Bower	12.1 km	North east	<b>High</b>
Lyth / Howth	12.5 km	North east	<b>High</b>

Settlement	Distance from Proposed Turbines	Direction to Proposed Development	Sensitivity
Killimster / Reiss	10.5 km	North east	High
Wick / Milton	12.5 km	East	High
Halkirk	9.8 km	North west	High

Source: Technical Appendix A6.8: Settlement Assessment

6.6.63 A detailed description of the baseline is provided in Technical Appendix A6.8.

**Residential Properties/Groups**

6.6.64 Residential receptors are divided into individual residential properties/groups located within 3 km of the Proposed Development.

6.6.65 The Landscape Institute has published a guidance note to support landscape professionals in undertaking Residential Visual Amenity Assessment (RVAA) for developments. This document promotes a logical approach to the assessment of views of developments from residential receptors.

6.6.66 Using OS and GIS data mapping, a total of 23 properties/property groups were identified within a 3 km radius of the outermost proposed turbines.

6.6.67 A review of aerial photography was undertaken to ascertain the access or approach to the property, the orientation of the property, the extent of its curtilage and the presence of vegetation and buildings around the property. A ZTV was then prepared, and the properties plotted as shown in Figures A6.7.1 – A6.7.25. This aids the identification of properties that are not predicted by the ZTV to receive views of the Proposed Development. A site survey was then carried out to verify these desktop studies and to ascertain whether properties were indeed inhabited.

6.6.68 The following individual residential properties are assessed in detail in the RVAA in Technical Appendix A6.9: Residential Visual Amenity Assessment and listed below.

Table 6.9: Residential Receptors

Property No.	Property/Group Name	Grid Coordinates	Distance from nearest turbine
1	Shielton	320620, 950994	0.25 km
2	22 West Watten	322120, 950994	1.04 km
3	19 West Watten	322808, 951726	1.31 km
4	18 West Watten	322715, 951968	1.21 km
5	Scouthall	323720, 952996	2.46 km
6	Milton	324012, 953211	2.82 km
7	Achingale	323873, 953779	3.01 km
8	Banks/Properties to the south	323645, 953663	2.76 km
9	West Watten/Strathview Cottage	323333, 953709	2.56 km
10	Knockfarrie	323100, 953739	2.42 km
11	Ballacharn/Alilichsa	322861, 953807	2.33 km
12	14 Watten	322716, 953852	2.27 km

Property No.	Property/Group Name	Grid Coordinates	Distance from nearest turbine
13	10 Watten	322821, 954393	2.75 km
14	Newton	321665, 953983	1.83 km
15	The Smiddy	321025, 954077	1.84 km
16	Backlass (New Build)	320756, 953928	1.72 km
16	Backlass Cottage	320366, 953583	1.53 km
17	Leanmore	320974, 953297	1.06 km
18	Houstry of Dunn	320657 954707	2.50 km
19	Backlass Hill Cottage	320426, 954034	1.92 km
20	Backlass Croft	319979, 954631	1.64 km
21	Balnasmurich /Markethill	319414, 954873	3.13 km
22	Lanergill Farm	319084, 954440	2.91 km
23	Knockglass	317261, 953339	3.30 km

Source: Technical Appendix A6.9: Residential Visual Amenity Assessment

6.6.69 A baseline description of the views obtained from each property is detailed in Technical Appendix A6.9.

6.6.70 For the purpose of this assessment, all residential receptors are considered to be of **High** sensitivity to change in their view. This considers that people at their home attach High value to their existing view and visual amenity and are more susceptible to being affected by changes in their visual amenity.

**6.7 POTENTIAL IMPACTS DURING DEVELOPMENT PHASES**

6.7.1 Based on the detailed description of the Proposed Development in Chapter 5: Project Description, the likely sources of landscape and visual impacts that will occur during each phase are as follows:

Table 6.10: Potential sources of landscape and visual impacts during each development phase

Construction	Operational	Decommissioning
Vehicular/personnel movements, including vehicles associated with the construction travelling in both directions along the B709 road and lighting in the Proposed Development Area.	Occasional maintenance activity and vehicular/personnel movements around the Proposed Development Area and on local roads.	Vehicular/personnel movements, including lighting on the Proposed Development.
The disturbance of areas of land and surface vegetation.	Access tracks and hardstanding areas at each turbine location at ground level.	Access tracks will either be left for use by the landowner or covered in topsoil.
The upgrading of existing site access tracks and formation of new tracks, crane hardstandings at each turbine location and the substation.		Deplanting of grid infrastructure, removal of the grid connection compound, and reinstatement of the compound location to match the character and condition of the existing landscape where required.
Installation of new substation control building.	Onsite substation.	Removal of substation and control building.



Construction	Operational	Decommissioning
Reinstatement of temporary compounds and track sides following construction.	Site monitoring of restoration.	Reinstatement of temporary compounds, track sides during decommissioning.
The gradual introduction of tall vertical structures (turbines) and the use of cranes during installation. The turbines themselves would be erected over a short period, typically 1-2 days per turbine, and the appearance of the construction cranes in views of the site would therefore be of short duration.	Tall vertical structures with moving parts (turbines), and medium intensity aviation lights.	Dismantling and removal of wind turbines, trimming of foundations to a depth of 1 m below ground surface levels, and restoration of turbine locations to match the character and appearance the existing landscape.

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- 6.7.2 Potential effects of the construction and decommissioning phases would include temporary effects on the landscape fabric of the Proposed Development Area (both direct and indirect) and indirect on the landscape character and visual amenity of the immediate area. The potential effects of the construction and decommissioning phases are considered together in this assessment due to the similarity of operations involved for the Proposed Development Area and wider landscape. Construction and decommissioning effects are short term, reversible unless stated.
- 6.7.3 Operational effects will occur during the 35-year life cycle of the Proposed Development and be associated with the operational wind turbines, supporting infrastructure such as substation/control building, BESS, and access tracks. Effects from these are considered long term and reversible unless otherwise stated.
- 6.7.4 Post decommissioning of the Proposed Development, including the removal of all above ground structures and reinstatement works, the remaining effects would largely relate to the retained site entrance and site tracks. The Proposed Development Area will be returned to unimproved pasture and open moorland.

## 6.8 EMBEDDED MITIAGTION

- 6.8.1 Embedded mitigation is mitigation that has been identified and adopted as part of the evolution of the project design.
- 6.8.2 NatureScot's current guidance<sup>27</sup> Siting and Designing Wind Farms in the Landscape (version 3a August 2017 para 1.15) states that '*Wind farms should be sited and designed so that adverse effects on landscape and visual amenity are minimised and so that landscapes which are highly valued are given due protection. If wind farms are sited and designed well the capacity of our landscape to incorporate this type of development is maximised.*'
- 6.8.3 Paragraph 3.22 of NatureScot's guidance goes on to state that 'It is important to site and design a wind farm so that it relates directly to the qualities of a specific site. The main design elements are likely to include the following:
  - *'Layout and number of wind turbines;*
  - *Size, design, and proportion of wind turbines;*
  - *Type, route and design of new and existing upgraded access tracks, including the amount of cut and fill required and the junctions with public roads;*
  - *Location, design and restoration of hardstandings;*
  - *Location, design and restoration of borrow pits;*
  - *Location, design and restoration of temporary construction compounds;*

- *Location and size of wind monitoring masts;*
- *Positioning and mitigation of turbine lighting (if required);*
- *Visitor facilities, including paths, signs, parking and visitor centre (if proposed); and*
- *Land management changes, such as muirburn, woodland management or felling, fences, and stock grazing.'*

6.8.4 Based on NatureScot's guidance together with an analysis of the baseline context of the Proposed Development Area and advice received from consultees, the embedded mitigation considers of the following issues in relation to the landscape, visual and cumulative context:

### Site Location and Layout

6.8.5 The siting and layout of the Proposed Development was based on an iterative design process aimed at reducing environmental effects whilst achieving suitable technical and commercial objectives bearing in mind the recent and emerging changes to funding mechanisms and the requirement for wind energy to compete in a Levelized Cost of Electricity Market (as discussed further in both Chapter 4: Site Selection and Design Evolution).

### Design Principles

- 6.8.6 The design strategy for the key elements of the Proposed Development has considered the following objectives:
- To maximise site efficiency and electricity production;
  - To provide a turbine layout with simple form, which relates to the landform and landscape character of the Proposed Development Area and its surroundings;
  - Retain a suitable separation between operational / consented wind farms and the Proposed Development;
  - To avoid areas of constraint where practical;
  - To create a turbine layout which reflects the scale of the landscape in which it is located;
  - To avoid an overly complex and visually confusing layout;
  - To achieve a balanced composition of the turbines against the landscape and skyline from key viewpoint locations;
  - To relate turbine height to topography;
  - To give due consideration to turbine proportions; and
  - To reflect the pattern of nearby existing and consented wind farms as far as practical.

### Proposed Turbines

- 6.8.7 The Proposed Development would make use of three bladed horizontal axis turbines with tubular steel towers. Care was taken to achieve a balanced ratio between tower height and blade length to avoid the rotor diameter or turbine tower being the dominant factor.
- 6.8.8 With regard to the colour of the proposed turbines, NatureScot Guidance<sup>27</sup> states that 'Selecting the most appropriate colour for a turbine(s) is an important part of detailed windfarm design and mitigation. It has previously been assumed that wind turbines could be painted a colour that would camouflage them against their background. Experience has shown that it is not possible to 'hide' turbines' (para 2.7).
- 6.8.9 Para 2.9 of this guidance goes on to state that '*As a rule for most rural areas of Scotland:*
  - *a single colour of turbine is generally preferable;*

<sup>27</sup> SNH (2017) *Siting and Designing Wind Farms in the Landscape* (Version 3a)

- a light grey colour generally achieves the best balance between reducing visibility and visual impacts when seen against the sky, although this works less well when viewed against the land;
- light coloured turbines seen against a land backdrop may have greater prominence than light or dark turbines seen against the sky;
- paint reflection should be minimised. Texture is an important factor in reducing reflectivity, and matt or light absorbent finishes are preferable; and
- for multiple wind farm groups or wind farm extensions, cumulative colour effects will be a key consideration. A strategic to turbine colour is desirable and the colour of turbines should generally be consistent.'

6.8.10 In cognisance of the guidance a simple off white/pale grey colour and non-reflective render is therefore proposed for the proposed turbines.

### Aviation Lighting

6.8.11 Elements of the Proposed Development at 150 m or greater in height would require lighting under Article 222 of the Air Navigation Order (ANO, 2016)<sup>28</sup>. This requires medium intensity 'steady' red aviation lights (emitting 2,000 candela (ca)) to be fitted at the wind turbine nacelle level. In addition, the CAA requires low intensity lights to be fitted at the intermediate level on the turbine tower (CAA, 2017). The intermediate lights will be 32 ca. It is proposed that visibility sensors are installed on relevant turbines to measure prevailing atmospheric conditions and visibility range. Should atmospheric conditions (for example an absence of low cloud cover, rain, mist, haze or fog) mean that visibility around the Proposed Development Area is greater than 5 km from the Proposed Development, CAA policy permits lights to operate in a lower intensity mode of 200 ca (being a minimum of 10% of their capable illumination). If visibility is restricted to 5 km or less, by weather conditions, the lights would operate at their full 2,000 ca. In effect, the CAA policy allows 'dimming' of the lights depending on meteorological conditions, which has the effect of reducing the perceived intensity of light in clear conditions. Aviation lights will be switched on half an hour after sunset i.e. civil sunset, or during periods of poor visibility.

6.8.12 Medium intensity aviation lights would be installed on all seven turbines which would also have 32 ca low intensity lights at mid-tower height.

6.8.13 It should be noted that 2,000 candela lights observed at the threshold visibility limit of 5 km (poor visibility conditions) have a lower illuminance than the 200 candela lights viewed in typical clear conditions, for distance beyond 5 km. Therefore, for the purposes of this assessment, 200 candela lights are assumed to be worst case scenario.

6.8.14 The assessment of aviation lighting is an evolving subject area, and it is difficult to replicate aviation lights in photomontages due to a range of issues highlighted in NatureScot guidance (2017)<sup>29</sup>. For the purposes of comparison, a 2,000 ca light (in poor visibility) has an illuminance below that of the brightest star, and comparable to a car brake light seen within 5 km. Beyond this distance, the light becomes unobservable due to atmospheric conditions.

6.8.15 Core Document 12.2 to the Crystal Rig (Phase IV) documentation (Planning and Environmental Appeals (DPEA) reference: WIN-140-8) sets out the detail of aviation lights, how they propagate light and how the human eye perceives them. With reference to this tried and accepted technical information, an assessment of their visual impacts has been carried out in this section.

6.8.16 A 200 ca light at distances of 10 – 15 km from well-lit areas is comparable to the brightest of stars, when the eye is dark-adapted with decreasing intensity beyond up to 40 km.

6.8.17 Aviation lights are designed to be seen horizontally, therefore, for angles below the horizontal plane, the luminous intensity of aviation lighting decreases. Figure 6.6a-g show the theoretical lighting intensities predicted. It should be noted that light intensities reduce with distance which the ZTVs do not demonstrate. Light intensities within 5 km of the Proposed Development in clear visibility would be comparable to car brake light, and beyond 5 km, to the brightest star in the sky.

### Access Tracks

6.8.18 During the construction phase of the Proposed Development all access tracks would be constructed/widened to a nominal width of 5 m and wider on bends and junctions to accommodate construction vehicles and abnormal load deliveries.

6.8.19 The proposed internal tracks are aligned to take advantage of the screening effect of intervening topography and/or vegetation where possible.

### Crane Pads

6.8.20 These would be surfaced to match the proposed track construction. Whilst crane pads would be retained for the duration of the Proposed Development, they are likely to be fully or partially screened from the majority of external viewpoints by topography and the angle of view.

### Cabling, Substation, Control Building, BESS and Permanent Compound

6.8.21 In order to avoid potential visibility of the grid connection cables these would be undergrounded within the Proposed Development Area from each turbine to the substation and onsite grid connection. Undergrounded sections of cable would, wherever practicable, be placed beside proposed access tracks to reduce disturbance of the landscape and to ease future maintenance.

6.8.22 Supporting infrastructure will be constructed at the Proposed Developed including Substation, Control Building and Energy Storage facility within a permanent compound and will be used for the management of the Proposed Development. This will be situated away from residential properties as well as on the main turbine access track to avoid the requirement for further access tracks.

### Construction Compound

6.8.23 During the construction phase of the Proposed Development, a temporary construction compound and laydown site will be required. Upon completion of construction works, the compound would be removed and the ground reinstated. To ensure that the compound and laydown area can be returned to a condition consistent with the existing landscape, suitable construction methods and soil handling methods would be adopted. These would be specified in the Construction Method Statement (CMS).

### Construction Methods and Landscape Reinstatement

6.8.24 Throughout all phases of the Proposed Development, ground disturbance on site would be confined, as far as practicable, to access tracks, turbine base areas, lay-down areas, crane pads and undergrounded sections of the grid connection cables. The proposed location of these elements is described in Chapter 5: Project Description. Moreover, working widths would be restricted and carefully monitored and any existing landscape feature or materials arising from site operations that are to be retained would be safeguarded.

6.8.25 Where possible stockpiled overburden materials would be used in re-instating the Proposed Development borrow pits and tracks. It is also highlighted that spoil from other working areas such as turbine bases may also be used

<sup>28</sup> The Air Navigation Order 2016. [Online] Available at: [The Air Navigation Order 2016 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uk/2016/1000/1) (Accessed: 30 September 2021).

<sup>29</sup> SNH (2017) *Visual Representation of Wind Farms* [Online] Available at: ["7 \(nature.scot\)](https://www.nature.scot/) [Accessed 02/08/2023]

to achieve the restoration profile. Overburden shall only be removed over the area necessary for safe removal of the rock to prevent affecting land out-with the extraction area. It should be noted that overburden volumes can only be estimated following intrusive site investigation works. It is anticipated that there will be minimal waste materials produced by the borrow pit development. Any un-useable rock and superficial deposits shall be temporarily stockpiled during construction and utilised as part of the borrow pit restoration scheme.

- 6.8.26 On completion of the construction phase, all areas subject to ground disturbance would be reinstated to match adjoining undisturbed ground. Additionally, the surface of the former temporary compound would be scarified to prepare the surface for subsoil base and seeded to match surrounding vegetation.
- 6.8.27 A detailed construction and reinstatement method statement would be agreed with THC, NatureScot and Scottish Environment Protection Agency (SEPA) prior to commencement of construction activities.
- 6.8.28 During decommissioning of the Proposed Development, all above ground structures (including access tracks) would be removed and the ground reinstated. Subject to further assessment of site hydrology and soil cover depths, below ground structures and foundations would be left in place to avoid further disturbance.
- 6.8.29 The LVIA considers the residual effects of the construction and operational phases resulting from the introduction of the Proposed Development following the mitigation measures which have been embedded into the design of the proposed layout.

## 6.9 ASSESSMENT OF LANDSCAPE & VISUAL EFFECTS

### Landscape Character

- 6.9.1 The aim of the landscape assessment is to identify, predict and evaluate potential key effects arising from the addition of the Proposed Development into the landscape as an environmental resource. Landscape effects may be caused by changes to the constituent features or elements of the landscape, its aesthetic or perceptual qualities and overall character. Landscape effects on designated landscapes are also considered in this assessment. This involves the assessment of changes to the special landscape qualities, which determine its reason for designation and the overall integrity of the designation.
- 6.9.2 Assessing the significance of landscape effects requires the identification of the landscape receptors, the consideration of the nature of the landscape receptors (sensitivity) and the nature of the effect (magnitude of change) which would be experienced by each landscape receptor as a result of the Proposed Development. The methodology for the landscape assessment is detailed in Technical Appendix A6.1: Landscape & Visual Impact Methodology, including the method of identifying the susceptibility of landscape receptors. The lower the susceptibility, the greater the ability of the LCT/landscape designation to accommodate the Proposed Development without undue adverse effects.
- 6.9.3 A cumulative landscape impact assessment is also included in the following landscape assessment and considers the level of effect as a result of the addition of the proposed development into each cumulative baseline scenario separately.
- 6.9.4 The following provides a summary of the effects on the landscape character of the Proposed Development Area and landscape character within the wider study area.

### Proposed Development Area

- 6.9.5 All of the proposed components of the Proposed Development Area would be located within the Sweeping Moorland and Flows LCT.

#### *During Construction / Decommissioning Phases (Scenario 1)*

- 6.9.6 During the construction phase of the Proposed Development, there will be potential for short-term direct impacts of activities associated with the construction of infrastructure and turbines. Potential impacts during this phase are reversible unless otherwise stated (e.g., creation of permanent new features such as earthworks, access tracks, hardstandings and components of the Proposed Development that will be retained post decommissioning).
- 6.9.7 Such operations would result in direct effects on the landscape fabric of the Proposed Development Area. This will include vegetation clearance, excavation of soil, earthworks, the introduction of new elements and activity associated with construction which would contrast with the existing land use and moorland context. Overall, land use within the Proposed Development Area would not change during construction.
- 6.9.8 The construction and decommissioning phases of the Proposed Development would result in the following activities:
- Construction/decommissioning of 4,985 m x 4.5 – 6 m wide access track (including upgrades);
  - Construction/decommissioning of seven temporary lay down areas and a 35 x 13 m permanent hardstanding;
  - Transportation of material to site to form access tracks and hardstandings;
  - Construction of seven turbine foundations 30 m in diameter;
  - Construction/decommissioning of a temporary construction and storage compound 50 x 50 m;
  - Construction/decommissioning of a permanent Control Building 16 x 16 m;
  - Construction/decommissioning Battery Energy Storage System (BESS) 47 x 29 m;
  - Installation/decommissioning of seven wind turbines at 220 m to tip height;
  - Creation of seven external transformer housing 3 x 3 m;
  - Excavation/reinstatement of cable trenches;
  - General reinstatement works; and
  - Vehicular/personnel movements on site.

#### **Magnitude of Change**

- 6.9.9 Such operations would result in direct impacts on the landscape fabric of the Proposed Development Area. This will include vegetation clearance, excavation of soil, earthworks, the introduction of new elements and activity associated with construction which would contrast with the existing land use and context. Overall, land use within the Proposed Development Area would not change during construction and decommissioning phases and would be limited to the areas identified on Figure 5.1.
- 6.9.10 It is considered the magnitude of change on the landscape resource of the Proposed Development Area would be **High** resulting from the temporary and permanent direct and indirect loss of blanket bog and modified bog (addressed in detail in Chapter 7: Ecology).
- 6.9.11 This would cover a small geographical extent of the overall Proposed Development Area where the size and scale of the change would be large.

### Significance of Effect

- 6.9.12 The Proposed Development Area is assessed as having a Medium sensitivity, combined with a High magnitude of change which when combined results in a **Major-moderate** adverse and **significant** effect on the physical landscape fabric of the Proposed Development Area during construction and decommissioning. This would occur over a short period of time, the majority of which would be temporary in nature and reversible in the long-term. The exception being the turbine foundations and access tracks which would be left in situ following decommissioning.

### Proposed Development Area During Operation

- 6.9.13 Following reinstatement post construction, the Proposed Development Area would enter the operational stage with activity within the proposed site reducing to works associated with the operation and maintenance of 7 wind turbines, BESS, substation, and access tracks. This would create additional movement within the landscape as well as the project components mentioned contrasting with the current land use resulting in both direct and indirect effects from the physical elements of the Proposed Development, and perception of remoteness within the Proposed Development Area. The overall land use within the Proposed Development Area would not change during operation and maintenance.
- 6.9.14 The operational and maintenance phase of the Proposed Development would result in the following activities:
- Operation and maintenance of 4,985 m x 4.5 – 6 m wide access track;
  - Operational and maintenance of a permanent hardstanding 35 x 13 m;
  - Operation and maintenance of a temporary construction and storage compound 50 x 50 m;
  - Operation and maintenance of a permanent Control Building 16 x 16 m;
  - Operation and maintenance of at BESS 47 x 29 m;
  - Operation and maintenance of seven wind turbines at 220 m to tip height;
  - Operation and maintenance of seven external transformer housing 3 x 3 m; and
  - Vehicular/personnel movements on site.

### Magnitude of Change

- 6.9.15 Magnitude of change on the landscape resource of the Proposed Development Area would remain as **High** during operation and maintenance due to the size and scale of the changes occurring over a localised area including the operation of seven wind turbines, access tracks, earthworks, compound, BESS, and substation.

### Significance of Effect

- 6.9.16 This would result in a **Major-moderate** adverse and **significant** effect on the physical landscape fabric and perception of the Proposed Development Area during operation. The nature of changes would be direct, long-term, and reversible following decommissioning, the exception being sections of access tracks and the turbine foundations which would be left in situ.
- 6.9.17 No further developments are planned for the Proposed Development Area and therefore there would be no cumulative effects.

## Sweeping Moorland and Flows

- 6.9.18 Beyond the Proposed Development Area, effects on the Sweeping Moorland and Flows LCT would be indirect and associated with visibility of the project components.

- 6.9.19 Analysis of the ZTV shown on Figures 6.3a – 6.4 show that theoretical visibility of the Proposed Development would occur from 42.2 % of the Sweeping Moorland LCT that is within the 45 km study area. This would be widespread within 15 km of the Proposed Development, the exception being to the south west where landform would restrict theoretical visibility at 13 km. Thereafter, theoretical visibility would reduce to areas of higher elevation. Due to the lack of tree cover within the LCT, theoretical visibility is predicted to be accurate.
- 6.9.20 To the north and south, the Proposed Development would extend turbines further east away from the existing cluster of Group 1 developments and therefore, increasing the horizontal extent of turbines seen within this LCT. To the west, the Proposed Development would be viewed behind the existing cluster of Group 1 developments, increasing the number of turbines forming the cluster and stacking. Depending on the elevation of the location within the LCT, in some cases, the turbines will at times appear in views noticeably higher than the foreground turbines, or at the same height.
- 6.9.21 A series of viewpoints represent the perceptual change experienced in the wider LCT from different elevations and distances from the Proposed Development as follows:
- Figures 6.22 a-f: Viewpoint 6: Ben Dorrery;
  - Figures 6.28 a-f: Viewpoint 12: Westerdale;
  - Figures 6.29 a-f: Viewpoint 13: Minor Road North of Grey Cairns;
  - Figures 6.30 a-g: Viewpoint 14: Loch More Cottage;
  - Figures 6.32 a-f: Viewpoint 16: A9, North of Rangag;
  - Figures 6.33 a-e: Viewpoint 17: Coire na Beinne; and
  - Figures 6.34 a-f: Viewpoint 18: Ben Alisky.

### Key Characteristics

- 6.9.22 The key characteristics of the LCT likely to be affected during the construction/decommissioning and operational and maintenance phases are analysed in the following paragraphs.

#### *Key characteristic - Vehicular tracks within parts of the landscape.*

- 6.9.23 The addition of the Proposed Development would result in an increase in access tracks constructed within this LCT. However, the low-lying nature and relatively flat topography will reduce their visibility within the wider landscape to direct impacts on the landscape fabric rather than to views.

#### *Key characteristic - Wind farms, transmission lines, the A9 and a network of minor roads are key features within the more modified outer fringes within Caithness.*

#### *Key characteristic - Long, low, and largely uninterrupted skylines offering extensive views across this landscape and result in a feeling of huge space.*

- 6.9.24 The skyline to the west of the Proposed Development is heavily influenced by operational wind farms, electricity transmission lines, and coniferous forestry plantations. The addition of the Proposed Development to this baseline would increase the number of wind turbines within the cluster, and from the south west, extend turbines further to the east of the Group 1 developments.

*Key characteristic - Consistent views to the distant Lone Mountains and Rugged Mountain Massif – Caithness & Sutherland.*

- 6.9.25 The Proposed Development is located on the eastern periphery of this LCT, therefore, would form an intervening feature to a small proportion of the LCT when viewing the lone mountains to the south west. Views from this area are currently affected by coniferous forestry and operational wind farms and it is not considered that the addition of the proposed turbines would affect these views.

*Key characteristic - A strong sense of remoteness is associated within the largely uninhabited, inaccessible core flows and moorlands of this landscape.'*

- 6.9.26 The addition of the Proposed Development would impact on the sense of remoteness of the proposed site, affecting a small number of people accessing the Proposed Development Area for commercial forestry and agricultural reasons that is privately owned. Within the wider landscape, the Proposed Development would be located on the periphery of the LCT, behind Group 1 developments and away from the core area of flows and moorland where the perception of remoteness is experienced and would have limited effect on this key characteristic.

**During Construction / Decommissioning Phases (Scenario 1)**

- 6.9.27 During construction, site enabling works and the installation of turbines and associated infrastructure would result in direct and indirect, permanent, and temporary impacts on the landscape fabric of the Proposed Development Area addressed above. Within the wider LCT, the main effects would relate to views of the Proposed Development which would form an additional new vertical feature (including temporarily views of cranes) alongside the existing operational wind farms. The supporting infrastructure works would be partially screened in views by a combination of landform and forestry plantations.

**Magnitude of Change**

- 6.9.28 This would result in a change in terms of the perceptual experience with theoretical visibility being widespread within 15 km, thereafter, affecting elevated areas. This would be experienced within the context of Group 1 developments and coniferous forestry which would be within the foreground, and therefore, the addition of the Proposed Development would not be as apparent as it would be without the existing operational wind farms..
- 6.9.29 Landscape magnitude of change during construction would be **High** as a result of the size and scale of the changes, combined with the geographical area affected surrounding the Proposed Development. As distance increases, the size and scale of change would reduce to **Medium** and **Low** levels.

**Significance of Effect**

- 6.9.30 Sensitivity for this LCT is assessed as Medium and magnitude of change High. This would result in a **Major-moderate** adverse and **significant** effect during construction and decommissioning, reducing to **Moderate** adverse **significant to Moderate** and **Minor** adverse **not significant** effects elsewhere as distance increases and the scale and size of the change reduces. This would occur over a short period of time, the majority of which would be temporary in nature and reversible in the long-term. The exception being the turbine foundations and access tracks which would be left in situ following decommissioning.

**During Operation (Scenario 1)**

- 6.9.31 The nature of the effects on landscape character would be both direct and indirect, long term during the operational life of the Proposed Development and reversible beyond this period following decommissioning, the exception

being the turbine foundations and sections of access track left in situ, which would not be visible in the wider landscape.

- 6.9.32 During operation, turbines would be experienced rotating adding additional movement to the landscape alongside the existing Group 1 developments. There would also be regular maintenance vehicles visiting the proposed site.
- 6.9.33 All seven aviation lights would be experienced within the LCT at various light intensities depending on elevation. This would include 0° to - 4° within 15 km where light intensities would be between 200 – 4 candela (ca). Beyond 15 km, theoretical visibility would reduce with summits and north facing slopes being predicted to receive 200 ca, at distances in excess of 13 to 45 km. At these distances, the lights would not be as intense owing to distance and atmospheric conditions and appear as blinking. In views from the west, foreground operational turbines would also pass in front of the aviation lights. Aviation lights would be seen in the direction of other artificial lighting sources including lights from properties, skyglow from the distant settlements of Wick and Thurso, and vehicles travelling along the road network.

**Magnitude of Change**

- 6.9.34 Figure 6.5 indicates that the horizontal angle of view that the Proposed Development will occupy in views from the LCT will be typically between 50-360° within 2 km, reducing to 10-60° within 5 km and 1-20° thereafter as distance increases occupying a geographical area of 42.2%.
- 6.9.35 Magnitude of change would be High, resulting from the size and scale of the changes including the introduction of seven wind turbines, substation/BESS, access tracks and aviation lights which would extend the effects over a longer period each day. These would-be long-term features within the landscape. Beyond 15 km, magnitude of change would reduce as the scale of the turbines would become less owing to the large-scale landscape that it is located within viewed beyond Group 1 developments, where the size and scale of the change would recede, and the geographical area reduce. This would result in **Medium** to **Negligible** levels of magnitude.

**Significance of Effect**

- 6.9.36 Sensitivity for the LCT is assessed as Medium and magnitude of change High. This would result in a **Major-moderate** adverse and **significant** effect within 15 km of the Proposed Development, reducing to **Moderate significant** to **Moderate** and **Minor** adverse not significant effects elsewhere. The nature of changes would be direct, long-term, and reversible following decommissioning, the exception being sections of access tracks and the turbine foundations which would be left in situ.

**Cumulative Assessment**

**Cumulative Assessment - Scenario 2**

- 6.9.37 Three consented wind farms are located in this LCT, Achlachan II located to the west infilling an area between Achlachan I and Causeymire, Tachur located on the southern end of Bad a Cheo would result in further turbines forming part of the existing Group 1 cluster. To the east, Camster II located to the east between Camster I and Achairn forming part of Group 2 developments, and Golticlay located in the south east of the LCT as a standalone development. Cogle Moss would also be located within the Moss of Kirk / Moss of Killimster sub-unit, and Slickly in the Battens of Brabster sub-unit to the north east of the Proposed Development. None of these developments would require aviation lights due to being under 150 m.
- 6.9.38 The Scenario 2 baseline would result in a further six turbines being viewed around the existing operational cluster of Bad a Cheo, Halsary and Causeymire. Both Achlachan II and Tachur would not result in further theoretical

visibility within the LCT. Golticlay in the south east of the LCT, would result in a slight increase in theoretical visibility mainly occurring in the south west of the LCT.

- 6.9.39 The introduction of the Proposed Development to this baseline would not result in an increase in theoretical visibility within the LCT. Effects would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further east away from Group 1 developments as discussed for the assessment of Scenario 1. Therefore, it is not considered that the magnitude of change would increase from Medium or from a **Major-moderate** adverse and **significant** effect.

### Cumulative Assessment- Scenario 3

- 6.9.40 Both application schemes considered would be located within this LCT, Tormsdale in the South and East Caithness sub-unit would extend turbines further west from Causeymire operational wind farm increasing the spread of the Group 1 developments westwards, and Hollandmey would be located within the Battens of Brabster sub-unit to the north east.
- 6.9.41 Scenario 3 baseline would result in the addition of Tormsdale, located between west of the existing cluster of turbines of Scenario 1. This would increase the influence of wind turbines on views from the north of the LCT, in particular from the adjacent peatlands.
- 6.9.42 Potential impacts would be associated with further turbines being viewed beyond the Group 1 cluster or extending development further east It is not considered that the magnitude of change would increase from Medium due to the proposed turbines being further away from the core area of the LCT which lies to the west of the A9 road. Therefore, the significance of effect would remain as **Major-moderate** adverse and **significant**, reducing to Moderate-minor and Minor non-significant levels as distance increases from the Proposed Development.

### LCT 143 Farmed Lowland Plain

- 6.9.43 Potential impacts on the Farmed Lowland Plain LCT would be indirect and associated with visibility of the Proposed Development.
- 6.9.44 Analysis of the ZTV shown on Figures 6.3a – 6.4 show that theoretical visibility of the Proposed Development would occur from 60.6 % of the Farmed Lowland Plain LCT that is within the 45 km study area. This would be widespread to the north and east of the Proposed Development within 15 km, with no theoretical visibility occurring in hollows. Beyond 15 km, theoretical visibility reduces to elevated ground facing the Proposed Development covering the east of Castletown, and north and west at Spittal, Halkirk and Thurso. In reality, the visual envelope would reduce as there are small coupes of woodland and field boundary hedgerows which would provide some screening.
- 6.9.45 The addition of the Proposed Development to this baseline would result in an increase in the number of turbines being viewed to the south which would be seen in combination and front of, or extending the existing operational cluster of Halsary, Bad a Cheo, Camster and Achlachan I further eastwards. The proposed turbines would also be seen sequentially with other wind farms both located within the LCT (Wathegar I and II, Achairn, and part of Bilbster, and those located in adjacent LCTs).
- 6.9.46 A series of viewpoints represent the perceptual change experienced in the wider LCT from different elevations and distances from the Proposed Development as follows:
- Figures 6.17 a-f: Viewpoint 1: Thurso;
  - Figures 6.18 a-f: Viewpoint 2: North of Hoy;
  - Figures 6.19 a-f: Viewpoint 3: Georgemas;
  - Figures 6.20 a-f: Viewpoint 4: North Watten;

- Figures 6.21 a-f: Viewpoint 5: Scotscaider;
- Figures 6.23 a-f: Viewpoint 7: Harpsdale Crossroads;
- Figures 6.24 a-f: Viewpoint 8: Watten;
- Figures 6.25 a-f: Viewpoint 9: A882, east of Watten; and
- Figures 6.27 a-f: Viewpoint 11: North Wick, A99 Road.

### Key Characteristics

- 6.9.47 The key characteristics of the LCT likely to be affected during the construction/decommissioning and operational and maintenance phases are analysed in the following paragraphs.

*Key Characteristic - Larger conifer woodlands located at the transition with the Sweeping Moorland and Flows standing out where they are planted on poorer wetter ground on low ridges.*

- 6.9.48 A total of 11.24 ha will be felled to enable construction of the Proposed Development, this would be located within the Sweeping Moorland and Flows LCT but form a transitional area with the Farmed Lowland Plain LCT. This area is on the edge of a larger forest and its removal would not open up views across the Proposed Development Area towards the Flow Country and lone mountains beyond.

*Key Characteristic - Small groups of large wind turbines sited on some of the low ridges and hills and prominent visibility of larger wind farms in adjacent Landscape Character Types.*

*Key Characteristic - Extensive views due to the openness of the landscape, and the clarity of northern air and light.*

- 6.9.49 The Proposed Development would form a large vertical feature which would be experienced in closer proximity to this LCT in comparison to the existing operational clusters. Viewpoints 4, 8 and 9 discussed in Technical Appendix A6.6 provide a representation of the likely effect on this LCT from close proximity. The remaining viewpoints 1, 2, 3, 5, 7 and 11 represent views from more distant locations and elevations.

*Key Characteristics - Dramatic views from the northern part of this landscape to Dunnet Head and the distant Orkney islands, and views from the A9 on the western edge of this landscape of the Lone Mountains of Morven and Scaraben seen across the low-lying Sweeping Moorland and Flows.*

- 6.9.50 The Proposed Development would not form an intervening feature in the views described on account of its location in the opposite direction.

### During Construction / Decommissioning Phases (Scenario 1)

- 6.9.51 During construction/decommissioning phases, the addition of the Proposed Development would result in additional vertical features (including temporarily views of cranes) alongside the existing operational wind farms being visible. The supporting infrastructure works would be partially to fully screened by a combination of landform and forestry plantations.

### Magnitude of Change

- 6.9.52 This would result in a change in terms of the perceptual experience of the LCT with theoretical visibility of construction and decommissioning activities being widespread within 15 km, thereafter, affecting elevated areas of farmland.

- 6.9.53 Landscape magnitude of change during construction would be **High** as a result of the size and scale of the changes, combined with the geographical area affected surrounding the Proposed Development Area. As distance increases, the size and scale of change would reduce to **Medium** and **Low**.

#### Significance of Effect

- 6.9.54 Sensitivity for this LCT is assessed as Medium and magnitude of change High. This would result in a **Major-moderate** adverse and **significant** effect within 15 km during construction and decommissioning phases, reducing to **Moderate** adverse and **Minor** adverse **not significant** levels elsewhere as distance increases.

#### During Operation (Scenario 1)

- 6.9.55 During operation, turbines would be experienced rotating adding additional movement to the landscape alongside the existing operational wind turbines. This would be experienced within the context of Group 3 and 4 developments within and neighbouring LCTs, Group 2 in the east, and backdropped by Group 1 developments. Therefore, the addition of the Proposed Development would not be as apparent as it would be without the existing operational wind farms..
- 6.9.56 All seven aviation lights would be experienced within the LCT at various light intensities depending on elevation. This would include 0° to - 4° within 15 km where light intensities would predominantly be 75 – 8 ca within 10 km, and 200 – 4 (ca) beyond 15 km. At distances beyond 5 km, the lights would not be as intense owing to distance and atmospheric conditions and appear as blinking. Aviation lights would be seen alongside other artificial lighting sources including lights from properties, skyglow from the distant settlements of Wick and Thurso, and vehicles travelling along the road network within the LCT.

#### Magnitude of Change

- 6.9.57 Figure 6.5 indicates that the horizontal angle of view that the Proposed Development will occupy in views from the LCT will be typically between 50-360° within 2 km, reducing to 10-60° within 5 km and 5-10° from 10 km as distance increases occupying a geographical area of 67.4%.
- 6.9.58 Magnitude of change would be **Medium** during operation resulting from the size and scale of the changes including the introduction of seven wind turbines, and aviation lights which would extend the effects over a longer period each day. These would-be long-term features within the landscape and reversible following decommissioning. Beyond 15 km, magnitude of change would reduce as the scale of the turbines would become less owing to the large-scale landscape that it is located within, screening from landform and vegetation, and distance where the size and scale of the change would recede, and the reduced geographical area affected. This would result in **Medium** to **Negligible** levels.

#### Significance of Effect

- 6.9.59 Sensitivity for the LCT is assessed as Medium and magnitude of change High. This would result in a **Major-moderate** adverse and **significant** effect within 15 km of the Proposed Development, reducing to **Moderate significant**, **Moderate** and **Minor** adverse **not significant** effects elsewhere. The nature of the effects on landscape character would be indirect, long term during the operational life of the Proposed Development and reversible beyond this period following decommissioning.

#### Cumulative Assessment

##### Cumulative Assessment - Scenario 2

- 6.9.60 No consented sites would be located within this LCT, but visibility would occur of turbines in the neighbouring Sweeping Moorlands and Flow LCT. This would include Slickly located to the west of Stroupster forming Group 4 developments, Cogle Moss as a standalone, Camster II infilling an area between Camster and Achairn wind farms forming Group 2 developments, Achlachan II and Tachur forming part of Group 1 developments, and Golticlay further south.

- 6.9.61 The introduction of the Proposed Development would not result in an increase in theoretical visibility within the LCT. Impacts would be associated with further turbines being viewed beyond the existing cluster of operational turbines forming Group 1 extending development further east towards the LCT. The consented sites would be further away from the LCT, and it is not considered that there would be an increase in cumulative effects as a consequence of the Proposed Development.

- 6.9.62 Therefore, it is not considered that the magnitude of change would increase from High, and the significance of effect would remain as **Major-moderate** adverse and **significant**, reducing to **Moderate-minor** and **Minor** non-significant levels as distance increases from the Proposed Development.

#### Cumulative Assessment- Scenario 3

- 6.9.63 The addition of the Scenario 3 developments would also be located in the neighbouring Sweeping Moorland and Flows LCT and include Hollandmey in the north forming Group 3 developments, and Tormsdale in the south west which would extend turbines westwards of Group 1.

- 6.9.64 Potential impacts would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further east towards the LCT. It is not considered that the magnitude of change would increase from High. Therefore, the significance of effect would remain as **Major-moderate** adverse and **significant**, reducing to **Moderate-minor** and **Minor non-significant** levels as distance increases from the Proposed Development.

### Protected and Designated Landscapes

- 6.9.65 The following paragraph provides a summary of the assessment of the Flow Country and Berriedale Coast SLA detailed in Appendix A6.4.

#### Flow Country and Berriedale Coast SLA

- 6.9.66 Analysis of the special qualities of the SLA identified two as potentially being affected by the Proposed Development as follows:
- *'The conspicuous mountain profiles, from striking cones to rolling masses, are visible from most of Caithness and serve as distinctive landmarks. They are typically seen from a distance and it is difficult to perceive their size or distance due to the simplicity of the intervening peatland.'*
  - *'The mountain summits offer rare opportunity to view a panorama of wide ranging characteristics – extending over the Flow Country peatlands, out to sea and as far south as the Cairngorms in clear conditions.'* (The Highland Council, 2011)
- 6.9.67 Both of the above special qualities relate to visibility across the SLA towards the lone mountains, both from within and out with the boundaries of the designation.
- 6.9.68 The introduction of the Proposed Development would result in approximately 31.7 % of the SLA receiving theoretical visibility based on a bare ground model. This covers low-lying peatland and elevated ground. Due to the lack of tree cover, the visual envelope is unlikely to reduce in reality.

- 6.9.69 Theoretical visibility of the Proposed Development extends between 6.7 and 35.9 km and is predicted to be widespread across low-lying peatland out to 12.9 km. Thereafter, reducing to elevated areas including the north and east facing slopes extending between Dalnaha in the north, to Cnoc Bad Cholla in the south including the summit of Ben Alisky (349 m AOD); the upper slopes of isolated hills; north east facing slopes between Loch Mhadaidh and Bad Mairi; and between Cnoc Coire na Fearna and Meall na Caorach including the summits of Morven and Scaraben.
- 6.9.70 Views of the Proposed Development vary from within the SLA on account of the size of the designation. From the western side of the SLA (see Viewpoint 14: Loch More Cottage – Figures 6.30a-g, and Viewpoint 18: Ben Alisky Figures 6.34a-f), the Proposed Development would be viewed behind the foreground cluster of operational wind turbines of Bad a Cheo and Halsary. The extent of the proposed turbines visible would depend on the elevation of the viewpoint, with landform providing some screening to the base of the proposed turbines from Viewpoint 14 which is located within the flat peatlands. The proposed turbines would also be noticeably taller, again, the elevation of the viewpoint would dictate how much taller, with Viewpoint 18: Ben Alisky (see Figures 6.34a-f) appearing more prominent due to the higher elevation in comparison to Viewpoint 14.
- 6.9.71 Therefore, the Proposed Development would form an intervening feature in views from the north east of the Proposed Development in the direction of the lone mountains. This would be seen within the existing context of operational wind farms which the Proposed Development would appear in the foreground against or extend eastwards within the view. However, the area affected would be beyond the SLA boundary. From within the SLA, the Proposed Development would not interfere with views across the peatlands towards the lone mountains due to being located in the opposite direction but would feature in distant views from the lone mountains looking across the Flow Country behind the existing cluster of operational wind farms or extending eastwards forming a standalone development.
- 6.9.72 All seven of the aviation lights mounted on turbine nacelles would be visible from the SLA. This would be widespread up to 12.9 km from the Proposed Development. It is predicted that the horizontal angle would be 0° to -1° resulting in light intensities of 200 ca to 75 ca and comparable to the break light of a car assuming clear conditions.
- 6.9.73 Areas of higher ground at Coire na Beinne, Cnocan, Ben Alisky and the Lone Mountains would obtain visibility of aviation lights between 0° to 3° at 200 ca in clear conditions, although the intensity would reduce as a consequence of the distance from the Proposed Development where lights will be observed blinking due to atmospheric conditions.
- 6.9.74 Aviation lighting would be experienced within the context of vehicles travelling along the A9 road, several A and minor roads, and lights from properties in the surrounding settled landscape. Nevertheless, aviation lights will extend the duration of effects of the wind turbines to hours of darkness.

### Magnitude of Change

- 6.9.75 The Proposed Development (during construction/decommissioning, and operation and maintenance phases) would be visible from the SLA. Changes to the special qualities of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the special qualities of the SLA would be limited to the two identified and with regards to visibility of the Proposed Development within the designation. The magnitude of change is considered to be **Medium** during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the south west of the Proposed Development to approximately 15 km, reducing as distance increases to **Low**.

### Significance of Effects - Scenario 1

- 6.9.76 The sensitivity of the Flow Country and Berriedale Coast SLA is considered Very High on account of the level of designations covering the SLA which are of international and national importance. Magnitude of change during the construction/decommissioning, and operation and maintenance phases would be Medium within the peatland area immediately to the south west of the Proposed Development, reducing to Low levels with distance. This would result in a **Major-moderate significant** adverse effect with 15 km, reducing to **Moderate** and **Minor** adverse levels thereafter and **not significant** as distance increases. Construction and decommissioning phases would be short-term in duration, becoming long-term during operation and maintenance and reversible following decommissioning.

### Cumulative Assessment

#### Scenario 2 – Operational/under Construction + Consented Wind Farms

- 6.9.77 Scenario 2 baseline would include a further three turbines at Achlachan II (4.2 km to the west) occupying an area between the operational Achlachan Wind Farm and Causeymire, and a further three turbines at Tachur (4.0 km to the south west), extending further south from Bad a Cheo appearing as an extension to the operational wind farm.
- 6.9.78 Further consented sites of note are Cogle Moss (7.0 km to the north east), Camster II (6.2 km to the east), and Golticlay (9.7 km to the south east), extending turbines southwards in views from the SLA and appearing as a standalone development.
- 6.9.79 The Scenario 2 baseline would result in a further six turbines being viewed around the existing operational cluster of Group 1 developments and would not result in further theoretical visibility within the SLA. Golticlay to the east of the SLA, would result in a slight increase in theoretical visibility.
- 6.9.80 The introduction of the Proposed Development would not result in an increase in theoretical visibility within the SLA. Impacts would be associated with further turbines being viewed beyond the existing cluster of Group 1 developments or extending development further east as a standalone development as discussed for the assessment of Scenario 1. Therefore, it is not considered that the magnitude of change would increase from Medium – Low. Therefore, the significance of effect would remain as **Major-moderate** adverse and **significant**, reducing to **Moderate-minor** and **Minor non-significant** levels as distance increases from the Proposed Development.

#### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

- 6.9.81 Scenario 3 baseline would result in the addition of Tormsdale (5.8 km to the west), located between the SLA and existing cluster of turbines of Scenario 1 and 2. This would increase the influence of wind turbines on views from the north of the SLA, in particular from the adjacent peatlands.
- 6.9.82 Similar to the assessments of Scenario 1 and 2, the addition of the Scenario 3 sites to the baseline, would not result in an increase in theoretical visibility within the SLA. Impacts would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further east as a standalone development. It is not considered that the magnitude of change would increase from Medium – Low levels. Therefore, the significance of effect would remain as **Major-moderate** adverse and **significant**, reducing to **Moderate-minor** and **Minor non-significant** levels as distance increases from the Proposed Development.

### Wild Land Areas

- 6.9.83 The following provides a summary of the assessment of WLA detailed in Technical Appendix A6.5.



### Causeymire – Knockfin Flows WLA

- 6.9.84 The following wild attribute has been identified as potentially being affected by the Proposed Development:
- *'Awe inspiring simplicity of wide open peatland from which rise isolated, arresting, steep mountains.*
  - *Irregular peatland and dubh lochan, comprising a complex mix of hidden pools, bogs and lochans that contribute to perceived naturalness and limit access.*
  - *'An extensive remote interior with few visitors in contrast to the margins of the area from which many people view into the WLA.*
  - *'Wide glens containing meandering rivers that limit access and are often the focus for isolated historic features.*
  - *Rolling interlocking hills in the south containing remote, sheltered glens with limited visibility'*
- 6.9.85 The Proposed Development would not be located within the WLA and would not have any direct effects on the physical attributes of the WLA, or views across the peatlands towards the mountains. Potential effects are therefore indirect and related to receptors experiencing visibility of the Proposed Development alongside operational wind farms.
- 6.9.86 Approximately 31.7 % of the Causeymire – Knockfin Flows WLA is predicted to receive theoretical visibility of the Proposed Development based on a bare ground model. This covers low-lying peatland and elevated ground and due to the lack of tree cover, the visual envelope is unlikely to reduce in reality.
- 6.9.87 Theoretical visibility of the Proposed Development extends between 5.7 and 35.8 km and is predicted to be widespread across low-lying peatland out to 12.9 km. Thereafter, reducing to elevated areas including the east facing slopes extending between Dalnaha in the north, to Cnoc Bad Cholla in the south including the summit of Ben Alisky (349 m AOD); the upper slopes of isolated hills; north east facing slopes between Loch Mhadaidh and Bad Mairi; high ground to the east of The Flows NNR; and along a ridgeline extending between Meall Dhonuil in the east, and Cnoc Coire na Fearnna in the west including the distinctive summits of Morven (706 m AOD) and Scaraben (626 m AOD).
- 6.9.88 The Proposed Development would be experienced beyond the existing cluster of operational turbines (Scenario 1) comprising Group 1 developments. There would be a very slight increase in theoretical visibility of wind turbines within the WLA as a direct consequence of the Proposed Development. This would extend visibility to the lower slopes of hills near Achscoriclate, Backlass, Sithean Corr-Meille, Loch Breac, Cnoc Gleannain, Pollboy and along the ridgeline extending west from Morven. This is mainly as a result of the proposed turbines being taller than the nearby operational turbines where blade tips will be visible at lower elevations.
- 6.9.89 Views of the Proposed Development vary from within the WLA on account of the size of the designation and supported by the following viewpoints:
- Figure 6.30a-g – Viewpoint 14: Loch More Cottage;
  - Figure 6.33a-e – Viewpoint 17: Coire na Beinne;
  - Figure 6.34a-f – Viewpoint 18: Ben Alisky;
  - Figure 6.35a-f – Viewpoint 19: Scaraben; and
  - Wirelines in Annex 3 (1-5) of Technical Appendix A6.5..
- 6.9.90 From the western side of the WLA (see Viewpoint 14: Loch More Cottage, and Viewpoint 18: Ben Alisky), the Proposed Development would be viewed behind the foreground cluster of operational wind turbines of Bad a Cheo and Halsary. The extent of the proposed turbines visible would depend on the elevation of the viewpoint, with landform providing some screening to the base of the proposed turbines from Viewpoint 14 which is located within

the flat peatlands. The proposed turbines would also be noticeably taller, again, the elevation of the viewpoint would dictate how much taller, with Viewpoint 18: Ben Alisky appearing more prominent due to the higher elevation in comparison to Viewpoint 14.

- 6.9.91 All seven of the aviation lights mounted on turbine nacelles would be visible from the WLA. This would be widespread up to 12.9 km from the Proposed Development. It is predicted that the horizontal angle would be 0° to -1° resulting in light intensities of 200 candela (ca) to 75 ca and comparable to the break light of a car assuming clear conditions.
- 6.9.92 Areas of higher ground at Coire na Beinne, Cnocan, Ben Alisky and the lone mountains would obtain visibility of aviation lights between 0° to 3° at 200 ca in clear conditions, although the intensity would reduce as a consequence of the distance from the Proposed Development where lights will be observed blinking due to atmospheric conditions.
- 6.9.93 Aviation lighting would be experienced within the context of vehicles travelling along the A9 road, several A and minor roads, and lights from properties in the surrounding settled landscape. Nevertheless, aviation lights will extend the duration of effects of the wind turbines to hours of darkness.

### Magnitude of Change

- 6.9.94 The Proposed Development (during construction/decommissioning, and operation and maintenance) would be visible from the WLA. Changes to the wild attributes of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the wild attributes of the WLA would be limited. The magnitude of change is considered to be **Medium** during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the south west of the Proposed Development to approximately 12.9 km, reducing as distance increases to **Low**. Construction and decommissioning phases would be short-term in duration, becoming long-term during operation and maintenance and reversible following decommissioning.

### Significance of Effect

- 6.9.95 The sensitivity of the Causeymire and Flows WLA is considered Very High on account of the level of designations covering the WLA which are of international and national importance. Magnitude of change during the construction/decommissioning, and operation and maintenance phases would be Medium within the peatland area immediately to the south west of the Proposed Development, reducing to Low levels with distance. This would result in a **Major-moderate significant** adverse effect with 12.9 km, reducing to **Moderate-minor** and **Minor** adverse levels thereafter and not significant as distance increases.

### Cumulative Assessment

#### Scenario 2 – Operational/under Construction + Consented Wind Farms

- 6.9.96 The addition of the consented sites (Scenario 2) would include a further 3 turbines at Achlachan II (4.2 km to the west ) occupying an area between the operational Achlachan Wind Farm and Causeymire, and a further 3 turbines at Tachur (4.0 km to the south west ), extending further south from Bad a Cheo appearing as an extension to the operational wind farm.
- 6.9.97 Further consented sites of note are Cogle Moss (7.0 km to the north east), Camster II (6.2 km to the south east), and Golticlay (9.7 km to the south east), extending turbines southwards in views from the WLA and appearing as a standalone development.

- 6.9.98 The Scenario 2 baseline would result in a further six turbines being viewed around the existing operational cluster of Bad a Cheo, Halsary and Causeymire. Both Achlachan II and Tachur would not result in further theoretical visibility within the WLA. Golticlay to the east of the WLA, would result in a slight increase in theoretical visibility.
- 6.9.99 The introduction of the Proposed Development would not result in an increase in theoretical visibility within the WLA. Impacts would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further east as a standalone development as discussed for the assessment of Scenario 1. Therefore, it is not considered that the magnitude of change would increase from Medium – Low.

### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

- 6.9.100 Scenario 3 baseline would result in the addition of Tormsdale (5.8 km to the west), located between the WLA and existing cluster of turbines of Scenario 1 and 2. This would increase the influence of wind turbines on views from the north of the WLA, in particular from the adjacent peatlands.
- 6.9.101 Scenario 3 (application sites would result in Tormsdale increasing the presence of wind turbines on the north eastern boundary of the Causeymire - Knockfin Flows WLA, resulting in turbines encroaching on the WLA and would be viewed in front of the existing operational and consented cluster.
- 6.9.102 Similar to the assessments of Scenario 1 and 2, the addition of the Scenario 3 sites to the baseline, would not result in an increase in theoretical visibility within the WLA. Impacts would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further east as a standalone development. It is not considered that the magnitude of change would increase from Medium – Low levels.

### East Halladale Flows WLA

- 6.9.103 NatureScot identify five wild attributes for the Causeymire - Knockfin Flows WLA. The following addresses each wild quality in relation to the Proposed Development;
- *'An awe-inspiring simplicity of landscape at the broad scale, with a strong horizontal emphasis, 'wide skies' and new foci.*
  - *A remote, discrete interior, with limited access and a strong sense of solitude.*
  - *A rugged and complex pattern of hidden burns, lochans and pools at the local level, despite the landscape's simple composition at the broad scale.*
  - *A remarkably open landscape with extensive visibility, meaning tall or high features in the distance are clearly visible.'*
- 6.9.104 The Proposed Development would not be located within the WLA and would not have any direct effects on the physical attributes of the WLA, or views across the WLA. Potential effects are therefore indirect and related to receptors experiencing intervisibility of the Proposed Development.
- 6.9.105 Approximately 34.4 % of the East Halladale Flows WLA is predicted to receive theoretical visibility of the Proposed Development based on a bare ground model. This covers low-lying peatland in the east and elevated ground in the west. Due to the lack of tree cover, the visual envelope is unlikely to reduce in reality.
- 6.9.106 The ZTV for the East Halladale Flows WLA shows widespread theoretical visibility between 13.6 – 22.1 km from the Proposed Development covering the Forsinard Flows National Nature Reserve. Thereafter, isolated hills including Beinn Ratha (242 m AOD), and Cnoc Bad Mhairtein (230 m AOD).
- 6.9.107 Similar to the Causeymire – Knockfin Flows WLA, the Proposed Development would be experienced beyond the existing cluster of operational turbines (Scenario 1) comprising Halsary, Bad a Cheo and Causeymire. Map A6.7

shows that there would be a very slight increase in theoretical visibility of wind turbines within the WLA as a direct consequence of the Proposed Development. This would extend visibility on the lower slopes of above Loch Calium, numerous watercourses and scattered elevated ground such as Bad Mhairtein and Sean Airigh. This would be as a result of the proposed turbines being taller than the nearby operational turbines where blade tips will be visible at lower elevations.

- 6.9.108 The wirelines shown in Annex 3 (Wirelines 6-8) show that there would be a slight increase in the horizontal extent of wind turbines when viewed from northern areas of the WLA, where some of the proposed turbines would extend beyond Achlachan and Halsary.
- 6.9.109 All seven of the aviation lights mounted on turbine nacelles would be visible from the WLA. This would be widespread in the eastern half of the WLA. It is predicted that the horizontal angle would be 0° to -1° resulting in light intensities of 200 candela (ca) to 75 ca and comparable to the break light of a car assuming clear conditions.
- 6.9.110 Areas of higher ground at Beinn nam Bad Beig, Beinn nam Bad Mor, and Cnoc Maol Donn would obtain visibility of aviation lights between 0° to 3° at 200 ca in clear conditions, although the intensity would reduce as a consequence of the distance from the Proposed Development where lights will be observed blinking due to atmospheric conditions.
- 6.9.111 Aviation lighting would be experienced within the context of vehicles travelling along the A9 road, several A and minor roads, and lights from properties in the surrounding settled landscape. Nevertheless, aviation lights will extend the duration of effects of the wind turbines to hours of darkness.

### Magnitude of Change

- 6.9.112 The Proposed Development (during construction/decommissioning, and operation and maintenance) would be visible from the WLA. Changes to the wild attributes of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the special qualities of the WLA would be limited. The magnitude of change is considered to be Low during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the west of the Proposed Development as a result of distance and screening by foreground landform. Construction and decommissioning phases would be short-term in duration, becoming long-term during operation and maintenance and reversible following decommissioning.

### Significance of Effect

- 6.9.113 The sensitivity of the East Halliday Flows WLA is considered Very High on account of the level of designations covering the WLA which are of international and national importance. Magnitude of change during the construction/decommissioning, and operation and maintenance phases would be Low within the peatland area immediately to the west of the Proposed Development. This would result in a **Moderate-minor not significant** adverse effect due to the distances involved where the Proposed Development would be viewed beyond the existing operational cluster of wind farms.

### Cumulative Effects

#### Scenario 2 – Operational/under Construction + Consented Wind Farms

- 6.9.114 The addition of the consented sites (Scenario 2) would further increase the number of turbines in the operational cluster in which the Proposed Development would be part of. Achlachan 2 would infill a gap between Achlachan and the main cluster and Tachur would extend turbines southwards from the main cluster.

6.9.115 Impacts on the WLA would be associated with further turbines being viewed beyond the existing cluster of operational turbines or slightly extending development further north. Therefore, it is not considered that the magnitude of change would increase from **Low**.

### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

6.9.116 Scenario 3 (application sites) would result in Tormsdale increasing the presence of wind turbines and extend turbines closer to the WLA boundary and would be viewed in front of the existing operational and consented cluster.

6.9.117 Impacts from the Proposed Development would be associated with further turbines being viewed beyond the existing cluster of operational turbines or extending development further north. Tormsdale would be prominent from the WLA, whereas the Proposed Development would be further away and appear part of the existing cluster. It is not considered that the magnitude of change would increase from Low.

## Visual Assessment

6.9.118 The aim of the visual impact assessment is to identify, predict and evaluate potential key effects arising from the addition of the Proposed Development on people's views and visual amenity. Effects on views and visual amenity as experienced by people can be caused by changes in the appearance of the landscape resulting from the Proposed Development.

6.9.119 Assessing the significance of visual effects requires the identification of the visual receptors, the consideration of the nature of the visual receptors (sensitivity) and the nature of the effect (magnitude), which would be experienced by each visual receptor as a result of the Proposed Development. The methodology for the visual assessment is detailed in Technical Appendix A6.1: Landscape & Visual Impact Methodology.

6.9.120 Technical Appendix A6.6 sets out a detailed assessment of viewpoints assessed including a cumulative visual assessment for each cumulative baseline scenario separately.

### Viewpoints

6.9.121 A total of 20 viewpoints were selected to represent the most sensitive receptors within the study area (see Technical Appendix A6.6: Viewpoint Assessment). A total of one viewpoint was assessed as receiving a **Major** adverse and **significant** effect as follows:

- Viewpoint 13: Minor road north of Grey cairns of Camster (Figures 6.29a-f).

6.9.122 The above viewpoint is located 4.1 km from the Proposed Development and would receive very close open views of all seven proposed turbines and during hours of darkness, all seven aviation lights which would extend the period of visual effects. Magnitude of change would be **High**, which combined with a High sensitivity due to the viewpoint being located on a minor road that accesses the Camster Cairns.

6.9.123 A total of one viewpoint was assessed as receiving a **Major-moderate** adverse and **significant** effect as follows:

- Viewpoint 4: North Watten (Figures 6.20a – 6.20f).

6.9.124 This viewpoint is located 6.7 km from the Proposed Development and would receive elevated open views of all seven of the proposed turbines and all seven of the aviation lights extending effects into night-time. Magnitude of change would be High-medium, which combined with a High sensitivity due to the viewpoint representing residential receptors.

6.9.125 A total of seven viewpoints were assessed as receiving a **Moderate** adverse and **significant** effect as follows:

- Viewpoint 6: Ben Dorrey;

- Viewpoint 8: Watten;
- Viewpoint 9: A882 East of Watten;
- Viewpoint 10: Spittal;
- Viewpoint 12: Westerdale;
- Viewpoint 16: A9, North of Rangag; and
- Viewpoint 17: Coire na Beinne.

6.9.126 These viewpoints range between 3.4 – 14.0 km from the Proposed Development which would occupy a small part of the overall view. The viewpoints are considered to be significant due to a combination of factors including a Very High or High sensitivity to change, proximity to the Proposed Development, combined with a small size and scale of change to the view.

6.9.127 The following viewpoints are not assessed as receiving a significant effect:

- Viewpoint 1: Thurso: **Moderate-minor** due to distance and the small change in the view from the settlement periphery;
- Viewpoint 2: **Minor** North of Hoy on B876: due to distance from the Proposed Development;
- Viewpoint 3: Georgemas: **Moderate-minor** due to screening by landform;
- Viewpoint 5: Scotsclader: **Moderate** due to partial screening by landform;
- Viewpoint 7: Harpsdale Cross Roads: **Minor** due to partial screening by forestry;
- Viewpoint 11: North Wick: **Moderate-minor** due to distance from the Proposed Development;
- Viewpoint 14: Loch More Cottage: **Moderate-minor** due to distance from the Proposed Development which would be viewed behind Group 1 developments;
- Viewpoint 15: Loch of Yarrows Trail: **Moderate-minor** due to distance and being viewed behind Camster Wind Farm;
- Viewpoint 18: Ben Alisky: **Moderate-minor** due to distance from the Proposed Development;
- Viewpoint 19: Scaraben: **Moderate-minor** due to distance from the Proposed Development; and
- Viewpoint 20: Dunnet Head: **Moderate-minor**: due to distance from the Proposed Development.

## Cumulative Assessment

### Scenario 2 – Operational/under Construction + Consented Wind Farms

6.9.128 Scenario 2 wind farms visible from Viewpoint 4 include Cogle Moss to the east, which would be prominent due to proximity to the viewpoint location but partially screened by trees, Camster II which would be seen within the existing Group 2 cluster to the south, and Golticlay partly infilling a gap between the operational Group 2 cluster to the south west which would include Tachur and Achlachan II which would be partially screened by landform.

6.9.129 The addition of the Proposed Development to this baseline would increase the number of turbines viewed successively, where Cogle Moss would be the closest and most prominent development, followed by the Proposed Development which would be viewed in front of the existing Group 1 developments.

6.9.130 Magnitude of change would increase to **High** resulting in a **Major significant** adverse effect.

6.9.131 The remaining viewpoints are not considered to receive an increase in effect from that assessed for Scenario 1.

### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

6.9.132 Scenario 3 baseline would include Tormsdale which would be predominantly screened due to landform with a few blade tips being visible above the ridgeline.

6.9.133 No increases in cumulative magnitude or effects have been identified for the viewpoints assessed.

### Sequential Routes

6.9.134 A total of six roads, one railway line and fifteen Core Paths were assessed. A total of eight route receptors were identified as receiving a significant effect of Moderate Adverse as follows:

- A9 road;
- A882 road;
- B870 road;
- Core Path 60 – Ben Dorrery;
- Core Path 64 – Achnarras Quarry;
- Core Path 65 – The Old Quarry;
- Core Path 105 – Achavanich and Munsary; and
- Core Path 158 – Watten Roadside Link to Loch Watten.

6.9.135 This is due to each route being located in close proximity to the Proposed Development where the proposed turbines would extend eastwards in views from the operational Group 1 developments. From the road receptors, these would be glimpsed views between gaps in field boundary hedges and intervening trees when travelling in a vehicle or on bicycle, and at a slower pace from footpaths enjoyed by walkers.

6.9.136 A further 3 route receptors would receive a **Moderate** adverse and **not significant** effect as follows:

- Inverness to Thurso/Wick Railway Line;
- Core Path 61 – Causeymire Wind Farm; and
- Core Path 126 – Blingrey Forest

6.9.137 These routes are located in close proximity to the Proposed Development but are not considered significant on account of the degree of screening occurring, and that some of the Core Paths are located within existing Wind Farms which form part of the views from the path.

6.9.138 The remaining route receptors include the following:

- A99 road;
- B874 road;
- B876 road;
- Core Path 8 – Loch More to Altnabreac;
- Core Path10 – Loch More to Dalnawillan;
- Core Path 17 – Hill Orlig;
- Core Path 64 – Achnarras Quarry;
- Core Path 70 – Dirlot Gorge Egress / Ingress;
- Core Path 127 – Camster Cairns Boardwalk;
- Core Path 160 – Sports Pitch;
- Core Path161 – Watten to Camster Roadend Link;

- Core Path 162 – Watten Riverside Link;
- Core Path173 – Wick to Milton Roadside Link; and
- Core Path177 – Wick to Ackergillshore by Roadside Footway.

6.9.139 All of the above would receive **Moderate-minor** and **not significant** adverse effects on account of distance from the Proposed Development and screening from landform and vegetation.

### Cumulative Assessment

#### Scenario 2 – Operational/under Construction + Consented Wind Farms

6.9.140 Scenario 2 baseline would include a further three turbines at Achlachan II occupying an area between the operational Achlachan Wind Farm and Causeymire, and a further three turbines at Tachur, extending further south from Bad a Cheo appearing as an extension to the operational wind farm.

6.9.141 Further consented sites of note are Cogle Moss (7.0 km to the north east), Camster II to the east, and Golticlay 9.7 km to the south east, extending turbines southwards.

6.9.142 The introduction of the Proposed Development would not result in an increase in theoretical visibility from route receptors. For the majority of routes, the Proposed Development would be viewed in conjunction with the existing Group 1 cluster and appear as one large development. From route receptors further away, the height difference in turbines between those that are proposed and the existing operational turbines will be noticeable. It is not considered that the addition of the Proposed Development would increase magnitude of change from that assessed for Scenario 1 and the overall effect for each route receptor would remain unchanged.

#### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

6.9.143 Similar to the assessments of Scenario 1 and 2, the addition of the Scenario 3 sites to the baseline, would not result in an increase in theoretical visibility from route receptors with the Proposed Development appearing as part of an existing cluster of Group 1 developments which would be seen from short sections of the overall route.

### Settlements

6.9.144 A total of seventeen settlements were assessed within 15 km of the Proposed Development. All settlements have been assessed as having a **High** sensitivity to change. One settlement group is predicted to receive a **Major-moderate** adverse and **significant** effect as follows:

- North Watten / Catchory / Brabertdorrn / Myrtledhorn.

6.9.145 This is due to receiving elevated views to the south where the Proposed Development would form a prominent feature 6.6 km to the south and eastwards of the main Group 1 developments resulting in a **High-medium** magnitude of change.

6.9.146 A further three settlements are predicted to receive a **Moderate** adverse and **significant** effect as follows:

- Watten;
- Bylbster Mains; and
- Spittal.

6.9.147 This is due to the settlements being located in close proximity to the Proposed Development and in some cases, elevated views. A degree of screening would be experienced from all three settlements in the form of landform and forestry resulting in a **Medium** magnitude of change.

- 6.9.148 Five property groups are predicted to receive a Moderate adverse and not significant due to screening from landform and woodland which reduces the magnitude of change to Low for the following properties:
- Westerdale;
  - Georgemas Junction;
  - Durran;
  - Lyth; and
  - Killmster.

- 6.9.149 Two settlement groups would receive a **Moderate-minor** adverse and **not significant** effect due to distance from the Proposed Development which would reduce the size and scale of the change in view:
- Wick; and
  - Halkirk.

- 6.9.150 This is due to distance and partial screening by trees and woodland on the periphery of the settlement.

#### Scenario 2 – Operational/under Construction + Consented Wind Farms

- 6.9.151 Scenario 2 wind farms visible from North Watten, Catchory, Brabertdorrان, Myrtledhorn include Cogle Moss to the east, which would be prominent due to proximity to the viewpoint location but partially screened by trees, Camster II which would be seen within the existing Group 2 cluster to the south, and Golticlay partly infilling a gap between the operational Group 2 cluster to the south west which would include Tachur and Achlachan II which would be partially screened by landform.

- 6.9.152 The addition of the Proposed Development to this baseline would increase the number of turbines viewed successively, where Cogle Moss would be the closest and most prominent development, followed by the Proposed Development which would be viewed in front of the existing Group 1 developments.

- 6.9.153 Magnitude of change would increase to **High** resulting in a **Major** significant adverse effect.

- 6.9.154 The remaining settlements are not considered to receive an increase in effect from that assessed for Scenario 1.

#### Scenario 3 – Operational/under Construction + Consented + Application Wind Farms

- 6.9.155 Scenario 3 baseline would include Tormsdale which would be predominantly screened due to landform with a few blade tips being visible above the ridgeline.

- 6.9.156 No increases in cumulative magnitude or effects have been identified for the settlements assessed.

#### Residential Receptors

- 6.9.157 Twenty-three properties/groups have been identified within 3 km from the Proposed Development. One of these is located within the Proposed Development Area and is financially involved with the Proposed Development, Shielton. The remaining properties are scattered to the north east, north, and north west of the Proposed Development.

- 6.9.158 The sensitivity of each property/settlement is judged to be High as residential receptors represent high value receptors with a high susceptibility to visual change owing to their fixed position. The visibility of the Proposed Development includes visibility from the property and its curtilage and immediate parts of the access road/driveway to each property.

- 6.9.159 Significant visual effects of Major adverse and significant have been predicted for 17 properties due to their proximity and open views from the gardens at the front of the houses resulting in a High magnitude of change. Those marked with an \* are financially involved:

- Property 1: Shielton\*; and
- Property 2: 22 West Watten;
- Property 3: 19 West Watten;
- Property 4: 18 West Watten;
- Property 6: Milton;
- Property 10: Knockfarrie;
- Property 11: Ballacharn/Alliochsa;
- Property 12: 14 Watten;
- Property 14: Newton;
- Property 15: The Smiddy;
- Property 16: Backlass (New Build);
- Property 16a: Backlass;
- Property 17: Leanmore;
- Property 19: Backlass Hill Cottage;
- Property 20: Backlass Cottage;
- Property 21: Balamurich/Markethill; and
- Property 22: Lanergill.

- 6.9.160 A further 4 properties/groups are assessed as receiving a Major-moderate and significant effect on account of partial screening by landform and woodland as follows:

- Property 5: Scouthall;
- Property 7: Achingale (includes Achingale Mill & Nether Banks);
- Property 8: Banks / Properties to the south (includes Banks and Baalvtyn House); and
- Property 9: West Watten/Strathview Cottage.

- 6.9.161 Three properties/groups are predicted to receive a Moderate adverse and significant effect due to receiving close partial views of the Proposed Development as follows:

- Property 13: 10 Watten;
- Property 18: Houstry of Dunn; and
- Property 23: Knockglass.

- 6.9.162 With the exception of Shielton which is financially involved, none of the properties assessed have been identified to be affected to such a degree that they would become 'widely regarded as an unattractive place where to live and/or the development is inescapably dominant or unpleasantly overwhelming', the approach adopted by Reporters in previous planning inquiries and set out in the guidance.

## 6.10 ASSESSMENT AGAINST OSWESG CRITERIA

- 6.10.1 In the scoping response, THC advised that the LVIA should include an assessment of the Proposed Development against the criteria set out in the OWESG. This document is used by THC to review the potential effects of the Proposed Development against a set criteria relevant to landscape and visual.
- 6.10.2 Table 6.11. sets out the criteria and provides an assessment in relation to the Proposed Development.

Table 6.11: Assessment of the proposed Development against OWESG criteria

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
<b>Criterion 1</b>		
<i>Relationship between Settlements/ Key locations and wider landscape respected.</i>	<i>The extent to which the proposal contributes to perception of settlements or key locations being encircled by windfarm development</i>	The Proposed Development has been kept as far away from settlements as possible and in close proximity to existing operational wind farms forming Group 1 developments. The closest settlement to the Proposed Development Area is Watten which lies 3.5 km to the north. Intervening woodland reduces the extent of views that residents from properties would experience of the seven turbines and aviation lights during hours of darkness.
<i>Development should seek to achieve a threshold where:</i>	<i>Turbines are not visually prominent in the majority of views within or from settlements/ key locations or from the majority of its access routes.</i>	A total of 17 settlements were assessed within 15 km of the Proposed Development, four settlement groups are predicted to receive a <b>Major-moderate</b> adverse or <b>Moderate</b> adverse and <b>significant</b> effect as follows: <ul style="list-style-type: none"> <li>• North Watten / Catchory / Brabertdorran / Myrtledhorn;</li> <li>• Watten;</li> <li>• Bylbster Mains; and</li> <li>• Spittal;</li> </ul> This is due to receiving close views, some of which would be elevated where the Proposed Development would form a prominent feature eastwards of the main Group 1 developments.
<b>Criterion 2</b>		

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
<i>Key Gateway locations and routes are respected.</i>	<i>The extent to which the proposal reduces or detracts from the transitional experience of key Gateway Locations and routes</i>	The LVIA indicates that the Proposed Development would form a noticeable new feature in views from the A9. B882 and B870 roads where short sections would experience views of the Proposed Development adjacent to the Group 1 operational developments. The remaining three roads and one railway line assessed are predicted to receive non-significant effects due to screening by landform, woodland and forestry, combined with the short section of the road affected.
<i>Development should seek to achieve a threshold where:</i>	<i>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.</i>	The assessment on landscape character undertaken in Technical Appendix A6.3 identifies significant adverse effects occurring on the Sweeping Moorland and Flows LCT and Farmed Lowland Plain LCTs. This would result in direct impacts on the Sweeping Moorland and Flows LCT which the Proposed Development is located within resulting in a <b>Major</b> adverse and <b>significant</b> . A significant effect of <b>Major-moderate</b> would also be experienced in the Sweeping Moorland and Flows and Farmed Lowland Plain LCTs due to close visibility with the Proposed Development which lies within a transitional landscape between the two LCTs. As distance increases, the size and scale of the change will reduce resulting in non-significant effects for two LCTs which cover a large geographical area.
<b>Criterion 3</b>		

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
<i>Valued natural and cultural landmarks are respected</i>	<i>The extent to which the proposal affects the fabric and setting of valued natural and cultural landmarks</i>	It is not considered that the Proposed Development will breach this threshold due to its location adjacent to existing operational developments where it is not anticipated to detract from key landmarks or disrupt setting. Ecology (Chapter 7) and Cultural Heritage(Chapter 10) are addressed separately in the EIAR.
<i>Development should seek to achieve a threshold where:</i>	<i>The development does not, by its presence, diminish the prominence of the landmark or disrupt its relationship to its setting.</i>	
Criterion 4		
<i>The amenity of key recreational routes and ways is respected.</i>	<i>The extent to which the proposal affects the amenity of key recreational routes and ways (e.g. Core Paths, Munros and Corbetts, Long Distance Routes etc.)</i>	Two key summits within the Causeymire and Flows WILA have been assessed as follows: <ul style="list-style-type: none"> <li>• Viewpoint 18: Ben Alisky; and</li> <li>• Viewpoint 19: Scaraben.</li> </ul> Both of these summits has been assessed as receiving a <b>Moderate-minor</b> adverse and <b>not significant</b> effect due to distance from the Proposed Development (19.6 – 27.4 km) which reduces the size and scale of the change within the view where the Proposed Development would be seen behind the existing Group 1 developments, or extending eastwards.
<i>Development should seek to achieve a threshold where:</i>	<i>Wind turbines or other infrastructure do not overwhelm or otherwise significantly detract from the visual appeal of key routes and ways.</i>	<b>Significant</b> adverse effects are also predicted to occur from the following viewpoint locations of interest: <ul style="list-style-type: none"> <li>• Viewpoint 6: Ben Dorrey;</li> <li>• Viewpoint 9: A882 East of Watten;</li> <li>• Viewpoint 13: Minor road north of Grey cairns of Camster</li> <li>• Viewpoint 16: A9, North of Rangag; and</li> <li>• Viewpoint 17: Coire na Beinne.</li> </ul>

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
		This is due to a combination of their higher sensitivity and close proximity to the Proposed Development.
Criterion 5		
<i>The amenity of transport routes is respected</i>	<i>The extent to which the proposal affects the amenity of transport routes (tourist routes as well as rail, ferry routes and local road access)</i>	The sequential assessment undertaken in Technical Appendix A6.7 indicates effects would be significant on short sections of the A9, A882 and B870 road. The Inverness to Wick/Thurso railway line is predicted to receive a Moderate not significant effect due to the influence of screening by vegetation, forestry, and landform.
<i>Development should seek to achieve a threshold where:</i>	<i>Wind turbines or other infrastructure do not overwhelm or otherwise significantly detract from the visual appeal of transport routes.</i>	The remaining three transport routes have been assessed as receiving a <b>Moderate</b> adverse <b>not significant</b> effect. This is due to a combination of the extent of the route that would receive visibility of the Proposed Development, screening effects from landform and woodland, and distance.
Criterion 6		
<i>The existing pattern of Wind Energy Development is respected.</i>	<i>The degree to which the proposal fits with the existing pattern of nearby windfarm development, considerations include:</i> <ul style="list-style-type: none"> <li>• Turbine height and proportions;</li> <li>• Density and spacing of turbines within developments;</li> <li>• Density and spacing of developments;</li> <li>• Typical relationship of development to the landscape;</li> <li>• Previously instituted mitigation measures; and</li> </ul>	The Proposed Development would be situated adjacent to Halsary, Bad a Cheo, Causeymire developments and would follow a similar pattern in layout from the majority of directions, the exception being in some views Turbines 1 and 2 extend out from the development rather than being seen as a cluster. Depending on elevation, there would be a noticeable difference in height between the existing operational turbines and that proposed. However, due to its

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
	<ul style="list-style-type: none"> <li>Planning Authority stated aims or development of area.</li> </ul>	proximity to the existing wind farms, the Proposed Development would be perceived as part of one larger development.
<i>Development should seek to achieve a threshold where:</i>	<i>The proposal contributes positively to existing pattern or objectives for development in the area.</i>	The Proposed Development would be consistent with other operational wind farms in the area in a large-scale landscape where wind turbines are a key characteristic of the landscape.
<b>Criterion 7</b>		
<i>The need for separation between developments and/ or clusters is respected</i>	<i>The extent to which the proposal maintains or affects the spaces between existing developments and/ or clusters</i>	There would be a slight gap between the closest operational site of Halsary to the south west which would result in a clear separation between the operational wind farms and Proposed Development within 2-3 km, thereafter, in the wider landscape the Proposed Development would appear as part of the Group 1 cluster.
<i>Development should seek to achieve a threshold where:</i>	<i>The proposal maintains appropriate and effective separation between developments and/ or clusters</i>	
<b>Criterion 8</b>		
<i>The perception of landscape scale and distance is respected</i>	<i>The extent to which the proposal maintains or affects receptors' existing perception of landscape scale and distance.</i>	Due to the low-lying nature of the landscape and the higher ground located to the south, the visual envelope of the Proposed Development is large and predicted to be widespread within 15 km of the Proposed Development Area based on ZTV mapping. This would be reduced once intervening features such as forestry and buildings are taken into account to a small degree. The Proposed Development is in proximity to an existing cluster of operational wind farms and it is not considered that the perception of scale and distance would be
<i>Development should seek to achieve a threshold where:</i>	<i>The proposal maintains the apparent landscape scale and/ or distance in the receptors' perception.</i>	

OSWEG Criterion	OSWESG Measure	Assessment of the Proposed Development
		affected by its introduction to the landscape.
<b>Criterion 9</b>		
<i>Landscape setting of nearby windfarm developments is respected</i>	<i>The extent to which the landscape setting of nearby windfarm developments is affected by the proposal.</i>	The Proposed Development would be in a similarly modified large-scale landscape as a result of the presence of operational wind farms to the south west and west and would have a limited increase in visual prominence.
<i>Development should seek to achieve a threshold where:</i>	<i>Proposal relates well to the existing landscape setting and does not increase the perceived visual prominence of surrounding wind turbines</i>	
<b>Criterion 10</b>		
<i>Distinctiveness of Landscape character is respected</i>	<i>The extent to which a proposal affects the distinction between neighbouring LCTs, in areas where the variety of character is important to the appreciation of the landscape.</i>	The Proposed Development is located on the edge of the Sweeping moorland and Flows LCT in an area that is transitional displaying characteristics of the adjacent Farmed Lowland Plain LCT, both of which are also large-scale and have limited notable landscape features in proximity to the Proposed Development.
<i>Development should seek to achieve a threshold where:</i>	<i>Integrity and variety of LCAs are maintained.</i>	The distinction between Sweeping Moorland and Flows and Farmed Lowland Plain LCTs would be maintained due to the separation distance between the Proposed Development and the smaller scale landscapes of the Farmed Lowland Plain which are located away from the Proposed Development Area.

Source: <Insert Source or notes>



## 6.11 SUMMARY OF LANDSCAPE & VISUAL EFFECTS

### Landscape Character

#### Proposed Development Area

- 6.11.1 The project components of the Proposed Development would be located entirely within the Sweeping Moorland and Flows LCT. Overall sensitivity for the Proposed Development Area is considered **Medium** on account of the lack of any formal designation, combined with the quality of the proposed site.
- 6.11.2 The construction and decommissioning stages of the Proposed Development would result in ground disturbance operations, new access tracks, crane pad hardstandings, installation of seven turbines followed by their removal during decommissioning and general reinstatement works, together with associated vehicular and personnel movements on site. Such operations would result in direct impacts on the landscape fabric of the Proposed Development Area. This will include ground vegetation and soil removal and the introduction of new elements into the semi-improved pasture and moorland context.
- 6.11.3 It is considered the magnitude of change on the landscape fabric of the Proposed Development Area would be **High**, due to the size and scale of proposed changes occurring over a short geographical area and period of time. This results in a **Major** adverse and **significant** effect on the landscape fabric of the Proposed Development Area during the construction and decommissioning stages of the Proposed Development.
- 6.11.4 Following reinstatement post construction, the Proposed Development Area would enter the operational stage. The nature of the effects on the Proposed Development Area would be direct, long term during the operational life of the Proposed Development, and reversible beyond this period due to decommissioning. This would arise from the siting of seven operational turbines, substation/energy storage area and access tracks located within a large-scale plateau landscape.
- 6.11.5 Once remedial works have been completed, there would be a reduction in activity on site centred around maintenance activities associated with operational wind turbines.
- 6.11.6 The magnitude of change on the landscape fabric of the Proposed Development Area would remain **High**, resulting from the size and scale of proposed change including seven operational wind turbines and associated infrastructure that would be long term and reversible at the end of the operational stage. This would result in a **Major** adverse **significant** effect on the landscape fabric of the Proposed Development Area during the operational stage of the Proposed Development.

#### Wider Landscape Character

- 6.11.7 Within the wider study area, a total of 20 LCTs and 2 isolated islands were identified within 45 km from the Proposed Development and initially assessed (see Technical Appendix A6.3). This identified 2 LCTs for more detailed assessment as follows:
- Sweeping Moorland and Flows LCT; and
  - Farmed Lowland Plain LCT;
- 6.11.8 Of these, both were assessed as potentially receiving significant effects.

#### Sweeping Moorland and Flows LCT

- 6.11.9 As noted, the Proposed Development Area would be located entirely within the Sweeping Moorland and Flows LCT. This unit comprises a large geographical area encompassing South Caithness and would also receive indirect effects beyond the Proposed Development Area.

6.11.10 This LCT is assessed as having a Medium sensitivity to change overall. The addition of the Proposed Development would result in a substantial change in terms of the perceptual experience during both construction and operational periods, mainly occurring within the immediate landscape surrounding the Proposed Development Area extending to approximately 15 km from the Proposed Development. Thereafter, becoming less widespread and limited to hill summits and the upper slopes facing the Proposed Development Area. In these locations, there would be an increase in activity as the supporting infrastructure is constructed followed by the installation of turbines. This would be viewed in the context of existing operational wind farms which would be situated to the side and in front of the Proposed Development depending on location.

6.11.11 Magnitude of change for the Sweeping Moorland and Flows LCT would be **Medium**, reducing with distance to the south and west to Low levels where the turbines would be less prominent. This would be experienced within an open large-scale landscape that includes operational wind farms located both within the unit as well as neighbouring LCTs.

6.11.12 This would result in a **Major** adverse and **significant** effect as a result of the extent of theoretical visibility predicted across the open plateau landscape, diminishing with distance to non-significant levels. During construction and decommissioning phases, effects would be short-term, and during operation long-term. Upon completion of decommissioning, effects would be completely reversible.

#### Farmed Lowland Plain LCT

6.11.13 Overall sensitivity is **Medium** due to the LCT due to not being covered by any formal landscape designation and agricultural nature of the landscape with few higher quality areas. It is considered that the characteristics of the LCT could accommodate the type of development proposed.

6.11.14 During construction and operational phases, effects on this LCT would arise from views of the siting of seven operational turbines, the supporting infrastructure mainly being screened by a combination of landform and trees. These would be long term during the operational life of the Proposed Development, and reversible beyond this period due to decommissioning.

6.11.15 Magnitude of change is predicted to be **High** on account of the close proximity to the Proposed Development, reducing with distance as the size and scale of the change reduces. Indirect nature of the change and distance involved where it is not considered to alter the key characteristics of this LCT during both construction and operation. This would be long term and reversible.

6.11.16 This would result in a **Major-moderate** adverse and **significant** effect within 15 km, reducing to Moderate and Minor and not significant levels as distance increases and the influence of scattered forests provides a degree of partial screening. During construction and decommissioning phases, effects would be short-term, and during operation long-term. Upon completion of decommissioning, effects would be completely reversible.

6.11.17 Table 6.12 provides a summary of the assessment of the Proposed Development on landscape character.

Table 6.12: Summary of Effects on Landscape Character

Landscape Character Type (LCT)	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effect (Scenario 2)	Cumulative Effect (Scenario 3)
<b>Proposed Development Area</b>	Medium	High	Major adverse and significant during construction, operation, and decommissioning phases.	N/a	N/a
<b>Sweeping Moorland and Flows</b>	Medium	High reducing to Medium and Low levels with distance beyond 15 km.	<b>Major-moderate</b> adverse and <b>significant</b> , reducing to non-significant levels as distance increases during construction, operation, and decommissioning phases.	<b>Major-moderate</b> adverse and <b>significant</b>	<b>Major-moderate</b> adverse and <b>significant</b>
<b>Farmed Lowland Plain</b>	Medium	High reducing to Medium and Low levels with distance beyond 15 km.	<b>Major-moderate</b> adverse and <b>significant</b> , reducing to non-significant levels as distance increases during construction, operation, and decommissioning phases.	<b>Major-moderate</b> adverse and <b>significant</b>	<b>Major-moderate</b> adverse and <b>significant</b>

**Protected & Designated Landscapes**

6.11.18 The Proposed Development would not be located within any national or regional designations. Several designations have been included due to their proximity within the study area to the Proposed Development.

**Causeymire – Knockfin Flows WLA**

6.11.19 The Causeymire – Knockfin Flows WLA has a **Very High** sensitivity to change on account of its national level designation.

6.11.20 The Proposed Development would introduce tall man-made features in the panoramic views beyond the WLA boundary where seven turbines are predicted to be theoretically visible at distances of 5.7 – 45.0 km. The areas affected comprise open hill sides and flat peatlands.

6.11.21 The construction and operational phases would be perceived from 31.7 % of the WLA<sup>2</sup> and include the installation of the proposed turbines. The supporting infrastructure would be screened by a combination of landform and forestry.

6.11.22 The Proposed Development (during construction/decommissioning, and operation and maintenance) would be visible from the WLA. Changes to the wild attributes of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the wild attributes of the WLA would be limited. The magnitude of change is considered to be **Medium** during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the south west of the Proposed Development to approximately 12.9 km, reducing as distance increases to Low.

6.11.23 A **Major-moderate** adverse and **significant** effect is predicted due to proximity in terms of visibility from the WLA but is not considered to result in adverse effects to the wild qualities. During construction and decommissioning phases, effects would be short-term, and during operation long-term. Upon completion of decommissioning, effects would be completely reversible.

**East Halladale Flows WLA**

6.11.24 Sensitivity for the East Halladale Flows WLA is **Very High** on account of its national level designation.

6.11.25 The Proposed Development would introduce a new feature experienced beyond the designation that would partially break the skyline to the south east and be seen in the context of Group 1 developments. However, it is not considered that the introduction of the Proposed Development would alter the experience of wild attributes within the WLA due to a combination of woodland screening (in the intervening landscape) and the limited extent of the Proposed Development experienced.

6.11.26 During construction and operation, the size and scale of the change would be small covering 34.4 % of the WLA as a result of screening by landform. Changes to the wild attributes of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the special qualities of the WLA would be limited. The magnitude of change is considered to be **Low** during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the west of the Proposed Development as a result of distance and screening by foreground landform.

6.11.27 A **Moderate-minor** adverse **not significant** effect is assessed for the construction, operational and decommissioning phases. During construction and decommissioning phases, effects would be short-term, and during operation long-term. Upon completion of decommissioning, effects would be completely reversible.

**Flow Country and Berriedale Coast SLA**

6.11.28 All seven turbines would be perceived mainly from elevated areas within the SLA with the supporting infrastructure being less noticeable due to screening by landform. This has a limited effect on the special qualities noted in the baseline which tend to focus on features within the SLA. The Proposed Development would feature in views beyond the designation adjacent to Group 1 operational developments.

6.11.29 The Proposed Development (during construction/decommissioning, and operation and maintenance phases) would be visible from the SLA. Changes to the special qualities of the designation would occur within the context of the existing operational wind farms and overhead lines. The size and scale of the change on the special qualities of the SLA would be limited to the two identified and with regards to visibility of the Proposed Development within the designation. The magnitude of change is considered to be **Medium** during construction/decommissioning, and operation and maintenance for the area of peatland located immediately to the south west of the Proposed Development to approximately 15 km, reducing as distance increases to Low...

6.11.30 This would result in a **Moderate-minor** adverse and **not significant** effect during construction, operation and decommissioning phases. During construction and decommissioning phases, effects would be short-term, and during operation long-term. Upon completion of decommissioning, effects would be completely reversible.

6.11.31 Table 6.12 provides a summary of the assessment of the Proposed Development on protected and designated landscapes.

**Table 6.13: Summary of Effects on Protected and Designated Landscapes**

Designation	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effect (Scenario 2)	Cumulative Effect (Scenario 3)
<b>Causeymire – Knockfin Flows</b>	Very High	Medium, reducing to Low levels with distance beyond 15 km.	<b>Major-moderate</b> adverse and <b>significant</b> , reducing to non-significant levels as distance increases during construction, operation, and decommissioning phases.	<b>Major-moderate</b> adverse and <b>significant</b>	<b>Major-moderate</b> adverse and <b>significant</b>
<b>East Halladale Flows</b>	Very High	Low	<b>Moderate-minor</b> adverse and not significant.	<b>Moderate-minor</b> adverse and not significant and <b>not significant</b> .	<b>Moderate-minor</b> adverse and not significant and <b>not significant</b> .
<b>Flow Country and Berridale Coast SLA</b>	Very High	Medium, reducing to Low levels with distance beyond 15 km.	<b>Major-moderate</b> adverse and <b>significant</b> , reducing to non-significant levels as distance increases during construction, operation, and decommissioning phases.	<b>Major-moderate</b> adverse and <b>significant</b>	<b>Major-moderate</b> adverse and <b>significant</b>

**Visual Amenity**

**Viewpoints**

6.11.32 Of the 20 selected viewpoints that were identified to represent the general visual amenity throughout the study area, a total of 9 viewpoints, located between 3.4 – 14.5 km from the Proposed Development would receive close

views of the proposed turbines during both construction, operation and decommissioning phases. These viewpoints have a **High** and **Medium** sensitivity due to the viewpoint locations being representative of the views from residential properties, roads, Core Paths, hill summits popular with walkers would result in a **Major, Major-moderate** or **Moderate** adverse and **significant** effect. Significant viewpoints include the following:

- Viewpoint 4: North Watten;
- Viewpoint 6: Ben Dorrey;
- Viewpoint 8: Watten;
- Viewpoint 9: A882 East of Watten;
- Viewpoint 10: Spittal;
- Viewpoint 12: Westerdale;
- Viewpoint 13: Minor road north of Grey cairns of Camster
- Viewpoint 16: A9, North of Rangag; and
- Viewpoint 17: Coire na Beinne.

6.11.33 The remaining 11 viewpoints located between 7.4 and 27.4 km, were all assessed as receiving a **Moderate, Moderate-minor**, or **Minor** adverse and **not significant** effect. From these locations, the proposed turbines would occupy a small part of the overall view from each viewpoint due to a combination of factors including screening by landform and forestry, distance, and in some cases where the receptor is assessed as having a **Low** magnitude of change.

6.11.34 Table 6.14 provides a summary of the assessment of viewpoints undertaken in this Technical Appendix.

**Table 6.146.: Viewpoint Summary Table**

Viewpoint	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effects – Scenario 2	Cumulative Effects – Scenario 3
<b>1. Thurso</b>	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
<b>2. North of Hoy on B876</b>	Medium	Low	Minor (not significant)	Minor (not significant)	Minor (not significant)
<b>3. Georgemas</b>	Medium	Negligible	Minor (not significant)	Minor (not significant)	Minor (not significant)
<b>4. North Watten</b>	High	High-medium	<b>Major-moderate (significant)</b>	<b>Major (significant)</b>	<b>Major (significant)</b>
<b>5. Scotscaider</b>	High	Medium-low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
<b>6. Ben Dorrey</b>	High	Medium-low	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
<b>7. Harpsdale Cross Roads</b>	Medium	Low	Minor (not significant)	Minor (not significant)	Minor (not significant)

Viewpoint	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effects – Scenario 2	Cumulative Effects – Scenario 3
8. Watten	High	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
9. A882, east of Watten	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
10. Spittal	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
11. North Wick, A99 Road	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
12. Westerdale	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
13. Minor road north of Grey Cairns of Camster	High	High	Major (significant)	Major (significant)	Major (significant)
14. Loch More Cottage	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
15. Loch of Yarrows Trail	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
16. A9, North of Rangag	Medium	High-medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
17. Coire na Beinne	High	Medium-low	Moderate (significant)	Moderate (significant)	Moderate (significant)
18. Ben Alisky	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
19. Scaraben Peak	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
20. Dunnet Head	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate (not significant)

**Sequential Routes**

6.11.35 A total of 8 route receptors of the 19 assessed were identified as receiving a significant effect of **Moderate** adverse and **significant** effect as follows:

- A9 road;
- A882 road;
- B870 road;
- Core Path 60 – Ben Dorrery;

- Core Path 64 – Achnarras Quarry;
- Core Path 65 – The Old Quarry;
- Core Path 105 – Achavanich and Munsary; and
- Core Path 158 – Watten Roadside Link to Loch Watten

6.11.36 This is due to each route being located in close proximity to the Proposed Development where the proposed turbines would extend turbines eastwards in views from the operational Group 2 developments.

6.11.37 The remaining eleven sequential routes have been assessed as receiving a Moderate adverse not significant effect. This is due to a combination of the extent of the route that would receive visibility of the Proposed Development, screening effects from landform and woodland, and distance.

6.11.38 Table 6.15 provides a summary of the assessment of sequential routes undertaken in this Technical Appendix.

Table 6.156.: Sequential Routes Summary Table

Sequential Route	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effects – Scenario 2	Cumulative Effects – Scenario 3
<b>Road Receptor</b>					
A9	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
A99	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
A882	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
B870	Medium	Medium	Moderate (significant)	Moderate (significant)	Moderate (significant)
B874	Medium	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
B876	Medium	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
<b>Railway Receptor</b>					
Inverness to Thurso / Wick Railway Line	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
<b>Core Path Receptor</b>					
8 – Loch More to Altnabreac	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
10 – Loch More to Dalnawillan	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
17 – Hill Olrig	High	Medium-low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)

Sequential Route	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effects – Scenario 2	Cumulative Effects – Scenario 3
60 – Ben Dorrery	High	Medium-low	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
61 – Causeymire Wind Farm	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
64 – Achnarras Quarry	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
65 – The Old Quarry	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
70 – Dirlot Gorge Egress / Ingress	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
105 – Achavanich and Munsary	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
126 – Blingrey Forest	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
158 – Watten Roadside Link to Loch Watten	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
160 – Sports Pitch					
161 – Watten to Camster Roadend Link					
162 – Watten Riverside Link					
177 – Wick to Ackergillshore by Roadside Footway	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)

**Settlements**

- 6.11.39 A total of 17 settlements were assessed within 15 km of the Proposed Development, four settlement groups are predicted to receive a **Major-moderate** adverse or **Moderate** adverse and significant effect as follows:
- North Watten / Catchory / Brabertdorran / Myrtledhorn;
  - Watten;
  - Bylbster Mains; and
  - Spittal;
- 6.11.40 This is due to receiving close views, some of which would be elevated where the Proposed Development would form a prominent feature eastwards of the main Group 1 developments.
- 6.11.41 Table 6.16 provides a summary of the assessment of settlements undertaken in this Technical Appendix.

Table 6.16: Settlement Assessment Summary Table

Settlement	Sensitivity	Magnitude of Change	Significance of Effect	Cumulative Effect (Scenario 2)	Cumulative Effect (Scenario 3)
Watten	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
Bylbster	High	Medium	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
Spittal	High	Low	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>	<b>Moderate (significant)</b>
North Watten / Catchory / Brabertdorran / Myrtledhorn	High	High-medium	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
Westerdale	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
Georgemas Junction	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
Durran	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
Lyth	High	Low	Moderate (not significant)	Moderate (not significant)	Moderate (not significant)
Killmster	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
Wick	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)
Halkirk	High	Low	Moderate-minor (not significant)	Moderate-minor (not significant)	Moderate-minor (not significant)

**Residential Receptors**

- 6.11.42 Twenty-four property groups were identified within 3 km from the Proposed Development, one of the properties considered in the RVAA were identified as receiving an effect.
- 6.11.43 Significant visual effects of Major, Major-moderate and Moderate adverse and significant have been predicted for all 24 property groups their proximity and open views from the building, gardens at the front of the houses as follows. Those marked with an \* are financially involved:
- Property 1: Shielton\*;
  - Property 2: 22 West Watten;

- Property 3: 19 West Watten\*;
- Property 4: 18 West Watten\*;
- Property 5: Scouthall;
- Property 6: Milton;
- Property 7: Achingale (includes Achingale Mill & Nether Banks);
- Property 8: Banks / Properties to the south (includes Banks and Baalvtyn House);
- Property 9: West Watten/Strathview Cottage;
- Property 10: Knockfarrie;
- Property 11: Ballacharn/Alliochsa;
- Property 12: 14 Watten;
- Property 13: 10 Watten;
- Property 14: Newton;
- Property 15: The Smiddy;
- Property 16: Backlass (New Build);
- Property 16a: Backlass;
- Property 17: Leanmore;
- Property 18: Houstry of Dunn;
- Property 19: Backlass Hill Cottage;
- Property 20: Backlass Cottage;
- Property 21: Balamurich/Markethill;
- Property 22: Lanergill; and
- Property 23: Knockglass.

6.11.44 With the exception of Shielton which is financially involved, none of the properties assessed have been identified to be affected to such a degree that they would become 'widely regarded as an unattractive place where to live and/or the development is inescapably dominant or unpleasantly overwhelming', the approach adopted by Reporters in previous planning inquiries and set out in the guidance.

### Cumulative

- 6.11.45 Cumulative Scenario 2 and 3 sites would result in further developments being located within Group 1 and 2 clusters and would result in a slight rise in the number of turbines visible. This would include Achlachan II and Tachur in Group 1, and Camster II increasing the size of Group 2 by infilling an area between Achairn and Camster I.
- 6.11.46 The addition of the Proposed Development to Scenario 2 and 3 would result in an increase in effects to North Watten, Catchory, Brabertdorran, and Myrtledhorn (see Viewpoint 4).
- 6.11.47 This is due to the addition of the Proposed Development extending turbines further eastwards from the Group 1 cluster and closer to the settlements and would be viewed successively with Cogle Moss to the west, increasing the area where turbines currently occupy. This would result in an increase in effect from Major-moderate to **Major** effect and **significant** for the settlements of North Watten, Catchory, Brabertdorran, Myrtledhorn.

6.11.48 Overall, the Proposed Development would be viewed as part of the existing Group 1 cluster and would be difficult to perceive as a separate development, and depending on direction of view, would be partially screened by foreground turbines.

## 6.12 STATEMENT OF SIGNIFICANCE

- 6.12.1 The LVIA has assessed the effects on landscape and visual amenity as a result of the Proposed Development and has identified significant effects would occur on the following:
- Direct effects to the Sweeping Moorland and Flows LCT due to the Proposed Development being located within the LCT;
  - Indirect effects to both the Sweeping Moorland and Flows LCT, and Farmed Lowland Plain LCT due to their close proximity to the Proposed Development;
  - The Causeymire – Knockfin Flows WLA within 15 km of the Proposed Development due to visibility of the proposed turbines, but would not affect the wild attributes of the designation;
  - The Flow Country and Berriedale Coast SLA within 15 km of the Proposed Development due to visibility of the proposed turbines but with limited effects upon the special qualities of the designation;
  - Nine viewpoints representing higher sensitivity receptors between 3.4 – 14.5 km from the Proposed Development ;
  - Three roads and four Core Paths owing to their close proximity and higher sensitivity;
  - Four settlements within 10 km of the Proposed Development due to their proximity and in some cases, the elevated views of the Proposed Development; and
  - Twenty-four property groups within 3 km of the proposed turbines.
- 6.12.2 Significant effects would occur within a localised area out to 15 km affecting a variety of landscape and visual receptors. This would occur within the context of the nearby Group 1 operational, consented and application developments. There would be direct impacts on landscape character principally as a result of the introduction of seven turbines and supporting infrastructure. This would affect semi-improved farmland and forestry and no sensitive landscape features.
- 6.12.3 One WLA is assessed as receiving a significant effect, this is based on the extent of theoretical visibility within the WLA rather than affecting the wild attributes of the designation. Similarly, one regional landscape designation, the Flow Country and Berriedale Coast SLA is also predicted to receive a significant effect based on the extent of visibility of the Proposed Development seen beyond the boundaries of the designation but would have limited effect on the special qualities of the SLA.
- 6.12.4 Several visual receptors would receive significant effects as a result of views of the Proposed Development, these would include twenty-four residential properties/groups within 3 km of the Proposed Development Area, three roads and four Core Paths, and four settlements as demonstrated by eight of the twenty viewpoints representing views from significant visual receptors.
- 6.12.5 The scale and characteristics of the receiving landscape is considered appropriate to accommodate the type of development proposed. Significant effects have been identified although these are relatively localised given the scale and size of the Proposed Development which would be experienced in close conjunction with operational and consented scheme of Group 1 developments.



# Chapter 7

## Ecology

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Important Ecological Features	Ecological features requiring specific assessment within an EIA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites, species rarity).
Survey Area	The areas covered by field surveys are termed the 'survey area'.
Study Area	The 'survey areas' considered as part of the assessment process are then collectively referred to as the 'Study Area'.
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
AEECoW	Association of Environmental Clerks of Works
AWI	Ancient Woodland Inventory
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BNG	Biodiversity Net Gain
CEMP	Construction Environmental Management Plan
CDSFB	Caithness District Salmon Fishery Board
CIEEM	Chartered Institute of Ecology and Environmental Management
DDS	Deer Distribution Survey
DEFRA	Department for Environment, Food and Rural Affairs
DMG	Deer Management Group
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FWPM	Fresh Water Pearl Mussel
GWDTE	Groundwater Dependent Terrestrial Ecosystems
IEF	Important Ecological Feature
INNS	Invasive non-native species
JNCC	Joint Nature Conservation Committee
LDP	Local Development Plan
LNR	Local Nature Reserve
NBN	National Biodiversity Network
NHZ	Natural Heritage Zone
NNR	National Nature Reserve
NPF	National Policy Framework
NSA	National Scenic Area
NVC	National Vegetation Classification
OBEMP	Outline Biodiversity Enhancement Management Plan
OUV	Outstanding Universal Value
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SEPA	Scottish Environment Protection Agency
SERAD	Scottish Executive Rural Affairs Department
SLA	Special Landscape Area
SNH	Scottish Natural Heritage

Abbreviation	Description
SOUV	Statement of Outstanding Universal Value
SPA	Special Protected Area
SPP	Species Protection Plan
SSSI	Site of Special Scientific Interest
THC	The Highland Council
UKBAP	United Kingdom Biodiversity Action Plan
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WANE	Wildlife and Natural Environment
WEWS	Water Environment and Water Services
WFD	Water Framework Directive
WHS	World Heritage Site
WLA	Wild Land Area

## 7.1. Introduction

- 7.1.1. This Chapter of the Environmental Impact Assessment Report (EIAR) evaluates the effects of the Watten Wind Farm (the “Proposed Development”) on non-avian ecology, including designated sites, terrestrial and aquatic habitats, and protected species. This ecological assessment has been carried out by MacArthur Green using guidance from NatureScot (formerly Scottish Natural Heritage, SNH, 2018)<sup>1</sup> and the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)<sup>2</sup>. All staff contributing to this Chapter have professional experience in ecological impact assessment and ecological survey.
- 7.1.2. This Chapter is supported by the following Technical Appendix documents provided in Volume 3: Technical Appendices:
- A7.1: National Vegetation Classification (NVC) and Habitats Survey Report;
  - A7.2: Protected Species Survey Report<sup>3</sup>;
  - A7.3: Bat Survey Report;
  - A7.4: Fisheries Survey Report;
  - A7.5: Outline Species Protection Plan; and
  - A7.6: Outline Biodiversity Enhancement Management Plan.
- 7.1.3. This Chapter is supported by the following Figures provided in Volume 2: Figures:
- Figure 7.1: Ecological Designated Sites and Ancient Woodland within 5 km;
  - Figure 7.2: Carbon and Peatland Map;
  - Figure 7.3: National Vegetation Classification (NVC) Survey Area and Survey Results;
  - Figure 7.4: Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) Survey Area and Survey Results;
  - Figure 7.5: Protected Species Survey Area and Results;
  - Figure 7.5C: Confidential Protected Species Survey Results;
  - Figure 7.6: Bat Survey Area and Anabat Locations (2015 and 2020) and Preliminary Bat Roost Assessment Results;
  - Figure 7.7: Overall Median Risk Assessment 2020 (July – October) – Common Pipistrelle;
  - Figure 7.8: Overall Median Risk Assessment 2020 (July – October) – Soprano Pipistrelle;
  - Figure 7.9: Overall Median Risk Assessment 2020 (July – October) – Nathusius’ Pipistrelle;
  - Figure 7.10: Overall Median Risk Assessment 2015 (May – September) – Common Pipistrelle;
  - Figure 7.11: Overall Median Risk Assessment 2015 (May – September) – Soprano Pipistrelle;
  - Figure 7.12: Electrofishing Locations; and
  - Figure 7.13: Outline Biodiversity Enhancement Management Plan.
- 7.1.4. The Confidential Annex of Technical Appendix A7.2 and Figure 7.5C will not be published with the EIAR due to the potential risk to protected species. However, they will be issued to the Scottish Ministers, NatureScot and The Highland Council (THC).
- 7.1.5. This Chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects;
- Cumulative Effect Assessment;
- Mitigation and Residual Effects;
- Summary of Effects; and
- Statement of Significance.

## 7.2. Legislation, Policy and Guidance

- 7.2.1. The following guidance, legislation and information sources have been considered in carrying out this assessment.

### Legislation

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (‘Habitats Directive’);
- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (‘Water Framework Directive’);
- Environmental Impact Assessment Directive 85/337/EEC, as amended (‘EIA Directive’) (as subsequently codified by Directive 2011/92/EU, as amended by Directive 2014/52/EU);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (‘the Habitats Regulations’);
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS);
- Nature Conservation (Scotland) Act 2004 (as amended);
- Wildlife and Natural Environment (Scotland) Act 2011 (WANE);
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011;
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- Wildlife and Countryside Act 1981 (as amended); and
- Protection of Badgers Act 1992.

### Planning Policy

- Joint Nature Conservation Committee (JNCC) and Department for Environment, Food and Rural Affairs (DEFRA) (2012). UK Post-2010 Biodiversity Framework;
- Scottish Government (2022). Onshore Wind Policy Statement 2022;
- Scottish Government (2022). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland; and
- Scottish Government (2023). National Planning Framework 4 (NPF4).

<sup>1</sup> Scottish Natural Heritage and Historic Environment Scotland (2018). Environmental Impact Assessment Handbook - Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental impact Assessment process in Scotland.

<sup>2</sup> CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. CIEEM, Winchester.

<sup>3</sup> Includes a Confidential Annex for sensitive protected species information.

## Guidance and Information

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine;
- Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edition);
- Highland Environment Forum (2021). Highland Nature: Biodiversity Action Plan 2021 – 2026;
- European Commission, Directorate-General for Environment (2010). Wind energy developments and Natura 2000;
- NatureScot (2020). General pre-application and scoping advice for onshore wind farms;
- JNCC (2019). Guidelines for selection of biological Sites of Special Scientific Interest (SSSI);
- Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1;
- Scottish Environment Protection Agency (SEPA) (2017). Land Use Planning System Guidance Note 4 – Planning guidance on on-shore windfarm developments;
- SEPA (2017). Land Use Planning System Guidance Note 31 – Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystem;
- Scottish Executive (2000). Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995;
- Scottish Executive Rural Affairs Department (SERAD) (2001). European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements;
- Scottish Government (2016). Draft Peatland and Energy Policy Statement;
- Scottish Government (2017). Planning Advice Note 1/2013 – Environmental Impact Assessment, Revision 1.0;
- Scottish Government (2017). Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Government, SNH, SEPA (2017). Peatland Survey – Guidance on Developments on Peatland;
- Scottish Government (2019). The Scottish Forestry Strategy 2019-2029;
- Scottish Government (2020). EU Exit: The Habitat Regulations in Scotland;
- Scottish Government (2020). Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update;
- Scottish Government (2020). Update to the Climate Change Plan 2018-2032;
- Scottish Government (2021). Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines;
- SNH (2015). Scotland's National Peatland Plan;
- SNH (2016). Decommissioning and Restoration Plans for wind farms;
- SNH (2016). Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2);
- SNH (2016). Planning for Development: What to consider and include in Habitat Management Plans. Version 2;
- SNH (2018). Advising on carbon-rich soils, deep peat and priority peatland habitat in development management;

- SNH (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), Historic Environment Scotland & Association of Environmental Clerks of Works (AEECoW) (2019). Good Practice During Windfarm Construction (4<sup>th</sup> Edition);
- NatureScot (2021). Assessing the cumulative landscape and visual impact of onshore wind energy developments; and
- NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation.

## 7.3. Assessment Methodology and Significance Criteria

### Scoping Responses and Consultations

7.3.1. Consultation for this EIAR topic was undertaken with the organisations shown in Table 7.1 below.

Table 7.1: Consultation responses

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
The Highland Council (THC)	Scoping Response, 28 July 2022	<p>The EIAR should provide a baseline survey of the bird and animals (mammals, reptiles, amphibians, etc) interest on site.</p> <p>Habitat enhancement and mitigation measures should be detailed, particularly in respect to any blanket bog, in the contexts of both biodiversity and conservation. Details of any habitat enhancement programme (such as native- tree planting, stock exclusions, etc) for the proposed site should be provided. It is expected that the EIAR will address whether or not the development could assist or impede delivery of elements of relevant Biodiversity Action Plans.</p> <p>The EIAR should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the proposed development. It should provide proposals for any mitigation that is required to avoid these impacts or to reduce them to a level where they are not significant.</p>	<p>Baseline protected species survey results are summarised in Section 7.4, and fully detailed within Technical Appendix A7.2.</p> <p>An Outline Biodiversity Enhancement Management Plan (OBEMP) has been developed in consultation with the landowners, which includes enhancement for blanket bog among other habitats, and is included as Technical Appendix A7.6.</p> <p>The local Biodiversity Action Plan (BAP) has been considered within the assessment.</p> <p>Potential effects of the Proposed Development on designated sites are discussed in Section 7.5.</p> <p>Effects on wild deer are discussed in Section 7.5.</p> <p>Aquatic interests will be protected by the embedded mitigation detailed in Embedded Mitigation, within Section 7.3. Consultation with the local fisheries trust was sought, with results of electrofishing surveys detailed in</p>

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>If wild deer are present or will use the Proposed Development Area, an assessment of the potential impact on deer will be required. This should address deer welfare, habitats and other interests.</p> <p>The EIAR needs to address the aquatic interests within local watercourses, including downstream interests that may be affected by the development, for example increases in silt and sediment loads resulting from construction works; pollution risk/incidents during construction; obstruction to upstream and downstream migration both during and after construction; disturbance of spawning beds/timing of works; and other drainage issues. The EIAR should evidence consultation input from the local fishery board(s) where relevant.</p>	<p>Section 7.4 and Technical Appendix A7.4, and discussions noted within this table within the Caithness District Salmon Fishery Board (CDFSB) response.</p>
SEPA	Scoping Response, 23 June 2022	<p>There appears to be no mention of potential biodiversity net gain within the scoping report. We would welcome exploration of this to be included in the final application. Both peatland restoration (on or off-site) and improvements to watercourses, such as the removal of any manmade features or re-meandering, would be looked upon favourably.</p>	<p>An OBEMP (Technical Appendix A7.6) has been prepared, in consultation with the landowners, which incorporates measures to enhance biodiversity, with particular focus on riparian planting, wader and raptor habitats and peatland restoration.</p>
NatureScot	Scoping Response, 28 June 2022	<p>We also do not agree that impacts to the Caithness and Sutherland Peatlands Special Area of Conservation (SAC) are scoped-out of the assessment. In part, this is due to identified otter activity on the Proposed Development Area and its likely connectivity with the nearby SAC. In addition, the Burn of Acharole appears to cut into the SAC in places along its route and impacts to water quality on the SAC should be considered further in any future application.</p>	<p>Potential effects on the Caithness and Sutherland Peatlands SAC and Shielton Peatlands SSSI are discussed in Section 7.5.</p> <p>Effects on the water quality of the Burn of Acharole are discussed in Chapter 9: Hydrology, Geology and Hydrogeology.</p> <p>An outline SPP is included as Technical Appendix A7.5, and details of its consideration and that of other embedded mitigation methods proposed within the assessment</p>

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>The proposal also lies adjacent to Shielton Peatlands SSSI, which forms part of the larger Caithness and Sutherland Peatlands SAC/Special Protected Area (SPA)/Ramsar site and is protected for its blanket bog and breeding bird assemblage. Impacts to this SSSI and its features should also be considered further within the EIA Report.</p> <p>We welcome the developer's intention to produce specific Species Protection Plans (SPPs) as part of the EIA. We advise details of these (and any other mitigation proposed) are included within the EIA Report.</p> <p>We also welcome the intention to undertake further assessment in relation to wild deer. This assessment should consider the direct and indirect impacts to wild deer and their impact on other interests (e.g. if changes to deer movement could adversely affect peatland habitats, particularly in relation to the adjacent SAC). A Deer Management Plan will be required and we refer the developer to our guidance for more information.</p>	<p>process is discussed in Embedded Mitigation within Section 7.3.</p> <p>Effects on deer are discussed in Section 7.5.21.</p>
Caithness District Salmon Fishery Board	Scoping Response (No Date Listed)	<p>CDSFB will want to be assured that the proposed development will not impinge on the continued good status of the various streams. In particular, measures must be put in place to ensure that none of the proposed site works impacts on the stream system.</p> <p>In addition, while CDSFB recognises that the cited lay-out is provisional and the height of the proposed turbine structures may well change, it should be noted that the direct visual impact of moving turbines on fish populations has been raised as an issue in CDFSB's previous responses to proposed windfarm developments and, in particular, to the proposed Tormsdale Windfarm which is presently being considered by the ECU.</p>	<p>Measures which will be in place to mitigate for impacts on the good status of the watercourses that may be affected by the Proposed Development are detailed in Embedded Mitigation within Section 7.3.</p> <p>Discussion relating to watercourses from the perspective of water quality and watercourse crossings are within Chapter 9: Hydrology, Geology and Hydrogeology.</p> <p>As discussed with CDSFB during the consultation process, it has not been possible to fully mitigate by design for the visual impacts of turbine blades. However, as part of the OBEMP (Technical Appendix A7.6), proposals for riparian planting are detailed which</p>

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
			will, among other benefits, provide visual screening of the watercourses.
Scottish Forestry	Gate check 1 Response 20/02/2023	Scottish Forestry have reviewed the gate check 1 report and are content that everything we requested has been captured.	Noted.
SEPA	Gate check 1 Response 01/03/2023	The application will also now need to show compliance with Policy 5(d) of National Planning Framework (NPF) 4 and we will expect to see extensive proposals for peatland restoration and enhancement works to ensure that any disturbed peat is used to form a functioning peatland system capable of achieving carbon sequestration.	An OBEMP is included in Technical Appendix A7.6 which details how the Proposed Development would achieve biodiversity enhancements in line with NPF4 <sup>4</sup> .
NatureScot	Gate check 1 Response 02/03/2023	On the basis of the submitted Gate Check 1 Report, we are content that the applicant appears to have taken on board advice given in our scoping response.	Noted.
The Highland Council (THC)	Gate check 1 Response 14/04/2023	<p>The Proposed Development is close to the Caithness and Sutherland Peatlands SAC, SPA and Ramsar site it will also be close to the World Heritage Site and this should be assessed using the United Nations Education Scientific and Cultural Organisation (UNESCO) World Heritage Site (WHS) toolkit <a href="https://whc.unesco.org/en/guidance-toolkit-impact-assessments/">https://whc.unesco.org/en/guidance-toolkit-impact-assessments/</a>.</p> <p>The Council would prefer a separate Outline Biodiversity Enhancement Management Plan to include a Biodiversity Net Gain Metric, and separate Outline Habitat Management Plan.</p> <p>The applicant should consider the Highland Nature Biodiversity Action Plan Priority habitats and species as well to comply with LDP polices 59 and 60.</p>	<p>Designated sites (non-avian) and the World Heritage Site are discussed in Section 7.4.</p> <p>An OBEMP is included in Technical Appendix A7.6 and includes the results of a Biodiversity Net Gain (BNG) metric assessment. For ease of clarity, the OBEMP includes the proposed practical habitat management for the Proposed Development Area which ties into achieving biodiversity enhancement, rather than keeping this within a separate document.</p> <p>The local BAP has been considered within the assessment.</p>

### Scope of Assessment

7.3.2. This Chapter considers the potential effects of construction, operation and decommissioning (including cumulatively) of the Proposed Development upon those ecological features identified during the review of desk-based information and field surveys. Effects, both temporary and permanent, upon the following features are assessed:

- designated nature conservation sites – effects include direct (i.e., derived from land-take or disturbance to habitats or protected species) and indirect (i.e., habitat fragmentation and modification, including through changes caused by impacts to supporting systems such as groundwater or overland flow);
- terrestrial habitats – effects include direct (i.e., derived from land-take) and indirect (i.e., habitat fragmentation and modification, including through changes caused by impacts to supporting systems such as groundwater or overland flow);
- aquatic habitats – effects are limited to the ecological impacts of changes in water conditions through potential pollution effects (hydrological effects are considered in Chapter 9: Hydrology, Geology and Hydrogeology); and
- protected species and other notable species – effects considered include direct (i.e., loss of life; loss of key habitat; displacement from key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e., loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g., as a result of pollution).

### Elements Scoped Out of Assessment

7.3.3. On the basis of the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees (e.g., Table 7.1), the following species and habitats/habitat features have been scoped out of detailed assessment:

- Generally common and widely distributed habitats or species which do not fall within the following categories were scoped out of the detailed assessment:
  - 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; and
  - Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.

7.3.4. Further ecological features and effects have been scoped out of the detailed assessment based on the results of the desk-based study and survey work undertaken for the Proposed Development, due to a lack of potential significant effect at a relevant species population or habitat extent scale. Details of ecological features and effects scoped out after further data searches and post-survey are provided from Section 7.5.

### Study Area/Survey Area

7.3.5. The area within which the desk-based research and field surveys were undertaken varies depending on the ecological feature and its search/survey requirements. Details of the extents are described in Section 7.4 of this Chapter and associated Technical Appendices A7.2-7.4 and their respective Figures. Hereafter in this Chapter, the areas covered by field surveys are termed the ‘survey area’ and these same areas which are considered as part of the assessment process are then collectively referred to as the ‘Study Area’.

<sup>4</sup> Scottish Government (2023). National Planning Framework 4.

## Baseline Survey Methodology

### Desk Study

7.3.6. A desk study was undertaken to collate available ecological information in relation to the Proposed Development Area and surrounding environment. This comprised a search of available online datasets and desk study resources and consultation with other organisations. The following data sources were considered as part of the determination of scope of baseline surveys and assessment:

- National Biodiversity Network (NBN) Atlas Scotland<sup>5</sup> for protected or notable species records within 5 km of the Proposed Development Area from the last 15 years (i.e., 2008 and onwards);
- NatureScot Sitelink<sup>6</sup> for designated site information within 5 km of the Proposed Development Area;
- Ancient Woodland Inventory (AWI) (Scotland)<sup>7</sup> for ancient woodland sites within 5 km of the Proposed Development Area;
- Scotland's Environment Map for the Carbon and Peatland 2016 Map<sup>8</sup>;
- SEPA Water Environment Hub<sup>9</sup> for watercourse classification;
- Highland Nature Biodiversity Action Plan 2021-2026<sup>10</sup>;
- Saving Scotland's Red Squirrels website<sup>11</sup> for local species records and Priority Areas for Red Squirrel Conservation;
- Deer Distribution Survey<sup>12</sup> results by the British Deer Society;
- Fisheries information from the Caithness District Salmon Fisheries Board<sup>13</sup>; and
- Relevant scientific literature on protected species, habitats distribution and conservation status etc.

### Field Surveys

7.3.7. The following field surveys were undertaken to further establish the baseline ecological conditions at the Proposed Development (plus appropriate buffers where relevant) to inform the assessment, and were undertaken in line with standard methodologies and best practice guidance (respective survey areas shown in Figures 7.3- 7.6):

- NVC surveys, incorporating Phase 1 habitat characterisation (2015, updates August 2020);
- Protected species surveys (June 2015 and August 2020) focusing on badger (*Meles meles*), red squirrel (*Sciurus vulgaris*), water vole (*Arvicola amphibius*), otter (*Lutra lutra*), and pine marten (*Martes martes*);
- Preliminary bat roost assessments (June 2015 and August 2020);
- Bat automated activity surveys (2015 and 2020);
- Fisheries surveys, including electrofishing and habitat surveys (August and September 2015); and

- Incidental records of other protected species (such as signs or features of particular importance e.g. potential signs of wildcat (*Felis sylvestris*), or potential hibernacula for reptile), notable species, or invasive non-native species (INNS), were also recorded during field surveys.

7.3.8. The full details of survey methods, species-specific legislation and results are provided within Appendices A7.1-7.4.

7.3.9. Surveys for beaver (*Castor fiber*) and great crested newt (*Triturus cristatus*) were scoped out of field surveys due to the absence of suitable habitat or the Proposed Development Area being located outwith the known range or distribution of these species.

### Methodology for the Assessment of Effects

7.3.10. The significance of the potential effects has been assessed for the Proposed Development considering the spatial and temporal magnitude of the potential impacts and the sensitivity of important ecological features.

7.3.11. The assessment method follows the process set out in CIEEM (2018)<sup>2</sup>, which is in line with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>14</sup>, and guidance on the implementation of the EU Birds and Habitats Directive (SERAD, 2001<sup>15</sup>).

7.3.12. The assessment involves the following process:

- Identification of the potential ecological effects of the Proposed Development on ecological features, including both positive and negative;
- Considering the likelihood of occurrence of potential effects;
- Defining the nature conservation value and conservation status of the ecological features present to determine sensitivity;
- Establishing the magnitude of change associated with the potential effect (both spatial and temporal);
- Based on the above information, making a professional judgement as to whether or not the resultant effect is significant in terms of the EIA Regulations;
- If a potential effect is determined to be significant, measures to avoid, reduce, mitigate or compensate for the effect are suggested where required;
- Considering opportunities for enhancement where appropriate; and
- Confirming residual effects after mitigation, compensation or enhancement are considered.

<sup>5</sup> National Biodiversity Network (2022). [Online] Available from - <https://scotland.nbnatlas.org>. [Accessed 01/08/2023]

<sup>6</sup> NatureScot (2022). *SiteLink*. [Online] Available from - <https://sitelink.nature.scot/map>. [Accessed 01/08/2023]

<sup>7</sup> Scottish Government (2022). *Ancient Woodland Inventory*. [Online] Available from - <https://data.gov.uk/dataset/c2f57ed9-5601-4864-af5f-a6e73e977f54/ancient-woodland-inventory-scotland->. [Accessed 01/08/2023]

<sup>8</sup> Scottish Government (2016). *Scotland's Soils*. [Online] Available from - [https://map.environment.gov.scot/Soil\\_maps/?layer=10](https://map.environment.gov.scot/Soil_maps/?layer=10). [Accessed 01/08/2023]

<sup>9</sup> SEPA (2022). *Water Environment Hub*. [Online] Available from - <https://www.sepa.org.uk/data-visualisation/water-environment-hub>. [Accessed 01/08/2023]

<sup>10</sup> Highland Environment Forum (2021). *Highland Nature: Biodiversity Action Plan 2021 – 2026*.

<sup>11</sup> Saving Scotland's Red Squirrels (2022). Available from – <https://scottishsquirrels.org.uk/squirrel-sightings/>. [Accessed 01/08/2023]

<sup>12</sup> British Deer Society (2022). *Deer Distribution Survey*. Available from - [www.bds.org.uk/index.php/research/deer-distribution-survey](http://www.bds.org.uk/index.php/research/deer-distribution-survey). [Accessed 01/08/2023]

<sup>13</sup> Caithness District Salmon Fishery Board (2022). *2021 Survey of Juvenile Salmonids in Caithness Rivers*. [Online] Available from - <https://caithness.dsfb.org.uk/files/2022/06/2021-EF-Report-draft-v2.pdf>. [Accessed 01/08/2023]

<sup>14</sup> Scottish Government (2017). *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017*. [Online] Available from - <https://www.legislation.gov.uk/ssi/2017/101/contents>. [Accessed 01/08/2023]

<sup>15</sup> SERAD (2001). *European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements*.

### Sensitivity of Receptors

- 7.3.13. The sensitivity of the baseline conditions, including the importance of environmental features on or close to the Proposed Development Area or the sensitivity of potentially affected features, is assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.
- 7.3.14. Determination of the level of sensitivity of an Important Ecological Feature (IEF) is based on a combination of the feature's nature conservation value and conservation status. Nature conservation value is defined on the basis of the geographic context given in Table 7.2 (which follows the guidance as detailed within CIEEM, 2018<sup>2</sup>).
- 7.3.15. Determination of the level of importance of ecosystems, habitats and species is based on professional judgement and a combination of factors, such as level of protection, rarity, conservation status, population trends, and quality/extent of the feature on Site. Published evaluation criteria (e.g., the SBL, JNCC on selection of biological SSSIs<sup>16</sup>) are used where relevant.
- 7.3.16. Attributing a value to an ecological feature is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of an importance level. For example, an SAC designated under the Habitats Directive is implicitly of European (International) importance. In the case of species, assigning value is less straightforward as contextual information about distribution and abundance is fundamental, including trends based on historical records. This means that even though a species may be protected through legislation at a national or international level, the relative value of the population onsite may be quite different (e.g., the Proposed Development Area population may consist of a single transitory animal, which within the context of a thriving local/regional/national population of a species, is therefore of local or regional value rather than national or international).
- 7.3.17. As per CIEEM guidance<sup>2</sup>, it is not necessary to carry out detailed assessment on features that are sufficiently widespread, unthreatened, and resilient to effects of the Proposed Development. Those ecological features affected by the Proposed Development and deemed to be of at least local importance are termed IEFs and are taken forward for assessment.

Table 7.2: Approach to valuing ecological features<sup>17</sup>

Importance of Feature in Geographical Context	Description
International/European	An internationally designated site (e.g., SAC) or undesignated areas that meet the criteria for international designations, or qualifying species whose presence contributes to the maintenance of such a site.  Species present in internationally important numbers (>1% of biogeographic populations).
National (UK)	A nationally designated site (SSSI, or a National Nature Reserve (NNR)), or sites meeting the criteria for national designation or qualifying species whose presence contributes to the maintenance of such a site.  Species present in nationally important numbers (>1% UK population).
Regional (Natural Heritage Zone or Local Authority Area)	Regionally significant and viable areas of key habitat identified in a Regional BAP.  Species present in regionally important numbers (>1% of Natural Heritage Zone population).  Areas of key habitat falling below criteria for selection as a SSSI (e.g., areas of semi-natural ancient woodland larger than 0.25 hectares (ha)).
Local	A site within the local area designated for nature conservation (e.g., Local Nature Reserves (LNRs)).  Areas of semi-natural ancient woodland smaller than 0.25 ha.  Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g., species-rich flushes or hedgerows.
Negligible	Usually widespread and common habitats and species that do not meet the above criteria. Features falling below local value are not considered in detail in the assessment process.

### Magnitude of Effect

- 7.3.18. Effect magnitude refers to changes in the extent and integrity of an ecological feature. A suitable definition of ecological 'integrity' is found within Scottish Executive circular 6/1995 updated by Scottish Executive (2000<sup>18</sup>) which 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*". Although this definition is used specifically regarding European level designated sites (e.g., SAC or SPA), it is applied to wider countryside habitats and species for the purposes of this assessment.
- 7.3.19. The magnitude of potential effects will be identified through professional judgement, best practice guidance and legislation, and consider the predicted degree of change (extent/scale) to baseline conditions, how the ecological features are likely to respond, and the duration, frequency/timing, likelihood of occurrence and reversibility of an effect. This effect can occur during construction or operation of the Proposed Development, and can be beneficial, neutral or adverse.

<sup>16</sup> JNCC (2019). Guidelines for selection of biological Sites of Special Scientific Interest (SSSI).

<sup>17</sup> Adapted from Hill, D., Fasham, M., Tucker, G., Shewry, M and Shaw, P. (2005). *Handbook of Biodiversity Methods – Survey, Evaluation and Monitoring*. Cambridge University Press, Cambridge.

<sup>18</sup> Scottish Executive (2000). Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995.



7.3.20. Effects are determined in terms of magnitude in space and time. There are five levels of spatial effects and five levels of temporal effects as described in Table 7.3 and Table 7.4.

**Table 7.3: Definition of spatial effect magnitude upon the IEFs**

Magnitude of Effects	Definition
Very High	Would cause the loss of the majority of a feature (>80%) or would be sufficient to damage a feature sufficient to immediately affect its viability.
High	Would have a major effect on the feature or its viability. For example, more than 20% habitat loss or damage.
Medium	Would have a moderate effect on the feature or its viability. For example, between 10 – 20% habitat loss or damage.
Low	Would have a minor effect upon the feature or its viability. For example, less than 10% habitat loss or damage.
Negligible	Minimal change on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.

**Table 7.4: Definition of temporal effect magnitude upon the IEFs**

Magnitude of Effects	Definition
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as 26+ years), except where there is likely to be substantial improvement after this period in which case the category Long Term may be more appropriate.
Long term	Between 15 years up to (and including) 25 years.
Medium term	Between 5 years up to (but not including) 15 years.
Short term	Up to (but not including) 5 years.
Negligible	No effect.

### Cumulative Assessment

7.3.21. NatureScot cumulative assessment guidance<sup>19</sup> is used to inform the cumulative assessment in this Chapter. Cumulative effects require the assessment of effects of the Proposed Development in combination with other developments, projects or activities. In the interests of focusing on the potential for significant effects, this assessment considers the potential for cumulative effects with other onshore wind farm EIA developments. The context in which these effects are considered is heavily dependent on the ecology of the feature assessed. For example, for water voles it may be appropriate to consider effects specific to individual catchments, should the distance between neighbouring catchments be sufficient to assume no movement of animals between them, whereas for blanket bog the region/Natural Heritage Zone (NHZ) may be the relevant spatial scale. Therefore, where it is considered necessary, an assessment of cumulative effects will be made for each feature, appropriate to its ecology.

<sup>19</sup> NatureScot (2021). Guidance - Assessing the cumulative landscape and visual impact of onshore wind energy developments (update to 2012 guidance).

### Significance of Effect

- 7.3.22. The significance of potential effects is determined through a standard method of assessment based on professional judgement and available evidence, considering the sensitivity (nature conservation value and conservation status) of the IEF and the nature and magnitude of effect, in a reasoned way.
- 7.3.23. A significant effect is an effect that either supports or undermines biodiversity conservation objectives. Significant effects include those which result from impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution)<sup>2</sup>.
- 7.3.24. Table 7.5 details the significance criteria that have been used in assessing the effects of the Proposed Development.

**Table 7.5: Significance criteria**

Magnitude of Effects	Definition
Major	Significant effect, as the effect is likely to result in a long term significant adverse effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitat and species.
Moderate	Significant effect, as the effect is likely to result in a medium term or partially significant adverse effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species.
Minor	The effect is likely to adversely affect the feature at an insignificant level by virtue of its limited duration and/or extent, but there will probably be no effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species. The level of effect would be Minor and Not Significant.
Negligible	No material effect. The effect is assessed to be Not Significant.

- 7.3.25. Using these definitions, it must be decided whether there would be any effects which would be sufficient to adversely affect the IEF to the extent that its conservation status deteriorates from that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).
- 7.3.26. Major and moderate effects are considered to be significant within the context of the EIA Regulations.
- 7.3.27. Where significant effects are identified, mitigation and/or compensation is required to reduce or offset effects where possible. Effects that are not significant would be expected to be avoided or reduced through compliance with best practice guidance and protected species legislation.
- 7.3.28. Residual effects are characterised as either adverse, neutral or beneficial and either significant or not significant, taking account of mitigation proposals.

### Assessment Limitations

- 7.3.29. Limitations exist regarding the knowledge base on how some species, and the populations to which they belong, react to impacts. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

- 7.3.30. Due to changes in the design, specific protected species surveys did not take place within the Proposed Development Area where it falls south of the Burn of Acharole, However, this area was surveyed for habitats and any incidental signs of protected species were recorded. No construction works are to take place within this non-surveyed area; furthermore, mitigation detailed in Embedded Mitigation would ensure any IEFs are identified, and negative effects avoided or minimised.
- 7.3.31. Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The ecological surveys undertaken for the Proposed Development have not therefore produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.
- 7.3.32. No notable limitations were experienced with regards to habitats, protected species, bats or fisheries field surveys (see Appendices A7.1-7.4 for full details).
- 7.3.33. Whilst some generic limitations have been identified, it is considered that there is sufficient information to enable a robust assessment of potential effects on ecological features.

## Embedded Mitigation

### Iterative Design Process

- 7.3.34. As part of the iterative design process for the Proposed Development, ecological constraints identified through baseline survey results were considered to avoid or reduce negative effects on ecological features where possible (see Chapter 4: Site Selection and Design Evolution). This involves:
- A minimum 50 m buffer for any infrastructure or construction activity around watercourses shown on a 1:50,000 scale Ordnance Survey (OS) map, except where a minimum number of watercourse crossings are required. This will minimise effects on associated habitats and species;
  - The track length and alignment has been designed to reduce the extent of new track and number of watercourse crossings required, where feasible considering the topography of the Proposed Development Area;
  - Avoidance of deeper peatland (>1 m), blanket bog and wet modified bog, and potential high GWDTEs, for the location of turbines and other infrastructure as far as practicable; and
  - A degree of forest felling will be required to accommodate access track and wind turbine infrastructure, and as bats can utilise edge habitat such as plantation edges for foraging and commuting this felling will create a small amount of new edge habitats for bats. Relevant guidance recommends a 50 m buffer from turbine blade tip to edge habitats should be established across the Proposed Development Area to safeguard bats<sup>20</sup>. Buffer distances will be calculated to determine the distance between the turbine base and these edge features using the following formula provided in relevant guidance<sup>20</sup>:  $b = \sqrt{((50+bl)^2 - (hh-fh)^2)}$  where buffer (b), blade length (bl), hub height (hh) and feature height (fh) are wind turbine and edge feature specific.

### Pre-construction and Construction

- 7.3.35. The assessment in this EIAR has been carried out on the basis that all works would be carried out in accordance with industry good practice construction measures, guidance and legislation.

- 7.3.36. To ensure all reasonable precautions are taken to avoid negative effects on habitats, protected species and aquatic interests, a suitably qualified Environmental Clerk of Works (ECoW) will be appointed prior to the commencement of construction to advise the Applicant and the Principal Contractor on all ecological matters. The ECoW will be required to be present onsite during the construction phase and will carry out monitoring of works and briefings with regards to any ecological sensitivities within the Proposed Development Area to the relevant staff of the Principal Contractor and subcontractors.
- 7.3.37. A SPP (outline provided in Technical Appendix A7.5) will be implemented during the construction phase. The SPP details measures to safeguard protected species known or likely to be in the area. The SPP includes pre-construction surveys and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new protected species in the vicinity of the construction works. The results of the pre-construction surveys will be used to update the outline SPP (Technical Appendix A7.5) ahead of construction starting. The SPP will remain a live document to be updated as required and in agreement with the ECoW where changes to the distribution and status of protected species and features are recorded.
- 7.3.38. Any micro-siting of infrastructure will be based on a review of existing ecological data and the completion of pre-construction surveys, to take into consideration the potential for direct encroachment onto protected species features, sensitive habitats or GWDTEs, or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micro-siting will also take consideration of any buffer distances on protected features identified, as detailed within the SPP (Technical Appendix A7.5).
- 7.3.39. There would be a contractual management requirement for the successful Principal Contractor to develop and fully implement a comprehensive and site-specific robust Construction Environmental Management Plan (CEMP). This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIAR, the SPP, statutory consents and authorisations, and industry good practice and guidance for environmental management, including implementation of appropriate pollution prevention (particularly in relation to watercourses).

## Operation

- 7.3.40. In line with best practice guidance on bats<sup>20</sup> the Proposed Development will utilise the method of reduced rotation speed whilst idling by feathering, at all turbines, to reduce collision risks to bats during the bat active period (April to October). The guidance notes that, "*The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50%*". Given the known presence of high collision risk bat species onsite, this measure will be put in place from the start of the operational period of the Proposed Development and does not result in any loss of output.

## 7.4. Baseline Description

- 7.4.1. This section details the results of the desk study and field surveys, providing the ecological baseline for the Proposed Development Area and Study Area, and includes:
- Statutory nature conservation designated sites (not including those designated for only ornithological or geological features);
  - Habitats and vegetation; and
  - Protected or notable species.

<sup>20</sup> NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation.

## Desk Study

### Designated Sites

- 7.4.2. Two designated sites overlap slightly with within the Proposed Development Area; Caithness and Sutherland Peatlands SAC and Shielton Peatlands SSSI. A further two SACs and two SSSIs that contain ecological (non-avian) qualifying interests, are present within 5 km of the Proposed Development Area. Details of these sites are listed in Table 7.6 and shown in Figure 7.1.

Table 7.6: Ecological designated sites within 5 km of the Proposed Development Area

Site Name	Distance to Proposed Development Area	Qualifying Interests	Condition and Last Assessed Date
Caithness and Sutherland Peatlands SAC	0 km	Acid peat-stained lakes and ponds	Favourable Maintained 4 August 2004
		Blanket bog	Unfavourable No change 8 June 2017
		Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Unfavourable Declining 6 August 2015
		Depressions on peat substrates	Unfavourable No change 8 June 2017
		Marsh saxifrage ( <i>Saxifraga hirculus</i> )	Favourable Maintained 24 August 2007
		Otter ( <i>Lutra lutra</i> )	Unfavourable Declining 9 September 2011
		Very wet mires often identified by an unstable 'quaking' surface	Favourable Declining 8 June 2017
Wet heathland with cross-leaved heath	Unfavourable No change 8 June 2017		
Shielton Peatlands SSSI	0 km	Blanket bog	Favourable Maintained 13 June 2007
Loch Watten SAC	2.5 km	Naturally nutrient-rich lakes of lochs which are often dominated by pondweed	Unfavourable Declining 18 August 2016
Loch Watten SSSI	2.5 km	Base-rich loch	Unfavourable Declining 18 August 2016
		Open water transition fen	Favourable Maintained 11 August 2015
River Thurso SAC	4.1 km	Atlantic salmon ( <i>Salmo salar</i> )	Unfavourable Recovering 1 October 2011
Blar nam Faoleag SSSI	4.2 km	Blanket bog	Unfavourable Declining 27 March 2007

### The Flow Country World Heritage Site Nomination

- 7.4.3. A nomination for WHS status for Scotland's Flow Country was submitted in February 2023 to the UNESCO, to recognise the global importance of its peatland ecosystem and associated biodiversity. A decision on the nomination bid is expected to be made in summer 2024. The Proposed Development Area overlaps with the proposed boundary of the Flow Country WHS which covers 187,026 ha of land, encompassing the Caithness and Sutherland SAC and SSSI and peatland habitat beyond (Figure 7.1). Existing designated sites within the WHS boundaries make up 73% of the area, with much of the remaining recognised as Wild Land Areas (WLAs), Special Landscape Areas (SLAs) and National Scenic Areas (NSAs); containing the areas of the blanket bog landscape

in the most natural condition or are functionally important and provide protection. The implications of being on the World Heritage List are that properties have 'Outstanding Universal Value' (OUV), which is defined in terms as three pillars for natural sites: criteria, integrity and protection and management. All three must be met before a site can be inscribed on the list. The Statement of Outstanding Universal Value (SOUV) details these three requirements and is summarised in the following brief synthesis:

*'The Flow Country property is the most outstanding example of a blanket bog ecosystem in the world. With its intricate network of pools, hummocks and ridges, the bog stretches across some c. 190,000 hectares of northern mainland Scotland, with the property boundary comprising seven discrete, but adjacent areas. The underlying peat has been accumulating for the past 9,000 years and the bog displays a remarkable range of features resulting from the climatic, altitudinal, geological and geomorphological gradients found across the region. Alongside the extensive record of peat accumulation that The Flow Country contains, and the store of carbon this represents, the ecological processes that result in peat formation continue to sequester carbon on a very large scale.'*

*The Flow Country blanket bog also provides a globally significant natural habitat for an internationally important assemblage of specialist biodiversity. The area supports a unique and distinctive assemblage of birds, with a combination of arctic-alpine, temperate and continental species not found anywhere else in the world. This is a result of the site's location and the diversity of blanket bog habitats it contains, combined with the patchwork of connected farming and coastal landscape elements within the wider setting.*

*Protection for The Flow Country is provided through international and national designations, as well as national and local planning policies, and there is scope for future expansion of the site through restoration of adjacent degraded blanket bog. The area is also considered to be the type-locality for the description of blanket bog and so represents a significant research and educational resource.'*

### Ancient Woodland

- 7.4.4. There is a cluster of four areas listed on the Ancient Woodland Inventory<sup>7</sup> within 5 km of the Proposed Development Area. These consist of one larger (3.8 ha) and three smaller (up to 0.3 ha) areas surrounding Strath Burn, with the closest area just over 2 km from the Proposed Development Area (Figure 7.1). NPF<sup>4</sup>, policy 6, states that: *'Development proposals will not be supported where they will result in...Any loss of ancient woodlands, ancient and veteran trees, or adverse impact on their ecological condition...'*

### Local Biodiversity Action Plan

- 7.4.5. The Proposed Development falls within the area covered by the Highland Nature Biodiversity Action Plan 2021-2026<sup>10</sup>. The plan covers a number of Key Actions, of which several are of potential relevance to the Proposed Development:
- Action 1: Planning and development decisions provide biodiversity protection;
  - Action 2: Landscape-scale nature conservation and restoration work;
  - Action 3: Identify and conserve priority species; and
  - Action 4: Invasive non-native species are controlled.

- 7.4.6. A number of priority mammal species are listed in the plan: European beaver, hedgehog (*Erinaceus europaeus*), mountain hare (*Lepus timidus*), red squirrel, Scottish wildcat, water vole, pine marten, brown long-eared bat (*Plecotus auratus*), Daubenton's bat (*Myotis 13nguilla13iid*), Natterer's bat (*Myotis nattereri*), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Nathusius' pipistrelle (*Pipistrellus nathusii*).
- 7.4.7. The plan also lists a number of plant and invertebrate species of importance, in addition to highlighting the top invasive non-native species of concern within the area.
- 7.4.8. The Highland Nature Biodiversity Action Plan outlines 50-year visions and commitments to Action for Habitats, including upland and moorland, peatland and wetland, woodland and forest, freshwater and agricultural land which can all be found within the Proposed Development Area.

## Habitats

### Terrestrial Habitats

- 7.4.9. The Proposed Development Area falls within an upland area and, where unplanted, contains habitats consistent with this.
- 7.4.10. The Carbon and Peatland Map 2016<sup>8</sup> was consulted to determine likely peatland classes present. The map is a predictive tool that provides an indication of the likely presence of peat at a coarse scale. The Carbon and Peatland map has been developed as "a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities"<sup>21</sup>. It identifies areas of 'nationally important carbon-rich soils, deep peat and priority peatland habitat'<sup>8</sup> which are categorised as Class 1 and Class 2 peatlands. Class 1 peatlands are also "likely to be of high conservation value" and Class 2 "of potentially high conservation value and restoration potential".
- 7.4.11. The Proposed Development Area encompasses areas of Class 1, Class 3<sup>22</sup>, Class 4<sup>23</sup> and Class 5<sup>24</sup> peatland (Figure 7.2). As the Carbon and Peatland Map is a high-level tool, detailed habitat and peat depth surveys have been carried out across the Proposed Development Area to inform siting, design and mitigation and the detailed assessment on peatland and associated habitats. The results of the habitat surveys are discussed below, and the results of the peat depth surveys are presented and discussed in Chapter 9: Hydrology, Geology and Hydrogeology.
- 7.4.12. Data from the NBN Atlas Scotland<sup>5</sup> obtained as part of the desk study indicated that aspen (*Populus tremula*), a priority plant species named in the Highland Nature Biodiversity Action Plan, has been recorded within 5 km of the Proposed Development Area within the last 15 years (i.e., 2008 and onwards).

### Aquatic Habitats

- 7.4.13. The Proposed Development Area includes a number of watercourses that fall within the Wick River catchment (see also Chapter 9: Hydrology, Geology and Hydrogeology). The Wick River – source to Loch Watten Burn (SEPA ID: 20037), which runs along the southern boundary of the Proposed Development Area, was assessed by SEPA

<sup>21</sup> NatureScot, (2020). Carbon and Peatland 2016 map. Available from - <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map> [Accessed 01/08/2023]

<sup>22</sup> Class 3 – Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.

<sup>23</sup> Class 4 – Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils.

<sup>24</sup> Class 5 – Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.

in 2014 as part of the Water Framework Directive (WFD) Classification as having Good overall condition, with High water quality and High access for fish migration<sup>9</sup>.

### Protected Species (Non-avian)

- 7.4.14. Data from the NBN Atlas Scotland<sup>5</sup> obtained as part of the desk study indicated that the following protected or notable species have been recorded within 5 km (10 km for bat species) of the Proposed Development Area within the last 15 years (i.e., 2008 and onwards) (data licences and providers are detailed in Appendices A7.2 and A7.3):
- Common lizard (*Zootoca vivipara*);
  - Hedgehog;
  - Mountain hare;
  - Otter;
  - Pine marten; and
  - Water vole.
- 7.4.15. Red squirrel sightings recorded by Saving Scotland's Red Squirrel do not show any records within 10 km of the Proposed Development. Between 2010 and 2022 (all available years), records at the latitude of the Proposed Development are very sparse<sup>11</sup>.

### Fish

- 7.4.16. The watercourses on and around the Proposed Development Area form part of the Wick River catchment. The CDSFB regularly carry out semi and fully quantitative surveys of the watercourses within the Wick catchment<sup>25</sup>. In 2021, which experienced summer drought conditions, the juvenile salmonid populations at sample points on the Scouthal Burn were in a very depleted condition<sup>26</sup>. The Scouthal Burn is fed by the Burn of Acharole, which runs along the southern boundary of the Proposed Development Area. The latest published report on the state of juvenile salmonids in the district highlights that a series of summer droughts have occurred since 2018 which has led to a depletion in salmonid populations.

### Other Species

#### Deer

- 7.4.17. Deer are not included in the assessment from a nature conservation perspective but are considered due to potential welfare issues and the potential impacts of deer on habitats and on neighbouring land and interests (including public roads).

- 7.4.18. The results of the 2016 Deer Distribution Survey (DDS)<sup>12</sup> indicated the following species may be present in the general area where the Proposed Development is located:
- Red deer (*Cervus elaphus*): recorded by the DDS in 2007 and/or 2011 and reconfirmed in 2016;
  - Roe deer (*Capreolus capreolus*): recorded by the DDS in 2007 and/or 2011 and reconfirmed in 2016;
  - Sika deer (*Cervus nippon*): recorded by the DDS in 2016 only.
- 7.4.19. The Proposed Development Area does not fall within the Northern Deer Management Group (DMG), with the extent of the Group area not extending east of the A9 road. However, the Northern DMG does encompass part of the Caithness and Sutherland Peatlands SAC, and Blar nam Faoleag SSSI, which are within 5 km of the Proposed Development. Management of deer numbers and monitoring of grazing impacts are being monitored within the area covered by the Northern DMG<sup>27</sup>. The latest Deer Working Group report<sup>28</sup> includes approximate densities of red deer across 53 deer management areas. According to the report, the Proposed Development Area lies right on the edge of red deer range, with red deer densities in the vicinity of the Proposed Development Area estimated to be approximately 6.1-8 deer per km<sup>2</sup>.
- 7.4.20. In terms of habitat suitability within the Proposed Development Area, areas of conifer plantation could provide shelter for deer species, with open areas of grassland and upland habitats throughout providing grazing and commuting opportunities.
- 7.4.21. The Caithness and Sutherlands Peatland SAC Conservation Advice Package<sup>29</sup> details that red deer use the peatlands for grazing and commuting. A number of qualifying habitats are noted as being degraded through browsing or trampling by red deer and cattle; although whilst high levels of herbivore use can be damaging, a low level of grazing and browsing by wild herbivores and/or livestock is necessary to maintain them<sup>29</sup>.
- 7.4.22. Details regarding field survey methodologies, survey timings, survey area extents, and results are included within Technical Appendices A7.1 – A7.4. The following Sections summarise the baseline conditions as identified during these surveys.

### Field Surveys

#### Habitats

#### National Vegetation Classification (NVC) and Phase 1

- 7.4.23. Technical Appendix A7.1 presents the detailed descriptions of habitats from the surveys.
- 7.4.24. The NVC data collected were cross-referenced to the Phase 1 Habitat Survey Classification<sup>30</sup> to allow a broader characterisation of habitats. The extent of Phase 1 habitat types within the Study Area<sup>31</sup> was calculated using the correlation of NVC communities to their respective Phase 1 types specific to the Proposed Development Area (see

<sup>25</sup> Caithness District Salmon Fishery Board (2022) *Publications* [Online] Available from - <https://caithness.dsfb.org.uk/publications/> [Accessed 01/08/2023]

<sup>26</sup> Caithness District Salmon Fishery Board (2022) *2021 Survey of Juvenile Salmonids in Caithness Rivers*. [Online] Available from - <https://caithness.dsfb.org.uk/files/2022/06/2021-EF-Report-draft-v2.pdf> [Accessed 01/08/2023]

<sup>27</sup> Northern Deer Management Group (2022) *Deer Management Plan: Working Plan 2021-2026*. [Online] Available from - <https://northerndmg.deer-management.co.uk/wp-content/uploads/2022/09/NDMG-DMP-Working-Plan-Sept-2022.pdf> [Accessed 01/08/2023]

<sup>28</sup> Deer Working Group (2020). *The management of wild deer in Scotland: Deer Working Group report*. Scottish Government.

<sup>29</sup> NatureScot (2021). *The Caithness and Sutherlands Peatland SAC Conservation Advice Package*.

<sup>30</sup> Joint Nature Conservancy Council (2010). *Handbook for phase 1 habitat survey – a technique for environmental audit*. JNCC, Peterborough.

<sup>31</sup> The habitat extents provided and discussed within this chapter relate only to those within the Proposed Development Area (i.e., the habitats Study Area) as these form the baseline conditions and the basis for the assessment of potential effects and habitat loss.

Technical Appendix A7.1 for details), and their extents mapped within ArcGIS software, including within mosaic areas. The NVC communities and non-NVC types recorded within the Study Area are provided in Annex A.

7.4.25. Table 7.13 (located at the end of this Chapter) and include proportions of particular habitat types that are found within the Proposed Development Area, including those within mosaic habitats. Full descriptions of the habitats, NVC communities and associated flora of the Proposed Development Area and wider survey area are provided in Technical Appendix A7.1.

7.4.26. The habitats are shown on Figure 7.3 which display all data collected during surveys. Due to changes in the Proposed Development Area during the baseline survey period, and to provide survey buffers to account for the presence of potential GWDTE (where land access permission allowed), in some areas the survey area extended beyond the Proposed Development Area. The Phase 1 symbology shading in Figure 7.3 has been used to broadly characterise stands of vegetation based on the dominant NVC community within a particular area<sup>32</sup>.

Diagram 7.1 summarises the Phase 1 habitats which contribute over 1% of the Study Area and shows that blanket bog, marshy grassland, acid grassland and coniferous plantation woodland make up the majority of the Study Areas. As detailed in Annex A, Table 7.13, the Study Area contains a variety of habitat types, and whilst some relatively homogenous stands of vegetation occur, many of the identified communities form complex mosaics and transitional areas across the Study Area. The only habitat types that have subsequently been scoped-in to the assessment of effects due to their extent and nature conservation value are blanket bog and wet modified bog. Detailed descriptions of these habitat types are included in Technical Appendix A7.1.

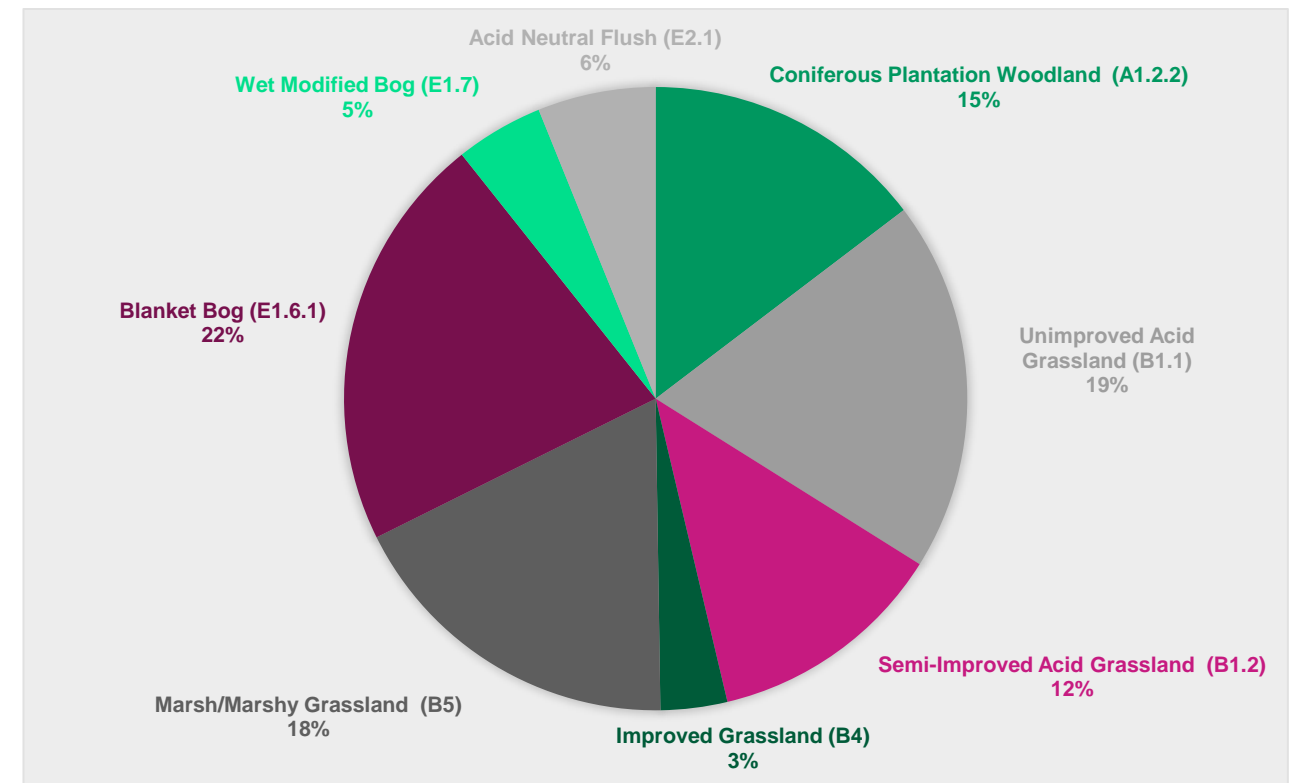


Diagram 7.1: Predominant Phase 1 Habitat Types Recorded within the Study Area (habitat types making up <1% of the Study Area are not included)

### Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

- 7.4.27. The NVC results were referenced against SEPA guidance<sup>33</sup> to identify those habitats which may be classified, depending on the hydrogeological setting, as being potentially groundwater dependent. Potential GWDTE NVC communities recorded within the survey area are identified in Annex A.
- 7.4.28. Table 7.13 and shown on Figure 7.4.
- 7.4.29. Within Figure 7.4, the potential GWDTE sensitivity of each polygon containing a potential GWDTE community was classified on a four-tier approach as follows:
- 'Highly – dominant' where potential high GWDTE(s) dominate the polygon;
  - 'Highly – sub-dominant' where potential high GWDTE(s) make up a sub-dominant percentage cover of the polygon;
  - 'Moderately – dominant' where potential moderate GWDTE(s) dominate the polygon and no potential high GWDTEs are present; and
  - 'Moderately – sub-dominant' where potential moderate GWDTE(s) make up a sub-dominant percentage cover of the polygon and no high GWDTEs are present.
- 7.4.30. Where a potential high GWDTE exists in a polygon, it outranks any potential moderate GWDTE communities within that same polygon.

<sup>32</sup> The Phase 1 characterisation has been utilised to allow a broader visual representation of the habitats within the survey area. Polygons or areas where there are mosaic NVC communities have generally been assigned a single Phase 1 classification based on the dominant NVC type (despite some polygons containing multiple Phase 1 types, often in low percentages). Therefore, the Phase 1 characterisation is generally a broader overview, and the NVC data should be referred to for further detail in any specific area.

<sup>33</sup> SEPA (2017). Land Use Planning System Guidance Note 4 - European Commission, Directorate-General for Environment (2010) and SEPA (2017). Land Use Planning System Guidance Note 31 – Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.

- 7.4.31. GWDTE sensitivity has been assigned solely on the SEPA listings. However, many of the NVC communities on the list are common habitat types across Scotland and generally of low nature conservation value. Furthermore, depending on several factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependent on groundwater. Because designation as a potential GWDTE is related to groundwater dependency and not nature conservation value, GWDTE status has not been used as criteria to determine a habitat's nature conservation value and similarly does not factor in the identification of IEFs within ecological impact assessments. There is however a requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment in Chapter 9: Hydrology, Geology and Hydrogeology.

### Annex I Habitats

- 7.4.32. Many NVC communities can also correlate with various Annex I habitat types listed under the Habitats Directive. The fact that an NVC community can be attributed to an Annex I type however does not necessarily mean all instances of that NVC community constitute Annex I habitat. Its status can depend on various factors such as quality, extent, species assemblages, geographical setting, and substrates.
- 7.4.33. NVC survey data and field observations have been compared to JNCC Annex I habitat listings and descriptions<sup>34</sup>. Those habitats within the Proposed Development Area which could be considered Annex I habitats are also summarised in Annex A, Table 7.13. Full details and discussion are provided within Technical Appendix A7.1.

### Scottish Biodiversity List (SBL) Habitats

- 7.4.34. The SBL<sup>35</sup> is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. The SBL identifies habitats which are the highest priority for biodiversity conservation in Scotland; these are termed 'priority habitats'. Some of the priority habitats are quite broad and can be correlated to many NVC types. Relevant SBL priority habitat types and corresponding associated NVC types recorded within the Proposed Development Area are summarised in Technical Appendix A7.1.
- 7.4.35. These SBL priority habitats correspond with UK BAP Priority Habitats<sup>36</sup>.

### Protected Species (Non-avian)

- 7.4.36. The section outlines the results from the protected species surveys. Detailed methodologies, survey timings, and results, including the legal status of each species, are included within Technical Appendices A7.2-A7.4 and their associated annexes. Results are presented in Figures 7.5 to 7.12.

### Badger

- 7.4.37. No evidence of badger was recorded within the Proposed Development Area, with suitable habitat for the species limited.

### Bats

- 7.4.38. This section provides a summary of the field surveys and associated results for bats. Full details are contained within Technical Appendix A7.3.

### Preliminary Roost Assessment

- 7.4.39. Two trees and four structures with the potential to support roosting bats were identified within the Proposed Development Area during field surveys (Figure 7.6); two trees and two structures with low potential, and two structures with moderate potential. Trees with low suitability for roosting bats were recorded at Shielton in the south and Druimdubh in the north of the Proposed Development Area. Structures with low suitability for roosting bats included two ruins, with only stone walls remaining, at Druimdubh and Blackisle, in the north of the Proposed Development Area.
- 7.4.40. Two features with moderate suitability for roosting bats were recorded within 200 m plus rotor radius of a proposed wind turbine location; these included buildings at Shielton farm. The features were assessed as unlikely to support a roost of high conservation status, and given the results of the 2015 inspection (including no bat droppings recorded), the distance from the turbines and its isolated location (with limited connectivity to areas of suitable foraging habitat), as well as the results of the automated activity surveys (detailed below), no further surveys were considered necessary; this was discussed and agreed with NatureScot in December 2022.

### Automated Activity Surveys

- 7.4.41. Two periods of automated activity surveys were carried out, in 2020 and 2015, each following standard guidance as it was at the time. Surveys in 2015 involved the deployment of five detectors onsite, carried out between May and September over a total of 20 days and collecting 77 complete recording nights of data. Surveys in 2020 involved the deployment of ten detectors at potential turbine locations onsite, deployed seasonally (three deployment periods) from July to October, over a total period of 62 days; resulting in 506 associated data recording nights. Anabat locations are detailed on Figure 7.6.
- 7.4.42. Bats were detected on 23 of the 77 recording nights in 2015, and 65 of the 506 recording nights in 2020, with 2602 and 5013 bat registrations in total respectively (Table 7.7 and Table 7.8). In 2015, two bat species were recorded: common and soprano pipistrelle. In 2020, static detectors recorded three species and one genus level classification: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle and *Myotis* sp. Common pipistrelle were the most frequently recorded species in both survey periods, accounting for 99.9% of registrations in 2015 and 98.4% of registrations in 2020.

Table 7.7: Total Number of Bat Passes for Each Species Across all Locations 2015

Species/Species Group	No of Registrations	Percentage of total (%)
Common pipistrelle	2600	99.9
Soprano pipistrelle	2	0.1
Total	2602	100

<sup>34</sup> JNCC Habitats List. [Online] Available from - <https://sac.jncc.gov.uk/habitat/> [Accessed 01/08/2023]

<sup>35</sup> NatureScot (2022). *Scottish Biodiversity List*. [Online] Available from - : <https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy-and-cop15/scottish-biodiversity-list>. [Accessed 01/08/2023]

<sup>36</sup> JNCC (2019) *UK BAP Priority Habitats*. [Online] Available from - <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/> [Accessed 01/08/2023]

Table 7.8: Total Number of Bat Passes for Each Species Across all Locations 2020

Species/Species Group	No of Registrations	Percentage of total (%)
Common pipistrelle	4931	98.4
Nathusius' pipistrelle	72	1.4
Soprano pipistrelle	8	0.2
<i>Myotis</i> spp.	2	0
Total	5013	100

### Quantifying Activity

- 7.4.43. The data from both 2015 and 2020 were analysed using the Ecobat tool<sup>37</sup> to gain a measure of relative bat activity at the Proposed Development. The data was then evaluated in accordance with NatureScot *et al.* guidance<sup>20</sup> tables to determine overall Site risk level for each species. The guidance explains that: “*The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year...Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain*”. Data from the Proposed Development Area were compared with data within a range of 100 km and within 30 days of the survey date from all years. The full Ecobat Report is provided in Annex F of Technical Appendix A7.3.
- 7.4.44. This Ecobat analysis provides a measure of average annual Site activity based on the median (most frequent activity category and representative of the ‘typical’ bat activity levels in the Study Area) and maximum (unusually high levels or important peats of bat activity) percentiles<sup>38</sup>. A reference range representing the number of nights for each species that the date was compared to was also generated. In general, a reference range of more than 200 nights is recommended for confidence in the activity level stated by the Ecobat output.
- 7.4.45. Common pipistrelle was attributed Site activity category levels of Moderate (median) to High (maximum) in both 2015 and 2020 (reference range of 2487 in 2015 and 1691 in 2020).
- 7.4.46. Soprano pipistrelle was attributed Site activity category levels of Low-Moderate (median and maximum) in 2015, and Low-Moderate (median) to Moderate (maximum) in 2020 (reference range of 554 in 2015 and 416 in 2020).
- 7.4.47. Nathusius' pipistrelle's Site activity category levels were calculated to be Low (median) to Moderate-High (maximum), with the species only recorded in 2020 (reference range of 44).
- 7.4.48. *Myotis* sp. was attributed a Site activity category level of Low (median and maximum), with the species only recorded in 2020 (reference range of 298).
- 7.4.49. The reference ranges for species in both years was above the minimum threshold for confidence, with the exception of Nathusius' pipistrelle; the attributed activity levels for this species should be treated with caution.

<sup>37</sup> Mammal Society (2017). Ecobat. [Online] Available from – <http://www.mammal.org.uk/science-research/ecostat/> [Accessed 01/08/2023]

<sup>38</sup> The percentile rank is attributed to one of the following five bat activity categories as defined within relevant guidance: Low (0-20%), Low-Moderate (20-40%), Moderate (40-60%), Moderate-High (60-80%) and High (80-100%).

### Assessing Potential Risk

- 7.4.50. As detailed in Technical Appendix A7.3, the Proposed Development Area risk level was determined to be Low/Lowest, based on having a Small project size and Moderate habitat risk.
- 7.4.51. As per NatureScot *et al.* guidance<sup>20</sup>, common, soprano and Nathusius' pipistrelle are the species recorded within the Study Area which are considered to have a high collision risk. The only other bat species recorded was *Myotis* spp., which is classified as having a low collision risk.
- 7.4.52. The Ecobat activity levels calculated for high collision risk species and the Proposed Development Area risk level were used to calculate an overall risk assessment score, which is summarised in Table 7.9. Common pipistrelle had an overall risk assessment score of Medium for both median and maximum percentiles. Soprano and Nathusius' pipistrelles had overall risk assessment scores of Low (median) to Medium (Maximum).

Table 7.9: Risk Assessment Scores Based on Median and Maximum Percentiles for High Collision Risk Species

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Maximum Percentile
Common pipistrelle (2015 and 2020)	Medium (6)	Medium (10)
Nathusius' pipistrelle	Low (2)	Medium (8)
Soprano pipistrelle (2015)	Low (4)	Low (4)
Soprano pipistrelle (2020)	Low (4)	Medium (6)

- 7.4.53. Figures 7.7 to 7.11 further illustrate the results of the median monthly risk assessment scores for high collision risk bat species recorded in the Proposed Development Area at each survey location, and per month<sup>39</sup>. No High risk assessment scores were recorded in any month for a high collision risk species.
- 7.4.54. Medium risk assessment scores were recorded for common pipistrelle at a number of varying locations in July, August, September and October 2020 and in May and July 2015. One medium risk assessment score was recorded for soprano pipistrelle in October 2020. Two medium assessment scores were recorded for both September and October in 2020 for Nathusius' pipistrelle, covering three locations in the north-west of the Study Area.
- 7.4.55. Analysis of the bat activity data referenced against known emergence times for high collision risk species was undertaken to indicate the likelihood of a bat roost being close to the Proposed Development.
- 7.4.56. The analysis of the 2020 bat activity indicated the potential for nearby roost sites at all locations which recorded *Pipistrellus* species during their known emergence time ranges. At Locations 1, 2, 3, 4, 5, 8 and 10 common and Nathusius' pipistrelle calls were recorded during the species-specific emergence time range in the maternity roost season. The maximum number of calls during the maternity roost season was eight, so the risk is not considered high.
- 7.4.57. In 2015, there were no registrations recorded close to a potential roost within the time period inferred from the known emergence times.

<sup>39</sup> Risk assessment scores are displayed per month rather than per season due to the format and nature of the Ecobat outputs.



### Otter

- 7.4.58. Numerous spraints were recorded along Loch Burn and Black Burn in 2015 and 2020, with a few instances also recorded on the Red Burn and other tributaries of the Burn of Acharole in the east of the Proposed Development Area in 2020 (see Figure 7.5). A potential couch was also noted on the Loch Burn in 2020, under a low bridge (Figure 7.5C). Incidental sightings of otter were recorded during ornithological surveys at the Proposed Development Area in November 2019, and April, June and July 2020; where otter were seen within Loch of Toftingall (in April 2020 two otters were seen together). The numerous watercourses within the Proposed Development Area provide suitable commuting routes between the Loch of Toftingall and the Burn of Acharole. The concentration of spraints recorded along Loch Burn and Black Burn suggests that these offer good foraging resource. One potential couch was recorded under a bridge, but otherwise there is little suitable habitat for shelter along any of the watercourses within the Proposed Development Area.

### Pine Marten

- 7.4.59. No evidence of pine marten was recorded within the Proposed Development Area, although three potential pine marten scats were recorded adjacent to the area in 2023 (Figure 7.5). The areas of mixed-age conifer forestry offer potential shelter for pine marten, with the main body of the Proposed Development Area providing more open hunting areas.

### Red Squirrel

- 7.4.60. No evidence of red squirrel was recorded within the Proposed Development Area. The areas of coniferous forestry on and adjacent to the Proposed Development Area offer some suitable habitat for foraging and drey building.

### Reptiles

- 7.4.61. No reptiles were sighted or signs of reptiles recorded in the course of the protected species surveys. The habitat in the east of the Proposed Development Area, open grassland and bog, offers suitable habitat for reptile, and a pile of stones that could be used by hibernating reptiles was identified.

### Water Vole

- 7.4.62. Seven potential burrows were identified in the Proposed Development Area in 2015, with one potential water vole burrow identified in 2020, near Loch Burn, and a potential run recorded close to Black Burn (Figure 7.5). Several of the smaller watercourses within the survey area offer habitat that may be suitable for water vole, with steep, soft banks and slow flows. The riparian vegetation would offer good foraging opportunity for water vole. No conclusive evidence of the species was recorded as water vole droppings are the only field sign that can be used to determine water vole presence reliably on their own<sup>40</sup>.

### Fish

- 7.4.63. CDSFB carried out electrofishing and fish habitat surveys for the Proposed Development on the watercourses surrounding the Proposed Development Area in 2015. The CDSFB report from 2015 is included as Technical Appendix A7.4. Samples were taken on Loch and Black Burns (within the Proposed Development Area), Burn of Acharole (directly adjacent to the Proposed Development Area) and The Clow (downstream of the Proposed Development Area). All four sampled sites had substantial populations of salmonids of mixed age-class

composition. Electrofishing locations are shown on Figure 7.12. All four sites had Atlantic salmon (*Salmo salar*), with brown trout (*Salmon trutta*) found at the three upstream sites, with Atlantic salmon outnumbering brown trout at most stages. European eel (*Anguilla 18nguilla*) and stickleback (*Gasterosteus aculeatus*) were also noted.

### Other Species

- 7.4.64. No signs or sightings of notable species or deer were recorded during field surveys.

### The Do-Nothing Scenario

- 7.4.65. In the absence of the Proposed Development, it is likely that the IEFs would generally remain as they are at present, although numbers and distribution of species may fluctuate naturally. Vegetation and habitat composition and extents in the Study Area may fluctuate marginally in the long-term in line with increasing or decreasing livestock grazing and natural fluctuations in deer browsing. The commercial forestry present within the Proposed Development Area would continue to mature and be felled, which may create temporary localised habitat changes until replanting and canopy closure.

## 7.5. Assessment of Potential Effects

- 7.5.1. This Section provides an assessment of the likely effects of the Proposed Development on the IEFs identified in the baseline studies. The assessment of effects is based on the project description outlined in Chapter 5: Project Description, and is structured as follows:

- Construction effects;
- Operational effects; and
- Decommissioning effects.

### Ecological Features Scoped-Out of the Assessment

- 7.5.2. In addition to those ecological features and effects already scoped-out as detailed within Section 7.3.3, with consideration of the additional desk-study and baseline data collected, and following the iterative design and embedded mitigation measures described above (Embedded Mitigation) and project assumptions below (Assumptions of the Assessment), several potential effects on IEFs can be scoped-out of further assessment based on the professional judgement of the EIA team and experience from other relevant projects and policy guidance or standards. This includes effects from the construction and operational phases of the Proposed Development, as well as cumulative effects. The following sections detail the ecological features and effects that have been scoped-out following further desk studies and field surveys.

### Designated Sites and Ancient Woodland

- 7.5.3. It is considered that there is no connectivity between the Proposed Development Area and either Loch Watten SAC and SSSI, River Thurso SAC, or Blar nam Faoileag SSSI. The Proposed Development Area is hydrologically separated from these designated sites and is sufficiently distant from them that no potential effects on the qualifying habitats detailed in Table 7.6 have been identified and as such the sites can be scoped out of further assessment.
- 7.5.4. Although the Proposed Development Area encompasses a discrete area that forms part of the Caithness and Sutherland SAC and Shielton Peatlands SSSI due to oversail, the footprint (areas for physical works to be carried

<sup>40</sup> Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds. Fiona Mathews and Paul Chanin. The Mammal Society, London.

out) of the Proposed Development does not overlap with these areas, and no works would be undertaken in the SAC or SSSI (Figure 7.1). As detailed in Section 7.3, the embedded mitigation includes that construction work would comply with a CEMP developed by the Principal Contractor, as detailed in section 7.3.39, which would be monitored by a suitably experienced ECoW. The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with SEPA best practice guidance. With this embedded mitigation in place, water pollution impacts and associated likely significant effects associated with the Proposed Development are considered unlikely. Furthermore, the Burn of Acharole separates the Proposed Development hydrologically from the Caithness and Sutherland Peatlands SAC and Shielton Peatlands SSSI. No potential effects on qualifying habitats of the SAC or SSSI (listed in Table 7.6) are therefore anticipated and are scoped out of the assessment.

- 7.5.5. Otter are a qualifying species of the Caithness and Sutherland Peatlands SAC. Otters that form part of the SAC population may use habitat within the Proposed Development Area for predominantly commuting (e.g., between Loch of Toffingall and Burn of Acharole) and foraging, due to limited habitat available for resting sites. Otter home ranges are large and individuals are unlikely to be fully dependent on prey availability and access within watercourses within the Proposed Development Area. Otters that form part of the SAC population may therefore be present within the Proposed Development Area, but the likelihood of direct impacts taking place such as mortality through collision with site vehicles is very low considering the size of the construction area and its relation to watercourses, as well as working time primarily being in the day and otter movements primarily being crepuscular/nocturnal. Furthermore, the proposed embedded mitigation of the provision and implementation of the SPP, CEMP (including Pollution Prevention Plan) and presence of an ECoW during construction (incorporating pre-construction otter surveys and ongoing otter monitoring during the construction period) would ensure that all reasonably practicable measures are taken during construction so that provisions of the relevant wildlife legislation are complied with and no impacts on a European designated site will result<sup>41</sup>. These measures would ensure direct and indirect effects on otter are avoided or reduced to a negligible level. Should otter be affected by minor and non-significant levels of disturbance and/or temporarily displaced during construction, there are abundant foraging and sheltering opportunities locally for this mobile and wide-ranging species that would ensure that there are no risks to the otters' population viability or overall distribution within the SAC and locally. The Proposed Development is also not considered likely to result in any otter population or territory fragmentation, nor create any barrier effects with respect to the movement of otters within the SAC or locally. In taking account of the above and standard and proven mitigation measures, any adverse effects on the SAC's conservation objectives for otter can be discounted and a likely significant effect from the Proposed Development on otter can be ruled out. As it has been concluded that there are no likely significant effects on otter as a feature of the Caithness and Sutherland Peatlands SAC and therefore are scoped out.
- 7.5.6. The nominated Flow Country WHS encompasses the Caithness and Sutherland Peatland SAC and Shielton Peatland SSSI at its nearest point to the Proposed Development site. As for the SAC and SSSI, water pollution impacts would not be anticipated due to compliance with the CEMP and no hydrological connection between the Proposed Development and the Flow country WHS, due to the separation provided by the Burn of Acharole which runs along the northern boundary of the WHS.
- 7.5.7. Based on the distance between areas of ancient woodland and the Proposed Development Area, it is considered that there is no connectivity between them, and ancient woodland is therefore scoped out of the assessment.

## Terrestrial Habitats

- 7.5.8. As per Section 7.3, habitats that are considered to be of low conservation value and are very common habitat types locally and regionally are scoped out of the assessment. Within the Study Area these include:
- broadleaved and coniferous plantation woodland;
  - unimproved and semi-improved acid grassland;
  - unimproved neutral grassland;
  - improved grassland;
  - bracken;
  - amenity grassland; and
  - bare ground.
- 7.5.9. Marshy grassland is scoped out of the assessment. Marshy grassland covers 89.53 ha (17.59% of the Study Area) and is characterised by several common and widespread communities, overwhelmingly dominated by rushes (*Juncus* spp., i.e., M23 and MG10); see Technical Appendix A7.1 and Table 7.13 in Annex A. M23 is a rush-dominated habitat generally of low ecological value unless particularly species-rich examples are found. The M23 within the Study Area is generally not species-rich, often consisting of little more than a dense sward of rushes with some grasses and common herbs. The range of marshy grassland communities present within the Proposed Development Area are common habitat types locally, regionally and nationally and the relatively small direct and indirect losses predicted in the Proposed Development Area, as per Table 7.13, are of minor significance. These marshy grassland communities are considered potential GWDTE's in line with guidance<sup>33</sup>. However, designation as a GWDTE does not infer an intrinsic biodiversity value, and GWDTE status has not been used as criteria to determine conservation value in the ecology assessment. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment (see Chapter 9: Hydrology, Geology and Hydrogeology).
- 7.5.10. A number of other habitats recorded within the Study Area are of local importance, some due to their listing as Annex I habitats or SBL Priority Habitats (see Technical Appendix A7.1). However, as they occupy such small areas within the Study Area, they are species-poor examples, and/or any direct or indirect effects on the habitat will not occur or will be negligible in magnitude (particularly due to assumptions detailed in Section 7.3) all effects on them are scoped out of the assessment. These habitats are broadleaved semi-natural woodland, dense/continuous scrub, and acid/neutral flush (see also Table 7.13).

## Aquatic Habitats and Species

- 7.5.11. Effects on aquatic habitats including standing water, running water and fisheries interests are scoped out of the assessment. Migratory salmonids are able to access the Proposed Development Area, although surveys carried out routinely in the catchment by CDSFB have shown that fish stocks appear at a depleted state, likely as a result of increased drought conditions in recent years. The Proposed Development has the potential to impact negatively on water quality and hydrogeomorphology in the absence of mitigation. However, to avoid direct or indirect impacts on these features a minimum 50 m buffer distance between infrastructure and watercourses has been maintained where possible (see Chapter 4: Site Design and Design Evolution). All turbines are outside this buffer, with some infrastructure inside the buffer by minimal distances in order to avoid areas of deeper peat, except where a watercourse crossing cannot be avoided (see Chapter 9: Hydrology, Geology and Hydrogeology). The design of

<sup>41</sup> NatureScot (2018). The handling of mitigation in Habitats Regulations Appraisal – the People Over Wind CJEU judgement. NatureScot Guidance Note. Available from - <https://www.nature.scot/doc/natura-case-work-guidance-how-consider-plans-and-projects-affecting-special-areas-conservation-sacs> [Accessed 01/08/2023]

permanent and temporary access track water crossings would comply with SEPA good practice guidance to minimise impacts on fish and their habitat. As detailed in Section 7.3, the embedded mitigation includes that construction work would comply with a CEMP developed by the Principal Contractor, which would be monitored by a suitably experienced ECoW. The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with SEPA best practice guidance. With this embedded mitigation in place, water pollution impacts and associated likely significant effects associated with the Proposed Development on watercourses and aquatic ecology, fish and Fresh Water Pearl Mussels (FWPM) are considered unlikely and therefore these pollution impacts are scoped out of further assessment.

- 7.5.12. Under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, Section 23<sup>42</sup>, it is an offence to injure or destroy any smolt, parr, salmon fry or alevin; injure or disturb any salmon spawn or disturb any spawning bed or any bank or shallow in which the spawn of salmon may be; or obstruct or impede salmon in their passage to any such bed, bank or shallow during the annual close season (October to February inclusive).
- 7.5.13. To comply with legislation and ensure protection of fish populations and no deterioration of water quality, the CEMP would ensure effective silt and pollution prevention.
- 7.5.14. It is assumed that no instream works will occur between October and the end of May on any watercourse containing suitable fish spawning substrates within the vicinity of the crossing locations without further survey and assessment by a fisheries consultant or an appropriately skilled ECoW in advance of works. Pollution prevention measures and a CEMP will also be implemented during construction and operation of the Proposed Development to ensure no adverse effects occur from pollution or sedimentation (see Technical Appendix A5.1 for outline CEMP and Embedded Mitigation).

### Protected Species

- 7.5.15. Effects on GCN, beaver, wildcat, brown hare, mountain hare, badger, pine marten, hedgehog (LBAP species), reptiles and red squirrel are scoped out of the assessment due to the absence of protected features, lack of suitable habitat, limited desk-based or field evidence within the Study Area (see Section 7.4 ), and/or lack of potential effects from the Proposed Development.
- 7.5.16. Effects on otter are scoped out, as described within Section 7.5.
- 7.5.17. Bats (roosting) are scoped out of the assessment. Whilst features with the potential to support roosting bats were identified, no key features capable of supporting maternity roosts, significant hibernation roosts and/or swarming sites within 200 m plus rotor radius have been detected. Analysis of the bat activity data referenced against known emergence times for high collision risk species was used to determine if a bat roost is likely to be close to the survey locations. It was found that although there were registrations indicative of a potential nearby roost, the numbers of bat passes recorded on any single night were low enough to suggest that the Proposed Development Area does not support many individuals.
- 7.5.18. Operational and cumulative effects arising from collision mortality for low collision risk bat species are scoped out of the assessment (as per NatureScot *et al.* 2021<sup>20</sup>). The genus-level classification *Myotis* spp. was the only low collision risk species recorded on site.
- 7.5.19. Effects on water vole are scoped out of the assessment. One potential water vole burrow and a potential water vole run were recorded in 2020, and seven potential burrows were recorded in 2015. However, no diagnostic field signs for water vole were recorded, so their presence at the Proposed Development Area cannot be confirmed. Desk study results suggest that water vole is likely to be present in the wider area, and there are some areas of

potentially suitable habitat along the larger watercourses within the Proposed Development Area (Loch Burn and Burn of Acharole), although the tributaries to these tend to be less suitable due to their flow variability, bank characteristics, and riparian vegetation. Unmitigated effects on water vole during construction could include direct injury/mortality of individuals, disturbance, and indirect effects on habitat or food supply e.g. through watercourse pollution. The SPP will outline best practice measures for minimising disturbance, including carrying out pre-construction surveys and monitoring, complying with protected species legislation, and outlining provisions for species licencing where this may be required. Small upland water vole populations are subject to dispersal and recolonization such that the presence and extent of populations can vary interannually. Given the distribution of suitable watercourses within the survey area and the mobile nature of water vole, and considering the lack of confirmed water vole presence, it is unlikely that there will be any operational effects of the Proposed Development on water vole. Thus, any direct or indirect effects on water vole arising from the Proposed Development are considered negligible and are not considered further.

- 7.5.20. Overall, the SPP will ensure that all reasonably practicable measures are taken during construction so that provisions of the relevant wildlife legislation are complied with in relation to all protected species, should any evidence of presence be found during pre-construction surveys.

### Other Species

#### Deer

- 7.5.21. Effects on deer are scoped out of the assessment. Roe, red and sika deer may be present in the local area, although the Proposed Development Area lies right on the edge of red deer range<sup>28</sup>. There are some areas of commercial forestry plantation present within the Proposed Development Area and, with the exception of keyholing for two potential wind turbines and associated infrastructure, it is not intended to fell this (detailed in Chapter 11: Forestry). Operational effects are not anticipated as there is no deer fencing around the Proposed Development and therefore deer may use and pass through uninhibited. The Proposed Development is relatively small and habitat loss has been minimised. Due to the extensive amount of similar suitable habitat in the surrounding land and its availability and accessibility, this loss of grazing and sheltering habitat is expected to be negligible to the wide-ranging species'. The size of the Proposed Development is not considered to pose a significant barrier to any local movements or migrations of deer. Construction effects, due to disturbance, are expected to be minimal due to the timing of works (primarily be in the day with deer more active during evening/nights) and short-term construction period (approximately 12 months). If individuals are displaced during construction, there are suitable routes around the Proposed Development which will not force deer into areas of risk, including public roads, or towards built-up areas. As a result of the size and location of the Proposed Development, temporary construction period, the retention of woodland, minimal habitat loss and the extensive suitable habitat and commuting corridors locally within the Proposed Development Area and beyond, no negative effects on deer are predicted. Due to minimal displacement expected outwith the Proposed Development Area during construction and operation, no negative effects, through increased browsing/trampling on surrounding habitats, including the Caithness and Sutherland Peatlands SAC, are expected.
- 7.5.22. A summary of the Nature Conservation Value of the remaining IEFs identified within the Proposed Development Area and surrounding area (as confirmed through survey results and consultation outlined above) which have been scoped-in to the assessment is given in Table 7.10 below, together with the justification for inclusion. These comprise blanket bog, wet modified bog and bats (high collision risk species: common pipistrelle, soprano pipistrelle, and Nathusius' pipistrelle).

<sup>42</sup> Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Available from - <https://www.legislation.gov.uk/asp/2003/15/section/23> [Accessed 01/08/2023]

Table 7.10: Nature Conservation Value of Scoped-in IEFs

IEF	Nature Conservation Value	Relevant Legislation/Guidance & Justification
Blanket Bog and Wet Modified Bog	Local	<p>The Development would result in direct and indirect habitat loss for blanket bog and wet modified bog habitats.</p> <p>Blanket bog covers 108.3 ha (21.28%) of the Study Area, whilst wet modified bog covers 22.81 ha (4.48%) (Table 7.11).</p> <p>The blanket bog communities present, including M17 and M19, tend to represent areas of relatively undamaged, active and better-quality bog with frequent to abundant Sphagna in the basal layer.</p> <p>Wet modified bog habitat present comprises the M25a sub-community and has a lower relative quality, with <i>Molinia caerulea</i> dominating the sward within the survey area.</p> <p>The habitats are associated with SBL blanket bog habitat with some areas also corresponding to Annex 1 type 7130 blanket bog habitat, including M17, M19, M20, M2 and M3 (where associated with M17-M20), and M25a where the peat depth is greater than 0.5 m.</p> <p>The Study Area contains small areas of Class 1 peatland from the SNH Carbon and Peatland Map (Figure 7.2). It is recognised that this definition is not solely for nature conservation and so not directly applicable to evaluating the value of a peatland. As per Figure 7.2, the majority of Class 1 peatland areas have been avoided for new infrastructure, with the exception of areas of track in the south-west corner.</p> <p>Despite some of these communities being associated with Annex I and SBL blanket bog classifications, the habitat within the Study Area is not considered to be Nationally or Regionally important due to its size, fragmented distribution, and quality and anthropogenic effects. Therefore, assigning a Nature Conservation Value higher than Local is not deemed appropriate. In addition, mire habitat of this quality (and greater) is relatively widespread across the local area as well as within Caithness and beyond, which further reduces the relative value of this habitat within the Study Area.</p>
Bats (high collision risk species: common pipistrelle, soprano pipistrelle, and Nathusius' pipistrelle)	Local	<p>All UK bat species are listed on Annex II of the Habitats Directive, and fully protected through the Conservation (Natural Habitats &amp;c.) Regulations 1994 (as amended) ('The Habitats Regulations'). Nine species are listed on the SBL and six species are also listed on the Highlands BAP<sup>10</sup> (including the three high collision risk species recorded within the Proposed Development Area: common pipistrelle, soprano pipistrelle, and Nathusius' pipistrelle).</p> <p>Common and soprano pipistrelle are considered to have a favourable conservation status in the UK and Scotland, under Article 17 of the Habitats Directive and are listed as Least Concern (LC) in Scotland under the IUCN Red List criteria<sup>43, 44</sup>. Nathusius' pipistrelle is listed as Vulnerable (VU) in Scotland under the IUCN Red List criteria, but there is insufficient data for</p>

IEF	Nature Conservation Value	Relevant Legislation/Guidance & Justification
		<p>the conservation status under Article 17 of the Habitats Directive to be assessed.</p> <p>The majority of bat activity (99.9 % in 2015, and 98.4% in 2020) was due to common pipistrelle bats which are considered to have a 'common' population relative abundance and are considered of 'medium' potential vulnerability<sup>20</sup>.</p> <p>Nathusius' pipistrelle are considered to have a 'rarest' population relative abundance with 'high' vulnerability<sup>20</sup>. It is considered however, that they may be considered rare, due to being under-recorded. Results from the National Nathusius' Pipistrelle Project<sup>45</sup> show very few results of individuals in Scotland so far. The species is a winter migrant in Scotland; although breed and remain year round in England<sup>46</sup>.</p> <p>Based on the availability of information, including a lack of high importance roost sites within the Proposed Development Area, and the large majority of species recorded within the Proposed Development Area being common pipistrelle, a Nature Conservation Value of Local is considered suitable.</p>

### Assumptions of the Assessment

- 7.5.23. The following assumptions are included in the assessment of otherwise unmitigated effects on IEFs:
- Work on the Proposed Development, including vegetation clearance and construction of new access tracks, turbine hardstandings and other ancillary infrastructure, erection of the turbines and site restoration is predicted to last for approximately 12 months.
  - All electrical cabling between turbines and the associated infrastructure would be underground in shallow trenches which would be reinstated post-construction and, in all cases, follow the access tracks.
  - The construction compound and any temporary laydowns or holding areas will be temporary infrastructure. Any disturbance or earthworks extents areas around permanent infrastructure during construction would be temporary and areas reinstated or restored before the construction phase ends. The only excavation in these areas would be for cabling as noted above and otherwise may only be periodically used for side-casting of spoil until reinstatement.
  - The embedded pre-construction and construction phase mitigation described in Embedded Mitigation above will be fully applied e.g., the presence of an ECoW, adherence to the agreed SPP and CEMP post-consent.

### Construction Effects

- 7.5.24. This Section provides an assessment of the likely effects of the construction of the Proposed Development upon the scoped-in IEFs.

<sup>43</sup> Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) A Review of the Population and Conservation Status of British Mammals: Technical Summary. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.

<sup>44</sup> <https://jncc.gov.uk/our-work/article-17-habitats-directive-report-2019-species/#regularly-occurring-species-vertebrate-species-mammals-terrestrial> [Accessed 01/08/2023]

<sup>45</sup> <https://www.bats.org.uk/our-work/national-bat-monitoring-programme/surveys/national-nathusius-pipistrelle-survey> [Accessed 01/08/2023]

<sup>46</sup> <https://www.bats.org.uk/our-work/in-scotland> [Accessed 01/08/2023]

### Predicted Construction Effects

- 7.5.25. The most tangible effect during construction of the Proposed Development would be direct habitat loss due to the construction of infrastructure such as new access tracks, turbines, hardstandings, laydown areas, compounds, substation and battery energy storage system (BESS). Much of this infrastructure would be permanent, however the temporary construction compound and earthworks would be restored at the end of construction.
- 7.5.26. There may also be some indirect habitat losses to wetland habitats due to drainage effects. For the purposes of this assessment, it is assumed that wetland habitat losses due to indirect drainage effects may extend out to 10 m from infrastructure (i.e., in keeping with indirect drainage assumptions within the carbon calculator guidance<sup>47</sup>). It is expected that any indirect drainage effects would only impact wetland habitats such as blanket bog, wet modified bog, wet heath, flushes etc. No indirect drainage effects are expected to impact or alter the quality or composition of non-wetland habitats, such as dry heath, bracken, acid grassland etc.; as such only direct habitat loss applies to those habitats.
- 7.5.27. Temporary habitat losses due to the creation of a temporary construction compound and earthworks have been calculated separately. These have been considered separately to permanent infrastructure as although these areas would be restored at the end of the construction period and therefore would not show a loss in habitat extent, the habitat type resulting after restoration may not be the same as the original due to changes in topographical or hydrological conditions. In particular, areas of land take for this temporary infrastructure may represent permanent losses for habitat types such as blanket bog/wet modified bog due to the effects on the structure and function of the habitat type, and the complexities and long timescales involved in restoring or re-creating these particular habitat types.
- 7.5.28. Table 7.11 details the estimated relative losses expected to occur for IEF habitats, for all new permanent and temporary infrastructure (with habitat loss estimated for all habitat types presented in Annex A, Table 7.13).

Table 7.11: Estimated Loss of IEF Habitats in Study Area for Permanent and Temporary Infrastructure

Phase 1 Habitat Type (Code)	Phase 1 Extent in Study Area (ha)	NVC Community Code or Habitat Type <sup>48</sup>	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of Phase 1 Type	Direct & Indirect Habitat Loss (ha) in Study Area	D&I Habitat Loss as a % of Phase 1 Type in Study Area
<b>Permanent</b>						
Blanket bog (E1.61.)	108.3	M17a, M19a, M20, M17c, M2b	2.85	2.64	6.02	5.56
Wet Modified Bog (E1.7)	22.81	M25a	0.26	1.12	0.56	2.44
<b>Temporary</b>						
Blanket bog (E1.61.)	108.3	M17a, M19a, M20, M17c, M2b	0.75	0.69	N/A	N/A
Wet Modified Bog (E1.7)	22.81	M25a	0.11	0.48	N/A	N/A

7.5.29. The following Sections assess the effect of these losses for each IEF scoped-in.

### Wet Modified Bog and Blanket Bog

- 7.5.30. **Effect:** Effects upon wet modified and blanket bog habitats will be direct (through permanent and temporary habitat loss) and indirect (through potential drying effects upon neighbouring bog habitats) occurring from the construction period into the operational period. Direct loss would occur in areas where permanent infrastructure such as access tracks, turbine foundations, and hardstandings are sited on these habitat types. The excavation of these habitat types for temporary infrastructure would also lead to the losses of blanket bog and wet modified bog due to the long-term effect on the ecological and hydrological structure and function of these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure (around 10 m from infrastructure is assumed) and disruption to hydrological flows.
- 7.5.31. Fragmentation could involve the creation of smaller areas of habitat which in turn could impair the functioning and reduce the resilience of essential hydrological processes. This could make the impacted habitat more vulnerable to future decline in condition and potentially lead to a transition to a different habitat type such as blanket bog to wet modified bog/wet heath or wet modified bog to dry modified bog/wet heath, or more subtle sub-community shifts.
- 7.5.32. For blanket bog and wet modified bog, fragmentation effects are a function of the extent of the hydrological unit, location of impact within the unit and magnitude of direct and indirect impact in the context of the hydrological unit. Figure 7.3 shows that blanket bog and wet modified bog habitats exist together and with other wetland habitats (e.g., mires, flushes and marshy grasslands) in large expansive hydrologically connected mosaics across the Study Area. The large scale of these wetland habitat mosaics reduces the likelihood that small, fragmented habitat patches would be created. No small-scale habitat fragments appear to be created by the location of tracks and other infrastructure, and where some wetland habitats are subject to infrastructure there are often floating tracks

<sup>47</sup> [https://informatics.sepa.org.uk/CarbonCalculator/assets/Carbon\\_calculator\\_User\\_Guidance.pdf](https://informatics.sepa.org.uk/CarbonCalculator/assets/Carbon_calculator_User_Guidance.pdf) [Accessed 01/08/2023]

<sup>48</sup> Only specific IEF habitats, communities or features subject to habitat losses are presented within this table. Any IEF communities not listed here are not subject to any predicted direct or indirect habitat losses. Full details of habitat losses for all habitat types are presented in Table 7.13.

that will allow the maintenance of sub-surface hydrological connectivity between areas. It is therefore unlikely that the potential effects of fragmentation would lead to further loss of blanket bog and wet modified bog in addition to that predicted to occur as a result of direct loss and precautionary indirect loss figures detailed above.

- 7.5.33. **Nature Conservation Value:** Local (as detailed in Table 7.10)
- 7.5.34. **Conservation Status:** Conservation Status of this habitat as assessed in the 2019 JNCC report by the UK on blanket bog is 'Unfavourable Bad' and 'Stable' at the UK level<sup>49</sup>.
- 7.5.35. **Magnitude of Effect:** The UK has an estimated 2,182,200 ha of blanket bog<sup>49</sup> of which around 1,759,000 to 1,800,000 ha is in Scotland<sup>50</sup> (approximately 23% of the land area<sup>51</sup>). Caithness and Sutherland contains large expanses of blanket bog, with more than 400,000 ha of blanket bog – the largest expanse of this habitat in Europe<sup>52</sup>.
- 7.5.36. Blanket bog covers 108.3 ha (21.28%) of the Study Area, of which the majority is composed of M17a and M19a (with M20, M17c and M2b also contributing). The direct habitat loss for blanket bog is predicted to be 2.85 ha due to permanent infrastructure, with up to an additional 0.75 ha due to temporary works areas (Annex A, Table 7.13). This results in a potential total direct loss of 3.6 ha, equivalent to 3.33% of the blanket bog within the Study Area.
- 7.5.37. Wet modified bog covers 22.81 ha (4.48 %) of the Study Area and is comprised of lower quality M25a. The direct habitat loss for wet modified bog is predicted to be 0.26 ha due to permanent infrastructure, with up to an additional 0.11 ha due to the temporary works areas (Annex A, Table 7.13). This results in a potential total direct loss of 0.37 ha, equivalent to 1.62 % of the wet modified bog within the Study Area.
- 7.5.38. For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog, direct losses amount to 3.11 ha for permanent infrastructure and 0.86 ha for temporary works areas infrastructure and earthworks extents: a total of 3.97 ha, or 3.03 % of the combined resource within the Proposed Development Area.
- 7.5.39. In addition, there may be some indirect losses because of the zone of drainage around infrastructure. The actual distance of the effects of drainage on a peatland is highly variable and depends on various factors such as the type of peatland and its characteristics and properties of the peat; the type, size distribution and frequency of drainage feature; and whether the drainage affects the acrotelm, penetrates the catotelm, or both. Consequently, drainage effects can be restricted to just a few metres around the feature or extend out to tens of metres, or further (e.g., see review within Landry & Rochefort (2012)<sup>53</sup>). The hydraulic conductivity of the peatland is one of the key variables which affect the extent of drainage. In general, less decomposed more fibric peatlands (which tend to be found commonly in fen type habitats) generally have a higher hydraulic conductivity and drainage effects can extend to around 50 m, whilst in more decomposed (less fibrous) peat drainage effects may only extend to around 2 m. Blanket bog habitats commonly are associated with more highly decomposed peats (Nayak *et al.* 2008<sup>54</sup>). For this assessment, indirect effects are assumed to extend out to 10 m from infrastructure<sup>47</sup>.
- 7.5.40. If indirect drainage effects are fully realised out to 10 m from in all blanket bog and wet modified bog areas, then predicted losses increase for blanket bog to 6.02 ha and for wet modified bog to 0.56 ha for permanent infrastructure. This worst-case scenario of direct and indirect habitat loss for permanent and temporary works areas is a total of 6.76 ha or 6.24 % of the Study Area for blanket bog and 0.67 ha or 2.92 % of the Study Area for wet modified bog. For this blanket mire resource as a whole, i.e., combining blanket bog and wet modified bog,

<sup>49</sup> <https://jncc.gov.uk/jncc-assets/Art17/H7130-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>50</sup> <https://jncc.gov.uk/jncc-assets/Art17/H7130-SC-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>51</sup> <https://www.nature.scot/landscapes-habitats-and-ecosystems/habitat-types/mountains-heaths-and-bogs/blanket-bog> [Accessed 01/08/2023]

<sup>52</sup> <https://www.theflowcountry.org.uk/flow-facts/> [Accessed 01/08/2023]

direct and indirect losses for permanent and temporary works areas amount to 7.43 ha, or 5.67 % of the combined resource within the Study Area.

- 7.5.41. It is considered unlikely that indirect drainage effects of this scale (i.e., out to 10 m either side of infrastructure) would occur or would have such an effect on the habitat as to result in any notable effect on the type of bog present or shifts to a lower conservation value habitat type (such as acid grassland for example). For instance, Stewart & Lance (1991)<sup>55</sup> in their study found that a lowering of the water table next to drains was slight and confined to just a few metres either side of the drain, on sloping ground the uphill zone of drawdown was even narrower. Subtle variations in plant species abundance were noted, with species dependent on high water-tables having a lower cover-abundance near to drains, and species with drier heathland affinities having higher cover than at places farther away. However, there were no wholesale changes in vegetation or the species assemblage; for instance, declines in *Sphagna* cover were highly localised and took nearly 20 years to achieve statistical significance.
- 7.5.42. Overall, evidence suggests that if some drainage effects materialise locally around infrastructure due to the Proposed Development the most likely effect will not be a major change in overall bog habitat type but rather a potential change in vegetation micro-topography, certain species cover, or abundance that may result in a subtle NVC community or sub-community shift, and which may only be apparent in the long term. If severe indirect drying effects are observed long term, then wet modified bog/blanket bog surface vegetation may transition to wet heath (e.g., NVC type M15), dry modified bog, or dry heath. Wet and dry heaths are still habitats of conservation interest, being Annex I, UKBAP and SBL Priority Habitats also.
- 7.5.43. When considering the scale of the above habitat losses (i.e., direct and indirect effects for permanent and temporary works areas on up to 5.67 % of the combined blanket bog and wet modified bog within the Study Area), and accounting for the relative abundance, distribution and quality of the wet modified bog and blanket bog within the Proposed Development Area, an effect magnitude of **Low spatial** and **Long-Term temporal** is appropriate.
- 7.5.44. **Significance of Effect:** Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude of Effect, the significance of effect is considered to be **Minor adverse** and **Not Significant**.

## Operational Effects

- 7.5.45. This Section provides an assessment of the likely effects of the operation of the Proposed Development upon the scoped-in IEFs.

## Predicted Operational Effects

### Habitats

- 7.5.46. All likely direct and indirect effects on habitats have been considered in the Construction Effects section above.
- 7.5.47. Although the majority of habitat loss is associated with infrastructure required for the operation of the Proposed Development (rather than temporary construction infrastructure), the physical loss of habitat would occur during the construction stage and is therefore considered above.

<sup>53</sup> Landry, J. & Rochefort, L. (2012). The Drainage of Peatlands: Impacts and Rewetting Techniques. Peatland Ecology Research Group, Université Laval, Quebec.

<sup>54</sup> Nayak, R.A., Miller, D., Nolan, A., Smith, P., Smith, J. (2008). Calculating carbon savings from wind farms on Scottish peat lands - A New Approach.

<sup>55</sup> Stewart, A.J.A. & Lance, A.N. (1991). Effects of Moor Draining on the Hydrology and Vegetation of Northern Pennine Blanket Bog. *Journal of Applied Ecology* 28: 1105-1117.

7.5.48. Indirect effects on wetland habitats would largely occur during the operational phase as potential drying effects become established. However, for ease and clarity of assessing effects on habitats these are considered together in Construction Effects.

### Bats

- 7.5.49. **Effect:** During the operational phase, there is potential for collision risk upon commuting and foraging bat species, together with the risk that bats may be affected by barotrauma when flying in close proximity to moving turbine blades. For the purposes of this assessment, the potential effects from barotrauma are assumed to be the same as for collision risk. This is due to the lack of published empirical evidence in causes of bat fatalities around wind farms and the difficulties in determining whether bat fatalities are due to strikes (collisions) with the turbine blades or barotrauma.
- 7.5.50. Research undertaken by Exeter University (DEFRA, 2016<sup>56</sup>) found that most bat fatalities at UK wind farms have been common pipistrelle, soprano pipistrelle and noctule bats. Further work (Richardson *et al.*, 2021<sup>57</sup>) found that common pipistrelle activity was higher at turbine locations than at control locations in similar habitat, suggesting that this species may be at particular risk. In the same study soprano pipistrelle activity was comparable between sites with no attraction or repulsion by turbines. It is suggested the observed higher levels of activity could be because there are more individual bats around turbines, or because bats spend more time in these locations relative to controls, even if the number of individual bats remains the same; however, it is not possible to distinguish between these possibilities using acoustic bat data.
- 7.5.51. There is less information available on the status of Nathusius' pipistrelle in the UK. Europe-wide, Nathusius' pipistrelle are one of three species accounting for 70% of recorded deaths at wind farms in northern Europe<sup>58</sup>. Nathusius' pipistrelles are long-distance migrants, and there is some suggestion that juveniles are more vulnerable to mortality at wind turbines, particularly where the density of turbines in an area is low<sup>59</sup>.
- 7.5.52. Because the proposed turbines have a blade tip height exceeding 150m, they will require red aviation warning lights. A five-year study by Spoelstra *et al.* (2017)<sup>60</sup> concluded that foraging bats are not attracted to red lighting. The reason for this is that white and green spectrum lights attract foraging insects whilst red lights do not. Based on this, Spoelstra *et al.* (2017) advised, "Hence, in order to limit the negative impact of light at night on bats, white and green light should be avoided in or close to natural habitat, but red lights may be used if illumination is needed". A study by Voight *et al.* (2018)<sup>61</sup> found evidence of attraction of migratory Soprano pipistrelle to red lighting. Soprano pipistrelles do not migrate in the UK as they do in continental Europe, so this finding is not relevant to the Proposed Development. However, the explanation for contrasting findings by Spoelstra *et al.*<sup>60</sup> is that "migratory bats may be more susceptible to light sources of specific wavelength spectra because vision may play a more

dominant role than echolocation during migration. Non-migratory bats might use orientation cues that are more involved during general hunting behaviour, for example, echoes reflected from local landmarks, instead of cues from natural or artificial light sources".

- 7.5.53. **Nature Conservation Value:** Local (as detailed in Table 7.10).
- 7.5.54. **Conservation Status:** Common pipistrelle are assessed in the 2019 JNCC report as 'Favourable' and 'Improving' at the UK level<sup>62</sup>; soprano pipistrelle are assessed as 'Favourable' and 'Stable' at the UK level<sup>63</sup>; there is insufficient data for the conservation status of Nathusius' pipistrelle to be assessed under Article 17 of the Habitats Directive<sup>64</sup>. Mathews *et al.* 2018 consider common and soprano pipistrelle species to have a favourable Conservation Status<sup>43</sup>.
- 7.5.55. Population estimates of common pipistrelle in the 2019 Article 17 of the UK Habitats Directive Reports estimates the population range to be from 1,100,600 to 7,843,000 in the UK<sup>62</sup> and from 285,000 to 2,160,000 in Scotland<sup>65</sup> although best single value estimates are not provided due to the uncertainty around population estimates. Matthews *et al.* (2018)<sup>43</sup> provided a UK estimate of 3,040,000 for common pipistrelle (with a plausible range of 991,000 – 7,510,000); population estimates for Scotland were not provided in that review.
- 7.5.56. Population estimates of soprano pipistrelle in the 2019 Article 17 of the UK Habitats Directive Reports estimates the population range to be from 2,024,000 to 8,563,000 in the UK<sup>63</sup> and from 512,000 to 2,180,000 in Scotland<sup>66</sup>, although best single value estimates are not provided due to the uncertainty around population estimates. Matthews *et al.* (2018)<sup>43</sup> provided a UK estimate of 4,670,000 for soprano pipistrelle (with a plausible range of 970,000 – 8,400,000); population estimates for Scotland were not provided in that review.
- 7.5.57. There is insufficient data to estimate the population range for Nathusius' pipistrelle.
- 7.5.58. **Magnitude of Effect:** Evaluating the vulnerability of a bat population to wind farms is based on three factors; activity level recorded, population vulnerability (determined by collision risk of species and population size) and site risk level. These factors are multiplied to generate an overall risk assessment score per species of either Low (0-4) Moderate (5-12) or High (15-25) in line with guidance<sup>20</sup>. Technical Appendix A7.3 presents the results of this risk assessment for each high collision risk species and provides detailed results from the Ecobat analysis. Figures 7.7 to 7.11 also present the spatial and temporal risk categories for high risk species, based on the results of the monitoring undertaken at locations across the Proposed Development Area in 2020 and 2015. A summary is provided below to inform the assessment.
- 7.5.59. Average site activity levels (median and maximum percentiles) were recorded for the following high collision risk bat species:
- Common pipistrelle: Moderate (median) to High (maximum) (2020 and 2015); and

<sup>56</sup> DEFRA (2016). *Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management*. University of Exeter

<sup>57</sup> Richardson, S.M., Lintott, P.R., Hosken, D.J., Economou, T. and Mathews, F. (2021). *Peaks in bat activity at turbines and the implications for mitigating the impact of wind energy developments on bats*. Sci Rep. 11, 3636.

<sup>58</sup> Arneet, E.b., Baerwald, E.F., Mathews, F., Rodrigues, L., Rodríguez-Durán, A., Rydell, J., Vellegas-Patraca, R. and Voigt, C.C. (2015). *Impacts of Wind Energy Development on Bats: A Global Perspective*. In: Voigt, D., Kingston, T. (eds) *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham.

<sup>59</sup> Krusynski, C., Bailey, L.D., Bach, L., Bach P., Fritze, M., Lindecke, O., Teige, T., Voigt, C.C. (2021). *High vulnerability of juvenile Nathusius' pipistrelle bats (Pipistrellus nathusii) at wind turbines*. Ecological Applications, 32, 2.

<sup>60</sup> Spoelstra, K., van Grunsven, R. H. A., Ramakers, J. J. C., Ferguson, K. B., Raap, T., Donners, M., Visser, M. E. (2017). Response of bats to light with different spectra: Light-shy and agile bat presence is affected by white and green, but not red light. *Proceedings Royal Publishing B*, 284, 20170075.

<sup>61</sup> Voigt, C.C., Rehnig, K., Lindecke, O., Pētersons, G. (2018) Migratory bats are attracted by red light but not by warm white light: Implications for the protection of nocturnal migrants. *Ecology and Evolution*. 2018;8:9353–9361.

<sup>62</sup> JNCC. S3109 – Common Pipistrelle (*Pipistrellus pipistrellus*). Available from - <https://jncc.gov.uk/jncc-assets/Art17/S1309-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>63</sup> JNCC. S5009 – Soprano pipistrelle (*Pipistrellus pygmaeus*). Available from - <https://jncc.gov.uk/jncc-assets/Art17/S5009-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>64</sup> JNCC. S1317 – Nathusius' pipistrelle (*Pipistrellus nathusii*). Available from - <https://jncc.gov.uk/jncc-assets/Art17/S1317-UK-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>65</sup> JNCC. S1309 – Common Pipistrelle (*Pipistrellus pipistrellus*). Available from - <https://jncc.gov.uk/jncc-assets/Art17/S1309-SC-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

<sup>66</sup> JNCC. S5009 – Soprano pipistrelle (*Pipistrellus pygmaeus*). Available from - <https://jncc.gov.uk/jncc-assets/Art17/S5009-SC-Habitats-Directive-Art17-2019.pdf> [Accessed 01/08/2023]

- Soprano pipistrelle: Low-Moderate (median) to Moderate (maximum) (2020), and Low-Moderate (median and maximum) (2015); and
  - Nathusius' pipistrelle: Low (median) to Moderate-High (maximum) (2020), not recorded in 2015.
- 7.5.60. Due to having a 'high' collision risk and a 'common' population abundance rating, common and soprano pipistrelle bats are classified as having 'medium' population vulnerability. With a 'high' collision risk' and 'rarest' population abundance rating, Nathusius' pipistrelle are classified as having 'high' population vulnerability.
- 7.5.61. The Proposed Development Area has been categorised as a 'low' site risk to bats due to its 'small' project size and 'moderate' habitat risk (see Technical Appendix A7.3).
- 7.5.62. The following overall collision risk assessment score of 'Median' and 'Maximum' percentiles was obtained for high collision risk species:
- Common pipistrelle: medium (6) (median) to medium (10) (maximum) (2020 and 2015); and
  - Soprano pipistrelle: low (4) (median) to medium (6) (maximum) (2020), and low (4) (median) to low (4) (maximum) (2015), and
  - Nathusius' pipistrelle: low (2) (median) to medium (8) (maximum) (2020), not recorded in 2015.
- 7.5.63. Figures 7.7 to 7.11 display the risk assessment categories per month and per Anabat based on the median percentile for the Study Area. As can be seen in these figures, the risk level varied temporally and spatially between May and October for each species, with August and September generally being the months with greatest bat activity across the Proposed Development Area in 2020, and July in 2015 (Technical Appendix A7.3). The figures also show there were no 'High' risk locations evident within the Study Area for any high risk species.
- 7.5.64. The embedded mitigation described in Section 7.3.40 with respect to bats, namely reduced rotor speed when idling, will be implemented throughout operation during the bat active period (April to October), reducing the risk of bat fatalities. The guidance<sup>20</sup> notes that, "*The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50%*". The presence of this mitigation measure has been taken into account when assigning the Significance of Effect.
- 7.5.65. Further context on each high collision risk species is provided below.
- 7.5.66. Common pipistrelle: no 'high' risk locations were identified in 2020 within the Proposed Development Area for common pipistrelle in any month during the July to October deployment period. Using the median percentile, locations 1, 2, 3, 4, 5, 6, 9 and 10 were 'medium' risk during at least one month recorded. August and September were most frequently the months where a 'medium' risk level was recorded at a location. An effect magnitude of **Low spatial** and **Long term temporal** is considered appropriate for common pipistrelle.
- 7.5.67. Soprano pipistrelle: no 'high' risk locations were identified in 2020 within the Proposed Development Area for soprano pipistrelle in any month during the July to October deployment period. Using the median percentile, location 3 was 'medium' risk for the species in October. All other locations were of 'low' risk (location 1) or returned no bat activity (all other locations). An effect magnitude of **Low spatial** and **Long term temporal** is considered appropriate for soprano pipistrelle.
- 7.5.68. Nathusius' pipistrelle: no 'high' risk locations were identified in 2020 within the Proposed Development Area for Nathusius' pipistrelle in any month during the July to October deployment period. Using the median percentile, locations 1, 3 and 6 were 'medium' risk for the species, with this being in September for locations 3 and 6 and October for locations 1 and 3. All other locations were of 'low' risk or returned no bat activity. An effect magnitude of **Low spatial** and **Long term temporal** is considered appropriate for Nathusius' pipistrelle.

- 7.5.69. **Significance of Effect:** Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude, the effect significance of collision risk on all high collision risk bat species recorded in the Study Area is considered **Minor Adverse** and **Not Significant** in the context of the EIA Regulations.

## Decommissioning Effects

- 7.5.70. Due to the distant time frame until their occurrence (>35 years), decommissioning effects are difficult to predict with confidence. In general decommissioning effects are usually considered for the purposes of assessment to be similar to (or likely less than) those of construction effects in nature and are likely to be of shorter duration. A method statement would be prepared and agreed with the relevant statutory consultees prior to decommissioning of the Proposed Development which would include the need for pre-works surveys.
- 7.5.71. The decommissioning of the Proposed Development would involve the removal of turbines, transformers and upper section of turbine foundations, along with restoration of the associated ground (detailed in Chapter 5: Project Description). Restoration would seek to return areas to their pre-construction habitat type, or as similar as feasible depending on local substrates, topography, hydrology etc. As a result, the decommissioning phase will not lead to any further direct or indirect habitat losses.

## 7.6. Cumulative Effect Assessment

- 7.6.1. The primary concern regarding the assessment of cumulative effects is to identify situations where effects on habitats or species populations that may be non-significant from individual developments, are judged to be significant when combined with nearby existing or proposed projects that are subject to an EIA process. In the interests of focusing on the potential for similar significant effects, this assessment considers the potential for cumulative effects with other wind farm developments, including those that are operational, under construction, consented or at application stage. Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.
- 7.6.2. Small projects with three or fewer turbines have also been excluded from the cumulative assessment as often these projects are not subject to the same level of detail of assessment, and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IEFs assessed.
- 7.6.3. The following wind farm developments are situated or proposed to be situated within 5 km of the Proposed Development Area, and fulfil the criteria outlined above:
- Halsary (Operational) 15 turbines;
  - Bad a' Cheò (Operational) 13 turbines;
  - Causeymire (Under Construction) 21 turbines;
  - Achlachan (Operational) Five turbines;
  - Camster (Operational) 25 turbines;
  - Camster II (Consented) 11 turbines;
  - Wathegar (Operational) Five turbines; and
  - Wathegar 2 (Operational) Nine turbines.



## Predicted Cumulative Construction Effects

- 7.6.4. Blanket bog and wet modified bog have been scoped-out of the cumulative assessment as it is considered unlikely that any significant ecological cumulative effects at a local or regional level will arise as a consequence of the Proposed Development adding to habitat loss associated with other projects (this applies to both the construction phase and also any limited drainage effects which may continue into the operational phase).
- 7.6.5. In general, for wind farm developments where peatland habitats are present or affected, mitigation and/or additional restoration/enhancement/creation of peatland and upland habitats is proposed to compensate and offset any effects. Mitigation and enhancement areas also tend to be larger or many orders of magnitude greater than the area of predicted loss. For example, documentation submitted as part of the adjacent Halsary Wind Farm application (Scottish Power Renewables, 2012a<sup>67</sup>) suggested that 604.6 ha of commercial forestry would be restored to priority peatland habitat, with the Environmental Statement for this development concluding a residual effect of Major Positive for blanket bog following mitigation (Scottish Power Renewables 2009<sup>68</sup>, 2012b<sup>69</sup>). Similarly, the assessment for Bad a'Cheò Wind Farm looked at cumulative impacts with Causeymire and Halsary wind farms, and concluded there was no potential identified for significant negative cumulative impacts, but there was expected to be significant positive cumulative impacts on blanket bog habitat in the local area for Bad a'Cheò and Causeymire due to the commitment to compensation and habitat improvements<sup>70</sup>. In addition to those noted above, blanket bog and upland habitat improvement and restoration is being undertaken, or planned, at multiple sites locally and regionally. Similar habitat enhancement would also be undertaken at the Proposed Development through the delivery of the OBEMP (see Technical Appendix A7.6).
- 7.6.6. Therefore, all scoped-in IEFs considered above (i.e., blanket bog and wet modified bog) have been scoped out of the cumulative assessment as it is considered unlikely that any significant residual cumulative effects at a local or regional level would arise as a consequence of the Proposed Development adding to habitat loss associated with other projects. This applies to both the construction period and also any limited drainage effects which may continue into the operational period. This is due to the small nature of habitat losses associated with the Proposed Development (see Table 7.13) and the Applicant's commitment to the delivery of an OBEMP for the Proposed Development which will include provisions for the maintenance, restoration and/or enhancement of peatland and upland habitats within the Proposed Development Area. As such, no adverse cumulative effects are predicted.
- 7.6.7. Overall, despite direct habitat loss in the short-term, the long-term cumulative enhancement and restoration of peatland and upland habitats in the region should lead to a longer-term increase in the extent, and in many cases quality, of bog and associated upland habitats.

## Predicted Cumulative Operational Effects

- 7.6.8. Bats may be affected by cumulative wind farm developments because of the distances travelled by some species of foraging bat and the cumulative risks to bat populations as a result of barotrauma and/or collision with wind turbines during operation. High collision risk species recorded at the Proposed Development Area were common, soprano and Nathusius' pipistrelle. These species are all considered here to be of Local Nature Conservation Value (as detailed in Table 7.10).

- 7.6.9. Bat activity across all wind farm sites within 5 km of the Proposed Development Area was low, and no significant effects on bats from projects were predicted:
- Halsary wind farm recorded very low levels of bat activity and, with the planned felling as part of the construction phase, concluded that there was unlikely to be any collision risk between bats and turbines<sup>68</sup>.
  - Bad a' Cheò recorded no suitable features for roosting bats within the Proposed Development Area and only low levels of bat activity were recorded during surveys (only single passes of common pipistrelle)<sup>70</sup>.
  - Causeymire – no bats surveys were carried out, but exposed site makes it likely to be similar to others<sup>71</sup>;
  - Achlachan wind farm recorded low levels of bat activity during baseline surveys<sup>72</sup>;
  - Camster II wind farm surveys recorded overall low levels of activity and very low species diversity (only common and soprano pipistrelle recorded)<sup>73</sup>; and
  - Wathegar 2 wind farm considered habitats to be suboptimal for bats, with low numbers of bats recorded<sup>74</sup>.
- 7.6.10. It is predicted that any cumulative effects that may materialise as a result of the Proposed Development are considered to be of **Low spatial** and **Long term temporal** magnitude, based on the following rationale:
- The low activity and no significant effects assessed at cumulative developments within 5 km (i.e. within typical *Pipistrelle* spp. foraging distances);
  - The now-standard applications of embedded mitigation in the form of 50 m buffer distances between turbines and habitat features such as forest edges, to minimise effects on foraging bats, and the adoption of reduced rotor speed when idling;
  - The minor adverse and non-significant effect of the Proposed Development; and
  - The Low-Medium risk assessment scores for all species.

## 7.7. Mitigation and Residual Effects

### Mitigation

#### Construction Phase

- 7.7.1. General and embedded mitigation measures for habitats, such as complying with best practice, micro-siting, presence of an ECoW and adherence with a detailed CEMP are included in Embedded Mitigation.
- 7.7.2. No significant construction effects were identified, and no non-standard mitigation is proposed for the Construction Phase. Enhancement and restoration of habitats through the delivery of a BEMP would reduce effects on habitats further. The BEMP will include provisions for the maintenance, restoration and/or enhancement of bog habitats and other upland habitats within the Proposed Development Area, as detailed in the outline BEMP (Technical Appendix A7.6). The detailed BEMP would be agreed with the Local Authority and NatureScot in advance of construction.

<sup>67</sup> Scottish Power Renewables (2012). *Technical Appendix A8.1: Integrated Forestry Redesign, Habitat Restoration and Peat Reuse Strategy*. Halsary Windfarm Environmental Statement Addendum.

<sup>68</sup> Scottish Power Renewables (2009). *Chapter 08 Ecology*. Environmental Statement Volume 1. Halsary Windfarm Environmental Statement.

<sup>69</sup> Scottish Power Renewables (2012). *A8 Ecology*. Halsary Windfarm Environmental Statement Addendum Volume 1.

<sup>70</sup> RWE (2012). Bad a' Cheò Wind Farm, Environmental Statement.

<sup>71</sup> Beaufort Wind Limited (2021).

<sup>72</sup> Whirlwind Renewables (2012). *Achlachan Wind Farm Ecology Environmental Statement*. Volume 4, Appendix 9.1.

<sup>73</sup> E.ON (2019). Camster II Wind Farm, Environmental Impact Assessment Report. Volume 2a: Main Report.

<sup>74</sup> Whirlwind Renewables (2011). Wathegar 2 Wind Farm, Volume 1: Environmental Statement.

### Operational Phase

- 7.7.3. Bats are the only IEF scoped-in to the assessment of potential operational effects, and mitigation during operation is detailed in Section 7.3.40 – this embedded mitigation has been considered as part of the assessment. No significant operational effects were identified, and no non-standard mitigation is proposed.
- 7.7.4. Creation of riparian woodland habitat through the delivery of a BEMP, as detailed in the OBEMP (Technical Appendix A7.6), would create and enhance bat foraging and commuting habitat along watercourses within the Proposed Development Area.

### Decommissioning Phase

- 7.7.5. None proposed.

### Residual Effects

- 7.7.6. No significant effects identified with all scoped-in IEFs remaining as Minor adverse, or less, and Not Significant (as per Sections 7.5.44 and 7.5.69).

## 7.8. Summary of Effects

- 7.8.1. Table 7.12 provides a summary of the effects detailed within this chapter.

Table 7.12: Summary of Effects

IEF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
<b>Construction Phase</b>				
Blanket bog and wet modified bog	Direct and indirect habitat loss	Minor adverse – Not significant	In addition to embedded mitigation, the implementation of a BEMP which includes bog and upland habitat restoration.	Minor adverse – Not significant
<b>Operational Phase</b>				
High collision risk bat species	Fatality through barotrauma or collision	Minor adverse – Not significant	In addition to embedded mitigation (i.e., maintenance of a 50 m buffer from turbine blade tip to feature height and feathering whilst idling), proposals for riparian planting within the Proposed Development Area included as part of biodiversity enhancements detailed in the OBEMP (Technical Appendix A7.6) would create and improve bat foraging habitat and corridors.	Minor adverse – Not significant
<b>Decommissioning</b>				
None identified; potentially positive effect with restoration of habitats.				
<b>Cumulative</b>				
None identified				

## 7.9. Statement of Significance

- 7.9.1. For all IEFs assessed above, the predicted residual levels of significance of effects during the construction, operational and decommissioning phases of the Proposed Development, alone or cumulatively with other projects, are considered to be no more than Minor adverse and therefore Not Significant.

## 7.10. Biodiversity Enhancement

- 7.10.1. In line with NPF4<sup>4</sup>, the Onshore Wind Policy Statement<sup>75</sup>, and the Scottish Biodiversity Strategy to 2045<sup>76</sup>, consideration has been given to how the Proposed Development can deliver significant enhancements to biodiversity over its lifetime.
- 7.10.2. The OBEMP (Technical Appendix A7.6) for the Proposed Development proposes measures which would provide enhancements to biodiversity in addition to their role in mitigating for impacts that may occur as a result of the Proposed Development’s construction, operation or decommissioning. A BNG toolkit has been used to quantify the biodiversity value of habitats with the Proposed Development Area and demonstrates net positive enhancements for biodiversity following implementation of the BEMP, as detailed in Technical Appendix A7.6.
- 7.10.3. One measure that will be implemented is riparian planting, consisting of low-density planting of native broadleaved species along watercourses where the peat depth is less than 0.5 m. Riparian planting of this type is considered to benefit biodiversity in a number of ways:
  - Provision of features that could be used by otter and other species as shelter along watercourses that are currently open and lack such suitable habitat;
  - Provision of commuting corridors along watercourses, enhancing habitat connectivity;
  - Shading of watercourses, aiding temperature regulation of watercourses and improving aquatic health;
  - Visual screening of the watercourse to avoid impacts on salmonids resulting from visual disturbance from moving turbine blades;
  - Increase of botanical diversity through planting of a range of native species, decreasing homogeneity of habitat types; and
  - Improvement to water quality through reduction in bank erosion, flooding risk and diffuse pollutants (further detailed in Chapter 9: Hydrology, Geology and Hydrogeology).
- 7.10.4. Drain blocking will form the basis of peatland restoration associated with the Proposed Development. Blocking drainage channels encourages water retention, and thereby allows blanket bog species to recolonise, which would in turn provide improved habitats for breeding waders and raptor prey (refer to Chapter 8: Ornithology). This will provide an enhancement to biodiversity. Furthermore, maintenance and restoration of peat habitats prevents the loss of carbon to the atmosphere, an important factor in controlling climate change, and helps to improve water quality and ameliorate flood events in surrounding watercourses.
- 7.10.5. Measures to create and maintain areas highly suitable for use by wading birds and raptors are detailed further in Chapter 8: Ornithology; these measures will also provide an enhancement to biodiversity from an ecology standpoint. Through the management of grazing intensity and timing, a greater diversity of plants will be able to establish.

<sup>75</sup> Scottish Government (2022). Onshore wind: policy statement 2022.

<sup>76</sup> Scottish Government (2022). Biodiversity strategy to 2045: tackling the nature emergency.

## 7.11. Non-Technical Summary

- 7.11.1. Chapter 7 considers the potential effects of the Proposed Development on non-avian ecology including designated sites, terrestrial and aquatic habitats, and protected species. The Chapter is supported by the following Appendices: A7.1 National Vegetation Classification and Habitats Survey Report; A7.2 Protected Species Survey Report; A7.3 Bat Survey Report; A7.4 Fisheries Survey Report; A7.5 Outline Species Protection Plan; and A7.6 Outline Biodiversity Enhancement Management Plan.
- 7.11.2. The assessment is based on best practice guidance including the Chartered Institute for Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland.
- 7.11.3. The scope of the ecological assessment and baseline conditions were determined through a combination of desk study, targeted surveys, and consultation with relevant nature conservation organisations.
- 7.11.4. This process established ecological features that could potentially be affected by the Proposed Development. No potential effects on statutory designated sites or ancient woodland were identified. In terms of habitats, the Proposed Development Area comprises upland and mire habitats, predominately including blanket bog, marshy grassland, acid grassland, as well as coniferous plantation. Specific surveys were also undertaken for a range of protected species. Evidence of bats, otter, pine marten, and water vole (potential) were recorded within and around the Proposed Development Area. Atlantic salmon, brown trout and European eel were recorded within watercourses surveyed in relation to the Proposed Development Area.
- 7.11.5. The Proposed Development has been designed to minimise impacts on important habitats, peatland and protected species as far as practicable. This has been achieved through embedded mitigation and the iterative design process. This process, combined with further commitments to certain mitigation measures pre-construction, during construction, and during operation allowed potential effects on several habitats and species present to be scoped-out of the assessment.
- 7.11.6. The following Important Ecological Features (IEFs) were taken forward to the assessment stage: blanket bog and wet modified bog, and high collision risk bat species (common pipistrelle, soprano pipistrelle and Nathusius' pipistrelle).
- 7.11.7. Assessment of potential effects and their significance were determined through consideration of the sensitivity of the feature and the magnitude of change. The most tangible effect during construction of the Proposed Development on blanket bog and wet modified bog would be direct habitat loss due to the construction of infrastructure, in addition to some indirect drainage effects. The assessment concluded that there would be a Minor adverse and Not Significant effect on blanket bog and wet modified bog. The effect of collision risk on populations of bat species was assessed by reviewing activity level recorded, population vulnerability and Site risk level in line with relevant guidance; all three high collision risk species recorded were calculated to have an overall collision risk assessment score of Low to Medium (based on median and maximum percentiles respectively) and concluded that effects would be Minor adverse and Not Significant.
- 7.11.8. No significant decommissioning or cumulative effects were identified.
- 7.11.9. A Biodiversity Enhancement Management Plan (BEMP) for the Proposed Development would be developed to further mitigate the effects on blanket bog and wet modified bog and to provide additional enhancement at the Proposed Development Area to meet 'significant biodiversity enhancements' that are a requirement of National Planning Framework 4. An outline BEMP is included. With the implementation of the BEMP, adverse effects on wet modified bog and blanket bog would be expected to reduce further through the restoration and enhancement of habitats.

## Annex A

Table 7.13: Habitat Baseline Composition and Habitat Loss Calculations for Study Area/Proposed Development Area

Phase 1 Description (Code)	NVC	Study Area (Baseline)				Permanent Direct Loss		Permanent Indirect Loss (only applies to Wetland Habitats) <sup>77</sup>		Permanent Direct + Indirect Loss		Temporary Direct Loss	
		Phase 1 Area (ha)	Phase 1 % of Study Area	NVC Area (ha)	% of NVC Type within Study Area	NVC Area (ha)	% Loss of Phase 1 Type within Study area	NVC Area (ha)	% Loss of Phase 1 Type within Study area	NVC Area (ha)	% Loss of Phase 1 Type within Study Area	NVC Area (ha)	% Loss of Phase 1 Type within Study Area
<b>Grand Totals</b>		<b>508.918</b>	<b>100.00%</b>	<b>508.918</b>	<b>100.00%</b>	<b>8.521</b>		<b>4.825</b>		<b>13.346</b>		<b>2.707</b>	
Broadleaved Semi-Natural Woodland (A1.1.1)	W7	0.294	0.06%	0.294	0.06%	0.039	13.37%			0.039	13.37%	0.011	3.84%
Broadleaved Plantation Woodland (A1.1.2)	BP	0.875	0.17%	0.875	0.17%			0.000	0.00%			0.000	0.00%
Coniferous Plantation Woodland (A1.2.2)	CP	73.298	14.40%	73.298	14.40%	0.928	1.27%	0.000	0.00%	0.928	1.27%	0.230	0.31%
Dense/Continuous Scrub (A2.1)	W23	0.978	0.19%	0.978	0.19%			0.000	0.00%			0.000	0.00%
Unimproved Acid Grassland (B1.1)	U4d	96.298	18.92%	65.444	12.86%	0.860	0.93%	0.000	0.00%	0.860	0.93%	0.216	0.24%
	U4a			16.320	3.21%	0.038		0.000		0.038		0.012	
	U4			13.752	2.70%			0.000				0.000	
	U6d			0.469	0.09%			0.000				0.000	
	U6a			0.314	0.06%			0.000				0.000	
Semi-Improved Acid Grassland (B1.2)	U4b	61.948	12.17%	61.948	12.17%	1.689	2.73%	0.000	0.00%	1.689	2.73%	0.734	1.18%
Unimproved Neutral Grassland (B2.1)	MG9a	3.584	0.70%	3.584	0.70%	0.130	3.63%	0.096	2.67%	0.226	6.31%	0.027	0.76%
Improved Grassland (B4)	MG6a	17.292	3.40%	17.292	3.40%			0.000	0.00%			0.000	0.00%
Marsh/Marshy Grassland (B5)	MG10a	89.528	17.59%	68.326	13.43%	1.395	1.91%	0.997	1.41%	2.392	3.32%	0.506	0.68%
	M23b			14.785	2.91%	0.310		0.258		0.568		0.098	
	M25b			3.828	0.75%			0.000				0.000	
	M23a			0.050	0.01%			0.000				0.000	
	MG10c			2.221	0.44%	0.003		0.004		0.008		0.001	
	M27c			0.318	0.06%			0.000				0.000	
Continuous Bracken (C1.1)	U20a	0.548	0.11%	0.548	0.11%			0.000	0.00%			0.000	0.00%
Blanket Bog (E1.6.1)	M17a	108.298	21.28%	29.990	5.89%	1.415	2.64%	1.778	2.92%	3.193	5.56%	0.423	0.69%
	M19a			42.674	8.39%	0.937		0.543		1.480		0.131	
	M20			20.669	4.06%	0.215		0.281		0.496		0.096	
	M17c			13.795	2.71%	0.274		0.544		0.818		0.090	
	M2b			1.169	0.23%	0.013		0.017		0.030		0.006	
Wet Modified Bog (E1.7)	M25a	22.814	4.48%	22.814	4.48%	0.256	1.12%	0.301	1.32%	0.557	2.44%	0.110	0.48%
Acid Neutral Flush (E2.1)	M6a	30.630	6.02%	27.726	5.45%		0.01%	0.000	0.02%		0.03%	0.000	0.01%
	M6c			2.326	0.46%	0.004		0.006		0.010		0.002	
	M4			0.579	0.11%			0.000				0.000	

<sup>77</sup> Based upon the precautionary 10 m indirect drainage assumption.

Phase 1 Description (Code)	NVC	Study Area (Baseline)				Permanent Direct Loss		Permanent Indirect Loss (only applies to Wetland Habitats) <sup>77</sup>		Permanent Direct + Indirect Loss		Temporary Direct Loss	
		Phase 1 Area (ha)	Phase 1 % of Study Area	NVC Area (ha)	% of NVC Type within Study Area	NVC Area (ha)	% Loss of Phase 1 Type within Study area	NVC Area (ha)	% Loss of Phase 1 Type within Study area	NVC Area (ha)	% Loss of Phase 1 Type within Study Area	NVC Area (ha)	% Loss of Phase 1 Type within Study Area
Amenity Grassland (J1.2)	PG	0.361	0.07%	0.361	0.07%			0.000	0.00%			0.000	0.00%
Building (J3.6)	BD	0.187	0.04%	0.187	0.04%	0.014	7.63%	0.000	0.00%	0.014	7.63%	0.013	6.93%
Bare Ground (J4)	BG	1.986	0.39%	1.986	0.39%			0.000	0.00%			0.000	0.00%

# Chapter 8

## Ornithology

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## Glossary

Term	Definition
Appropriate Assessment	An assessment required by the European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora where a project (or plan) would be likely to have a significant effect on a European Site, either alone or in combination with other plans or projects (part of the Habitats Regulations Assessment process in the UK and the Appropriate Assessment process in Ireland).
At risk	Defined as: a flight having at least part of its duration (i) at potential collision height; (ii) within the Collision Risk Analysis Area (CRAA); and (iii) recorded within the 2 km viewshed of the associated Vantage Point (VP).
Barrier effects	Where a wind farm creates an obstacle to regular movements of birds to and from breeding colonies or migration.
Collision Risk Analysis Area (CRAA)	The three-dimensional airspace within and surrounding the proposed turbine area where birds in flight are theoretically at risk of a collision with operational turbines. This forms the basis of calculations used in collision risk modelling.
Conservation objective	Objective for the conservation of biodiversity (e.g., specific objective within a management plan or broad objectives of policy).
Conservation status	The sum of the influences acting on a species which may affect its long-term distribution and abundance, within a geographical area of interest.
Cumulative effect	Additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
Habitats Regulations Appraisal	An assessment of projects (or plans) potentially affecting European Sites in the UK, required under the European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora and the Conservation (Natural Habitats &c.) Regulations 1994.
Important Ornithological Features	Ornithological features requiring specific assessment within an EIA. Ornithological features can be important for a variety of reasons (e.g., quality and extent of designated sites, species rarity).
Integrity (of a designated site)	The coherence of its ecological structure and function across its whole area which enables it to sustain the habitats, complex of habitats and/or population levels of the species for which it was classified (or designated).

Target species	Target species are those species listed as Annex 1 (Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds) and/or Schedule 1 (Wildlife and Countryside Act 1981) and/or are Red Listed non-passerines (BoCC, Stanbury et al. 2021 <sup>35</sup> ).
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).



## List of Abbreviations

Abbreviation	Description
BDPP	Bird Disturbance Protection Plan
BoCC	Birds Of Conservation Concern
BTO	British Trust for Ornithology
CRM	Collision Risk Modelling
CRAA	Collision Risk Analysis Area
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017
Habitats Directive	Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora
HMP	Habitat Management Plan
HRA	Habitats Regulations Appraisal
HRSG	Highland Raptor Study Group
JNCC	Joint Nature Conservation Committee
IOF	Important Ornithological Feature
NCI	Nature Conservation Importance
NHZ	Natural Heritage Zone
NPF4	National Planning Framework Four
OBEMP	Outline Biodiversity Enhancement Plan
RSPB	Royal Society for the Protection of Birds
SRMS	Scottish Raptor Monitoring Scheme
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
VP	Vantage Point

## 8.1. Introduction

8.1.1. This Chapter of the Environmental Impact Assessment Report (EIAR) evaluates the potential effects of the Watten Wind Farm (the Proposed Development) on ornithological features. This assessment was undertaken by MacArthur Green.

This chapter of the EIAR includes the following elements:

- Legislation, Policy and Guidance;
- Consultations;
- Assessment Methodology and Significance Criteria;
- Baseline Description;
- Assessment of Potential Effects;
- Cumulative and In-combination Effects Assessment;
- Mitigation and Residual Effects;
- Summary of Effects; and
- Statement of Competence.

8.1.2. This chapter is supported by the following figures provided in Volume 2: Figures:

- Figure 8.1: Ornithological Designated Sites within 20 km;
- Figure 8.2: Proposed Development Area and Study Areas;
- Figure 8.3: Vantage Points and Viewsheds;
- Figure 8.4: Non-breeding raptor and Owl Activity: 2013 to 2022;
- Figure 8.5: Flight Activity: Hen Harrier;
- Figure 8.6: Flight Activity: Merlin;
- Figure 8.7: Flight Activity: Osprey;
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- Figure 8.9: Flight Activity: Red-throated diver;
- Figure 8.10: Breeding Wader Activity: 2013 to 2022;
- Figure 8.11: Non-breeding Wader Activity: 2013 to 2022;
- Figure 8.12: Flight Activity: Curlew;
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- Figure 8.15: Flight Activity: Whimbrel;
- Figure 8.16: Non-breeding Wildfowl Activity: 2013 to 2022;
- Figure 8.17: Flight Activity: Greylag goose;

- Figure 8.18: Flight Activity: Pink-footed goose;
- Figure 8.19: Flight Activity: Whooper swan;
- Figure 8.20: Seabird Activity: 2013 to 2022;
- Figure 8.21: Flight Activity: Arctic skua;
- Figure 8.22: Flight Activity: Great black-backed gull;
- Figure 8.23: Flight Activity: Herring gull; and
- Figure 8.24: Cumulative Impact Assessment, Natural Heritage Zone 5.

8.1.3. This chapter is supported by the following Technical Appendix documents provided in Volume 3: Technical Appendices:

- Technical Appendix A8.1: Ornithology and associated annexes; and
- Technical Appendix A7.6: Outline Biodiversity Enhancement Management Plan which includes the proposed practical habitat management for the Proposed Development Area which ties into achieving biodiversity enhancement.

8.1.4. This chapter is supported by the following confidential information (that will have restricted distribution) provided in Volumes 2 and 3 of the EIAR:

- Technical Appendix A8.2: Confidential Ornithology;
- Confidential Figure 8.2.1: Barn owl Activity: 2019 to 2022;
- Confidential Figure 8.2.2: Hen harrier Activity: 2013 to 2022;
- Confidential Figure 8.2.3: Merlin Activity: 2014 to 2020;
- Confidential Figure 8.2.4: Osprey Activity: 2013 to 2022; and
- Confidential Figure 8.2.5: Diver Activity: 2013 to 2022.

## 8.2. Legislation, Policy and Guidance

### Legislation

8.2.1. The assessment will consider the following European legislation:

- Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive')<sup>1</sup>;
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) ('Habitats Directive')<sup>2</sup>; and
- Environmental Impact Assessment Directive 2014/52/EU (the EIA Directive)<sup>3</sup>.

8.2.2. The following national legislation which has recently been amended because of the EU exit (Scottish Government, 2019<sup>4</sup>; 2020<sup>5</sup>), will also be considered as part of the ornithology assessment:

- The Wildlife and Countryside Act 1981 (as amended)<sup>6</sup>;

<sup>1</sup> UK Government. (2009) *Directive 2009/147/EC of the European Parliament and of the Council* [Online] Available from - <https://www.legislation.gov.uk/eudr/2009/147>. [Accessed: April 2023]

<sup>2</sup> Scottish Government. (1992) *Council Directive 92/43/EEC* [Online] Available from - <https://www.legislation.gov.uk/eudr/1992/43/>. [Accessed: April 2023]

<sup>3</sup> Scottish Government. (2014) *Directive 2014/52/EU of the European Parliament and of the Council* [Online] Available from - <https://www.legislation.gov.uk/eudr/2014/52/contents>. [Accessed: April 2023]

<sup>4</sup> Scottish Government. (2019) *The Town and Country Planning and Electricity Works (EU Exit) (Scotland) (Miscellaneous Amendments) Regulations 2019* [Online] Available from - <https://www.legislation.gov.uk/ssi/2019/80/introduction/made>. [Accessed: April 2023]

<sup>5</sup> Scottish Government. (2020) *EU Exit: The Habitats Regulations in Scotland* [Online] Available from - <https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/>. [Accessed: April 2023]

<sup>6</sup> Scottish Government. (1981) *Wildlife and Countryside Act 1981* [Online] Available from - <https://www.legislation.gov.uk/ukpga/1981/69>. [Accessed: April 2023]

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (the Habitats Regulations)<sup>7</sup>;
- The Nature Conservation (Scotland) Act 2004 (as amended)<sup>8</sup>;
- The Wildlife and Natural Environment (Scotland) Act 2011<sup>9</sup> and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (The EIA Regulations)<sup>10</sup>.

## Policy

8.2.3. The following policies will be considered in the assessment:

- Scottish Government (2000<sup>11</sup>). Planning Advice Note 60: Planning for Natural Heritage;
- Scottish Government (2017<sup>12</sup>). Planning Advice Note (PAN) 1/2013 – Environmental Impact Assessment, Revision 1.0;
- UK Post-2010 Biodiversity Framework (2012<sup>13</sup>);
- Scottish Biodiversity Strategy: It's in Your Hands (2004<sup>14</sup>) /2020 Challenge for Scotland's Biodiversity (2013<sup>15</sup>);
- National Planning Framework Four – ( February 2023 <sup>16</sup>)(NPF4);
- The Scottish Biodiversity List<sup>17</sup>; and
- Highland Nature: Biodiversity Action Plan (LBAP, 2021-2026<sup>18</sup>).

<sup>7</sup> Scottish Government. (1994) *The Conservation (Natural Habitats, &c.) Regulations 1994* [Online] Available from - <https://www.legislation.gov.uk/ukxi/1994/2716/contents>. [Accessed: April 2023]

<sup>8</sup> Scottish Government. (2004) *Nature Conservation (Scotland) Act 2004* [Online] Available from - <https://www.legislation.gov.uk/asp/2004/6/contents>. [Accessed: April 2023]

<sup>9</sup> Scottish Government. (2011) *Wildlife and Natural Environment (Scotland) Act 2011* [Online] Available from - <https://www.legislation.gov.uk/asp/2011/6/contents/enacted>. [Accessed: April 2023]

<sup>10</sup> Scottish Government. (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* [Online] Available from - <https://www.legislation.gov.uk/ssi/2017/101/contents>. [Accessed: April 2023]

<sup>11</sup> The Scottish Government. (2000) *Planning Advice Note 60: Planning for Natural Heritage* [Online] Available from - <https://www.gov.scot/publications/pan-60-natural-heritage/>. [Accessed: April 2023]

<sup>12</sup> Scottish Government. (2017) *Planning Advice Note 1/2013 – Environmental Impact Assessment*. Revision 1.0. Scottish Government. Edinburgh. <https://www.gov.scot/publications/planning-advice-note-1-2013-environmental-impact-assessment/> [Accessed: March 2023]

<sup>13</sup> JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). (2012) *UK Post-2010 Biodiversity Framework*. JNCC. Peterborough. <https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/> [Accessed: May 2023]

<sup>14</sup> Scottish Executive. (2004) *Scotland's biodiversity: it's in your hands* Scottish Executive. Edinburgh. <https://www.gov.scot/publications/scotlands-biodiversity---its-in-your-hands/> [Accessed: May 2023]

<sup>15</sup> The Scottish Government. (2013) *2020 Challenge for Scotland's Biodiversity*. The Scottish Government. Edinburgh. <https://www.gov.scot/publications/2020-challenge-scotlands-biodiversity-strategy-conservation-enhancement-biodiversity-scotland/pages/3/#:~:text=Scotland's%202020%20Challenge%20aims%20to,in%20decisions%20about%20their%20environment> [Accessed: May 2023]

<sup>16</sup> Scottish Government. (2021) *Scotland 2045 – National Planning Framework 4 – Delivery Programme v1* [Online] Available from - <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf>. [Accessed: March 2023]

<sup>17</sup> NatureScot. (SNH, 2018) *Scottish Biodiversity List* [Online] Available from - <https://www.nature.scot/doc/scottish-biodiversity-list> [Accessed: April 2023]

## Guidance

8.2.4. The assessment will consider the following guidance:

- CIEEM (2018<sup>19</sup>). *Guidelines for Ecological Impact Assessment*;
- European Commission (2010<sup>20</sup>) *Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'*;
- Pearce-Higgins (2021<sup>21</sup>). *Climate Change and the UK's Birds*;
- NatureScot (Scottish National Heritage (SNH), 2000<sup>22</sup>). *Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action*;
- NatureScot (SNH, 2014a<sup>23</sup>). *Assessing the impacts to pink-footed and greylag geese from small-scale windfarms in Scotland*;
- NatureScot (SNH, 2014b<sup>24</sup>). *Implications of Additional Protection for Hen Harrier, Red Kite and Golden Eagle under Schedules A1 & 1A of the Wildlife and Countryside Act (1981)*;
- NatureScot (SNH, 2016a<sup>25</sup>). *Assessing connectivity with Special Protection Areas (SPAs)*;
- NatureScot (SNH, 2016b<sup>26</sup>). *Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees Version 2*;
- NatureScot (SNH, 2017<sup>27</sup>). *Recommended bird survey methods to inform impact assessment of onshore wind farms*;

<sup>18</sup> Highland Environment Forum. (2021) *Highland Nature: Biodiversity Action Plan 2021 – 2026* [Online] Available from - <https://www.highlandenvironmentforum.info/biodiversity/action-plan/>. [Accessed: April 2023]

<sup>19</sup> CIEEM. (2018) *Guidelines for Ecological Impact Assessment* [Online] Available from - <https://cieem.net/wp-content/uploads/2019/02/Combined-EcIA-guidelines-2018-compressed.pdf>. [Accessed: April 2023]

<sup>20</sup> European Commission. (2010) *Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'*. European Commission, Brussels [Online] Available at: <https://op.europa.eu/en/publication-detail/-/publication/65364c77-b5b8-4ab6-919d-8f4e3c6eb5c2>. [Accessed: April 2023]

<sup>21</sup> Pearce-Higgins, J.W. (2021) *Climate Change and the UK's Birds. British Trust for Ornithology Report, Thetford, Norfolk* [Online] Available from - <https://www.bto.org/our-science/publications/research-reports/climate-change-and-uks-birds>. [Accessed: April 2023]

<sup>22</sup> SNH (2000) *Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note*. SNH [Online] Available from - <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf>. [Accessed: April 2023]

<sup>23</sup> SNH (2014a). *Assessing the impacts to pink-footed and greylag geese from small-scale wind farms in Scotland*. [https://www.webarchive.org.uk/wayback/archive/20221026161429mp\\_/https://www.nature.scot/sites/default/files/2019-01/Guidance%20-%20Assessing%20impacts%20to%20pink-footed%20and%20greylag%20geese%20from%20small-scale%20wind%20farms%20in%20Scotland.pdf](https://www.webarchive.org.uk/wayback/archive/20221026161429mp_/https://www.nature.scot/sites/default/files/2019-01/Guidance%20-%20Assessing%20impacts%20to%20pink-footed%20and%20greylag%20geese%20from%20small-scale%20wind%20farms%20in%20Scotland.pdf) [Accessed: May 2023]

<sup>24</sup> SNH (2014b). *Implications of Additional Protection for Hen Harrier, Red Kite and Golden Eagle under Schedules A1 & 1A of the Wildlife and Countryside Act (1981)*. <https://www.nature.scot/doc/implications-additional-protection-hen-harrier-red-kite-and-golden-eagle-under-schedules-a1-1a> [Accessed: May 2023]

<sup>25</sup> SNH (2016a) *Assessing connectivity with Special Protection Areas (SPAs)* [Online] Available from - <https://www.nature.scot/doc/assessing-connectivity-special-protection-areas>. [Accessed: April 2023]

<sup>26</sup> SNH (2016b) *Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees Version 2* [Online] Available from - <https://www.nature.scot/doc/environmental-statements-and-annexes-environmentally-sensitive-bird-information> [Accessed: April 2023]

<sup>27</sup> SNH (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms* [Online] Available from - <https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms>. [Accessed: April 2023]

- NatureScot (SNH, 2018a<sup>28</sup>). Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas;
- NatureScot (SNH, 2018b<sup>29</sup>). Assessing the cumulative impacts of onshore wind farms on birds;
- NatureScot (SNH, 2018c<sup>30</sup>). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland;
- NatureScot (SNH, 2019<sup>31</sup>). Good Practice during Wind Farm Construction. 4th Edition;
- NatureScot (SNH, 2020a<sup>32</sup>). General pre-application and scoping advice for onshore wind farms;
- NatureScot (SNH, 2020b<sup>33</sup>). The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures;

- SERAD (2000<sup>34</sup>). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna; and
- Stanbury *et al.* (2021<sup>35</sup>). Birds of Conservation Concern 5: the status of all regularly occurring birds in the UK, Channel Islands and the Isle of Man.

### 8.3. Consultations

8.3.1. In undertaking the assessment, consideration has been given to the scoping responses and other consultation relating to ornithology, as detailed in Table 8.1.

Table 8.1: Consultation Responses

Consultee and date	Scoping/Other Consultation	Issue Raised	Response/Action Taken/Outcome
NatureScot 28 <sup>th</sup> June 2022	Formal Scoping Consultation	<p>The proposal has the potential to impact the following sites:</p> <ul style="list-style-type: none"> <li>• Caithness and Sutherland Peatlands SPA and Ramsar site;</li> <li>• Caithness Lochs SPA;</li> <li>• East Caithness Cliffs SPA; and</li> <li>• Shielton Peatlands Site of Special Scientific Interest (SSSI).</li> </ul> <p>The developer should assess the direct and indirect impacts on these protected sites and their qualifying interests in context of their conservation/management objectives. The assessment should consider the impact of the proposal both as a single development and cumulatively with other projects affecting these protected sites.</p>	<p>The consideration of connectivity for all SPAs (and underlying SSSIs) and Ramsar Sites within 20 km of the Proposed Development is assessed in Section 8.5, <b>Consideration of SPA and Ramsar site Connectivity</b>.</p>
		<p>We do not agree that impacts to the East Caithness Cliffs SPA are scoped-out of the assessment. This is due to the proposal being within foraging range for both herring gull and great black-backed gull associated with this SPA. From the information available, herring gull has been recorded during survey work for this proposal. We are also aware that both species have been regularly recorded during survey work for other nearby wind farms and flight lines identified between this inland area and the coastal SPA.</p>	<p>The connectivity of herring gulls and great-black-backed gulls (designated ornithological features of the East Caithness SPA) with the Proposed Development is assessed in Section 8.5, <b>Consideration of SPA and Ramsar site Connectivity</b>.</p>

<sup>28</sup> SNH (2018a) *Assessing the significance of impacts on bird populations from onshore wind farms that do not affect protected areas* [Online] Available from - <https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected#:~:text=Wind%20farms%20can%20affect%20bird,zone%20surrounding%20the%20wind%20farm> . [Accessed: April 2023]

<sup>29</sup> SNH (2018b) *Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note* [Online] Available from - <https://www.nature.scot/doc/guidance-assessing-cumulative-impacts-onshore-wind-farms-birds>. [Accessed: April 2023]

<sup>30</sup> 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* [Online] Available from - <https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf> [Accessed: April 2023]

<sup>31</sup> SNH (2019) *Good Practice during Wind Farm Construction. 4th Edition* [Online] Available from - <https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Good%20Practice%20during%20wind%20farm%20construction.pdf> [Accessed: April 2023]

<sup>32</sup> SNH (2020a) *General pre-application and scoping advice for onshore wind farms. Guidance* [Online] Available from - <https://www.nature.scot/sites/default/files/2020-10/General%20pre-application%20and%20scoping%20advice%20for%20onshore%20wind%20farms.pdf> [Accessed: April 2023]

<sup>33</sup> SNH. (2020b) *The Effect of Aviation Obstruction Lighting on Birds at Wind Turbines, Communication Towers and Other Structures. NatureScot Information Note* [Online] Available from - <https://www.nature.scot/sites/default/files/2020-10/Wind%20farm%20impacts%20on%20birds%20-%20Turbine%20lighting%20and%20birds%20-%20Information%20Note.pdf>. [Accessed: April 2023]

<sup>34</sup> Scottish Executive Rural Affairs Department (SERAD). (2000) *Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna* [Online] Available from - <https://www.gov.scot/binaries/content/documents/govscot/publications/foi-eir-release/2020/01/foi-201900008726/documents/foi-201900008726-information-released-a/foi-201900008726-information-released-a/govscot%3Adocument/FOI%2B-%2B201900008726%2B-%2BInformation%2Breleased%2B-%2BCircular%2B6-1995%2BNature%2BConservation%2B-%2B%2527The%2BHabitats%2Band%2BBirds%2BDirectives%2527%2B%2528Updated%2BJune%2B2000%2529..PDF>. [Accessed: April 2023].

<sup>35</sup> Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. and Win, I. (2021) *Birds of Conservation Concern 5: the status of all regularly occurring birds in the UK, Channel Islands and the Isle of Man. British Birds 114: 723-747* [Online] Available from - <https://www.bto.org/our-science/publications/birds-conservation-concern/status-our-bird-populations-fifth-birds>. [Accessed: April 2023].

Table 8.1: Consultation Responses

Consultee and date	Scoping/Other Consultation	Issue Raised	Response/Action Taken/Outcome
		<p>The proposal also lies adjacent to Shielton Peatlands SSSI, which forms part of the larger Caithness and Sutherland Peatlands Special Area of Conservation/SPA/Ramsar site and is protected for its blanket bog and breeding bird assemblage. Impacts to this SSSI and its features should also be considered further within the EIA Report.</p> <p>In relation to the [flight activity survey] Vantage Point (VP) locations, we note that 2 VPs were used up until 2015. Without further information at this stage, the flight activity data for the area around turbine 1 is likely to be considered too old to be relevant for an assessment of potential impacts.</p> <p>We advise that full details of the surveys undertaken (and their results) are provided within any future application, to support the conclusions presented in the EIA Report.</p>	<p>Shielton Peatlands SSSI is overlain by the Caithness and Sutherland Peatlands SPA as described in Section 8.5, <b>Designated Sites</b>. The connectivity of the Caithness and Sutherland SPA with the Proposed Development is assessed in Section 8.5, <b>Consideration of SPA and Ramsar site Connectivity</b> and is taken forward into the HRA assessment in Section 8.5.</p> <p>Turbine 1 in the location presented in the Scoping Report has been removed from the final design.</p>
		<p>We welcome the intention to undertake a lighting assessment in relation to birds and refer the developer to Annex 1 of our pre-application guidance.</p> <p>We welcome the intention to produce a Bird Disturbance Management Plan and recommend the details of this are included within any future application.</p>	<p>Information on the surveys undertaken is summarised in Section 8.5. Full methodology and all survey results are presented in Technical Appendix A8.1: Ornithology and associated annexes and Technical Appendix A8.2: <b>Confidential Ornithology</b>.</p> <p>Lighting impacts on Important Ornithological Feature (IOFs) have been assessed in section 8.6 <b>Operation – Lighting</b>.</p> <p>The implementation of a Bird Disturbance Protection Plan is included as part of the embedded mitigation in Section 8.4, <b>Embedded Mitigation</b>. The contents of this would be agreed with relevant stakeholders prior to commencement of construction.</p>
		<p>Where a collision risk is identified, Collision Risk Modelling (CRM) should be undertaken. For species associated with the SPA, an assessment should be made against the conservation objectives for the Proposed Development Area. For wider countryside species, an assessment should be made against the relevant Natural Heritage Zone(s) (NHZs).</p>	<p>Species identified to be at risk of collision were analysed using CRM, results are presented in Table 8.12 <b>Flight Activity Summary</b> and in Technical Appendix A8.1 Annex E.</p> <p>Species associated with SPAs are assessed against the conservation objectives for the Proposed Development Area in section 8.6 <b>Assessment of Potential Effects</b>.</p> <p>Wider countryside species are assessed against NHZ 5 in section 8.6 <b>Assessment of Potential Effects</b>.</p>
NatureScot 17 <sup>th</sup> October 2022	Data request	<p>MacArthur Green requested cumulative/in-combination collision dataset for the Caithness and Sutherland Peatlands SPA species (red-throated diver).</p>	<p>Provided by NatureScot on 21<sup>st</sup> October 2022. Data used in Section 8.5, <b>Cumulative and In-combination Effects Assessment</b>.</p>
The Royal Society for the Protection of Birds (RSPB) 13 <sup>th</sup> July 2022	Formal Scoping Consultation	<p>T1 is located out with the viewshed of VP2 and therefore it seems that there is no recent flight activity data covering this location. This limitation should be recognised and justified within the EIAR. If this is not possible, the turbine should be removed from the final design as collision risk modelling will be underestimated.</p> <p>We note the high level of herring gull activity over the Proposed Development Area and suggest impacts on this red-listed Bird of Conservation Concern should be considered in the EIAR in isolation and in-combination with other projects. There is also potential connectivity to the East Caithness Cliffs SPA which is designated for its breeding population of herring gull and so we suggest impacts are assessed against this population with regards to collision risk and barrier effects. Therefore, we do not agree that East Caithness Cliffs SPA can be scoped out of the EIA at this stage.</p> <p>The high number of curlew territories identified on the Proposed Development Area to date is notable. A displacement assessment of breeding pairs should be undertaken, and</p>	<p>Turbine 1 in the location presented in the Scoping Report has been removed from the final design.</p> <p>The connectivity of herring gull (a designated ornithological feature of the East Caithness SPA) with the Proposed Development is assessed in Section 8.5, <b>Consideration of SPA and Ramsar site Connectivity</b>.</p> <p>Section 8.5 assesses displacement risk to curlew during the construction/decommissioning and operational phases. The assessment considers the unmitigated displacement effect on curlew to</p>

Table 8.1: Consultation Responses

Consultee and date	Scoping/Other Consultation	Issue Raised	Response/Action Taken/Outcome
		<p>infrastructure should avoid the areas with highest breeding density. The mitigation hierarchy should be followed and mitigation and compensatory actions for this species should be suggested within a Habitat Management Plan if avoidance of impacts is not possible.</p>	<p>be Not Significant, and the species will benefit from wader management areas within the Outline Biodiversity Enhancement Management Plan (OBEMP) as summarised in Section 8.7: <b>Mitigation and Residual Effects</b>.</p>
		<p>We note other farmland wader species such as snipe, lapwing and oystercatcher were also recorded breeding on the Proposed Development Area. These species should also be included in the assessment due to their declining populations</p>	<p>Curlew and lapwing are considered target species as they are Red-listed Birds of Conservation Concern and are therefore included in the assessment in Section 8.5.</p> <p>All other wader species recorded during baseline surveys are listed in Section 8.5, <b>Waders</b>, and full details are presented in Technical Appendix A8.1: Ornithology. NatureScot guidance (SNH, 2017) has been used to determine which species are classified as ‘target’ and in accordance with the guidance, birds that are not Annex 1, Schedule 1 or Red-listed are considered as secondary species and are not included in the assessment.</p> <p>Section 8.7: <b>Mitigation and Residual Effects</b> includes an OBEMP with wader enhancement areas which will benefit all wader species.</p>
		<p>It is not clear if golden plovers commute to the Proposed Development Area to feed from breeding sites in the designated peatlands to the south of the proposed development. This should be examined as part of the assessment.</p>	<p>As described in Section 8.5, <b>Golden plover</b>, breeding bird surveys identified a single golden plover within the 500 m study area in May 2020 with no evidence of breeding activity recorded. There was no evidence to suggest that golden plovers use the Proposed Development Area for foraging.</p>
		<p>The Scoping Report indicates that a number of Schedule 1 and 1A bird species nest or roost in the vicinity of the development. The final design should ensure that there is an appropriate buffer from these important sites and that any Bird Disturbance Protection Plan for the construction period should ensure the maximum safe working distances outlined in Ruddock &amp; Whitfield (2007<sup>40</sup>) and any relevant NatureScot guidance is adhered to i.e., at least 500 m from merlin nests, 750 m from osprey nests and 750 m from hen harrier roost sites as per the maximum safe distances. NatureScot guidance also suggests that “risk of harassment” of roosting [hen harriers] can be minimised by avoiding activity overnight and within two hours of dusk (two hours before official sunset time) and dawn (two hours after official sunrise time).”</p>	<p>Appropriate buffers to avoid construction and operational disturbance from all infrastructure to Schedule 1 and 1A bird species have been applied in the assessment in Section 8.5. A 500 m buffer has been used to avoid construction and operational disturbance to breeding hen harrier, merlin and red-throated diver. A 750 m buffer avoids disturbance to breeding osprey (Goodship and Furness, 2022<sup>41</sup>).</p> <p>A 500 m buffer avoids operational disturbance to roosting hen harrier. Some construction works within the 750 m buffer of roosting hen harrier is mitigated with avoiding construction activity overnight and within 2 hours of dawn and dusk as summarised in Section 8.4, Embedded Mitigation.</p>
		<p>A robust cumulative assessment of collision risk, disturbance, displacement and barrier effects should take account of all operational, consented and proposed wind energy schemes that could impact on bird populations of both the relevant NHZ (5: The Peatlands of Caithness and Sutherland), the Caithness and Sutherland Peatlands SPA, Caithness Lochs SPA and East Caithness Cliffs SPA. The in-combination effect of other relevant plans or projects such as grid connection and forestry projects should also be considered.</p>	<p>A cumulative and in-combination assessment is presented in section 8.8: <b>Cumulative and In-combination Effects Assessment</b>.</p>
		<p>We strongly support the production of an Outline Biodiversity Enhancement Plan and Species Protection Plan (SPP), including any proposals for mitigation and/or enhancement in relation to important habitats and species, and an indication of size of any areas to be restored. This should have sufficient detail to allow consideration of its feasibility and effectiveness in providing any proposed mitigation and/or compensation and enhancement. The HMP, or other</p>	<p>An OBEMP as summarised in Section 8.7: <b>Mitigation and Residual Effects</b> is presented Technical Appendix A7.6.</p>

Table 8.1: Consultation Responses

Consultee and date	Scoping/Other Consultation	Issue Raised	Response/Action Taken/Outcome
		document, should also include information on post-construction monitoring of birds, including reporting of collision mortality.	A Bird Disturbance Protection Plan (BDPP) is included as part of the embedded mitigation. A Species Protection Plan is included as part of the embedded mitigation included in Chapter 7: Ecology.
		Once impacts are mitigated, opportunities to enhance the Proposed Development Area for biodiversity should be taken.	The OBEMP outlined in Section 8.7: <b>Mitigation and Residual Effects</b> (presented in full in Technical Appendix A7.6) will aim to enhance habitats for a wide range of fauna and flora.
		The presence of protected species such as Schedule 1 Birds must be included and considered as part of the planning application process, not as an issue which can be considered at a later stage	All Schedule 1 Birds recorded in the baseline data are included in the assessment in Section 8.5.
The Highland Raptor Study Group (HRSG) 30 <sup>th</sup> May 2022	Data request	Requested historical data for breeding raptors within 6 km of the Proposed Development Area.	Informed by HRSG on 26 <sup>th</sup> May 2022 that they hold no data for this area of Caithness.
British Trust for Ornithology (BTO) 11 <sup>th</sup> August 2022	Data request	Requested BTO data report covering an area of four 10 km grid squares surrounding the Proposed Development Area.	Report received from BTO, 23 <sup>rd</sup> August 2022 This background information was used to assess the requirement for embedded mitigation in Section 8.4, <b>Embedded Mitigation</b> .

## 8.4. Assessment Methodology and Significance Criteria

### Study Area

- 8.4.1. The assessment focuses on the Proposed Development Area and appropriate study areas, based on NatureScot survey guidance (SNH 2017<sup>27</sup>) and NatureScot assessment guidance (SNH 2016a<sup>25</sup>; SNH 2018a<sup>28</sup>,b<sup>29</sup>,c<sup>30</sup>) (see Technical Appendix A8.1: Ornithology for further details). The Proposed Development Area is outside the range of black grouse<sup>36</sup>.
- 8.4.2. The specific study areas associated with this assessment are as follows:
- Ornithology designated sites – Proposed Development Area and a 20 km study area (Figure 8.1);
  - Scarce breeding birds – Proposed Development Area and a 2 km study area (Figure 8.2);
  - Eagle surveys - Proposed Development Area and a 6 km study area;
  - Breeding upland waders and wintering waders, raptors, owls and wildfowl – Proposed Development Area and a 500 m study area (Figure 8.2);
  - Roosting hen harrier - Proposed Development Area and a 750 m study area;
  - Flight activity (VP) surveys: a 500 m buffer surrounding proposed turbine locations, referred to for collision risk modelling (CRM) purposes as the Collision Risk Analysis Area (CRAA) (see Technical Appendix A8.1 Annex E and Figure 8.3);
  - Cumulative assessment – as per NatureScot guidance (SNH, 2018b<sup>29</sup>), the NHZ level is considered practical and appropriate for most breeding species of wider countryside interest, in this case NHZ 5: Caithness and Sutherland Peatlands; and
  - In-combination assessment – required as part of the Habitats Regulations Appraisal (HRA) process, NatureScot (SNH, 2016<sup>25</sup>) guidance has been consulted to identify an appropriate study area per SPA species scoped into the assessment.

### Desk Study

- 8.4.3. The following data sources were considered as part of the assessment:
- NatureScot Sitelink (<https://sitelink.nature.scot/home>) for designated site information;
  - BTO for historic breeding raptor data;
  - EIA reports and monitoring documents for wind farm projects within NHZ 5; and
  - NatureScot cumulative/in-combination collision dataset for the Caithness and Sutherland Peatlands SPA species (red-throated diver).

### Field Surveys

- 8.4.4. Ornithological fieldwork for the Proposed Development was undertaken between March 2013 to March 2015, April 2019 to March 2021 and March to August 2022 (see Technical Appendix A8.1 Annex B for methodologies and Annex C for survey effort details).
- Flight activity surveys: comprised two VPs March 2013 to March 2015; and one VP April 2019 to March 2021;

- Scarce breeding bird surveys: between March to August 2013, 2014, 2019, 2020 and 2022;
- Breeding bird surveys: between April to July 2013, 2019 and 2020;
- Breeding diver activity surveys: July and August 2013 and May to August 2020;
- Hen harrier winter roost activity surveys: August 2013 to February 2014, September 2014 to March 2015, November 2019 to March 2020 and November 2020 to March 2021; and
- Winter walkover surveys: between November to March 2013/14, 2019/20 and 2020/21.

## Assessment of Potential Significance

### Assessing Wider-Countryside Ornithological Significance

- 8.4.5. The evaluation for wider-countryside interests (ornithology features unrelated to SPAs and Ramsar sites but including SSSIs) has been made using the following process:
- Identifying the potential impacts associated with the Proposed Development;
  - Considering the likelihood of occurrence of potential impacts where appropriate;
  - Defining the sensitivity of a feature to impacts via the Nature Conservation Importance (NCI) of the species present and establishing each population's conservation status;
  - Establishing the magnitude of the impact (both spatial and temporal);
  - Based on the above criteria, making a judgement as to whether or not the resultant effect is significant with respect to the EIA Regulations;
  - If a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required; and
  - Considering residual effects after mitigation, compensation or enhancement.

### Assessing the Likely Significant Effects on a Special Protection Area (SPA)

- 8.4.6. The method for assessing the likely significant effects on an SPA is different from that employed for wider-countryside ornithological interests. The Habitats Directive is transposed into domestic legislation by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). Regulation 48 includes a number of steps to be taken by the competent authority before granting consent (these are referred to here as an HRA). In order of application, the first four are listed below.
- Step 1: consider whether the proposal is directly connected to or necessary for the management of the SPA (Regulation 48(1)(b)).
  - If not, Step 2: consider whether the proposal (alone or in combination) is likely to have a significant effect on the SPA (Regulation 48(1)(a)).
  - If so, Step 3: make an Appropriate Assessment of the implications for the SPA in view of that SPA's conservation objectives (Regulation 48(1)(a)).
  - Step 4: consider whether it can be ascertained that the proposal will not adversely affect the integrity of the SPA ("Integrity Test") having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48(5) and 48(6)).

<sup>36</sup> Bird Atlas, black grouse breeding distribution 2008-11 [Online] Available from - <https://app.bto.org/mapstore/StoreServlet?id=127> [Accessed: April 2023]



8.4.7. It has already been established that the Proposed Development does not meet the criteria for Step 1. The results of baseline surveys and scientific conclusions presented in this chapter are therefore used to inform the HRA process to determine likely significant effects, and potentially for the competent authority to conduct an Appropriate Assessment where likely significant effects have been identified.

### Sensitivity

8.4.8. The sensitivity of the ornithological features on or near to the Proposed Development is assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

8.4.9. Determination of the level of sensitivity of an IOF (CIEEM 2018) to be taken forward for assessment is based on a combination of the feature’s NCI and conservation status. Table 8.1 details the framework for determining the NCI of target species<sup>37</sup> recorded during baseline surveys, with IOFs considered to be those target species identified to be of High or Medium NCI (CIEEM 2018).

Table 8.1: Determining factors of a feature’s NCI

Importance	Definition
High	Populations receiving protection due to inclusion as features of an SPA, Ramsar Site, SSSI or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1% national breeding population).
Medium	The presence of target species listed in Annex 1 of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The presence of species noted on the latest Birds Of Conservation Concern (BoCC) Red list (Stanbury <i>et al.</i> 2021 <sup>35</sup> ). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the wind farm. Species present in regionally important numbers (>1% regional breeding population).
Low	All other species’ populations not covered by the above categories.

8.4.10. As defined by NatureScot, the conservation status of a species is, “the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest” (SNH, 2018a<sup>28</sup>).

8.4.11. Conservation status is considered to be favourable under the following circumstances (SNH, 2018a<sup>28</sup>):

- “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 it 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”.

8.4.12. NatureScot states that “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” (SNH, 2018a<sup>28</sup>).

8.4.13. The relevant population scale for assessing potential effects on breeding species is considered to be the appropriate NHZ, in this case NHZ 5 Caithness and Sutherland Peatlands. However, for some populations, insufficient information on the NHZ population may exist and, in these circumstances, the regional, national or a particular population that ties in with national censuses population estimate is used. For wintering or migratory species, the national or flyway population is considered to be the relevant scale for determining effects on the conservation status (SNH, 2018a<sup>28</sup>) and this approach is used in this assessment.

### Magnitude

8.4.14. An impact magnitude is defined as a change to the abundance and/or distribution of a reference population as a result of the Proposed Development. Impacts can be adverse, neutral or beneficial.

8.4.15. In determining the magnitude of impacts, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

8.4.16. The response of individual species to impacts during relevant behaviours is considered when determining spatial and temporal magnitude of impact and is assessed using guidance including Bright *et al.* (2006<sup>38</sup>), Hill *et al.* (1997<sup>39</sup>), Ruddock and Whitfield (2007<sup>40</sup>) and Goodship and Furness (2022<sup>41</sup>).

8.4.17. Impacts are judged in terms of magnitude in space and time, and there are five levels of spatial and temporal impacts as detailed in Table 8.2 and Table 8.3 below respectively. The examples given in these two tables provide a guideline to the assessment, but professional judgement will be relied upon in each individual case.

Table 8.2: Spatial magnitude of impact

Spatial Magnitude	Definition
High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80% of population lost through additive mortality.
Medium	Partial loss or alteration in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 6-80% of population lost through additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 1-5% of population lost through additive mortality.

<sup>37</sup> Target species are those species listed as Annex 1 (EU Birds Directive) and/or Schedule 1 (Wildlife and Countryside Act) and/or are Red Listed non-passerines (BOCC, Stanbury *et al.* 2021<sup>35</sup>).

<sup>38</sup> Bright, J. A., Langston, R. H. W., Bullman, R., Evans, R. J., Gardner, S., Pearce-Higgins, J. and Wilson, E. (2006) Bird Sensitivity Map to provide locational guidance for onshore windfarms in Scotland. RSPB Research Report No. 20.

<sup>39</sup> Hill, D. A., Hockin, D., Price, D., Tucker, G., Morris, R. and Treweek J. (1997). Bird Disturbance: Improving the Quality of Disturbance Research. *Journal of Applied Ecology*, 34: 275-288.

<sup>40</sup> Ruddock, M. and Whitfield, D. P. (2007) A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

<sup>41</sup> Goodship and Furness 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283. [Online] Available from: <https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance> [Accessed: April 2023]

Spatial Magnitude	Definition
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Reduction barely discernible, approximating to the “no change” situation. Guide: <1% population lost through additive mortality.

Table 8.3: Temporal magnitude of impact

Temporal Magnitude	Definition
Permanent	Impact continuing indefinitely beyond the span of one human generation (taken as approximately 30 years), except where there is likely to be substantial improvement after this period. Where this is the case, Long Term may be more appropriate.
Long Term	Approximately 15-30 years (or longer, see 'Permanent').
Medium Term	Approximately 5-15 years.
Short Term	Up to approximately 5 years.
Negligible	Very minor (<6 months) or no temporal effect.

### Significance

8.4.18. The predicted significance of an effect has been determined through a standard method of assessment based on professional judgement, considering both sensitivity and the magnitude of an impact. The significance criteria used in this assessment is guided by the matrix presented in Table 8.4. It should be noted that the ornithological assessment primarily focuses on the identification of any potential adverse effects. Should any proposed mitigation for any scoped in IOFs result in any residual beneficial effects, these will be highlighted in the assessment.

Table 8.4: Determining significance of effects

Magnitude of Change		High	Medium	Low	Negligible
Sensitivity	High	Major	Major/Moderate	Moderate	Moderate /Minor
	Medium	Major/Moderate	Moderate	Moderate/Minor	Minor
	Low	Moderate	Moderate/Minor	Minor	Minor /Negligible

8.4.19. ‘Major’ and ‘Major/Moderate’ impacts are considered to be **significant** in accordance with the EIA Regulations.

8.4.20. ‘Moderate’, ‘Moderate/Minor’, ‘Minor’ and ‘Minor/Negligible’ impacts are considered to be not significant in accordance with the EIA Regulations.

### Cumulative Effects

8.4.21. The significance of cumulative<sup>42</sup> effects of the Proposed Development combined with other projects that are located within NHZ 5 is assessed following the same methodology as detailed above for the Proposed Development alone. The assessment follows NatureScot (SNH, 2018b<sup>29</sup>) guidance for cumulative assessment.

### Assessment Limitations

8.4.22. Limitations exist regarding the knowledge base on how some species, and the populations to which they belong, react to impacts. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

8.4.23. It should be noted that whilst there have been revisions to the design across the Proposed Development life history, surveys across all seasons and years covered the Proposed Development Area and relevant study areas detailed on Figure 8.2 as a minimum.

### Assessment Assumptions

The assessment makes the following assumptions as listed below.

- All electrical cabling between the proposed turbines and the associated infrastructure will be underground in shallow trenches which would be reinstated post-construction and, in most cases, follow the proposed access tracks.
- Any ground disturbance areas around permanent infrastructure during construction will be temporary and areas will be reinstated or restored before the construction period ends. The only excavation in these areas will be for cabling as noted above and otherwise may only be periodically used for side-casting of spoil until reinstatement.
- Construction work on the Proposed Development, including vegetation clearance and construction of the access tracks, turbine hardstandings and compound and erection of the turbines is predicted to last for approximately 12 months. The number of bird breeding seasons potentially disrupted would depend on the month in which construction commences and the breeding season of the potentially affected species. The main breeding season of most birds at the Proposed Development extends from March to August. For the purposes of this assessment, it is assumed that, for any given species of bird, construction activities would commence during the breeding season and would therefore potentially affect a maximum of up to two breeding seasons. This, therefore, represents a worst-case scenario.

### Embedded Mitigation

8.4.24. Breeding locations and key foraging areas of target species were taken into consideration from the early stages of the Proposed Development design process, to minimise the risk of disturbance, displacement, and collision effects. This included the results of baseline surveys as well as large scale datasets gathered from the BTO (refer to section 8.3: **Consultations**). In summary, the following steps have been taken in the design process to minimise the risk of significant effects:

- Avoidance of infrastructure from any active or potential Schedule 1 species nest within the Proposed Development Area by at least 500 m during the construction and operational phases;
- Avoidance of infrastructure from potential hen harrier roost sites by 750 m during the construction phase and 500 m during the operation phase. To reduce the possibility of disturbance to roosting hen harrier, construction activity within the 750 m buffer of roosting hen harrier would be avoided overnight and within two hours of dusk (two hours before official sunset time) and dawn (two hours after official sunrise time) during the non-breeding season in accordance with NatureScot (SNH, 2014b<sup>24</sup>) guidance; and
- Avoidance of current and historic nest sites (and appropriate disturbance buffers) of Schedule 1 breeding species has been considered through micro-siting of infrastructure.

<sup>42</sup> When considering cumulative effects under the HRA process, the term ‘in-combination’ is used in place of ‘cumulative’.

8.4.25. In addition to the above considered during the design process, this chapter has been prepared on the basis of the assumptions/embedded mitigation listed below:

- To ensure all reasonable precautions are taken to avoid negative effects on ornithological interests during construction and decommissioning, the Applicant will appoint a suitably qualified Environmental Clerk of Works (ECoW) prior to the commencement of construction and decommissioning and they will advise the Applicant and the Principal Contractor on all ornithological matters (with the assistance of a suitably qualified/licenced ornithologist if required). The ECoW will be required to be present in the Proposed Development Area during the construction and decommissioning periods and will carry out monitoring of works and briefings with regards to any ornithological sensitivities within the Proposed Development Area to the relevant staff within the Principal Contractor and subcontractors.
- A BDPP will be implemented during construction of the Proposed Development. The BDPP will detail measures to ensure legal compliance and safeguard breeding birds known to be in the area and will include species-specific guidance. The BDPP shall include pre-construction surveys and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new breeding bird activity in the vicinity of the construction works. The ECoW will oversee the implementation of the above measures.

## 8.5. Baseline Description

8.5.1. The sections below provide information on statutory designations, a summary of flight activity survey results and a summary of results for each target species (grouped into species groups) recorded. For each target species recorded, it is also determined (based on baseline survey results and/or historic data) whether they can be reasonably scoped out of the assessment due to a lack of likely significant effects.

### Designated Sites

8.5.2. There are no statutory conservation designations within the Proposed Development Area but it is located within 20 km of four SPAs, two Ramsar sites and 12 SSSIs (Figure 8.1):

- Caithness and Sutherland Peatlands SPA, approximately 55 m at the closest point to the south of the nearest turbine (underpinned by Caithness and Sutherland Peatlands Ramsar, Dunbeath Peatlands SSSI, Loch Caluim Flows SSSI, Rumsdale Peatlands SSSI, Shielton Peatlands SSSI and Strathmore Peatlands SSSI), Table 8.5;
- Caithness Lochs SPA, approximately 2.5 km to the north of the nearest turbine (underpinned by Caithness Lochs Ramsar, Broubster Leans SSSI, Loch Calder SSSI, Loch Heilen SSSI, Loch of Wester SSSI, Loch Scarmclate SSSI and Loch Watten SSSI), Table 8.6;
- East Caithness Cliffs SPA, approximately 13.7 km south-east of the nearest turbine, Table 8.7;
- North Caithness Cliffs SPA, approximately 15.8 km north of the nearest turbine, Table 8.8; and
- Lambsdale Leans SSSI, approximately 14.2 km west of the nearest turbine, Table 8.9.

Table 8.5: Qualifying features of Caithness and Sutherland Peatlands SPA (and underpinning Caithness and Sutherland Peatlands Ramsar, Dunbeath Peatlands SSSIa, Loch Caluim Flows SSSIb, Rumsdale Peatlands SSSIC, Shielton Peatlands SSSId and Strathmore Peatlands SSSIE).

Feature	Qualifying Feature Category	Condition	Definition
Black-throated diver, breeding	SPA, Ramsar	Favourable Maintained: June 2018	Breeding population of Annex 1 species of European importance: 1994, 26 pairs, 15% of the GB population.
Common scoter, breeding	SPA, Ramsar, SSSIE	Unfavourable Declining: June 2013	Breeding population of migratory species of European importance: 2007, at least 21 pairs, at least.
Dunlin, breeding	SPA, Ramsar, SSSIa, SSSIB, SSSIC, SSSIE	Favourable Maintained: June 2015	Breeding population of Annex 1 species of international importance: 1993 and 1994, 1,860 pairs, 20% of the GB population.
Golden eagle, breeding	SPA	Favourable Maintained: August 2016	Breeding population of Annex 1 species of European importance: 1992, 5 pairs, 1% of the GB population.
Golden plover, breeding	SPA, Ramsar, SSSIa, SSSIB, SSSIC, SSSIE	Favourable Recovered: June 2015	Breeding population of Annex 1 species of European importance: 1993 and 1994, 1,064 pairs, 5% of the GB population.
Greenshank, breeding	SPA, Ramsar, SSSIa, SSSIB, SSSIC, SSSIE	Favourable Maintained: June 2015	Breeding population of migratory species of European importance: 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.
Greylag goose, breeding	Ramsar	Favourable maintained: June 2018	Breeding population of international importance.
Hen harrier, breeding	SPA	Favourable Maintained: June 2016	Breeding population of Annex 1 species of European importance: 1993 to 1997, mean of at least 14 pairs, at least 2.8% of the GB population.
Merlin, breeding	SPA	Favourable Maintained: July 2004	Breeding population of Annex 1 species of European importance: 1993 and 1994, an estimated 54 pairs, 4% of the GB population.
Red-throated diver, breeding	SPA, Ramsar	Favourable Maintained: July 2006	Breeding population of Annex 1 species of European importance: 2006, 46 pairs, 3.5% of the GB population.
Short-eared owl, breeding	SPA	Not assessed	Breeding population of Annex 1 species of European importance: 30 pairs, 2% of the GB population.

Feature	Qualifying Feature Category	Condition	Definition
Wigeon, breeding	SPA, Ramsar, SSSIe	Favourable Maintained: June 2018	Breeding population of migratory species of European importance: 1993/94, at least 43 pairs, at least <0.1% of the Western Siberia/Northwestern/Northeastern Europe biogeographic population and at least 10.8% of the GB population.
Wood sandpiper, breeding	SPA	Favourable maintained: June 2004	Breeding population of Annex 1 species of European importance: up to 5 pairs, up to 40% of the GB population.
Breeding bird assemblage	Ramsar, SSSIa, SSSIb, SSSIc, SSSId, SSSIe	Favourable maintained: July 2009	Across the Ramsar and SSSIs the following species are listed in the breeding bird assemblages that are not individually qualifying features: Arctic skua, black-throated diver, buzzard, common sandpiper, common scoter, curlew, dipper, dunlin, golden eagle, golden plover, greenshank, greylag goose, hen harrier, merlin, osprey, peregrine, raven, red grouse red-throated diver, short-eared owl, snipe, teal, wigeon and wood sandpiper.

Table 8.6: Qualifying features of Caithness Lochs SPA (and underpinning Caithness Lochs Ramsar, Broubster Leans SSSIa, Loch Calder SSSIb, Loch Heilen SSSIc, Loch of Wester SSSId, Loch Scarmclate SSSIe and Loch Watten SSSIf)

Feature	Qualifying Feature Category	Condition	Definition
Greenland white-fronted goose, non-breeding	SPA, Ramsar SSSIb, SSSIc	Favourable Declining: April 2016	Wintering population of Annex 1 species of European importance: 1993/94-97/98 winter peak mean of 440 representing 3% of GB and 1% of Greenlandic population.
Greylag goose, non-breeding	SPA, Ramsar, SSSIb, SSSIc, SSSIe, SSSIf	Favourable Maintained: November 2015	Wintering population of European importance: 1993/94-1997/98 winter peak mean of 7,190 representing 7% of the GB and Icelandic populations.
Whooper swan, non-breeding	SPA, Ramsar, SSSIb, SSSIc, SSSId	Favourable Maintained: March 2015	Wintering population of Annex 1 species of European importance: 1993/94-1997/98 winter peak mean of 240 representing 4% of GB and 1% of Icelandic population.

Feature	Qualifying Feature Category	Condition	Definition
Breeding bird assemblage	SSSIa	Favourable Maintained: June 2007	The following species are listed as part of the breeding bird assemblages that are not individually qualifying features: wigeon, snipe, teal, greenshank, wood sandpiper and spotted crane. It is also an important foraging area for hen harrier and short-eared owl that breed outwith the SSSI.

Table 8.7: Qualifying features of East Caithness Cliffs SPA

Feature	Qualifying Feature Category	Condition	Definition
Cormorant, breeding	SPA	Unfavourable Declining: June 2015	Breeding population of National importance: 230 pairs, 3% of the GB population.
Fulmar, breeding	SPA	Favourable Maintained: June 2015	Breeding population of National importance: 15,000 pairs, 3% of the GB population.
Great black-backed gull, breeding	SPA	Unfavourable No change: June 2015	Breeding population of National importance: 800 pairs, 4% of the GB population.
Guillemot, breeding	SPA	Favourable Maintained: June 2015	Breeding population of migratory species of European importance: 106,700 individuals, 3.1% of north Atlantic biogeographic population.
Herring gull, breeding	SPA	Unfavourable No change: June 2015	Breeding population of migratory species of European importance: 9,400 pairs, 1.0% of NW European biogeographic population.
Kittiwake, breeding	SPA	Favourable Maintained: June 2015	Breeding population of migratory species of European importance: 32,500 pairs, 1.0% of north Atlantic biogeographic population.
Peregrine falcon, breeding	SPA	Favourable Maintained: June 2014	Breeding population of Annex 1 species of European importance: an estimated 6 pairs, 0.5% of the GB population and selected as one of the most suitable sites for peregrine in GB.
Razorbill, breeding	SPA	Favourable Maintained: June 2015	Breeding population of migratory species of European importance: 15,800

Feature	Qualifying Feature Category	Condition	Definition
			individuals, 1.8% of total A. t. islandica biogeographic population.
Shag, breeding	SPA	Unfavourable No change: June 2015	Breeding population of migratory species of European importance: 2,300 pairs, 1.8% of the north Europe biogeographic population.
Seabird assemblage, breeding	SPA	Favourable Maintained: June 2015	The SPA regularly supports 300,000 individual seabirds including nationally important populations of the following species: great black-backed gull, cormorant, fulmar, razorbill, guillemot, kittiwake, herring gull and shag.

Table 8.8: Qualifying features of North Caithness Cliffs SPA

Feature	Qualifying Feature Category	Condition	Definition
Fulmar, breeding	SPA	Favourable Maintained: June 2016	Breeding population of National importance: 14,700 pairs; 3% of the GB population.
Guillemot, breeding	SPA	Favourable Maintained: June 2016	Breeding population of migratory species of European importance: 1985 to 1987, 38,300 individuals, 1% of the North Atlantic biogeographic population.
Kittiwake, breeding	SPA	Unfavourable Declining: June 2016	Breeding population of National importance: 13,100 pairs, 3% of the GB population.
Peregrine falcon, breeding	SPA	Unfavourable Declining: June 2014	Breeding population of Annex 1 species of European importance: an estimated 6 pairs, 0.5% of the GB population and selected as one of the most suitable sites for peregrine in GB.
Puffin, breeding	SPA	Favourable Maintained: June 2016	Breeding population of National importance: 2,080 pairs, 0.4% of the GB population and greater than 2,000 individuals.
Razorbill, breeding	SPA	Favourable Recovered: June 2016	Breeding population of National importance: 4,000 individuals, 3% of the GB population).

Feature	Qualifying Feature Category	Condition	Definition
Seabird assemblage, breeding	SPA	Favourable Maintained: June 2016	The SPA regularly supports 20,000 individual seabirds including nationally important populations of the following species: fulmar, kittiwake, razorbill, guillemot and puffin.

Table 8.9: Qualifying features of Lambsdale Leans SSSI

Feature	Qualifying Feature Category	Condition	Definition
Breeding bird assemblage	SSSI	Favourable Recovered: June 2005	The SSSI provides breeding and/or foraging grounds for a wide variety of wildfowl and wading birds that are characteristic of upland wetlands including: grey heron, greylag goose, teal, wigeon, tufted duck, dunlin, snipe, curlew, redshank, greenshank and common sandpiper.

### Consideration of SPA and Ramsar site Connectivity

- 8.5.3. Table 8.10 details the qualifying features listed for the four SPAs and two Ramsar sites within 20 km of the Proposed Development Area in relation to their recommended connectivity distances, based on territory and foraging ranges presented in NatureScot (SNH, 2016a<sup>25</sup>) and Woodward *et al.* (2019<sup>43</sup>). Foraging ranges are not provided in NatureScot (SNH, 2016a<sup>25</sup>) for common scoter, wigeon or wood sandpiper and so approximate foraging ranges have been supplied on the basis of comparative species<sup>44</sup> for which foraging ranges are detailed in the NatureScot (SNH, 2016<sup>25</sup>) connectivity guidance.
- 8.5.4. For the East Caithness Cliffs SPA only peregrine falcon, cormorant, herring gull and great black-backed gull have been included in Table 8.10 and for North Caithness Cliffs SPA only peregrine falcon is included, as all the other species for which these SPAs are designated (Table 8.7 and Table 8.8) are considered to only use coastal or pelagic habitats and as such the Proposed Development Area would not be used by these species (in addition, the Proposed Development Area is located inland from these SPAs and would not be located within any flyways for these species between the SPAs and their offshore feeding areas). Cormorant, herring gull and great black-backed gull all have a foraging range of >20 km (Table 8.10), however, the larger foraging ranges of these seabird species are more applicable for the marine environment and it is most likely that seabirds passing over the Proposed Development Area were from the closest colonies within 20 km.

<sup>43</sup> Woodward, I., Thaxter, C.B., Owen, E., and Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report number 724

<sup>44</sup> Comparative species are: common scoter = red-throated diver; wigeon = curlew; wood sandpiper = curlew

Table 8.10: Likely connectivity of SPA and Ramsar site qualifying features on the basis of foraging ranges to the proposed development.

SPA and Ramsar Species	Foraging Range NatureScot (SNH, 2016) or Woodward <i>et al.</i> 2019*	Caithness and Sutherland Peatlands SPA and Ramsar site – 55 m	Caithness Lochs SPA and Ramsar site- 3.6 km	East Caithness Cliffs SPA – 15.4 km	North Caithness Cliffs SPA – 16.9 km
Black-throated diver (Breeding)	< 10 km	Possible connectivity	N/A	N/A	N/A
Common scoter (Breeding)	< 8 km	Possible connectivity	N/A	N/A	N/A
Cormorant (Breeding)	25.6 ± 8.3 km*	N/A	N/A	Possible connectivity	N/A
Dunlin (Breeding)	500 m	Possible connectivity	N/A	N/A	N/A
Golden eagle (Breeding)	6 km	Possible connectivity	N/A	N/A	N/A
Golden plover (Breeding)	3 km	Possible connectivity	N/A	N/A	N/A
Great black-backed gull (Breeding)	73 km*	N/A	N/A	Possible connectivity	N/A
Greenland white-fronted goose (non-breeding)	5 – 8 km	N/A	Possible connectivity	N/A	N/A
Greenshank (Breeding)	2 km	Possible connectivity	N/A	N/A	N/A
Greylag goose (Breeding)	15 – 20 km	Possible connectivity	N/A	N/A	N/A
Greylag goose (Non-breeding)	15 – 20 km	N/A	Possible connectivity	N/A	N/A
Hen harrier (Breeding)	2 km	Possible connectivity	N/A	N/A	N/A
Herring gull (Breeding)	58.8 ± 26.8 km*	N/A	N/A	Possible connectivity	N/A
Merlin (Breeding)	5 km	Possible connectivity	N/A	N/A	N/A
Peregrine falcon (Breeding)	2 km	N/A	N/A	No connectivity	No connectivity
Red-throated diver (Breeding)	< 8 km	Possible connectivity	N/A	N/A	N/A

SPA and Ramsar Species	Foraging Range NatureScot (SNH, 2016) or Woodward <i>et al.</i> 2019*	Caithness and Sutherland Peatlands SPA and Ramsar site – 55 m	Caithness Lochs SPA and Ramsar site- 3.6 km	East Caithness Cliffs SPA – 15.4 km	North Caithness Cliffs SPA – 16.9 km
Short-eared owl (Breeding)	2 km	Possible connectivity	N/A	N/A	N/A
Whooper swan (Non-breeding)	<5 km	N/A	Possible connectivity	N/A	N/A
Wigeon (Breeding)	1 km	Possible connectivity	N/A	N/A	N/A
Wood sandpiper (Breeding)	1 km	Possible connectivity	N/A	N/A	N/A

8.5.5. Considering the information detailed in Table 8.10 there is potential connectivity between the Proposed Development Area with the Caithness and Sutherland Peatlands SPA, Caithness Lochs SPA and the East Caithness Cliffs SPA based on foraging distances of qualifying features and as such, the **Caithness and Sutherland Peatlands SPA and Caithness Lochs SPA (and associated Ramsar sites) as well as the East Caithness Cliffs SPA are scoped in to the appropriate assessment (refer to section 8.5 Scope of Appropriate Assessment).**

### Flight Activity Summary

8.5.6. A summary of all target species recorded during flight activity surveys at the Proposed Development is detailed in Table 8.11. This summarises all flights observed during the baseline period (March 2013 to March 2015 and April 2019 to March 2021) regardless of the location of the flight in relation to the Proposed Development Area. For further details of the flight activity surveys, refer to Technical Appendix A8.1: Ornithology (Volume 3).

8.5.7. Band *et al.* (2007) describe a method of quantifying potential bird collisions with onshore turbines, in which: (i) the activity rate per unit area per season is extrapolated; (ii) the likelihood of a collision with a blade for a bird passing through the rotor swept area is calculated; and (iii) an ‘avoidance rate’ is applied to account for behavioural adaptation of birds to the presence of turbines. The bird seconds<sup>45</sup> for target species identified to be ‘at-risk’<sup>46</sup> were input into a collision risk model (using Band *et al.* 2007) to calculate the predicted collision rates per season for each target species recorded during baseline flight activity surveys. A summary of the collision model results is detailed in Table 8.12 (refer to Technical Appendix A8.1: Ornithology Annex E, Volume 3 for detailed results).

<sup>45</sup> Bird seconds are calculated for each observation as the product of flight duration and number of individuals.

<sup>46</sup> At-risk’ is defined as: a flight having at least part of its duration (i) at potential collision height; (ii) within the CRAA; and (iii) recorded within the 2 km viewshed of the associated VP.

Table 8.11: Species recorded during flight activity surveys, March 2013 to March 2015 and April 2019 to March 2021.

Species	Total Number of Flights Recorded	Total Bird Seconds Recorded	Number of Flights Recorded 'at-risk'	Bird Seconds Recorded 'at-risk'
Arctic skua	1	49	1	49
Curlew	173	9327	53	5007
Golden plover	17	43070	12	39279
Great black-backed gull	28	4797	21	4373
Greylag goose	61	451304	55	418236
Hen harrier	150	25287	21	5455
Herring gull	462	217994	370	202917
Lapwing	102	62984	25	48015
Merlin	9	471	3	130
Osprey	16	3027	15	2974
Peregrine falcon	1	192	1	192
Pink-footed goose	36	311723	31	304549
Red-throated diver	3	219	3	219
Red kite	1	174	1	174
Sandwich tern	1	120	1	120
Snipe	47	5693	23	4893
Whimbrel	1	45	1	45
Whooper swan	3	2798	2	1148

Table 8.12: Collision modelling results (collision rate per season).

Species	Mean Breeding Season	Mean Non-Breeding Season	Mean Annual	Equivalent to One Bird Every X Years
Arctic skua	0.0001	0.0000	0.0001	8022.33
Curlew	0.0352	0.0000	0.0352	28.41
Golden plover	0.0012	0.0346	0.0358	27.94
Great black-backed gull	0.0439	0.0002	0.0441	22.69
Greylag goose	0.0011	0.4089	0.4099	2.44
Hen harrier	0.0099	0.0023	0.0122	82.02
Herring gull	1.8327	0.1172	1.9499	0.51

Species	Mean Breeding Season	Mean Non-Breeding Season	Mean Annual	Equivalent to One Bird Every X Years
Lapwing	0.0720	0.0354	0.1074	9.31
Merlin	0.0016	0.0000	0.0016	618.72
Osprey	0.0214	0.0000	0.0214	46.66
Peregrine falcon	0.0000	0.0011	0.0011	907.91
Pink-footed goose	0.0000	0.2321	0.2321	4.31
Red-throated diver	0.00002	0.0000	0.00002	45115.51
Red kite	0.0009	0.0000	0.0009	1063.89
Sandwich tern	0.0008	0.0000	0.0008	1307.04
Snipe	0.0157	0.0188	0.0345	28.99
Whimbrel	0.0002	0.0000	0.0002	6392.58
Whooper swan	0.0000	0.0007	0.0007	1386.08

## Raptors

### Barn owl

- 8.5.8. Barn owls were recorded using two buildings within the Proposed Development Area (Confidential Figure 8.2.1, Confidential Technical Appendix A8.2, Volume 3); in one building (BO\_1), pellets and feathers were found in April and June 2019 and 2022 as well as May 2020. One barn owl was also recorded taking food into the same building in June 2020. In a second building (BO\_2), one barn owl was recorded within the building in March 2020 and pellets were found at the same location in April 2022. Both locations are over 400 m from the nearest turbine and over 270 m from the nearest access track.
- 8.5.9. A barn owl was recorded within a third derelict building (BO\_3) within the 2 km study area in May 2020 and again in June 2022, however, the location is over 2.6 km from the nearest proposed turbine and access track.
- 8.5.10. Considering that barn owl is regarded to have a relatively low sensitivity to human disturbance and the presence of barn owl is beyond the maximum disturbance limit of 100 m estimated for this species (Goodship and Furness, 2022<sup>41</sup>), and there is no predicted risk of collision, **barn owl is scoped out of the assessment.**

### Golden eagle

- 8.5.11. A single golden eagle was recorded on two different days, once in May 2019 and once February 2020 flying within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3). A single golden eagle was recorded perched on the ground in May 2019 outwith the 2 km study area. There are no known golden eagle nest sites within the 2 km study area.
- 8.5.12. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and no predicted risk of collision, **golden eagle (the wider-countryside population) is scoped out of the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to: **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Goshawk

- 8.5.13. Two goshawks were recorded together on the same day in April 2022 flying within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3), but no breeding evidence has been recorded during the baseline period.
- 8.5.14. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and no predicted risk of collision, **goshawk is scoped out of the assessment.**

### Hen harrier

- 8.5.15. One pair of hen harriers (ID: HH\_1 on Confidential Figure 8.2.2, Confidential Technical Appendix A8.2, Volume 3) were suspected to be breeding in 2020 at location within the Caithness and Sutherland Peatlands SPA approximately 1.9 km from the nearest proposed infrastructure. Hen harrier breeding activity was not recorded within the 2 km study area in any other year.
- 8.5.16. Hen harriers were confirmed to be roosting at two locations within the 2 km study area during the non-breeding seasons in 2013/14-2014/15 (HH\_R1) and 2020/21 (HH\_R2); HH\_R1 and HH\_R2 roost locations were located approximately 700 m and 520 m from the nearest proposed turbine and infrastructure respectively.
- 8.5.17. Baseline winter walkover surveys recorded roosting birds at HH\_R2 between November 2020 and March 2021 with a peak number of five roosting birds recorded in January 2021. HH\_R1 was active between mid-August 2013 until February 2014 with an estimated peak number of five roosting birds recorded in September 2013. A roost site in a similar location was active again between September 2014 until March 2015 with one or two birds recorded in each month (except February 2015 when no roosting birds were recorded). Hen harrier were not recorded roosting during the 2019/20 non-breeding season.
- 8.5.18. Flight activity surveys recorded a total of 150 hen harrier flights (Table 8.11, Figure 8.5, Technical Appendix A8.1 Annex D Volume 3), of which only 21 flights were identified to be 'at-risk', predicting mean annual collision risk of 0.0122 or one every 82.02 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3). Hen harrier flights were recorded more frequently during non-breeding seasons (mean number of flights = 28 per non-breeding season) than in the breeding seasons (mean number of flights = 9 flights per breeding season).
- 8.5.19. Considering this species' evidence of breeding and roosting within the 2 km study area, **hen harrier (the wider-countryside population) is scoped into the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Hobby

- 8.5.20. A single juvenile hobby was recorded once in July 2020 perching on the ground within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3), no breeding evidence was recorded.
- 8.5.21. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and no predicted risk of collision, **hobby is scoped out of the assessment.**

### Merlin

- 8.5.22. One pair of merlin (ID: ML\_1 on Confidential Figure 8.2.3, Confidential Technical Appendix A8.2, Volume 3) were confirmed to be breeding within the Proposed Development Area in 2020 at one location that was 509 m from the nearest proposed turbine and infrastructure.

- 8.5.23. A single male merlin was recorded displaying and calling within the 2 km study area in May 2014, but no further breeding evidence was observed.
- 8.5.24. Flight activity surveys recorded nine flights (Table 8.11, Figure 8.6, Technical Appendix A8.1 Annex D Volume 3), of which three flights were identified to be 'at-risk', predicting mean annual collision risk of 0.0016 or one every 618.72 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.25. Considering this species' evidence of breeding within the 2 km study area, **merlin (the wider-countryside population) is scoped in to the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Osprey

- 8.5.26. One pair of ospreys (ID: OP\_2 on Confidential Figure 8.2.4, Confidential Technical Appendix A8.2, Volume 3) was confirmed to be breeding within the 2 km study area in 2019 and 2020 at one location approximately 1.28 km from the nearest turbine and over 1.27 km from the nearest access track, at least one chick was present in the nest each year. A pair of osprey were recorded within in the 2 km study area in July 2022, although breeding activity was not observed in 2022.
- 8.5.27. Osprey were suspected to be breeding at another location (ID: OP\_1 on Confidential Figure 8.2.4, Confidential Technical Appendix A8.2, Volume 3) within the 2 km study area in 2013 and 2014 that was at least 1.3 km from the nearest turbine and 1.2 km from the nearest access track.
- 8.5.28. Flight activity surveys recorded a total of 16 flights (Table 8.11, Figure 8.7, Technical Appendix A8.1 Annex D Volume 3), of which 15 flights were identified to be 'at-risk', predicting mean annual collision risk of 0.0214 or one every 46.66 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.29. Osprey is listed as part of the breeding bird assemblage for Loch Caluim Flows SSSI (13.5 km from the nearest proposed turbine), but as this protected site is beyond the 10 km foraging range for osprey NatureScot (SNH, 2016a<sup>30</sup>), birds recorded during baseline surveys are considered to be part of the wider-countryside population.
- 8.5.30. Considering this species' evidence of breeding within the 2 km study area, **osprey is scoped into the assessment.**

### Peregrine falcon

- 8.5.31. Flight activity surveys recorded a single peregrine falcon flight (Table 8.11, Figure 8.8, Technical Appendix A8.1 Annex D Volume 3), which was identified to be 'at-risk', predicting a mean annual collision risk of 0.0011 or one every 907.91 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.32. A single peregrine falcon was recorded on four occasions each on a different day in May and October 2019, April and June 2020 within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3), no breeding evidence was recorded.
- 8.5.33. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and very low predicted risk of collision, **peregrine falcon is scoped out of the assessment.**



### Red kite

- 8.5.34. Flight activity surveys recorded a single red kite flight (Table 8.11, Figure 8.8, Technical Appendix A8.1 Annex D Volume 3), which was identified to be 'at-risk', predicting a mean annual collision risk of 0.0009 or one every 1,063.89 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.35. A single red kite was recorded on two other occasions each on a different day in July 2013 and 2014 within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3), but no breeding evidence has been recorded.
- 8.5.36. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and very low predicted risk of collision, **red kite is scoped out of the assessment.**

### Short-eared owl

- 8.5.37. A single short eared owl was recorded in June 2019 while foraging within the 2 km study area (Figure 8.4, Technical Appendix A8.1, Volume 3), but no breeding evidence was recorded. Short-eared owls (1–2 birds) were recorded on a further seven occasions flying within the 2 km study area during the 2020/2021 non-breeding season (Figure 8.4, Technical Appendix A8.1, Volume 3).
- 8.5.38. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and no predicted risk of collision, **short-eared owl (the wider-countryside population) is scoped out of the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### White-tailed eagle

- 8.5.39. A single white-tailed eagle was recorded in July 2020 flushing from a carcass located within the Proposed Development Area (Figure 8.4, Technical Appendix A8.1, Volume 3), no breeding evidence was recorded.
- 8.5.40. Considering this species' minimal onsite activity, no evidence of breeding within the 2 km study area and no predicted risk of collision, **white-tailed eagle is scoped out of the assessment.**

## Divers

### Black-throated diver

- 8.5.41. Black throated divers (maximum of 2 – 3 pairs) were recorded in 2013 in a location over 3.5 km north from the nearest infrastructure (Confidential Figure 8.2.5, Confidential Technical Appendix A8.2, Volume 3), but no evidence of breeding or flight activity was recorded in the 2 km study area.
- 8.5.42. Although this species was heard in flight at a distance from the Proposed Development (not mapped), no birds were recorded within the 2 km study area.
- 8.5.43. Considering this species' lack of activity and breeding evidence within the 2 km study area and no predicted risk of collision, **black-throated diver (the wider-countryside population) is scoped out of the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Red-throated diver

- 8.5.44. Two red-throated divers were occasionally recorded foraging on Loch of Toftingall within the 2 km study area in April and July in 2020, the closest part of the loch is approximately 660 m from the nearest proposed turbine and infrastructure. No evidence of breeding was recorded, the red-throated divers were potentially failed breeders or more likely non-breeding birds (Confidential Figure 8.2.5, Confidential Technical Appendix A8.2, Volume 3). One or two adult red-throated divers were present at Loch of Toftingall in April 2022, April and July 2019, May and July 2014 and April and May 2013, but no evidence of breeding was recorded in any year.
- 8.5.45. One pair of red-throated divers (ID: RH\_1 on Confidential Figure 8.2.5, Confidential Technical Appendix A8.2, Volume 3) were confirmed to be breeding in 2013 on a loch within the Caithness and Sutherland Peatlands SPA over 2.8 km from the nearest proposed infrastructure, one adult with one chick was recorded at this location in July and August 2013.
- 8.5.46. One red-throated diver was recorded once in April and May 2014 on a loch located north-west of RH\_1 within the Caithness and Sutherland Peatlands SPA approximately 2.2 km from the nearest infrastructure (Confidential Figure 8.2.5, Confidential Technical Appendix A8.2, Volume 3), no evidence of breeding was recorded.
- 8.5.47. Flight activity surveys recorded a total of 3 flights (Table 8.11, Figure 8.9, Technical Appendix 8.1 Annex D Volume 3), which were all identified to be 'at-risk', predicting mean annual collision risk of 0.00002 or one every 45,115 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.48. Considering this species' use of Loch of Toftingall within the 2 km study area as a feeding/loafing location for breeding birds or non-breeders, **red-throated diver (the wider-countryside population) is scoped into the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

## Waders

- 8.5.49. Table 8.13 contains a summary of the number of target wader species breeding territories identified within the 500 m from all proposed infrastructure associated with the Proposed Development (Figure 8.10, Technical Appendix A8.1 Volume 3). It should be noted that waders were also recorded during scarce breeding bird surveys during the 2022 breeding season. Secondary wader (non-target) species including common sandpiper, Jack snipe, oystercatcher, redshank and snipe were also recorded during surveys (refer to Technical Appendix A8.1 Volume 3 for further details). Proposed enhancement (Section 8.7: Mitigation and Residual Effects) includes an OBEMP with wader protection areas which will benefit all wader species.

Table 8.13: Wader territory summary, 2013, 2019 and 2020.

Species	2013	2019	2020
Curlew	1-4	1-4	1-3
Lapwing	0-2	0	0

### Curlew

- 8.5.50. Flight activity surveys recorded 173 curlew flights (Table 8.11, Figure 8.12, Technical Appendix A8.1 Annex D Volume 3), of which 53 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.0352 or one every 28 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).

- 8.5.51. Breeding bird surveys identified 1-4 (2013 and 2019) and 1-3 (2020) curlew territories located within 500 m from all proposed infrastructure (turbines and access track) associated with the Proposed Development (Table 8.13). Additional territories were recorded more than 500 m from proposed infrastructure to the north and east of the Proposed Development. Considering this species' breeding activity within 500 m to the Proposed Development, **curlew is scoped into the assessment.**

### Golden plover

- 8.5.52. Flight activity surveys recorded 17 golden plover flights (Table 8.11, Figure 8.13, Technical Appendix A8.1 Annex D Volume 3), of which 12 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.0358 or one every 28 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.53. Breeding bird surveys identified a single golden plover within the 500 m study area in May 2020 (Figure 8.11, Technical Appendix A8.1 Volume 3) with no evidence of breeding activity recorded. Non-breeding golden plover were recorded occasionally beyond the 500 m study area during the 2013, 2014 and 2020 breeding seasons mainly passing through the wider area during migration in April and early May (flock size 1 to 1,500 birds). Non-breeding birds (flock size 1 to 40 birds) were also occasionally recorded passing through the 500 m study area in September, October and March during the 2013/14, 2014/15, 2019/20 and 2020/21 non-breeding seasons (Figure 8.11 Technical Appendix A8.1 Volume 3).
- 8.5.54. Considering this species' limited activity and no evidence of breeding within the 500 m study area as well as the relatively low predicted risk of collision, **golden plover (the wider-countryside population) is scoped out of the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Greenshank

- 8.5.55. Greenshank was not recorded breeding within the 500 m study area in any survey year. Single birds were recorded in May in 2019 and 2022 within the 2 km study area (Figure 8.11, Technical Appendix A8.1 Volume 3), but no breeding evidence was recorded.
- 8.5.56. Considering this species' lack of activity and breeding evidence within the 500 m study area and no predicted risk of collision, **greenshank (the wider-countryside population) is scoped out of the assessment.** For consideration of the Caithness and Sutherland Peatlands SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Lapwing

- 8.5.57. Flight activity surveys recorded 102 lapwing flights (Table 8.11, Figure 8.14, Technical Appendix A8.1 Annex D Volume 3), of which 25 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.1074 or one every 9.3 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.58. Breeding bird surveys identified a maximum of two lapwing territories in 2013 located within 500 m from all proposed infrastructure (turbines and access track) associated with the Proposed Development. No lapwing territories were recorded in either 2019 or 2020 within 500 m of the Proposed Development.
- 8.5.59. Non-breeding birds (flock size 1 to 200 birds) were recorded within the 500 m study area in 2013/14, 2014/15 and 2020/21 non-breeding seasons (Figure 8.11, Technical Appendix A8.1 Volume 3).

- 8.5.60. Considering this species' breeding activity within 500 m to the Proposed Development, **lapwing is scoped into the assessment.**

### Whimbrel

- 8.5.61. Flight activity surveys recorded one 'at-risk' whimbrel flight (Table 8.11, Figure 8.15, Technical Appendix A8.1 Annex D Volume 3), predicting a mean annual collision risk of 0.0002 or one every 6,393 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.62. This species was not recorded at any other time during the baseline surveys.
- 8.5.63. Considering this species' lack of activity and breeding evidence within the 500 m study area and negligible predicted risk of collision, **whimbrel is scoped out of the assessment.**

### Woodcock

- 8.5.64. A single woodcock was recorded in April 2022 within the 500 m study area, but no breeding evidence was recorded in any survey year (Figure 8.11, Technical Appendix A8.1 Volume 3).
- 8.5.65. Non-breeding birds (1 to 2 birds) were also occasionally recorded within the 500 m study area during the 2019/20 and 2020/21 non-breeding seasons (Figure 8.11, Technical Appendix A8.1 Volume 3).
- 8.5.66. Considering this species' lack of activity and breeding evidence within the 500 m study area and no predicted risk of collision, **woodcock is scoped out of the assessment.**

### Wildfowl

#### Goldeneye

- 8.5.67. Goldeneye were recorded sporadically (1 to 3 sightings each year, flock size of 1 to 20 birds) during the 2013, 2014, 2020 and 2022 breeding seasons within the 2 km study area on Loch Toftingall which is located more than 650 m from the nearest proposed turbine, no evidence of breeding was recorded (Figure 8.16, Technical Appendix A8.1 Volume 3). One sighting of two birds was recorded on Loch Toftingall during the non-breeding season in December 2020, non-breeding birds were not recorded in any other year.
- 8.5.68. Although goldeneye is regarded to have a relatively high sensitivity to human disturbance, birds recorded during the baseline breeding season surveys were located beyond the maximum disturbance limit of 150 m estimated for this species during the breeding season (Goodship and Furness, 2022<sup>41</sup>).
- 8.5.69. Considering this species' limited activity within a likely disturbance range of the Proposed Development Area and no predicted risk of collision, **goldeneye is scoped out of the assessment.**

#### Greylag goose

- 8.5.70. Flight activity surveys recorded 61 greylag goose flights (Table 8.11, Figure 8.17, Technical Appendix A8.1 Annex D Volume 3), of which 55 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.4099 or one every 2.44 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.71. Within the 2 km study area, flocks of up to 80 birds were recorded flying occasionally during the breeding seasons (2013, 2014, 2019, 2020 and 2022) and flocks of up to 600 birds were recorded flying more regularly during the non-breeding seasons (2013/14, 2014/15, 2019/20 and 2020/21). One sighting of two birds on the ground was

recorded in April 2019 within the 2 km study area (Figure 8.16, Technical Appendix A8.1 Volume 3) but no foraging, roosting or breeding behaviour was recorded. The baseline survey data are supported by Mitchell (2012<sup>47</sup>) data which show that the closest 1 km grid squares identified as potentially suitable for foraging greylag goose are beyond 1.5 km from the nearest proposed turbine.

- 8.5.72. Considering this species' lack of foraging, roosting and breeding evidence within the 2 km study area and relatively low predicted risk of collision, **greylag goose (the wider-countryside population) is scoped out of the assessment**. For consideration of the Caithness Lochs SPA and Ramsar site non-breeding population as well as the Caithness and Sutherland Peatlands Ramsar site breeding population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Pink-footed goose

- 8.5.73. Flight activity surveys recorded 36 pink-footed goose flights (Table 8.11, Figure 8.18, Technical Appendix A8.1 Annex D Volume 3), of which 31 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.2321 or one every 4.3 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3). It should be noted that current NatureScot guidance<sup>48</sup> on potential wind farm impacts on pink-footed geese states: "*In light of the robust population and its high avoidance rate of 99.8%, collision risk modelling for pink-footed geese is only required if a proposal has connectivity with a protected area where this species is a qualifying interest*".
- 8.5.74. Pink-footed goose is not listed as a feature at any designated sites within 20 km of the Proposed Development and the pink-footed geese recorded are therefore considered to be part of the wider countryside population.
- 8.5.75. Although Mitchell (2012<sup>47</sup>) data identify two 1 km grid squares within the 2 km study area as potentially suitable for foraging pink-footed goose, baseline surveys did not record any foraging pink-footed geese, indicating a lack of suitable habitat for this species within the study area.
- 8.5.76. Considering the NatureScot guidance regarding the sensitivity of non-SPA pink-footed geese, lack of suitable habitat within the Proposed Development Area and low predicted collision rate, **pink-footed goose is scoped out of the assessment**.

### Pochard

- 8.5.77. Very few sightings of pochard were recorded during the breeding seasons of 2013 (one sighting of four birds) and 2020 (three sightings of one bird) within the 2 km study area on Loch Toftingall which is located more than 650 m from the nearest proposed turbine (Figure 8.16, Technical Appendix A8.1 Volume 3), no evidence of breeding was recorded. Pochard were not recorded during the non-breeding seasons in any year.
- 8.5.78. Considering this species' limited activity within the 2 km study area and no predicted risk of collision, **pochard is scoped out of the assessment**.

### Whooper swan

- 8.5.79. Flight activity surveys recorded three whooper swan flights (Table 8.11, Figure 8.19, Technical Appendix A8.1 Annex D Volume 3), of which two were identified to be 'at-risk', predicting a mean annual collision risk of 0.0007 or one every 1386 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).

- 8.5.80. Non-breeding birds (flock size 6 to 14 birds) were recorded in flight within the 2 km study area during the 2013/14, 2014/15 and 2020/21 non-breeding seasons, and one bird was recorded on the ground within the 2 km study area in April 2019 (Figure 8.16, Technical Appendix A8.1 Volume 3).
- 8.5.81. Considering this species' limited activity and no evidence of foraging or roosting within the 2 km study area as well as the very low predicted risk of collision, **whooper swan (the wider-countryside population) is scoped out of the assessment**. For consideration of the Caithness Lochs SPA and Ramsar site non-breeding population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10

## Other target species

### Arctic skua

- 8.5.82. Flight activity surveys recorded one Arctic skua flight (Table 8.11, Figure 8.21, Technical Appendix A8.1 Annex D Volume 3), which was identified to be 'at-risk', predicting a mean annual collision risk of 0.0001 or one every 8022 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.83. Single Arctic skuas were recorded flying over the Proposed Development Area in May 2013 and June 2020 (Figure 8.20, Technical Appendix A8.1 Volume 3).
- 8.5.84. Considering this species' lack of activity and breeding evidence within the 500 m study area and negligible predicted risk of collision, **Arctic skua is scoped out of the assessment**.

### Cormorant

- 8.5.85. Cormorant (BoCC Green list species, Stanbury *et al.* 2021<sup>35</sup>) would not normally be considered as a target species for an onshore wind farm, however, as this species is designated under the East Caithness Cliffs SPA (Table 8.10), the baseline data recorded is presented in here.
- 8.5.86. One cormorant was recorded flying within the 500 m study area during a winter walkover survey in December 2019, but there were no further sightings during baseline surveys.
- 8.5.87. Considering the very limited activity recorded within the 500 m study area as well as no predicted risk of collision, **cormorant (the wider-countryside population) is scoped out of the assessment**. For consideration of the East Caithness Cliffs SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Great black-backed gull

- 8.5.88. Flight activity surveys recorded 28 great black-backed gull flights (Table 8.11, Consideration of SPA and Ramsar site Connectivity Figure 8.22, Technical Appendix A8.1 Annex D Volume 3), of which 21 flights were identified to be 'at-risk', predicting a mean annual collision risk of 0.0441 or one every 23 years (Table 8.12, Technical Appendix A8.1 Annex E Volume 3).
- 8.5.89. Great black-backed gulls were recorded flying in small flocks of up to 6 birds within the 2 km study area mainly during the breeding seasons over moorland areas in the north-east of the Proposed Development Area, and two birds were recorded in flight during the 2013/2014 non-breeding season. No evidence of foraging birds on the ground was recorded (Figure 8.20, Technical Appendix A8.1 Volume 3).

<sup>47</sup> Mitchell, C. (2012). Mapping the distribution of feeding Pink-footed and Iceland Greylag Geese in Scotland. Wildfowl & Wetlands Trust / Scottish Natural Heritage Report, Slimbridge.

<sup>48</sup> SNH (2023) *Wind Farm Impacts on Birds* [Online] Available from - <https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/renewable-energy/onshore-wind-energy/wind-farm-impacts-birds> [Accessed: April 2023]

8.5.90. Considering the lack of foraging within the 2 km study area as well as the relatively low predicted risk of collision, **great black-backed gull (the wider-countryside population) is scoped out of the assessment.** For consideration of the East Caithness Cliffs SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

### Herring gull

8.5.91. Flight activity surveys recorded a total of 462 herring gull flights (Table 8.11, Figure 8.23, Appendix A8.1 Annex D Volume 3), of which 370 flights were identified to be 'at-risk', predicting a potentially high mean annual collision risk of approximately two birds (Table 8.12, Appendix A8.1 Annex E Volume 3). Considering this species' evidence of flight activity within 500 m of the Proposed Development, **herring gull (the wider-countryside population) is scoped in to the assessment.** For consideration of the East Caithness Cliffs SPA population, refer to **Consideration of SPA and Ramsar site Connectivity**, Table 8.10.

## Scope of Appropriate Assessment

### Caithness and Sutherland Peatlands SPA

8.5.92. On the basis of the information detailed in Table 8.10, there is considered to be potential connectivity (on the basis of distance alone) between the Proposed Development Area and 13 of the breeding species listed as features on the Caithness and Sutherland Peatlands SPA. In order to determine the scope of the appropriate assessment, a review of the true likelihood of connectivity for each of these species is detailed as follows:

- Hen harrier and merlin – these species were recorded breeding within the 2 km study area during baseline surveys and are within possible foraging range to the Proposed Development. Likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA hen harrier and merlin populations are scoped in to the appropriate assessment (refer to section 8.6).**
- Red-throated diver – this species was recorded foraging within the 2 km study area during baseline surveys and is within possible foraging range to the Proposed Development. Likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA and Ramsar site red-throated diver population is scoped in to the appropriate assessment (refer to section 8.6).**
- Black-throated diver – whilst the Proposed Development Area is within possible foraging range and this species is known to breed in the wider area over 3.5 km from the nearest proposed turbine, black-throated diver was not recorded within the 2 km study area during any of the baseline surveys undertaken between 2013 and 2022 and no suitable waterbodies for breeding black-throated diver were identified within 2 km of the Proposed Development Area. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA and Ramsar site black-throated diver population is scoped out of the appropriate assessment.**
- Common scoter and wigeon - whilst the Proposed Development Area is within possible foraging range, these species are closely linked to waterbodies and the associated wetland habitats. Considering the lack of common scoter and wigeon records recorded during baseline surveys and the lack of suitable waterbodies and grassland areas for these species within the 2 km study area, no likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA and Ramsar site common scoter and wigeon populations are scoped out of the appropriate assessment.**

- Dunlin, greenshank and wood sandpiper – whilst the Proposed Development Area is within possible foraging range, there is a lack of suitable breeding habitat surrounding the Proposed Development for these wader species and they were not recorded during baseline surveys within the 500 m study area. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA and Ramsar site dunlin, greenshank and wood sandpiper populations are scoped out of the appropriate assessment.**
- Golden eagle – whilst the Proposed Development Area is within possible foraging range, very few records (three individual sightings between 2013 to 2022) of this species were recorded during baseline surveys indicating a lack of suitable habitat within the 2 km study area. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA golden eagle population is scoped out of the appropriate assessment.**
- Golden plover – whilst the Proposed Development Area is within possible foraging range and non-breeding golden plover were recorded migrating over the Proposed Development Area, this species was not recorded breeding during baseline surveys within the 500 m study area which indicates that lack of suitable habitat surrounding the Proposed Development. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA and Ramsar site golden plover population is scoped out of the appropriate assessment.**
- Greylag goose - NatureScot (SNH, 2016a<sup>25</sup>) only provides a foraging range for wintering greylag goose (15 km – 20 km). A study by Kleinhenz and Koenig (2018<sup>49</sup>) found that breeding resident greylag goose in Germany used small home ranges whilst rearing young and tended to feed close to water, and so, it is likely that breeding greylag goose designated under the Caithness and Sutherland Peatlands Ramsar site would range considerably less than 15 km – 20 km. The Caithness and Sutherland Peatlands Ramsar site is adjacent to the Proposed Development Area and is potentially within foraging range for designated breeding greylag geese, however, considering the lack of foraging greylag geese recorded within the 2 km study area during baseline surveys and the lack of suitable foraging habitat (Mitchell, 2012<sup>47</sup>), the evidence suggests that greylag geese from the Ramsar site do not forage within 2 km of the Proposed Development Area. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands Ramsar site greylag goose population is scoped out of the appropriate assessment.**
- Short-eared owl - whilst the Proposed Development Area is within possible foraging range, there is a lack of suitable habitat within the 2 km study area and only one sighting of an individual bird was recorded once during breeding season baseline surveys. No likely significant effects are predicted and so the **Caithness and Sutherland Peatlands SPA short-eared owl population is scoped out of the appropriate assessment.**

### Caithness Lochs SPA

8.5.93. On the basis of the information detailed in Table 8.10, there is considered to be potential for connectivity between the Proposed Development Area and all three of the non-breeding species listed as features on the Caithness Lochs SPA. A review of the true likelihood for connectivity for each of these species is detailed as follows:

- Greenland white-fronted goose - whilst the Proposed Development Area is within possible foraging range, the habitat within and directly surrounding the Proposed Development Area, mainly areas of heather moorland and forestry, is considered to be of limited suitability to foraging geese and swans. Some wet heath/wet modified bog/marshy grassland is present within the 2 km study area, and this can be suitable for white-fronted geese, however the lack of records for this species recorded during baseline surveys show that this is not a foraging area. No likely significant effects are predicted and so the **Caithness Lochs SPA and Ramsar site Greenland white-fronted goose population is scoped out of the appropriate assessment.**

<sup>49</sup> Kleinhenz A, Koenig A (2018) Home ranges and movements of resident graylag geese (*Anser anser*) in breeding and winter habitats in Bavaria, South Germany. PLOS ONE 13(9): e0202443. <https://doi.org/10.1371/journal.pone.0202443>

- Greylag goose - whilst the Proposed Development Area is within possible foraging range, the lack of foraging records for this species during baseline surveys show that birds will not be displaced from foraging grounds as a result of the construction and operation of the Proposed Development. Baseline surveys did record birds in flight across the Proposed Development Area, however, NatureScot guidance<sup>23</sup> states that wind farms are considered to be “*low risk*” for greylag geese collisions if “*sites [are] more than 1.5 km from SPA roosts and away from regularly used foraging areas. Almost all geese will be above collision risk height; goose collisions at these sites are expected to be very rare*”. As the Proposed Development Area is 3.6 km from the Caithness Lochs SPA, designated greylag geese collision risk is predicted to be low. Similarly, NatureScot guidance<sup>23</sup> states that “*More than 1.5km from SPA: barrier effects are expected to be trivial*”. No likely significant effects are predicted and so the **Caithness Lochs SPA and Ramsar site greylag goose population is scoped out of the appropriate assessment**.
- Whooper swan - whilst the Proposed Development Area is within possible foraging range, the habitat within and directly surrounding the Proposed Development Area, mainly areas of heather moorland and forestry, is considered to be of limited suitability to foraging geese and swans. Some wet heath/wet modified bog/marshy grassland is present within the 2 km study area and this can be suitable for whooper swan, however the minimal records for this species recorded during baseline surveys show that this is not a foraging area. No likely significant effects are predicted and so the **Caithness Lochs SPA and Ramsar site whooper swan population is scoped out of the appropriate assessment**.

### East Caithness Cliffs SPA

- 8.5.94. On the basis of the information detailed in Table 8.10, there is considered to be potential for connectivity between the Proposed Development Area and three breeding species listed as features on the East Caithness Cliffs SPA summarised in Table 8.10. A review of the true likelihood for connectivity for each of these species is detailed as follows:
- Cormorant - whilst the Proposed Development Area is within possible foraging range, only one sighting of a single non-breeding bird was recorded in flight during baseline surveys. Due to the minimal records for this species it is concluded that the 2 km study area is not used by foraging cormorants from the SPA. No likely significant effects are predicted and so the **East Caithness Lochs SPA cormorant population is scoped out of the appropriate assessment**.
  - Great black-backed gull - whilst the Proposed Development Area is within possible foraging range and small flocks of birds were recorded during baseline breeding season surveys (refer to baseline description ‘Great black-backed gull’), the importance of the Proposed Development Area for foraging great-black backed gull is considered to be very low (great black-backed gulls were not observed on the ground) and as such connectivity with the SPA is considered to be trivial at best. No likely significant effects are predicted and so the **East Caithness Lochs SPA great black-backed gull population is scoped out of the appropriate assessment**.
  - Herring gull – this species was recorded flying within the 2 km study area during baseline surveys and is within possible foraging range to the Proposed Development. Likely significant effects are predicted and so the **East Caithness Cliffs SPA herring gull population is scoped into the appropriate assessment (refer to section 8.6)**.

### Conservation objectives

The Caithness and Sutherland Peatlands SPA and the East Caithness Cliffs SPA conservation objectives are detailed as follows:

- 1) To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the Proposed Development Area is maintained; and
- 2) To ensure for the qualifying species that the following are maintained in the long term:
  - (a) Population of the species as a viable component of the SPA;
  - (b) Distribution of species within the Proposed Development Area;
  - (c) Distribution and extent of habitats supporting the species;
  - (d) Structure, function and supporting processes of habitats supporting the species; and
  - (e) No significant disturbance of the species.

### Connectivity with SSSIs

- 8.5.95. Shielton Peatlands SSSI (underlying the Caithness and Sutherland Peatlands SPA) is adjacent to the Proposed Development Area and includes a breeding bird assemblage as a qualifying feature which names foraging hen harrier and merlin within the citation (Table 8.5). As hen harrier and merlin would be within potential foraging range to the Proposed Development, likely significant effects are predicted and so the **Shielton Peatlands SSSI is scoped in to the EIA assessment (refer to section 8.6)**.
- 8.5.96. All other SSSIs underlying the Caithness and Sutherland Peatlands SPA (including: Dunbeath Peatlands SSSI, Loch Caluim Flows SSSI, Rumsdale Peatlands SSSI and Strathmore Peatlands SSSI) which collectively include qualifying features of breeding common scoter, dunlin, golden plover, greenshank, wigeon (Table 8.5) are predicted to have no significant effects due to the reasons stated above in section: **Caithness and Sutherland Peatlands SPA**. These SSSIs also include a breeding bird assemblage as a qualifying feature and although hen harrier, merlin and red-throated divers are included as named species within the citations, these SSSIs are all beyond foraging range to the Proposed Development. Consequently, **Dunbeath Peatlands SSSI, Loch Caluim Flows SSSI, Rumsdale Peatlands SSSI and Strathmore Peatlands SSSI are scoped out of the assessment**.
- 8.5.97. All SSSIs underlying the Caithness Lochs SPA (including: Broubster Leans SSSI, Loch Calder SSSI, Loch Heilen SSSI, Loch of Wester SSSI, Loch Scarmclate SSSI and Loch Watten SSSI) which collectively include qualifying features of non-breeding Greenland white-fronted goose, greylag goose and whooper swan are predicted to have no significant effects due to the reasons stated above in section: **Caithness Lochs SPA**. Broubster Leans SSSI also includes a breeding bird assemblage as a qualifying feature (Table 8.5), but there are no species named within the citation that would be within potential foraging range of the Proposed Development. Consequently, **Broubster Leans SSSI, Loch Calder SSSI, Loch Heilen SSSI, Loch of Wester SSSI, Loch Scarmclate SSSI and Loch Watten SSSI are scoped out of the assessment**.
- 8.5.98. Lambsdale Leans SSSI includes a breeding bird assemblage as a qualifying feature (Table 8.9) and of the species named within the citation, only breeding greylag goose would be within potential foraging range (15-20 km) of the Proposed Development (14.3 km from the SSSI). However, the lack of foraging records for this species recorded during baseline surveys as well as the lack of suitable foraging habitat (Mitchell, 2012<sup>47</sup>), show that greylag geese are unlikely to be part of the SSSI breeding population. Consequently, the **Lambsdale Leans SSSI is scoped out of the assessment**.

### Features brought forward for assessment

- 8.5.99. Based on the information presented in the previous sections of this chapter, seven species (Table 8.14) have been scoped into the assessment as IOFs of medium or high NCI (Table 8.1).

Table 8.14: Scoped in IOFs

Feature	NCI	Reason for Inclusion
Hen harrier	High	Designated feature listed under Caithness and Sutherland Peatlands SPA, Annex 1, Schedule 1 and BoCC Red list.
Merlin	High	Designated feature listed under Caithness and Sutherland Peatlands SPA, Annex 1, Schedule 1 and BoCC Red list.
Osprey	Medium	Annex 1, Schedule 1.
Red-throated diver	High	Designated feature listed under Caithness and Sutherland Peatlands SPA, Annex 1 and Schedule 1.
Curlew	Medium	BoCC Red list.
Lapwing	Medium	BoCC Red list.
Herring gull	High	Designated feature listed under East Caithness Cliffs SPA and BoCC Red list.

8.5.100. It is necessary to consider the conservation status of any scoped in IOFs and these are detailed in Table 8.15.

Table 8.15: Conservation status of scoped in IOFs

Feature	Conservation Status	Information
Hen harrier	Annex 1, Schedule 1 and BoCC Red list	<p>Hen harrier is Red-listed due to an historical decline in the UK without substantial recent recovery (Balmer <i>et al.</i>, 2013<sup>50</sup>).</p> <p>In the UK plus the Isle of Man, numbers increased from 630 pairs in 1988-89 to 806 pairs in 2004; however, numbers fell again to 662 pairs in 2010 (Balmer <i>et al.</i>, 2013<sup>50</sup>). Woodward <i>et al.</i> (2020<sup>51</sup>) reported a further decrease to 545 pairs in 2016. Eaton <i>et al.</i> (2022<sup>52</sup>) state a decrease in breeding birds of 29% over 12 years, thus, the national population is considered to be in unfavourable conservation status.</p> <p>Scotland holds the bulk of the population with an estimated 460 breeding pairs in 2016 (Challis <i>et al.</i>, 2020<sup>53</sup>) and 350-450 individuals in winter (Forrester <i>et al.</i>, 2012<sup>54</sup>).</p> <p>The NHZ 5 population was estimated by Wilson <i>et al.</i> (2015<sup>55</sup>) to be 38 (range 35-40) pairs in 2011. Fielding <i>et al.</i> (2011<sup>56</sup>) considered that although 76% of the area of NHZ 5 contains suitable hen harrier habitat, and fledgling rate is</p>

<sup>50</sup> Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. and Fuller, R.J. 2013. Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Theford.

<sup>51</sup> Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. and Noble, D. 2020. Population estimates of birds in Great Britain and the United Kingdom. British Birds 113: 69-104.

<sup>52</sup> Eaton, M. and the Rare Breeding Birds Panel 2022. Rare breeding birds in the UK in 2020. British Birds 115: 623-686.

<sup>53</sup> Challis, A., Wilson, M.W., Schönberg, N., Eaton, M.A., Stevenson, A. and Stirling-Aird, P. 2020. Scottish Raptor Monitoring Scheme Report 2019. BTO Scotland, Stirling.

Feature	Conservation Status	Information
		<p>above 1.2 young per breeding attempt (NHZ 5 = 2.02 fledgling rate) and more than 44.1% of the surveyed habitat is occupied (NHZ 5 = 63.6% occupation), the population in NHZ 5 was considered to be in unfavourable conservation status as the density is below the density threshold criterion of 2.12 pairs per 100 km<sup>2</sup> (NHZ 5 = 1.78 pairs per 100 km<sup>2</sup>). The low density of hen harriers in some parts of NHZ 5 is considered possibly to be due to a shortage of suitable nesting habitat arising from excessive burning and grazing of open areas leading to a shortage of tall vegetation and/or, possibly due to under recording of the numbers of hen harriers nesting in forestry plantations (Fielding <i>et al.</i> 2011<sup>56</sup>). The regional/NHZ population is assessed to have an <b>unfavourable conservation status</b>.</p> <p>According to the SPA citation, the Caithness and Sutherland Peatlands SPA qualified under Article 4.1 of the Wild Birds Directive by providing habitat for around 14 pairs of hen harrier in 1999 and the Proposed Development Area condition was assessed as Favourable Maintained in June 2016.</p>
Merlin	Annex 1, Schedule 1 and BoCC Red list	<p>The breeding population of merlin in Britain has been subject of three national surveys; the last national merlin survey in 2008 estimated a British breeding population of around 1,128 breeding pairs (Ewing <i>et al.</i> 2011<sup>57</sup>). The national population increased between 1983-84 to 1993-94, but figures from 2008 suggest a subsequent 13% decline, although the 2008 estimate was not significantly different from the British estimate of the 1993-94 survey (Ewing <i>et al.</i>, 2011<sup>57</sup>; Balmer <i>et al.</i>, 2013<sup>50</sup>). Eaton <i>et al.</i>, (2022<sup>52</sup>) state a weak increase in breeding birds over 25 years, thus, the national population is considered to have a relatively stable population, albeit with regional differences in success.</p> <p>The merlin population estimate for Scotland in 2008 was 733 breeding pairs, constituting 63% of the total UK population (Ewing <i>et al.</i>, 2011<sup>57</sup>). Survey data suggest that there was no clear change in the Scottish population between national surveys in 1993-94 and 2008, and although counts in areas with high survey coverage (e.g. northeast Scotland) indicated declines in some regional populations, overall, these declines only resulted in a small, non-significant decrease (-7%) in Scotland as a whole across the two surveys (Ewing <i>et al.</i>, 2011<sup>57</sup>).</p> <p>The NHZ 5 population was estimated to be 71 (range 55-86) pairs in 2008 (Wilson <i>et al.</i> 2015<sup>55</sup>) and the latest analysis of Scottish Raptor Monitoring Scheme (SRMS) merlin data suggests that there has been no significant</p>

<sup>54</sup> Forrester, R.W., Andrews, I.J., McInerney, C.J., Murray, R.D., McGowan, R.Y., Zonfrillo, B., Betts, M.W., Jardine, D.C. and Grundy, D.S. eds. 2012. The digital birds of Scotland. The Scottish Ornithologists' Club, Aberlady.

<sup>55</sup> Wilson, M. W., Austin, G. E., Gillings, S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned Report number SWBSG 1504.

<sup>56</sup> Fielding, A., Haworth, P., Whitfield, P., McLeod, D. & Riley, H. (2011). A Conservation Framework for Hen Harriers in the United Kingdom. JNCC Report 441. Joint Nature Conservation Committee, Peterborough.

<sup>57</sup> Ewing, S. R., Rebecca, G.W., Heavisides, A., Court, I.R., Lindley, P., Ruddock, M., Cohen, S. and Eaton, M.A. (2011). Breeding status of Merlins *Falco columbarius* in the UK in 2008. Bird Study 58: 379-389.

Feature	Conservation Status	Information
		change in the number of breeding merlin within NHZ 5 between 2009-18 <sup>58</sup> . The regional/NHZ population is therefore assessed to have a <b>favourable conservation status</b> . According to the SPA citation, the Caithness and Sutherland Peatlands SPA qualified under Article 4.1 of the Wild Birds Directive by providing habitat for around 54 pairs of merlin in 1999 and the Proposed Development Area condition was assessed as Favourable Maintained in July 2004.
Osprey	Annex 1, Schedule 1 and BoCC Amber list	Ospreys became virtually extinct as a breeding species in Britain during the 1900's due to human persecution, but since natural recolonisation in the 1950's there has been a steady increase in range and abundance in Scotland and northern England (Balmer <i>et al.</i> 2013 <sup>50</sup> ). Woodward <i>et al.</i> (2020 <sup>51</sup> ) reported there to be 240 breeding pairs in the UK between 2013-17. Eaton <i>et al.</i> (2022 <sup>52</sup> ) state a strong increase in breeding birds (+239%) over 25 years, thus, the national population is considered to be in favourable conservation status. Scotland holds the bulk of the population with 230 breeding pairs estimated in 2017 (Challis <i>et al.</i> , 2020 <sup>53</sup> ). The NHZ 5 population was estimated by Wilson <i>et al.</i> (2015 <sup>55</sup> ) to be 8 (range 6-9) breeding pairs in 2013 and as the NHZ population likely reflects the rise in the national population, the regional/NHZ population is assessed to have a <b>favourable conservation status</b> .
Red-throated diver	Annex 1 and Schedule 1	Woodward <i>et al.</i> (2020 <sup>51</sup> ) estimated a UK population of 1,250 pairs in 2006. In the Scottish population as a whole, there has been considerable regional variation in trends. Breeding numbers in Scotland as a whole increased by 38% between 1994 and 2006, and with an apparent increase in numbers away from the Northern Isles, some of the highest densities are found in Caithness (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). Breeding range increased by 11% between 1968/72 – 2007/11, although a 9% range contraction was recorded between 1988/91 – 2007/11 (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). Eaton <i>et al.</i> (2022 <sup>52</sup> ) state an increase in breeding birds by 38% over 12 years, thus, the national population is considered to have a relatively stable population, albeit with regional differences in success. The NHZ 5 population was estimated by Wilson <i>et al.</i> (2015 <sup>55</sup> ) to be 58 (range 31-93) pairs in 2006 and is considered to be in <b>favourable conservation status</b> . According to the SPA citation, the Caithness and Sutherland Peatlands SPA qualified under Article 4.1 of the Wild Birds Directive by providing habitat for around 46 pairs of red-throated diver in 2006 and the Proposed Development Area condition was assessed as Favourable Maintained in July 2006.

Feature	Conservation Status	Information
Curlew	BoCC Red list	Curlew is Red-listed as breeding range contracted by 17% in Britain over the last 40 years and there has been a 44% population decline in the UK between 1995 – 2010 (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). Woodward <i>et al.</i> (2020 <sup>51</sup> ) reported there to be 58,500 breeding pairs in the UK in 2016. Population declines have been steepest in heather-dominated areas of the British uplands (Balmer <i>et al.</i> , 2013 <sup>50</sup> ) and the current Scottish population is now likely to be lower. The NHZ 5 population was estimated to be 1,737 (range 1,555-1,919) pairs in 2005 (Wilson <i>et al.</i> 2015 <sup>55</sup> ). Due to the decline in the national population, particularly in upland areas, the regional/NHZ population is assessed to have an <b>unfavourable conservation status</b> .
Lapwing	BoCC Red list	Lapwing is Red-listed due to decades of population decline (Schubb 2007), although despite this, lapwing is still the most widespread breeding wader species in Britain and Ireland (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). Declines in numbers are thought to have been brought about by changes in agricultural practices, particularly in lowland areas, although predation pressures may be important in some areas (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). Woodward <i>et al.</i> (2020 <sup>51</sup> ) reported there to be 97,500 breeding pairs in the UK in 2016. The BTO BirdTrends programme (Massimino <i>et al.</i> 2023 <sup>59</sup> ) has reported a national decline by 33 % across the UK, and 39 % in Scotland between 2008 and 2018. The NHZ 5 lapwing population is unknown but, (considering the breeding distribution map presented in Forrester <i>et al.</i> (2012 <sup>54</sup> ), there is likely to be a minimum of 2,000 breeding pairs in Caithness. Although population declines have particularly affected lowland areas, and some increases have occurred in some upland and northern regions of Britain including Sutherland region (Balmer <i>et al.</i> , 2013 <sup>50</sup> ), due to the decline in the national population and lack of accurate data, the regional/NHZ population is assessed to have an <b>unfavourable conservation status</b> .
Herring gull	BoCC Red list	Herring gull is Red-listed due to population decline in the UK: numbers declined by 48% between 1969-70 and 1985-88, 13% between 1985-88 and 1998-2002 (Joint Nature Conservation Committee (JNCC), 2021 <sup>60</sup> ) and 33% between 2000 and 2011 (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). In Scotland, the population declined by 23% between 1998-2002 (JNCC, 2021 <sup>60</sup> ). The greatest losses have been at coastal sites in western Ireland and western Scotland, although some gains have occurred in urban areas, particularly in eastern Scotland, North Wales and northern and southern England (Balmer <i>et al.</i> , 2013 <sup>50</sup> ). In Scotland, about 8% of herring gulls nest on buildings, the majority of rooftop

<sup>58</sup> <https://raptormonitoring.org/srms-species/falconiformes/merlin>

<sup>59</sup> Massimino, D., Woodward, I.D., Hammond, M.J., Barber, L., Barimore, C., Harris, S.J., Leech, D.I., Noble, D.G., Walker, R.H., Baillie, S.R. & Robinson, R.A. (2023) BirdTrends 2022: trends in numbers, breeding success and survival for UK breeding birds. Research Report 753. BTO, Thetford. [www.bto.org/birdtrends](http://www.bto.org/birdtrends)

<sup>60</sup> JNCC. 2021. Seabird Population Trends and Causes of Change: 1986–2019 Report available at <https://jncc.gov.uk/our-work/smp-report-1986-2019>.

Feature	Conservation Status	Information
		<p>colonies occur mainly on the east coast and across the central lowlands through Forth and Clyde valleys (Forrester <i>et al.</i>, 2012<sup>54</sup>).</p> <p>Woodward <i>et al.</i> (2020<sup>51</sup>) reported there to be 130,000 breeding pairs in the UK between 1998-2002. Between 1969-2002, the population in Scotland was estimated to be 72,130 breeding pairs (JNCC, 2021<sup>60</sup>) The herring gull NHZ 5 breeding population is estimated to be 2,953 pairs (Wilson <i>et al.</i> 2015<sup>55</sup>), which was based on the latest available complete Joint Nature Conservation Committee (JNCC) seabird census undertaken between 1998-2002 (Mitchell <i>et al.</i>, 2004<sup>47</sup>) and updated using NHZ-specific trend information derived from Seabird Monitoring Programme data<sup>61</sup>. Due to the decline in the national population, the regional/NHZ population is assessed to have an <b>unfavourable conservation status</b>, although in north-east Scotland the breeding distribution range has increased since 1968-72 (Balmer <i>et al.</i>, 2013<sup>50</sup>).</p> <p>According to the SPA citation, the East Caithness Cliffs SPA qualified under Article 4.2 of the Wild Birds Directive by regularly supporting 9,400 pairs of herring gulls in 1996, the Proposed Development Area condition was assessed as Unfavourable No change in June 2015.</p>

## 8.6. Assessment of Potential Effects

8.6.1. This section provides an assessment of the likely effects of the Proposed Development on the IOFs scoped into the assessment. The assessment of effects is based on the project description outlined in Chapter 5 and is structured as follows:

- construction effects – displacement through disturbance or direct habitat loss;
- operational effects – collision risk, displacement and lighting.

### Habitats Regulations Appraisal

8.6.2. In addition to their wider countryside populations, impacts relating to breeding hen harrier, merlin and red-throated diver also require consideration within the context of the Caithness and Sutherland Peatlands SPA via the HRA process (refer to section 'Consideration of SPA and Ramsar site Connectivity'). As previously stated, the Proposed Development is not directly connected to, or necessary for the management of, the SPA (Step 1) and it is considered likely to have a significant effect, either alone or in combination, on the SPA (Step 2). Step 3 therefore requires an Appropriate Assessment to be undertaken by the competent authority on the implications of the Proposed Development on the SPA's conservation objectives. This chapter provides information to inform the Appropriate Assessment.

### Construction - Displacement

8.6.3. The main likely impacts of construction activities associated with the Proposed Development are the displacement and disruption of breeding, foraging and roosting birds as a result of noise and visual disturbance over a short-

term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period – expected to be 12 months).

8.6.4. Impacts on birds would be confined to areas in the locality of temporary construction compounds, turbines, tracks and other infrastructure. Few attempts have been made to quantify the impacts of disturbance of birds due to activities of this type, and much of the available information is inconsistent. However, as a broad generalisation, larger bird species such as raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex habitats (such as woodland, scrub and hedgerow) (Hill *et al.* 1997<sup>39</sup>).

8.6.5. Direct habitat loss would also occur due to the Proposed Development's construction, which would be both temporary (e.g. construction compounds, etc) and long-term or permanent (access tracks and turbines). This has the potential to impact on breeding, foraging or roosting individuals.

### Hen harrier

8.6.6. **Impact:** breeding, roosting or foraging hen harrier may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.

8.6.7. **Sensitivity:** high NCI (Table 8.14) and unfavourable conservation status (Table 8.15); overall high sensitivity.

8.6.8. **Magnitude of Impact:** baseline surveys recorded one hen harrier nest site at HH\_1 in the 2020 breeding season within the Caithness and Sutherland Peatlands SPA. This breeding pair is part of the SPA population. The closest proposed infrastructure (turbine T2) to the HH\_1 nest site is approximately 1.9 km away. At this distance, direct disturbance to nesting birds during construction is considered unlikely (Goodship and Furness, 2022<sup>41</sup>). Breeding hen harrier have a core foraging range of 2 km (SNH, 2016a<sup>30</sup>) which means that the Proposed Development may be within potential foraging range from the HH\_1 nest site. However, baseline surveys in 2020 (the same year HH\_1 was active), recorded only one hen harrier flight over the Proposed Development and relatively high activity within approximately 1 km surrounding HH\_1 nest (Confidential Figure 8.2.2) indicating that the breeding pair at HH\_1 had very limited use of the Proposed Development Area for foraging at this time. Furthermore, baseline flight activity surveys found that generally fewer hen harrier flights were recorded during the breeding seasons over the Proposed Development Area (Figure 8.5, 1 flight in 2020, 14-22 flights in 2013 to 2014) compared with the non-breeding seasons (Figure 8.5, 2-38 flights in 2013/14 to 2020/21), indicating a limited use of the Proposed Development Area in the breeding seasons. Therefore, the breeding pair is likely to be able to breed and forage successfully without reduction in productivity. The unmitigated impact on breeding hen harrier is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude.

8.6.9. Roosting hen harrier are protected by law<sup>24</sup> and non-breeding season baseline surveys recorded two roost locations, one at HH\_R2 in 2020/21 and another at HH\_R1 in 2013/14 and 2014/15; HH\_R1 and HH\_R2 roost sites were located approximately 700 m and 520 m from the nearest infrastructure, respectively. It is possible that at least some birds breeding in the Caithness and Sutherland Peatlands SPA roost at least occasionally within 2 km of the Proposed Development Area.

8.6.10. Although NatureScot guidance<sup>24</sup> recommends a buffer of 500-750 m to protect roosting hen harrier, they also state that 'risk of "harassment" of roosting birds can be minimised by avoiding activity overnight and within two hours of dusk (two hours before official sunset time) and dawn (two hours after official sunrise time)'. At a distance of over 500 m from all proposed infrastructure, direct disturbance to roosting birds during construction is considered unlikely, however, embedded mitigation (Section 8.4) including avoiding construction activity within two hours of

<sup>61</sup> Seabird Monitoring programme data available at: <https://app.bto.org/seabirds/public/data.jsp>



dusk and dawn as recommended by NatureScot would, if necessary, be used to avoid any construction disturbance.

- 8.6.11. Some hen harrier roosts are repeatedly used year after year, but other sites are more transient<sup>24</sup>. HH\_R1 was an active winter roost site over two years between 2013 to 2015; this site was no longer in use by the time of the 2019/20 non-breeding season surveys (no roosting hen harrier were recorded during the 2019/20 non-breeding season), but in November 2020 a new roost site at HH\_R2 was recorded which was used until the last non-breeding survey in March 2021. These data suggest that there is a degree of flexibility in roost site choice in the area surrounding the Proposed Development meaning that hen harriers can move away from a perceived disturbance source if required.
- 8.6.12. Hen harrier flight activity was regularly recorded within the north-eastern part of the Proposed Development Area during the non-breeding seasons, and it is likely that roosting birds will venture into this part of the Proposed Development Area to forage (with the southern and western areas generally comprising unsuitable habitat during the baseline period). There is little evidence to determine to what extent foraging hen harriers may be affected by human activity (Goodship and Furness, 2022<sup>41</sup>), but localised, temporary displacement of foraging non-breeding birds in the northern area due to construction activity is possible. Embedded mitigation to avoid construction activity overnight and at dawn and dusk will help avoid disturbance to roosting hen harrier (Section 8.4, **Embedded Mitigation**) and although some foraging habitat may be lost/unavailable during the construction phase, the unmitigated impact on non-breeding roosting hen harrier is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude.
- 8.6.13. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 hen harrier population breeding and non-breeding populations as a result of construction is considered to be **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.14. **Significance of Effect (HRA):** based on the above information, no SPA hen harrier breeding pairs will likely be affected (productivity/ territory viability) by the Proposed Development and there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section '**Consideration of SPA and Ramsar site Connectivity**' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Merlin

- 8.6.15. **Impact:** breeding or foraging merlin may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.
- 8.6.16. **Sensitivity:** high NCI (Table 8.14) but favourable conservation status (Table 8.15); overall medium sensitivity.
- 8.6.17. **Magnitude of Impact:** baseline surveys indicated that the Proposed Development Area potentially hosts 1 pair of breeding merlin (breeding confirmed at ML\_1 in 2020 in an old crow's nest in a pine tree). Located at a distance of 450 m from the Caithness and Sutherland Peatlands SPA, the ML\_1 nest is within breeding merlin foraging range (up to 5 km, SNH, 2016a<sup>30</sup>) to the SPA, therefore, the breeding pair could be considered as part of the SPA population.
- 8.6.18. No turbine locations or infrastructure associated with the Proposed Development is situated within 500 m (considered to be the maximum disturbance distance for breeding merlin, Goodship and Furness, 2022<sup>41</sup>) of the nest location and consequently, construction disturbance and habitat loss will not directly affect merlin nesting.

Although some foraging habitat may be lost/unavailable during the construction period which may affect productivity, the impact would be short-term and recoverable and as merlin has a favourable conservation status (Table 8.15), it is not likely that any reduction in productivity for the pair during construction would result in a long-term impact at population level. The unmitigated impact on breeding merlin is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude on the NHZ 5 breeding population.

- 8.6.19. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 merlin population as a result of construction is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.20. **Significance of Effect (HRA):** based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section '**Consideration of SPA and Ramsar site Connectivity**' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Osprey

- 8.6.21. **Impact:** breeding or foraging osprey may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.
- 8.6.22. **Sensitivity:** medium NCI (Table 8.14) and favourable conservation status (Table 8.15); overall medium sensitivity.
- 8.6.23. **Magnitude of Impact:** baseline surveys indicated that there is one osprey breeding territory within the 2 km study area (one pair of breeding ospreys confirmed at OP\_2 in 2019 and 2020, at least one chick was present in the nest each year). Ospreys were suspected to be breeding at another location (OP\_1) within the 2 km study area in 2013 and 2014, but this nest wasn't occupied between 2019 to 2022; the evidence shows that only one nest site is occupied within the 2 km study area in any one year. No turbine locations or infrastructure associated with the Proposed Development is situated within 750 m of either nest location and consequently, construction disturbance will not directly affect osprey nesting.
- 8.6.24. Osprey breeding and foraging locations are strongly linked to fresh-waterbodies and the baseline surveys recorded osprey flight and foraging activity over Loch Toftingall. Although the Proposed Development Area lies between Loch Toftingall and the OP\_2 nest site, the minimum distance between the loch and any infrastructure associated with the Proposed Development is approximately 650 m and it is unlikely that any foraging habitat will be lost/unavailable during the construction period. Individual osprey pairs vary in their ability to habituate to human disturbance<sup>41</sup>, the stage of the breeding cycle at the time of the disturbance event can be important, but Swenson (1979<sup>62</sup>) suggested that if ospreys are habituated to human presence before nesting, the continued presence of human disturbance might not be detrimental to nesting success. In the UK, ospreys have been known to habituate to human disturbance, for example, pair of ospreys in Perthshire continued to breed normally in 2015 despite the occurrence of a music festival (T In The Park), which took place in the immediate surrounding area in the summer<sup>41</sup>. Given the above, it is considered unlikely that ospreys breeding at OP\_2 would be discouraged from foraging on Loch Toftingall due to construction activity. A BDPP (refer to Section 8.4, **Embedded Mitigation**) would be in place to ensure that any osprey breeding activity is undisturbed during the construction phase. The unmitigated impact on breeding osprey is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude on the NHZ population.
- 8.6.25. **Significance of Effect:** the unmitigated effect on the NHZ osprey population as a result of construction is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

<sup>62</sup> Swenson, J.E. 1979. Factors affecting status and reproduction of ospreys in Yellowstone National Park. Journal of Wildlife Management 43: 595-601.

### Red-throated diver

- 8.6.26. **Impact:** red-throated divers may be displaced from breeding or foraging lochs due to the impacts of construction activities. No direct habitat loss is predicted, with all infrastructure being located over 500 m from waterbodies.
- 8.6.27. **Sensitivity:** high NCI (Table 8.14) and favourable conservation status (Table 8.15); overall medium sensitivity.
- 8.6.28. **Magnitude of impact:** no breeding activity was recorded within 2 km surrounding the Proposed Development Area during the baseline surveys between 2013-2022, although one or two red-throated divers were occasionally present during breeding seasons on Loch Toftingall approximately 660 m from the nearest infrastructure. The divers recorded in the vicinity of Loch Toftingall during breeding season baseline surveys were likely non-breeders, either young birds or an adult pair that failed elsewhere and were therefore potentially less constrained in their choice of loafing and feeding locations than breeding birds would be. However, even if Loch Toftingall was to be considered as a potentially suitable breeding loch for red-throated diver, at a minimum distance of 660 m, the loch is considered beyond the minimum disturbance distance to any proposed infrastructure for this species (minimum disturbance buffer for breeding red-throated divers = 500 m, Goodship and Furness, 2022<sup>41</sup>). Furthermore, an area of forestry lies between the loch and the Proposed Development, further reducing the potential for any disturbance effects as a result of construction activities due to screening. Red throated diver activity surveys specifically recording red-throated diver flight to and from Loch Toftingall indicated that this species did not generally fly over the Proposed Development Area (Confidential Figure 8.2.5).
- 8.6.29. Baseline surveys recorded one red-throated diver nest site at RH\_1 in the 2013 breeding season on a loch within the Caithness and Sutherland Peatlands SPA. This breeding pair would be considered part of the SPA population. The closest infrastructure to the RH\_1 nest site is over 2.8 km away. At this distance, direct disturbance to nesting birds during construction is considered very unlikely (Goodship and Furness, 2022<sup>41</sup>). Breeding red-throated diver have a core foraging range of c.8 km (SNH, 2016a<sup>30</sup>) which means that the Proposed Development is within potential foraging range to the RH\_1 nest site. However, baseline surveys recorded relatively few red-throated diver flights over the Proposed Development Area during the baseline surveys (maximum of five flights recorded to and from RH\_1, Confidential Figure 8.2.5) and as the construction works for the Proposed Development will be temporary and short-term, any disturbance to foraging activity is unlikely to significantly affect productivity of the SPA pair at RH\_1. A BDPP (refer to Section 8.4, **Embedded Mitigation**) would be in place to ensure that any diver breeding activity is undisturbed during the construction phase. Although as a worst case some foraging habitat could be unavailable at Loch Toftingall during the construction period, flight data collected during the baseline surveys indicated that red-throated divers do not fly regularly over the Proposed Development Area (Confidential Figure 8.2.5). The unmitigated impact on breeding red-throated diver is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude.
- 8.6.30. **Significance of Effect:** the unmitigated effect on the NHZ 5 red-throated diver population as a result of construction is considered to be no more than **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.31. **Significance of Effect (HRA):** based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section '**Consideration of SPA and Ramsar site Connectivity**' for the SPA conservation objectives).

### Curlew

- 8.6.32. **Impact:** breeding or foraging curlew may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.
- 8.6.33. **Sensitivity:** medium NCI (Table 8.14) and unfavourable conservation status (Table 8.15); overall medium-high sensitivity.
- 8.6.34. **Magnitude of impact:** breeding bird surveys identified up to four curlew territories within 500 m from proposed infrastructure (turbines and access track) associated with the Proposed Development (Figure 8.10). The curlew NHZ 5 breeding population is estimated to be 1,737 pairs (Wilson *et al.* 2015<sup>55</sup>), and the potential (temporary) loss up to four curlew territories would result in a temporary loss of up to 0.23% of the breeding population.
- 8.6.35. This species has been shown to be affected by disturbance, particularly during construction (Pearce-Higgins *et al.* 2012<sup>63</sup>), so some displacement of breeding birds during the construction phase of the Proposed Development would be expected. It should be noted however, that it is unlikely that all breeding curlews would be entirely lost from the population during construction as there would be suitable breeding habitat within and surrounding the Proposed Development unaffected by construction activities, and therefore at least some affected breeding pairs may move to adjacent habitat. In addition the BDPP (and associated pre-construction surveys) and presence of ECoW during the construction period (Section 8.4, **Embedded Mitigation**) will ensure that there is no disturbance to active nests during construction, however some birds may still be displaced (temporarily) as a result of construction. As a worst-case (where breeding curlew would be lost rather than displaced), an effect of **low** and **short-term** magnitude is predicted.
- 8.6.36. **Significance of Effect:** the unmitigated effect on the NHZ 5 curlew population as a result of construction is considered to be at most **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Lapwing

- 8.6.37. **Impact:** breeding or foraging lapwing may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.
- 8.6.38. **Sensitivity:** medium NCI (Table 8.14) and unfavourable conservation status (Table 8.15); overall medium-high sensitivity.
- 8.6.39. **Magnitude of impact:** a maximum of two territories were recorded in 2013 within 500 m from all proposed infrastructure (turbines and access track) associated with the Proposed Development, but no lapwing territories were identified within this area in 2019 and 2020. A flock of up to 38 lapwings were recorded on three separate occasions within 500 m of the proposed turbines in July and August 2013 and it is likely that these sightings were post-breeding birds (Figure 8.10). The NHZ 5 lapwing population is unknown but based on a minimum of 2,000 breeding pairs in Caithness (Table 8.15), the potential (temporary) loss of two lapwing territories would result in a loss of up to 0.10% of the breeding population. It should however be noted that it is unlikely that all breeding lapwing activity would be entirely lost from the population during construction as there is additional suitable breeding habitat (wet grassland) to the east of the Proposed Development, and it is more likely that any lapwing that may have bred near the Proposed Development Area would be displaced to adjacent habitat. As a worst-case (where breeding lapwing would be lost rather than displaced), an impact of **low** and **short-term** magnitude is predicted.

<sup>63</sup> Pearce-Higgins, J.W., Stephen, L., Douse, A. and Langston, R.H.W. (2012). Greater impacts of Windfarms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. *Journal of Applied Ecology* 49: 386-394.

- 8.6.40. **Significance of Effect:** the unmitigated effect on the NHZ lapwing population as a result of construction is considered to be at most **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Herring gull

- 8.6.41. **Impact:** foraging herring gull may be displaced from the Proposed Development Area during construction, either by disturbance or direct habitat loss.
- 8.6.42. **Sensitivity:** high NCI (Table 8.14) and unfavourable conservation status although the breeding distribution in the north east of Scotland has increased since 1968-72 (Table 8.15); overall medium-high sensitivity.
- 8.6.43. **Magnitude of Impact:** no roosting or breeding behaviour was recorded during baseline surveys. Located at a distance of 13.7 km from the East Caithness Cliffs SPA, construction disturbance and habitat loss will not directly affect herring gull nesting, although as the Proposed Development is within breeding herring gull foraging range ( $58.8 \pm 26.8$  Km, Woodward et al., 2019<sup>43</sup>) to the SPA, breeding birds from the SPA could forage over the Proposed Development Area.
- 8.6.44. Herring gulls were recorded very infrequently on the ground during baseline surveys. Two sightings (flock size of 16 and 6 birds) were recorded within the 500 m of proposed infrastructure in May and July 2019, four other flocks of herring gulls (flock size of 3 to 110 birds) were recorded on the ground in 2019 over 700 m away from any proposed infrastructure. Considering the very limited availability of suitable foraging habitat within the Proposed Development Area which is predominantly moorland/upland habitat and limited potential foraging records it is not predicted that any foraging habitat lost/ made unavailable during the construction period would affect productivity. The impact on breeding herring gull is predicted to result in, at worst, an effect of **negligible** and **short-term** magnitude on the NHZ 5 breeding population.
- 8.6.45. **Significance of Effect (EIA):** the effect on the NHZ 5 herring gull population as a result of construction is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.46. **Significance of Effect (HRA):** based on the above information on breeding herring gull there is considered to be **no adverse effects on integrity** of the East Caithness Cliffs SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives).

### Construction Effects relating to Grid Connection

- 8.6.47. As outlined in Chapter 5 - Project Description, the transformers would be linked to the substation at Mybster via high voltage underground cables placed in trenches which would generally follow the route of the onsite tracks.
- 8.6.48. Due to the location of the onsite tracks within relatively low sensitivity habitats for IOFs (predominantly open land, conifer plantation or clearfell) and the usage of existing tracks, it is considered very unlikely that there will be any additive construction disturbance or habitat loss effects for IOFs above those described above for other Wind Farm infrastructure.

### Operation – Collision Risk

- 8.6.49. Birds that utilise the airspace within the Proposed Development Area at potential collision heights during the lifetime of the Proposed Development will be at risk of collision with turbines. The risk of collision with moving wind turbine blades may be related to various factors including the amount of flight activity over the Proposed

Development Area, the topography of the Proposed Development Area, the species' behaviour, and the ability of birds to detect and manoeuvre around rotating turbine blades.

- 8.6.50. Collision risk modelling was undertaken as part of the baseline survey analysis (refer to page 16, Table 8.10 and Technical Appendix A8.1: Ornithology Annex E Volume 3) which results in a figure for the predicted collision rate at the Proposed Development, to which the associated additional mortality is then (for those IOFs identified) assessed within the context of the species' relevant populations to determine the significance of any losses.

### Hen harrier

- 8.6.51. **Sensitivity:** high.
- 8.6.52. **Magnitude of Impact:** hen harrier were recorded on 150 occasions during flight activity surveys, but as hen harrier is typically a low flying species away from nest sites, the majority of flights were below potential collision risk height. Collision modelling predicted an annual collision risk of 0.0122 (or one bird every 82 years). This very small increase in baseline mortality is therefore predicted to result in an effect of negligible and long-term magnitude.
- 8.6.53. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 hen harrier population as a result of collisions is considered to be **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.54. **Significance of Effect (HRA):** Based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Merlin

- 8.6.55. **Sensitivity:** medium.
- 8.6.56. **Magnitude of Impact:** merlin were recorded on 9 occasions during flight activity surveys, with an annual collision risk of 0.0016 (or one bird every 619 years) predicted. This very small increase in baseline mortality is therefore predicted to result in an effect of negligible and long-term magnitude.
- 8.6.57. **Significance of Effect:** the unmitigated effect on the NHZ 5 merlin population as a result of collisions is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.58. **Significance of Effect (HRA):** Based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Osprey

- 8.6.59. **Sensitivity:** medium.
- 8.6.60. **Magnitude of Impact:** osprey were recorded on 16 occasions during flight activity surveys with an annual collision risk of 0.0214 (or one bird every 47 years). This very small increase in baseline mortality is therefore predicted to result in an effect of negligible and long-term magnitude.
- 8.6.61. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 osprey population as a result of collisions is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Red-throated diver

- 8.6.62. **Sensitivity:** medium.
- 8.6.63. **Magnitude of Impact:** red-throated were recorded on 3 occasions during flight activity surveys with an annual collision risk of 0.00002 (or one bird every 45,115 years). This negligible increase in baseline mortality is therefore predicted to result in an effect of negligible and long-term magnitude.
- 8.6.64. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 red-throated diver population as a result of collisions is considered to be at worst **Minor** and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.65. **Significance of Effect (HRA):** Based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives).

### Curlew

- 8.6.66. **Sensitivity:** medium-high.
- 8.6.67. **Magnitude of Impact:** curlew were recorded on 173 occasions during flight activity surveys with an annual collision risk of 0.0352 (or one bird every 28 years). The Caithness breeding population is considered to be at least 1,737 pairs and the additional mortality due to collision would be an increase over the baseline mortality rate (0.101, BTO BirdFacts<sup>64</sup>) of 0.01%. The increase in baseline mortality for curlew is considered to be of **negligible** and **long-term** magnitude.
- 8.6.68. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 curlew population as a result of collisions is considered to be at worst **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Lapwing

- 8.6.69. **Sensitivity:** medium-high.
- 8.6.70. **Magnitude of Impact:** lapwing were recorded on 102 occasions during flight activity surveys with an annual collision risk of 0.1074 (or one bird every 9.3 years). The Caithness breeding population is considered to be at least 2,000 pairs and the additional mortality due to collision would be an increase over the baseline mortality rate (0.295, BTO BirdFacts<sup>64</sup>) of 0.01%. The increase in baseline mortality for lapwing is considered to be of **negligible** and **long-term** magnitude.

<sup>64</sup> BTO BirdFacts website [Online] Available from -. <https://www.bto.org/understanding-birds/birdfacts> [Accessed: April 2023]

<sup>65</sup> Mortality rate from BTO Birds Facts [Online] Available from -. <https://app.bto.org/birdfacts/results/bob5921.htm> [Accessed: April 2023]

<sup>66</sup> <https://app.bto.org/seabirds/public/data.jsp> [Accessed 10/08/2023]

- 8.6.71. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 lapwing population as a result of collisions is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Herring gull

- 8.6.72. **Sensitivity:** medium-high.
- 8.6.73. **Magnitude of Impact:** Flight activity surveys recorded a total of 462 herring gull flights (Table 8.11, Figure 8.23, Appendix A8.1 Annex D Volume 3), of which 370 flights were identified to be 'at-risk', predicting a potentially high mean annual collision risk of approximately two birds (Table 8.12, Appendix A8.1 Annex E Volume 3). The herring gull NHZ 5 breeding population is estimated to be 2,953 pairs (Wilson *et al.* 2015<sup>65</sup>; Table 8.15). Based on the NHZ 5 breeding population of 2,953 with an adult mortality rate of 0.12<sup>65</sup> this would result in 0.28% increase in baseline mortality as a result of the operation of the Proposed Development which is not considered to have a significant impact on the regional NHZ 5 population.
- 8.6.74. As a worst-case scenario that all of the 'at-risk' birds were breeding birds from the East Caithness Cliffs SPA, based on the latest herring gull population of 3,267 pairs recorded at East Caithness Cliffs SPA in 2015<sup>66</sup>, with an adult mortality rate of 0.12<sup>65</sup> this would result in 0.25% increase in baseline mortality as a result of the operation of the Proposed Development. However, other herring gull colonies are present along the North Caithness coast within 20 km of the Proposed Development Area, and it is quite likely that at least some herring gulls recorded in flight during the baseline surveys were from other colonies outside of the East Caithness Cliffs SPA. This small increase in baseline mortality is therefore predicted to result in an effect of **negligible** and **long-term** magnitude.
- 8.6.75. **Significance of Effect (EIA):** the unmitigated effect on the NHZ 5 herring gull population as a result of collisions is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- Significance of Effect (HRA):** Based on the above information there is considered to be **no adverse effects on integrity** of the East Caithness Cliffs SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives).

### Operation – Displacement

- 8.6.76. The displacement of nesting and foraging birds from the Proposed Development Area has the potential to extend beyond the construction phase, as described above, and to occur during the operational phase. It is recognised that disturbance may occur due to maintenance activities throughout the operational phase, although since these are likely to be of shorter duration and smaller extent than construction activities, effects will be lower than those predicted for construction impacts (refer to previous section).
- 8.6.77. Displacement away from operational turbines has been found to occur in a number of individual wind farm studies, although the effects vary considerably between sites and species. Devereux *et al.* (2008<sup>67</sup>) showed that wind farms had no, or at most a minimal, effect on the local distribution of wintering farmland birds and across a range of breeding bird species but predominantly waders and passerines at upland wind farms, Pearce-Higgins *et al.* (2012<sup>63</sup>) found no displacement effects on any bird species at operating wind farms, other than where such displacement had already occurred during construction, and for some species the effects during construction were reversed during operation with numbers returning to pre-construction numbers. Consistent with the findings of Pearce-Higgins *et al.* (2012<sup>63</sup>), Hale *et al.* (2014<sup>68</sup>) found no evidence of displacement due to wind turbines in

<sup>67</sup> Devereux, C.L., Denny, M.J.H. and Whittingham, M.J. (2008). Minimal effects of wind turbines on the distribution of wintering farmland birds, *Journal of Applied Ecology* 45: 1689-1694.

<sup>68</sup> Hale, A.M., Hatchett, E.S., Meyer, J.A. and Bennett, V.J. (2014). No evidence of displacement due to wind turbines in breeding grassland songbirds. *Condor* 116: 472-482.

breeding grassland songbirds. However, Sansom *et al.* (2016<sup>69</sup>) suggested that breeding golden plovers may be affected by operational turbines up to 400 m away.

- 8.6.78. Pearce-Higgins *et al.* (2009<sup>70</sup>) observed certain species experiencing localised population increases with proximity to wind farm infrastructure installations, so while some birds may be displaced locally, others may benefit from the introduction of new structures into the habitat, or some other consequence of construction. This finding was further supported by Pearce-Higgins *et al.* (2012<sup>63</sup>) who reported significant increases in breeding numbers of skylarks and stonechats at wind farms.
- 8.6.79. An additional consideration is the displacement of birds from larger areas where the turbines act as a barrier to bird movement. The likelihood of this effect occurring tends to increase with wind farm size, where large turbine arrays can force birds to alter their regular flight-paths, resulting in an increase in distance flown and so energy expended. However, a review of the literature suggests that none of the barrier effects identified have significant effects on populations (Drewitt and Langston 2006<sup>71</sup>). This was also the conclusion from modelling of energy costs to those bird species most likely to be sensitive to barrier effects (large and long-lived breeding birds such as seabirds) by Masden *et al.* (2010<sup>72</sup>). Humphreys *et al.* (2015<sup>73</sup>) concluded that the extent to which barrier and displacement effects have been differentiated between in the field is however highly debatable as both are manifested as a reduction of birds within the wind farm (Cook *et al.* 2014<sup>74</sup>). It may be the case therefore that barrier effects during the breeding season have already been accounted for as displacement effects.

### Hen harrier

- 8.6.80. **Impact:** hen harrier may be at risk of displacement from foraging habitat, thereby impacting on productivity, fitness and survival rates.
- 8.6.81. **Sensitivity:** high.
- 8.6.82. **Magnitude of Impact:** evidence suggests that hen harrier is not very sensitive to displacement around operational wind farms. Studies conducted at Irish and Scottish wind farms (Madden and Porter 2007<sup>75</sup>; Robson 2012<sup>76</sup>; Haworth and Fielding 2013<sup>77</sup>) have all recorded harrier flights close to turbines. At Ben Aketil and Edinbane Wind Farms, harrier activity increased post-construction within a 500 m turbine buffer (Haworth and Fielding 2013<sup>77</sup>). Haworth and Fielding (2013<sup>77</sup>) and Pearce-Higgins *et al.* (2012<sup>63</sup>) concluded that there was no evidence for displacement impacts on hen harrier from operational wind farms.
- 8.6.83. Haworth and Fielding (2013<sup>77</sup>) present several examples, from within the UK, where harriers have been recorded nesting close to operating turbines. For example, at the Cruach Mhor Wind Farm in Argyll, harriers were first recorded nesting during the construction year (2003) and nesting has continued within a mean distance of 284 m to the closest turbine (range 131 – 476 m, 2003-2009) (ScottishPower Renewables 2009, cited in Haworth and Fielding 2013<sup>77</sup>). At the Paul's Hill Wind Farm, nesting harrier numbers near the wind farm site were similar during operation (mean 2.4, 2006-2010) to before construction (mean 2.6, 1991-2003), and were higher during

construction (mean 4.5, 2004-2005) with one nest at 110 m from construction activities (Forrest *et al.* 2011 cited in Haworth and Fielding 2013<sup>77</sup>).

- 8.6.84. Whitfield and Madders (2006<sup>78</sup>) concluded from a review of previous studies that if displacement of foraging hen harriers occurs, then it will likely be limited to within 100 m of wind turbines, if it occurs at all. Haworth and Fielding (2013<sup>77</sup>) found no clear evidence of hen harrier foraging displacement at distances beyond 100 m from turbines at wind farms in Scotland, concluding their review '*even if the effects of wind farms are much larger than the available evidence suggests it is highly unlikely that these effects would result in significant population level effects*'. Based on the evidence presented, it is considered that a 100 m displacement distance is likely to be a reasonable extent of possible effects on hen harrier activity around turbines at the Proposed Development.
- 8.6.85. One hen harrier nest site (HH\_1) was recorded during the 2020 breeding season baseline surveys within the Caithness and Sutherland Peatlands SPA. At a distance of at least 1.9 km to the nearest infrastructure, direct operation disturbance effects on the HH\_1 nest is very unlikely. Furthermore, even though the Proposed Development is within potential foraging range to the HH\_1 nest site, baseline surveys indicated very limited foraging activity within the Proposed Development Area during the 2020 breeding season. The unmitigated impact on breeding hen harrier is predicted to result in, at worst, an effect of **negligible** and **long-term** magnitude.
- 8.6.86. Two hen harrier roosts were recorded during baseline surveys, the closest to the Proposed Development and also the most recent roost site (HH\_R2) recorded in 2020/21 is beyond 500 m from the nearest proposed turbine location and so direct displacement of nesting and roosting birds at that distance is unlikely (Goodship and Furness, 2022<sup>41</sup>). Even if displacement effects were of greater spatial extent, it appears that there is a degree of flexibility in roost site choice in the area surrounding the Proposed Development (refer to section 'Construction - Displacement'), and therefore the location of infrastructure would not prevent roosting attempts occurring. Although some foraging habitat may be lost within the north-eastern part of the Proposed Development Area during the operation period, the unmitigated impact on non-breeding roosting hen harrier is predicted to result in, at worst, an effect of **low** and **long-term** magnitude on the population.
- 8.6.87. **Significance of Effect (EIA):** the unmitigated effect from operational displacement is considered to be **Moderate** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.88. **Significance of Effect (HRA):** based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section '**Consideration of SPA and Ramsar site Connectivity**' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Merlin

- 8.6.89. **Impact:** merlin may be at risk of displacement from foraging habitat, thereby impacting on productivity, fitness and survival rates.

<sup>69</sup> Sansom, A., Pearce-Higgins, J. W and Douglas, D.J.T. (2016). Negative impact of wind energy development on a breeding shorebird assessed with a BACI study design. *Ibis* 158: 541-555.

<sup>70</sup> Pearce-Higgins, J. W., Stephen, L., Langston, R. H. W., Bainbridges, I. P., and Bullman, R. (2009). The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology*, 46: 1323-1331.

<sup>71</sup> Drewitt, A.L. and Langston, R.L.H. (2006). Assessing the impacts of wind farms on birds, *Ibis* 148: 29-42.

<sup>72</sup> Masden, E.A., Haydon, D.T., Fox, A.D. and Furness, R.W. (2010). Barriers to movement: Modelling energetic costs of avoiding marine windfarms amongst breeding seabirds. *Marine Pollution Bulletin* 60: 1085-1091.

<sup>73</sup> Humphreys, E.M., Cook, A.S.C.P., and Burton, N.H.K. (2015). Collision, Displacement and Barrier Effect Concept Note. BTO Research Report No. 669. British Trust for Ornithology, Thetford.

<sup>74</sup> Cook, A.S.C.P., Humphreys, E.M., Masden, E.A., & Burton, N.H.K. (2014). The avoidance rates of collision between birds and offshore turbines. *Scottish Marine and Freshwater Science Volume 5 Number 16*. Marine Scotland Science, Aberdeen.

<sup>75</sup> Madden, B. & Porter, B. 2007. Do wind turbines displace Hen Harriers *Circus cyaneus* from foraging habitat? Preliminary results of a case study at the Derrybrien wind farm, county Galway. *Irish Birds* 8: 231–236.

<sup>76</sup> Robson, P. 2012. Hen Harrier activity at Cruach Mhor windfarm. Review of monitoring data 2001-2011. SNH Sharing Good Practice Workshop - Assessing the impact of windfarms on birds, 3 April 2012.

<sup>77</sup> Haworth, P. F. and Fielding, A. H. (2013). Edinbane Windfarm: Ornithological Monitoring. A review of the spatial use of the area by birds of prey. Report for Vattenfall.

<sup>78</sup> Whitfield, D.P. & Madders, M. 2006. A review of the impacts of Windfarms on hen harriers *Circus cyaneus* and an estimation of collision avoidance rates. *Natural Research Information Note 1* (revised). Natural Research Ltd, Banchory, UK.

- 8.6.90. **Sensitivity:** medium.
- 8.6.91. **Magnitude of Impact:** as outlined above in the construction impacts section, turbine locations are not located within 500 m of any merlin nest sites and so direct displacement of nesting birds is unlikely (Goodship and Furness, 2022<sup>41</sup>).
- 8.6.92. As per NatureScot (SNH, 2016<sup>25</sup>) guidance, merlin foraging ranges may extend out to 5 km, and therefore the ML\_1 territory recorded within the Proposed Development Area in 2020 may overlap with the proposed turbine locations. The foraging range of merlin also means that ML\_1 territory potentially overlaps with the Caithness and Sutherland Peatlands SPA, therefore, the breeding pair at ML\_1 could be considered as part of the SPA population.
- 8.6.93. There is little evidence as to whether merlin are affected by the presence of turbines, or a wind farm development as a whole, although some studies (e.g. Pearce-Higgins *et al.* 2012<sup>63</sup>) have shown that merlin prey species such as skylark are largely unaffected, meaning that reduction in food availability is unlikely to be a relevant factor. Similar to many raptor species, the majority of merlin hunting activity during the breeding season is likely to take place close to nest sites and therefore a buffer of 500 m between a nest site and the nearest turbine is likely to enable much foraging to continue, should the nest be in similar location in future years. The ML\_1 is located in a pine tree and as there are no plans to fell the forestry in this part of the Proposed Development Area, there will be no changes to the habitat within 500 m of ML\_1. As a worst case, some foraging habitat could potentially be lost during the operation period, which may affect productivity, but as merlin has a favourable conservation status at an NHZ level (Table 8.15), it is not likely that this would result in an impact at population level. The unmitigated impact on breeding merlin is predicted to result in, at worst, an effect of **negligible** and **long-term** magnitude.
- 8.6.94. **Significance of Effect:** the unmitigated effect from operational displacement is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.95. **Significance of Effect (HRA):** based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Osprey

- 8.6.96. **Impact:** osprey may be at risk of displacement from foraging habitat, thereby impacting on productivity, fitness and survival rates.
- 8.6.97. **Sensitivity:** medium
- 8.6.98. **Magnitude of Impact:** the operational Halsary Wind Farm is adjacent to the west of the Proposed Development. As the Proposed Development lies between Loch Toftingall and the OP\_2 nest site that was used in 2019 and 2020 (located approximately 1.28 km from the nearest proposed turbine) the operational turbines from both wind farms could theoretically cause a barrier effect for foraging ospreys breeding at OP\_2. However, relatively few flightlines (Confidential Figure 8.2.4 and Figure 8.7) were recorded during baseline surveys passing within 500 m of the proposed turbine layout when the OP\_2 nest was active and therefore Loch Toftingall seems unlikely to be the main feeding location for the OP\_2 pair. It is considered likely that in the longer term any ospreys breeding at OP\_2 would become habituated to the presence of a wind farm and are unlikely to be discouraged from foraging on Loch Toftingall due to the presence of wind turbines. Furthermore, osprey breeding activity is not restricted to one location within the 2 km study area, and at least one other nest site exists (OP\_1) which was suspected to be active in 2013 and 2014. As the OP\_1 nest is located to the west of the Proposed Development Area, ospreys

breeding in this location have direct access to Loch Toftingall without any potential barrier effect due to turbines. The unmitigated impact on breeding osprey is therefore predicted to result in, at worst, an effect of **negligible** and **long-term** magnitude.

- 8.6.99. **Significance of Effect:** the unmitigated effect from operational displacement is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### Red-throated diver

- 8.6.100. **Impact:** nesting, foraging or loafing red-throated divers may be subject to displacement from, or reduced access to lochs due to the presence of turbines or other infrastructure, thereby impacting on breeding success, productivity or survival rates.
- 8.6.101. **Sensitivity:** medium.
- 8.6.102. **Magnitude of Impact:** although the wider local area has many waterbodies and is used by red-throated divers, no breeding activity was recorded within 2 km surrounding the Proposed Development Area during the baseline surveys between 2013-2022. Red-throated divers were recorded at Loch Toftingall located approximately 660 m from the nearest proposed turbine during breeding season baseline surveys, but divers recorded in this location were considered to be likely non-breeders, either young birds or an adult pair that failed elsewhere. However, even if Loch Toftingall was to be considered as a potentially suitable breeding loch for red-throated divers, at a minimum distance of 660 m, the loch is considered beyond the minimum displacement distance to any proposed infrastructure for this species (minimum disturbance buffer for breeding red-throated divers = 500 m, Goodship and Furness, 2022<sup>41</sup>). Furthermore, an area of forestry lies between the Loch Toftingall and the Proposed Development, further reducing the potential for any displacement effects.
- 8.6.103. One red-throated diver nest site (RH\_1) was recorded within the Caithness and Sutherland Peatlands SPA in 2013. At a distance of 2.8 km from any proposed infrastructure, no direct displacement of nesting birds during operation will occur. The Proposed Development is within red-throated diver core foraging range (c.8 km, SNH, 2016a<sup>30</sup>) from the RH\_1 site, and although baseline surveys indicated relatively few red-throated diver flights to and from RH\_1, some flights were recorded flying north and west over the Proposed Development (Confidential Figure 8.2.5). Therefore, there is a possibility that the operational phase of the Proposed Development alongside the operational Halsary Wind Farm adjacent to the west could result in a barrier effect, limiting the ability of red-throated divers breeding around RH\_1 to forage on Loch Toftingall beyond the Proposed Development. However, the adjacent habitat west of RH\_1 within the Caithness and Sutherland Peatlands SPA and outside the SPA is known to be suitable for breeding and foraging divers. Furthermore, red-throated diver flight activity from RH\_1 was highest around lochs over 1.5 km south of the Proposed Development Area within the SPA (Confidential Figure 8.2.5), indicating that divers at RH\_1 mainly forage in lochs south of the Proposed Development. It is therefore considered that although as a worst case some foraging habitat at Loch Toftingall may be unavailable during the operation period, the unmitigated impact on breeding red-throated diver is predicted to result in an effect of **negligible** and **long-term** magnitude.
- 8.6.104. **Significance of Effect:** the unmitigated effect on the NHZ 5 red-throated diver population from operational displacement is considered to be no more than **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.105. **Significance of Effect (HRA):** whilst there is potential for a likely significant effect predicted (arising from potential operational barrier displacement), based on the above consideration there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives).

## Curlew

- 8.6.106. **Impact:** nesting or foraging curlew may be at risk of displacement from habitat around turbines or other infrastructure, thereby impacting on productivity or survival rates.
- 8.6.107. **Sensitivity:** medium-high
- 8.6.108. **Magnitude of impact:** up to four curlew breeding territories were recorded within 500 m from all proposed infrastructure (turbines and access track) associated with the Proposed Development (Figure 8.10). As there is evidence that curlew nest densities may be reduced within 800 m of turbines (Pearce-Higgins *et al.* 2009<sup>70</sup>, Pearce-Higgins *et al.*, 2012<sup>63</sup>), it is considered that at least some of these pairs may be permanently lost during the lifetime of the Proposed Development. However, it should be noted that Whitfield *et al.* (2010<sup>79</sup>) offers little support to the hypothesis that breeding curlew are displaced by operational turbines (even at 200 m). In addition, the authors suggested that breeding curlew are not sensitive to disturbance and that there is no correlation between nesting success and turbine proximity (Whitfield *et al.* 2010<sup>79</sup>). The curlew NHZ 5 breeding population is estimated to be 1,737 pairs (Wilson *et al.* 2015<sup>55</sup>), and as a worst-case (where breeding birds would be lost rather than displaced), this would result in a loss of up to 0.23% of the breeding population. However, as the majority of breeding curlews recorded during baseline surveys were beyond 500 m to the north and east of the Proposed Development it is more likely that at least some curlews that may have bred within 500 m to the Proposed Development would be displaced to adjacent habitat. As such an effect of **low** and **long-term** magnitude is predicted.
- 8.6.109. **Significance of Effect:** the unmitigated effect from operational displacement is considered to be at most **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

## Lapwing

- 8.6.110. **Impact:** nesting or foraging lapwing may be at risk of displacement from habitat around turbines or other infrastructure, thereby impacting on productivity or survival rates.
- 8.6.111. **Sensitivity:** medium-high
- 8.6.112. **Magnitude of impact:** lapwings were predominately recorded beyond 500 m from any infrastructure associated with the Proposed Development (Figure 8.10). A maximum of two territories were recorded in 2013 within 500 m from all proposed infrastructure (turbines and access track) associated with the Proposed Development, and so the worst case is that these territories may be lost from the breeding population. The NHZ 5 lapwing population is unknown but based on a minimum of 2,000 breeding pairs in Caithness (Table 8.15), the displacement of two lapwing pairs would result in a loss of up to 0.10% of the breeding population. As a worst-case (where breeding birds would be lost rather than displaced), an impact of **low** and **long-term** magnitude is predicted.
- 8.6.113. **Significance of Effect:** the unmitigated effect from operational displacement is considered to be at most **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

## Herring gull

- 8.6.114. **Impact:** foraging herring gull may be at risk of displacement from habitat around turbines or other infrastructure, thereby impacting on productivity or survival rates.
- 8.6.115. **Sensitivity:** medium-high
- 8.6.116. **Magnitude of Impact:** no roosting or breeding behaviour was recorded during baseline surveys. Few foraging birds were recorded during baseline surveys, birds that were recorded foraging in 2019 were mainly recorded

beyond 500 m from any infrastructure associated with the Proposed Development. Considering the very limited availability of suitable foraging habitat within the Proposed Development Area and the limited number of foraging records it is not considered that any foraging habitat lost as a result of the operation of the Proposed Development would affect productivity. The impact on breeding herring gull is predicted to result in, at worst, an effect of **negligible** and **short-term magnitude** on the NHZ 5 breeding population.

- 8.6.117. **Significance of Effect (EIA):** the effect on the NHZ 5 herring gull population from operational displacement is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.118. **Significance of Effect (HRA):** based on the above information on breeding herring gull there is considered to be **no adverse effects on integrity** of the East Caithness Cliffs SPA under the Habitat Regulations (refer to section 'Consideration of SPA and Ramsar site Connectivity' for the SPA conservation objectives).

## Operation – Lighting

As the wind turbines would be in excess of 150 m to blade tip, they are required to be lit pursuant to Article 222 of the UK Air Navigation Order (ANO) 2016. As advised by NatureScot (2020b<sup>33</sup>), there are potential wind turbine lighting impacts on birds which therefore require consideration within an EIA.

## All IOFs

- 8.6.119. **Impact:** wind turbine lighting could have various impacts on birds: they may be attracted to lights and thereby placed at higher risk of collisions, have migration patterns disrupted, show avoidance of lights with a consequent displacement impact, or be subject to increased predation threat. NatureScot (2020b<sup>33</sup>) has identified attraction (phototaxis) as posing the principal threat to birds, in relation to wind turbines.
- 8.6.120. **Sensitivity:** high (hen harrier), medium-high (curlew, lapwing, herring gull) and medium (merlin, osprey, red-throated diver).
- 8.6.121. **Magnitude of impact:** In NatureScot's (2020a<sup>32</sup>) advice on the scope of assessment for wind turbine lighting, it is identified that an assessment of the possible impacts of lighting on birds may be required in the following three situations, where risk is greater:
- wind turbines on or adjacent to a seabird colony that hosts burrow nesting species;
  - wind turbines that are on or adjacent to protected areas that host large concentrations of wintering waterbirds, where such sites are located within open country away from other sources of artificial light; and
  - where wind farms are located on migratory corridors or bottlenecks for nocturnally migrating passerines.
- 8.6.122. It is clear that the Proposed Development does not fit the first two situations. In the case of migrating species, there is no evidence to suggest that the Proposed Development Area is of any importance as a migration route, with relatively few wildfowl flights recorded for example (Figure 8.16). The topography within the Proposed Development Area does not suggest that it would be a significant flight corridor (with birds more likely to follow the coastline or the River Thurso), and it is distant from coastal areas which would be of greater importance to continental migrants.
- 8.6.123. As such, based on the guidance provided by NatureScot (2020a, b), it is considered that there is little evidence to indicate that any species would be significantly impacted either negatively or positively by wind turbine lighting requirements of the Proposed Development. An impact of **negligible, long-term** magnitude is therefore predicted for all IOFs.

<sup>79</sup>Whitfield, D.P., Green, M. and Fielding, M.H. (2010). Are breeding curlew *Numenius arquata* displaced by wind energy developments? Natural Research Projects Ltd, Banchory.

- 8.6.124. **Significance of Effect:** the level of significance of wind turbine lighting on IOFs is predicted to be **Moderate/Minor or Minor/Negligible** adverse and therefore **Not Significant** in the context of the EIA Regulations.
- 8.6.125. **Significance of Effect (HRA):** based on the above information there is considered to be **no adverse effects on integrity** of the Caithness and Sutherland Peatlands SPA or the East Caithness Cliffs SPA under the Habitat Regulations (refer to section '**Consideration of SPA and Ramsar site Connectivity**' for the SPA conservation objectives). It also follows that there would be no significant effects on the Shielton Peatlands SSSI within the context of the EIA Regulations.

### Potential Decommissioning Effects

- 8.6.126. Decommissioning effects, because of the long timeframe until their occurrence (up to 35 years), are difficult to predict with confidence. For the purpose of this chapter they are considered to be similar to those of construction effects in nature, but of shorter duration, with the result being a restored habitat within an area where displaced birds will be able to return. Thus, effects assessed during construction are considered to apply to decommissioning.

## 8.7. Mitigation and Residual Effects

### Construction and Decommissioning

- 8.7.1. Section 8.6 presented the assessment of unmitigated construction effects on IOFs. With no significant unmitigated effects predicted, no specific mitigation, other than the embedded mitigation outlined in Section 8.4, **Embedded Mitigation** (including disturbance protection buffers for hen harrier and merlin, avoidance of construction activity within 750 m of hen harrier roost locations two hours either side of dawn and dusk, BDPP, ECoW and pre-construction surveys) is required for IOFs. These measures will aim to ensure that no breeding or roosting activity is disrupted by construction activities.
- 8.7.2. Given that no additional mitigation is required, the residual effects relation to construction (disturbance/habitat loss) and decommissioning (disturbance) remain as considered in Section 8.6, i.e. not significant within the context of the EIA Regulations, and no adverse effect on the integrity of the Caithness and Sutherland Peatlands SPA or East Caithness Cliffs SPA under the Habitats Regulations.

### Operation

- 8.7.3. Section 8.6 presented the assessment of unmitigated operation effects on IOFs. With no unmitigated significant effects predicted, no additional mitigation is specifically required. However, a HMP which forms part of the OBEMP is planned within the Proposed Development Area boundary, which would aim to provide additional mitigation and enhancement measures to habitats that would be beneficial for all IOFs. An OBEMP (as recommended by NatureScot in Table 8.1) is presented in Appendix A7.6, which would be finalised, and agreed with consultees prior to construction of the Proposed Development. The main features of the OBEMP that would benefit IOFs are:
- Improvements to habitats within the HMP area used by roosting and foraging hen harrier would aim to increase the quality of roost sites and abundance of prey species away from the risk of collisions with turbines. This measure would help limit adverse effects associated with a loss of foraging habitat due to displacement around turbines;
  - Improvements to habitats within the HMP area used by foraging merlin would aim to improve merlin foraging habitat away from the proposed turbine locations;

- Restoration and management to improve blanket bog and wet heath habitat to provide improved habitats for breeding waders (especially curlew) and raptor prey, and therefore potentially encourage raptors to forage within the management areas;
- Management of grazing so that a diverse sward and shrub level can be created, thereby providing suitable nesting habitat for waders, grouse and potentially raptors including merlin, away from turbines; and
- Monitoring would take place across the Proposed Development Area to record any IOF breeding activity.

- 8.7.4. Given the additional mitigation in the form of an HMP the outline of which is summarised above, the residual effects for the Caithness hen harrier population as a result of operation disturbance/displacement are considered to be reduced to **Moderate/Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations (refer to Table 8.4), and no adverse effect on the integrity of the Caithness and Sutherland Peatlands SPA under the Habitats Regulations.
- 8.7.5. With the HMP in place, the residual effects for the Caithness curlew and lapwing populations as a result of operation disturbance are considered to be reduced to **Minor** beneficial and therefore **Not Significant** in the context of the EIA Regulations.
- 8.7.6. The residual effects for merlin, red-throated diver, osprey and herring gull in relation to the operation phase remain as considered in Section 8.6, i.e. not significant within the context of the EIA Regulations, and no adverse effect on the integrity of the Caithness and Sutherland Peatlands SPA or East Caithness Cliffs SPA under the Habitats Regulations.

## 8.8. Cumulative and In-combination Effects Assessment

- 8.8.1. This section presents information about the potential cumulative effects of the Proposed Development combined with other projects that are located within NHZ 5. In-combination effects on the Caithness and Sutherland Peatlands SPA are also considered within an HRA context.
- 8.8.2. NatureScot (SNH, 2018b<sup>29</sup>) provides guidance on assessing the cumulative effects on birds and this assessment follows the principles set out in that guidance.
- 8.8.3. Cumulative effects may include cumulative disturbance-displacement, collision mortality, habitat loss or barrier effects. Some cumulative impacts (such as collision risk) may be summed quantitatively, but according to NatureScot (SNH, 2018b<sup>29</sup>) "*In practice, however, some effects such as disturbance or barrier effects may need considerable additional research work to assess impacts quantitatively. A more qualitative process may have to be applied until quantitative information becomes available for developments in the area, e.g. from post-construction monitoring or research*".

### Scope of Assessment

- 8.8.4. Based on the conclusions of the assessment presented in Section 8.6, and the embedded mitigation outlined in Section 8.4, **Embedded Mitigation**, the following have been scoped out of the cumulative/in-combination assessment:
- Cumulative/in-combination collision effects for all IOFs due to the negligible impact during the 35-year lifespan of the Proposed Development;
  - Cumulative/in-combination construction and operational displacement impacts on hen harrier and merlin: no loss of territory or impact on survival rate, no disturbance to roosting hen harrier and at worst some reduction in productivity (hen harrier and merlin);



- Cumulative/in-combination construction and operational impacts on breeding red-throated diver: no loss of nest site or impact on survival rate;
- Cumulative construction and operational impacts on breeding osprey: no loss of nest site or impact on survival rate; and
- Cumulative construction and operational impacts on breeding herring gull: no loss of nest site or impact on survival rate.

8.8.5. Based on the conclusions of the predicted effects of the Proposed Development alone for the NHZ 5 populations, the impacts on curlew and lapwing detailed in Table 8.16 have been taken forwards into the cumulative assessment below.

**Table 8.16: Effects scoped-in to the cumulative/in-combination assessment**

Species	Construction/Decommissioning	Operation
Osprey (NHZ 5)	-	-
Curlew (NHZ 5)	Breeding disturbance/displacement	Breeding disturbance/displacement
Lapwing (NHZ 5)	Breeding disturbance/displacement	Breeding disturbance/displacement
Hen harrier (NHZ 5)	-	-
Hen harrier (SPA)	-	-
Merlin (NHZ 5)	-	-
Merlin (SPA)	-	-
Red-throated diver (NHZ 5)	-	-
Red-throated diver (SPA)	-	-
Herring gull (NHZ 5)	-	-
Herring gull (SPA)	-	-

8.8.6. The main projects likely to cause similar effects to those associated with the Proposed Development are other operational wind farms, or those under construction, consented or in the planning process within NHZ 5 for the cumulative assessment. No other projects or activities subject to the EIA process have been identified for inclusion in the cumulative assessment.

8.8.7. Wind farm projects at scoping stage have been scoped out of the cumulative assessment because they usually do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing or results have not been published. Projects that have been refused (and are no longer capable of appeal) or withdrawn have also been scoped out of the cumulative assessment.

8.8.8. Small projects with three or fewer turbines have also been scoped out from the cumulative assessment as often these projects are not subject to the same level of detail of ornithological impact assessment and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IOFs assessed here. Other small-scale renewable projects such as micro-hydro schemes have also been scoped out for similar reasons. It should also be noted that it is highly unlikely that all projects within NHZ 5 would be consented, and even less likely that all would become operational at the same time, and so the additive values represent a highly precautionary assessment of potential cumulative effects.

8.8.9. Table 8.17 identifies the wind farm projects that have been considered in the cumulative assessment.

Table 8.17: Other wind farm projects within NHZ 5 (cumulative assessment).

Wind Farm	Status	Number of Turbines	Information Available	Species considered in the impact assessment	
				Curlew	Lapwing
Achany Estate	Operational	23	ES Chapter	-	-
Achlachan	Operational	5	ES Chapter	-	-
Bad a Cheo	Operational	13	ES Chapter	✓	-
Buolfrulich	Operational	15	No information available	-	-
Burn of Whilk	Operational	9	Non-Technical Summary	-	-
Camster	Operational	25	No information available	-	-
Causeymire	Operational	21	Causeymire post-construction report between April-July 2009	-	-
Gordonbush	Operational	35	Non-Technical Summary	-	-
Gordonbush extension	Operational	15	ES Chapter	-	-
Halsary	Operational	15	ES Chapter but Ornithology Chapter not available	-	-
Kilbraur Community Share	Operational	19	Non-Technical Summary	-	-
Kilbraur Extension	Operational	8	No information available	-	-
Rosehall	Operational	19	No information available	-	-
Strathy North	Operational	33	Report 1: Compilation of Historical and 2003-09 Bird Data and Collision Risk Modelling from 2003-08 Vantage Point Data	-	-
Wathegar 1	Operational	5	ES Chapter	-	-
Wathegar 2	Operational	9	ES Chapter	-	-
Creag Riabhach	Construction	22	ES Chapter	-	-
Braemore	Consented	18	ES Chapter, but details have been redacted.	-	-
Golticlay & Rumster - FCS wind lots	Consented	19	ES Chapter	-	-
Lairg 2	Consented	10	EIA Report, FEI 1 and 2 Reports	✓	-

Wind Farm	Status	Number of Turbines	Information Available	Species considered in the impact assessment	
				Curlew	Lapwing
Limekiln Extension	Consented	7	ES Chapter	-	-
Limekilns	Consented	24	ES V2 Chapter	-	-
Strath Tirry	Consented	4	Scoping Report and ES Chapter	-	-
Strathy South	Consented	39	ES Addendum Chapter, details redacted	-	-
Strathy Wood	Consented	13	ES Chapter	-	-
Achany Extension	Application	20	ES Chapter	✓	-
Armadale	Application	12	ES Chapter	✓	-
Chleansaid	Application	16	ES Chapter	-	✓
Garvary	Application	37	ES Chapter, but some details have been redacted	✓	-
Kintradwell	Application	15	ES Chapter	-	-
Sallachy	Application	9	ES Chapter	✓	-
Tormsdale wind farm	Application	12	ES Chapter	✓	✓

✓ = Species breeding within 500 m of the wind farm project and considered within impact assessment  
 - = Information not available or species not breeding within 500 m of the wind farm project and not considered in impact assessment

### Curlew

#### Predicted cumulative effects during construction – Disturbance.

8.8.10. A total of seven wind farms (from those where information was publicly available) within NHZ 5 considered curlew as part of their impact assessment (Table 8.18), of which one is already operational. Of the remaining six projects, Lairg 2 Wind Farm is already consented and it is therefore reasonably unlikely that the Proposed Development will be on a similar construction timescale to Lairg 2 Wind Farm. The remaining five wind farm projects (Achany Extension, Armadale, Garvary, Sallachy, Tormsdale) are at application stage and there is therefore the potential for the (temporary) loss of an additional 16 breeding pairs of curlew which would equate to a maximum cumulative loss (including the Proposed Development) of 17-20 pairs of curlew (up to 1.15% of the NHZ 5 population).

**Table 8.18: Cumulative disturbance/displacement effects for NHZ 5 projects assessing impacts on curlew: predicted loss of breeding pairs**

NHZ 5 Population (pairs)	Possible Loss of Pairs (Wind Farm Project)					Total	Percentage of NHZ 5 Population
	Operational	Construction	Consented	Application	Proposed Development		
1,737	2 (Bad a Cheo)	0	1 (Lairg2)	1 (Achany Extension) 5 (Armadale) 3 (Garvary) 1 (Sallachy) 6 (Tormsdale)	1 to 4	20 to 24	1.15 – 1.38

- 8.8.11. As detailed in the assessment for the Proposed Development alone (Section 8.6), it should be noted that it is unlikely that all breeding pairs of curlew would be permanently lost from the breeding populations as:
- curlew have been identified as a key ornithological feature within the OBEMP (section 8.7: **Mitigation and Residual Effects**) therefore there will continue to be suitable habitat adjacent to the Proposed Development that some pairs (if not all) may be displaced into;
  - there is evidence to indicate that there is limited correlation between nesting success and turbine proximity and that therefore at least some pairs may continue to nest successfully in proximity to turbines (Whitfield *et al.* 2010<sup>79</sup>).
- 8.8.12. In summary, the potential worst-case cumulative loss of breeding curlew NHZ 5 due to construction disturbance is considered to be less than 1 % of the NHZ population and **negligible** and **short-term** magnitude. The cumulative construction effect is therefore considered to be at most **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

**Predicted cumulative effects during construction – Displacement.**

- 8.8.13. A total of seven wind farms within NHZ 5 considered curlew as part of their impact assessment (Table 8.18), of which one is already operational. Information on the predicted effects on curlew and potential mitigation at these wind farms was limited. However, a total (including the Proposed Development) of 20-24 curlew territories (1.15-1.38% of the NHZ 5 breeding population) are potentially at risk of some level of disturbance or displacement at these wind farms. As detailed above in the assessment for the Proposed Development alone, it should be noted that it is unlikely that all breeding pairs of curlew would be permanently lost from the breeding populations as:
- curlew have been identified as a key ornithological feature within the OBEMP (section 8.7: **Mitigation and Residual Effects**) therefore there will continue to be suitable habitat adjacent to the Proposed Development that some pairs (if not all) may be displaced into;
  - some of the territories recorded at these projects may have been over 500 m from the turbines and were therefore not at risk of disturbance (it is often not clear in reports exactly where territories were recorded in relation to the final turbine design and ambiguity often exists over ‘survey area’ versus ‘study area’); and

- there is evidence to indicate that there is limited correlation between nesting success and turbine proximity (Whitfield *et al.* 2010<sup>79</sup>) and that therefore at least some pairs may continue to nest successfully in proximity to turbines.

- 8.8.14. It should also be noted that for the projects where breeding curlew were detailed in the documents available, there is a good deal of uncertainty regarding how many breeding pairs may be truly affected by disturbance-displacement at each project, the magnitude of any potential effects and any mitigation/habitat management that may offset any potential effects. These values should therefore be seen as worst-case estimates.
- 8.8.15. Overall, considering the NHZ 5 breeding pair population estimates, the potential worst-case cumulative loss of breeding curlew is considered to be less than 1 % of the NHZ 5 population and of **negligible** and **long-term magnitude**. The cumulative operational effect is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

**Lapwing**

**Predicted cumulative effects during construction – Displacement.**

- 8.8.16. Where information was publicly available, one wind farm (Tormsdale Wind Farm) within NHZ 5 considered lapwing as part of the impact assessment (Table 8.19). As the Tormsdale project is at application stage, there is a potential for the (temporary) loss of an additional 4 breeding pairs of lapwing which would equate to a maximum cumulative loss (including the Proposed Development) of 5-6 pairs of lapwing (up to 0.30% of the NHZ 5 population).
- 8.8.17. The potential worst-case (assuming that all pairs across both projects would be lost from the breeding population rather than displaced) cumulative loss of breeding lapwing within NHZ 5 due to construction disturbance is considered to be **negligible** and **short-term** magnitude (i.e. the same as for the Proposed Development alone). The cumulative construction effect is therefore considered to be at most **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

**Table 8.19: Cumulative disturbance/displacement effects for NHZ 5 projects assessing impacts on lapwing: predicted loss of breeding pairs**

NHZ 5 Population (pairs)	Possible Loss of Pairs (Wind Farm Project)					Total	Percentage of NHZ 5 Population
	Operational	Construction	Consented	Application	Proposed Development		
2,000	0	0	0	4 (Tormsdale)	1 to 2	5 to 6	0.25 – 0.30

**Predicted cumulative effects during construction – Displacement.**

- 8.8.18. Where information was publicly available, one wind farm (Tormsdale Wind Farm) within NHZ 5 considered lapwing as part of the impact assessment Table 8.18. There is a potential for the loss of an additional 4 breeding pairs of lapwing which would equate to a maximum cumulative loss (including the Proposed Development) of 5-6 pairs of lapwing (at most 0.30% of the NHZ 5 population, assumed to be at least 2,000 pairs).
- 8.8.19. Considering the NHZ 5 estimated breeding pair population estimates, the potential worst-case (assuming that all pairs would be lost from the breeding population rather than displaced) cumulative loss of breeding lapwing within

NHZ 5 is considered to be **negligible** and of **long-term magnitude**. The cumulative operational effect is considered to be **Minor** adverse and therefore **Not Significant** in the context of the EIA Regulations.

### 8.9. Summary of Effects

8.9.1. In summary, this chapter reports on the baseline ornithological conditions recorded within and around the Proposed Development Area and presents an assessment of likely significant effects on populations of identified target species.

Table 8.20: Summary of effects

Description of Effect	Significance of Potential Effect		Additional Mitigation measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
<b>Construction</b>					
Disturbance/ displacement of breeding or roosting hen harrier	Moderate/Minor and Not Significant	Adverse	None, other than embedded mitigation including BDPP and restriction of works activity overnight and at dawn and dusk during non-breeding season.	Moderate/Minor and Not Significant	Adverse
Disturbance/displacement of breeding merlin	Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding osprey	Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Minor and Not Significant	Adverse
Disturbance/ displacement of potentially breeding red-throated diver	Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding curlew	Moderate/Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Moderate/Minor and Not Significant	Adverse

Description of Effect	Significance of Potential Effect		Additional Mitigation measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
Disturbance/ displacement of breeding lapwing	Moderate/Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Moderate/Minor and Not Significant	Adverse
Disturbance/ displacement of foraging herring gull	Minor and Not Significant	Adverse	None, other than embedded mitigation of BDPP	Minor and Not Significant	Adverse
Disturbance/ displacement of qualifying ornithological features of Caithness and Sutherland Peatlands SPA	No Adverse Effect on the Integrity of the SPA		None, other than embedded mitigation of BDPP	No Adverse Effect on the Integrity of the SPA	
Disturbance /displacement of qualifying ornithological features of East Caithness Cliffs SPA	No Adverse Effect on the Integrity of the SPA		None, other than embedded mitigation of BDPP	No Adverse Effect on the Integrity of the SPA	
<b>Operation</b>					
Risk of collision: Hen harrier	Moderate/Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Moderate/Minor and Not Significant	Adverse
Risk of collision: Merlin	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Risk of collision: Osprey	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity	Minor and Not Significant	Adverse

Description of Effect	Significance of Potential Effect		Additional Mitigation measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
			Enhancement Management Plan)		
Risk of collision: red-throated diver	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Risk of collision: Curlew	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Risk of collision: Lapwing	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Risk of collision: Herring gull	Minor and Not Significant	Adverse	Annual monitoring, OHMPOBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding or roosting hen harrier	Moderate and Not Significant	Adverse	OBEMP monitoring (Appendix	Moderate/Minor and Not Significant	Adverse

Description of Effect	Significance of Potential Effect		Additional Mitigation measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
			A7.6: Outline Biodiversity Enhancement Management Plan)		
Disturbance/ displacement of breeding merlin	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding osprey	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding red-throated diver	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Disturbance/ displacement of breeding curlew	Moderate/Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Beneficial
Disturbance/ displacement of breeding lapwing	Moderate/Minor and Not Significant	Adverse	OBEMP monitoring (Appendix	Minor and Not Significant	Beneficial

Description of Effect	Significance of Potential Effect		Additional Mitigation measure	Significance of Residual Effect	
	Significance	Beneficial / Adverse		Significance	Beneficial / Adverse
			A7.6: Outline Biodiversity Enhancement Management Plan)		
Disturbance/ displacement of foraging herring gull	Minor and Not Significant	Adverse	OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	Minor and Not Significant	Adverse
Disturbance/ displacement of qualifying ornithological features of Caithness and Sutherland Peatlands SPA	No Adverse Effect on the Integrity of the SPA		OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	No Adverse Effect on the Integrity of the SPA	
Disturbance/ displacement of qualifying ornithological features of East Caithness Cliffs SPA	No Adverse Effect on the Integrity of the SPA		OBEMP monitoring (Appendix A7.6: Outline Biodiversity Enhancement Management Plan)	No Adverse Effect on the Integrity of the SPA	
Lighting effects on all IOFs	Moderate/Minor or Minor/Negligible and Not Significant	Adverse	None required	Moderate/Minor or Minor/Negligible and Not Significant	Adverse

### 8.10. Statement of Significance

8.10.1. For all IOFs taken forward into the assessment, the predicted residual effects during the construction, operation and decommissioning phases of the Proposed Development (alone or cumulatively) are considered to be no more than Moderate/Minor adverse (for 'High' sensitive species) and Minor adverse (for 'Medium' or Medium/High' for

sensitive species) and therefore not significant in the context of the EIA Regulations. In the longer-term with the implementation of the HMP, effects are likely to further reduce in severity and may result in a positive net gain for IOFs (and other species present within and around the Proposed Development).

### 8.11. Non-Technical Summary

- 8.11.1. In order to determine baseline conditions to inform the ornithology impact assessment, field surveys were undertaken from March 2013 to March 2015, April 2019 to March 2021 and March to August 2022.
- 8.11.2. Based on baseline survey results and historic data, seven Important Ornithological Features (IOFs) were taken forward for assessment, due to identified potential for significant effects from the Proposed Development: hen harrier, merlin, osprey, red-throated diver, curlew, lapwing and herring gull. Shielton Peatlands Site of Special Scientific Interest (SSSI) which is adjacent to the Proposed Development Area, was also taken forward for assessment, due to identified potential for significant effects from the Proposed Development on the breeding bird assemblage which names foraging hen harrier and merlin as part of the designated features.
- 8.11.3. It was also concluded that prior to further assessment as part of the HRA process, a Likely Significant Effect could not be discounted for the Caithness and Sutherland Peatlands Special Protection Area (SPA), designated for, among other features, its breeding populations of hen harrier, merlin and red-throated diver; and the Caithness and Sutherland Peatlands Ramsar site which includes breeding red-throated diver as a qualifying feature. These sites are adjacent to the east and south Proposed Development Area. A Likely Significant Effect also could not be discounted for the East Caithness Cliffs SPA designated for, among other features, its breeding population of herring gull. This site is located 15.4 km southeast of the Proposed Development.
- 8.11.4. Ornithological interests were taken into consideration during the iterative design layout process. The following embedded mitigation is integral to the final layout:
  - Locating infrastructure at least 500 m from any known nest site of a Schedule 1 breeding species; and
  - Locating infrastructure at least 750 m during the construction phase and 500 m during the operation phase from potential hen harrier roost sites.
- 8.11.5. Construction, operational and decommissioning effects were considered for each IOF.
- 8.11.6. Construction effects included temporary and long-term habitat loss, and disturbance over a short-term construction period. The Development's design iteration process identified at an early stage the potential for IOFs to be disturbed during construction, and so efforts were made to avoid locating infrastructure close to important habitats. This means that the likelihood of disturbance to nest and roost sites of Schedule 1 species in particular is low.
- 8.11.7. Unmitigated, a construction disturbance effect of Moderate/Minor adverse and Not Significant was predicted for the hen harrier, curlew and lapwing Natural Heritage Zone (NHZ) 5 populations and an effect of Minor adverse and Not Significant was predicted for the merlin, osprey, red-throated diver and herring gull populations. A Bird Disturbance Protection Plan is proposed which would ensure reasonable measures are taken to avoid the destruction or disturbance of any nest site, with additional species-specific temporal and spatial restrictions around hen harrier roosts.
- 8.11.8. Operational effects (displacement and collision risk) were considered for each IOF. Again, the design iteration process took these into consideration, thereby minimising risks. Unmitigated, a displacement effect of Moderate adverse and Not Significant was predicted for the NHZ 5 population of non-breeding roosting hen harrier and Moderate/Minor and Not Significant was predicted for breeding curlew and lapwing. Non-significant unmitigated effects were predicted for all other IOFs and effects. With habitat management as part of a Habitat Management

Plan offering improvements to breeding, foraging and roosting habitats away from the Proposed Development for all IOFs, the residual effects were no more than Moderate/Minor adverse for hen harrier and Minor beneficial for curlew and lapwing and therefore Not Significant for all IOFs.

- 8.11.9. Decommissioning effects were considered to be similar to those predicted for construction effects and were no more than Moderate/Minor adverse and Not Significant for each IOF when mitigation is considered.
- 8.11.10. No adverse effects on the integrity of the Caithness and Sutherland Peatlands SPA and Ramsar site, or the East Caithness Cliffs SPA were predicted as a result of the Proposed Development, when mitigation measures were taken into consideration.
- 8.11.11. Cumulative operational effects on curlew and lapwing were assessed for other projects at an NHZ 5 level. For these species, a worst-case cumulative displacement scenario (assuming all projects become fully operational) would lead to a minor adverse effect, but the contribution of the Proposed Development towards the cumulative effect would be negligible, when habitat management is considered.

# Chapter 9

## Hydrology, Geology and Hydrogeology

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area)

## List of Abbreviations

Abbreviation	Description
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
BGS	British Geological Society
CAR	Controlled Activity Regulations
CEMP	Construction Management Plan
CIRIA	Construction Industry Research and Information Association
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FOI	Freedom of Information
GIR	Ground Investigation Reports
GWDTE	Groundwater Dependent Terrestrial Ecosystems
OBEMP	Outline Biodiversity Enhancement Management Plan
PMP	Peat Management Plan
PLHRA	Peat Landslide Hazard Risk Assessment
PPP	Pollution Prevention Plan
PWS	Private Water Supplies
RBMP	River Basin Management Plans
SAC	Special Area of Conservation
SEPA	Scottish Environmental Protection Agency
SSSI	Site of Specific Interest
SuDS	Sustainable Drainage System
THC	The Highland Council
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WHS	World Heritage Site
WFD	Water Framework Directive

## 9.1. Introduction

- 9.1.1. This chapter of the Environmental Impact Assessment Report (EIAR) evaluates the effects of the Watten Wind Farm (the “Proposed Development”) on surface water hydrology, geology and hydrogeology, including peat deposits, terrestrial and aquatic habitats, and protected species. This assessment was undertaken by MacArthur Green. All staff contributing to this chapter have professional experience in hydrological impact assessment and surveys.
- 9.1.2. This chapter of the EIAR is supported by the following Figures provided in Volume 2: Figures:
- Figure 9.1: Proposed Development Area and Study Areas;
  - Figure 9.2: Hydrological Constraints;
  - Figure 9.3: Watercourse Crossings Visible on 1:25,000 Basemapping;
  - Figure 9.4: Watercourse Crossings (Aerial Imagery);
  - Figure 9.5: Bedrock Geology;
  - Figure 9.6: Superficial Geology;
  - Figure 9.7: Hydrological Catchments;
  - Figure 9.8: Phase 1 & 2 Peat Depth Sample & Coring Locations;
  - Figure 9.9: Phase 1 & 2 Peat Depth Sample Results;
  - Figure 9.10: Phase 1 & 2 Interpolated Peat Depth;
  - Figure 9.11: Proposed Development Infrastructure and Peat Excavation; and
  - Figure 9.12: Hydrology Study Area and Identified Private Water Supply Locations.
- 9.1.3. This chapter of the EIAR is supported by the following Technical Appendix documents provided in Volume 3: Technical Appendices:
- 9.1 Watercourse Crossing Assessment;
  - 9.2 Private Water Supply Risk Assessment;
  - 9.3 Ground Water Dependent Terrestrial Ecosystem Assessment;
  - 9.4 Phase 1 and Phase 2 Peat Depth and Coring Survey Report;
  - 9.5 Draft Peat Management Plan;
  - 9.6 Carbon Calculator Assessment; and
  - 9.7 Peat Hazard and Landslide Risk Assessment.
- 9.1.4. This chapter includes the following sections:

- Legislation, Policy and Guidance;
- Consultations;
- Assessment Methodology and Significance Criteria;
- Baseline Description;
- Assessment of Potential Effects;
- Mitigation and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Effects; and
- Statement of Significance.

## 9.2. Legislation, Policy and Guidance

- 9.2.1. The following international, national and regional legislation, best practice guidance and advice has been taken into consideration in the preparation of this chapter and shall be considered to provide the basis for the implementation of good environmental practice, regarding water resources in the Proposed Development Area.
- 9.2.2. International legislation relevant to this assessment comprises:
- Water Framework Directive 2000/60/EC<sup>1</sup>;
  - Environmental Impact Assessment Directive 2014/52/EU (the EIA Directive)<sup>2</sup>; and
  - Habitats Directive 92/43/EEC<sup>3</sup>.
- 9.2.3. National Legislation and Policy relevant to this assessment comprises:
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>4</sup>;
  - Water (Scotland) Act 1980 and amendments<sup>5</sup>;
  - Water Environment and Water Services (Scotland) Act 2003<sup>6</sup>;
  - The Water Environment (Controlled Activities) (Scotland) Regulations 2011<sup>7</sup>;
  - Flood Risk Management (Scotland) Act 2009<sup>8</sup>;
  - The Water Intended for Human consumption (Private Supplies) (Scotland) Regulations 2017<sup>9</sup>;

<sup>1</sup> European Commission (2000) *The Water Framework Directive (2000/60/EC)* [Online] Available at: [http://ec.europa.eu/environment/water/water-framework/index\\_en.htm](http://ec.europa.eu/environment/water/water-framework/index_en.htm) (Accessed 29/06/2022).

<sup>2</sup> European Union (2014) *Directive 2014/52/Eu of The European Parliament and of The Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment*. L 124/1 [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=FR> (Accessed on 29/06/2022).

<sup>3</sup> European Commission (1992) *The Habitats Directive (92/43/EEC)* [Online] Available at: [https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm) (Accessed 29/06/2022).

<sup>4</sup> Scottish Government (2017) *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* [Online] Available at: [The Electricity Works \(Environmental Impact Assessment\) \(Scotland\) Regulations 2017 \(legislation.gov.uk\)](http://www.legislation.gov.uk/legislation.gov.uk) (Accessed 21/07/2023).

<sup>5</sup> Scottish Government (2022). *Water (Scotland) Act 1980*. [Online] Available at: <https://www.legislation.gov.uk/ukpga/1980/45> (Accessed 29/06/2022).

<sup>6</sup> Scottish Government (2003) *The Water Environment and Water Services (Scotland) Act 2003* [Online] Available at: <http://www.legislation.gov.uk/asp/2003/3/contents> (Accessed 29/06/2022).

<sup>7</sup> Scottish Government (2011) *The Water Environment (Controlled Activities) (Scotland) Regulations 2011*. [Online] Available from: <https://www.legislation.gov.uk/ssi/2011/209/contents/made?view=plain> (Accessed 30/06/2022).

<sup>8</sup> Scottish Government (2009) *Flood Risk Management (Scotland) Act 2009*. [Online] Available at: <https://www.legislation.gov.uk/asp/2009/6/contents> (Accessed 30/06/2022)

<sup>9</sup> Scottish Government. (2017) *The Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2017*. [Online] Available from- <http://www.legislation.gov.uk/ssi/2017/321/made>. (Accessed 30/06/2022).

- The Water Environment (Drinking Water Protected Areas) (Scotland) Order 2013<sup>10</sup>; and
  - National Planning Framework 4<sup>11</sup>.
- 9.2.4. Local Development Plans:
- Highland-wide Local Development Plan, Policy 64, Flood Risk
- 9.2.5. The following guidelines and good practice guides, which are relevant to this assessment, are published by the Scottish Environmental Protection Agency (SEPA) and other regulatory bodies. They comprise:
- Planning Advice Note (PAN) 79: Water and Drainage (September 2006)<sup>12</sup>;
  - SEPA Land Use Planning System Guidance Note 4 (LUPS -GU4): Planning guidance on on-shore windfarm developments (2017)<sup>13</sup>;
  - SEPA Land Use Planning System Guidance Note 2a (LUPS-DP-GU2a): Development Plan Guidance on Flood Risk (2018)<sup>14</sup>;
  - SEPA Land Use Planning System Guidance Note 9 (LUPS-GU19): Planning advice on wastewater drainage (2011)<sup>15</sup>;
  - Flood Risk and Drainage Impact Assessment Supplementary Guidance, (2013)<sup>16</sup>;
  - SEPA Land Use Planning System Guidance Note 31 (LUPS-GU31): Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTE), Version 3 (September 2017)<sup>17</sup>;
  - Developments on peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste<sup>18</sup>;
  - Proposed electricity generation developments: peat landslide hazard best practice guide<sup>19</sup>;
  - NetRegs Guidance for Pollution Prevention (GPP)<sup>20</sup>.
  - Engineering in the Water Environment: Good Practice Guide River Crossings (WAT-SG-25) (2010)<sup>21</sup>;
  - Engineering in the Water Environment: Good Practice Guide Sediment Management (WAT-SG-26) (2010)<sup>22</sup>;
  - Engineering in the Water Environment: Good Practice Guide Temporary Construction Methods (WAT-SG-29): (2009)<sup>23</sup>;
  - SEPA Position Statement to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2011: WAT-PS-06-02: Culverting of Watercourses Position Statement and Supporting Guidance (2015)<sup>24</sup>;
  - SEPA, Controlled Activity Regulations (CAR) – A Practical Guide, Version 9.1 (2022)<sup>25</sup>;
  - The Highland Council (THC) Onshore Wind Energy Supplementary Guidance 2016<sup>26</sup>;
  - Scottish Government Guidance on Development on Peatland<sup>27</sup>; and
  - Good Practice During Wind Farm Construction (4<sup>th</sup> Edition) (2019)<sup>28</sup>.

<sup>10</sup> Scottish Government (2013) *The Water Environment (Drinking Water Protected Areas) (Scotland) order 2013*. [Online] Available at: <https://www.legislation.gov.uk/ssi/2013/29/introduction/made> (Accessed 29/06/2022).

<sup>11</sup> Scottish Governmental (2023) *National Planning Framework 4* ([www.gov.scot](http://www.gov.scot))

<sup>12</sup> Scottish Government (2006) Planning Advice Note 79: Water and Drainage. [Online] Available at: <https://www.gov.scot/publications/planning-advice-note-pan-79-water-drainage/pages/0/> (Accessed 30/06/2022).

<sup>13</sup> SEPA (2017). Land Use Planning System SEPA Guidance Note 4, Planning Guidance on on-shore windfarm developments. [Online] Available at: <https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf> (Accessed 30/06/2022).

<sup>14</sup> SEPA (2018) Land US Planning System SEPA Development Plan Guidance Note 2a, Development Plan Guidance on Flood Risk. LUPS-DP-GU2a. [Online] Available at: <https://www.sepa.org.uk/media/143247/lups-dp-gu2a-development-plan-guidance-on-flood-risk.pdf> (Accessed 30/06/2022).

<sup>15</sup> SEPA (2011). Land Use Planning System SEPA Guidance Note 19, Planning advice on waste water drainage. [Online]. Available at: <https://www.sepa.org.uk/media/143338/lups-gu19-planning-guidance-on-waste-water-drainage.pdf> (Accessed 30/06/2022).

<sup>16</sup> The Highland Council (2013). Flood Risk and Drainage Impact, [Online] Available at: [https://www.highland.gov.uk/downloads/file/2954/flood\\_risk\\_and\\_drainage\\_impact\\_assessment\\_supplementary\\_guidance](https://www.highland.gov.uk/downloads/file/2954/flood_risk_and_drainage_impact_assessment_supplementary_guidance) (Accessed 30/06/2022).

<sup>17</sup> SEPA, (2017) *Land Use Planning System SEPA Guidance Note 31, Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*, Version3, [Online] Available at: <https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf> (Accessed 29/06/2022).

<sup>18</sup> Scottish Environmental Protection Agency (SEPA) and Scottish Renewables, (2012). *Developments on peatland: Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste*. Version 1.

<sup>19</sup> Energy Consents Unit and Scottish Government (2017). *Proposed electricity generation developments: peat landslide hazard best practice guide*. Edition 2.

<sup>20</sup> NetRegs (2021). *Guidance for Pollution Prevention (GPPs)*. [Online] Full list Available from- <https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/guidance-for-pollution-prevention-gpps-full-list/> (Accessed 30/06/2022).

<sup>21</sup> SEPA (2010) Engineering in the water environment: good practice guide, River Crossings. Second Edition [Online] Available at: <https://www.sepa.org.uk/media/151036/wat-sg-25.pdf> (Accessed 30/06/2022)

<sup>22</sup> SEPA (2010) Engineering in the water environment: good practice guide, Sediment Management. First Edition. [Online] Available at: <https://www.sepa.org.uk/media/151049/wat-sg-26.pdf> (Accessed 30/06/2022).

<sup>23</sup> Engineering in the Water Environment Good Practice Guide, Temporary Construction Methods) First Edition. [Online] Available at: [https://www.sepa.org.uk/media/150997/wat\\_sg\\_29.pdf](https://www.sepa.org.uk/media/150997/wat_sg_29.pdf) (Accessed 30/06/2022).

<sup>24</sup> SEPA (2015). WAT-PS-06-02: Culverting of Watercourses - Position Statement and Supporting Guidance. Version 2. [Online] Available at: [https://www.sepa.org.uk/media/150919/wat\\_ps\\_06\\_02.pdf](https://www.sepa.org.uk/media/150919/wat_ps_06_02.pdf) (Accessed 30/06/2022).

<sup>25</sup> SEPA (2022) The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended). A Practical Guide. [Online] Available at: [https://www.sepa.org.uk/media/34761/car\\_a\\_practical\\_guide.pdf](https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf) (Accessed 30/06/2022).

<sup>26</sup> The Highland Council (THC) (2016) *Onshore Wind Energy Supplementary Guidance*. Available online at: <https://www.highland.gov.uk/onshorewind>. (Accessed 30/06/2022).

<sup>27</sup> Scottish Government, Scottish Natural Heritage, SEPA (2017), *Peatland Survey. Guidance on Developments on Peatland*, [Online] Available from- <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf>. (Accessed: 30/06/2022).

<sup>28</sup> Scottish Renewables, Scottish Natural Heritage (SNH), SEPA, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019), *Good Practice During Wind Farm Construction* (4th Edition). [Online] Available at: <https://www.nature.scot/doc/guidance-good-practice-during-wind-farm-construction> (Accessed 30/06/2022)

### 9.3. Consultations

9.3.1. The scope of this assessment has been determined through reference to relevant guidance, stakeholder consultation and professional judgement. The issues raised during consultation are summarised in Table 9.1 along with the response to each point raised by consultees to demonstrate where the design of the Proposed Development has changed in response to specific issues raised by consultees.

Table 9.1: Summary of Consultation

Consultee	Type and Date	Summary of Consultation	Response to Consultee
Nature Scot	Scoping Response (28 June 2022)	<p>Impacts on peat habitat and carbon rich soils which are present on the proposal site and wider area. The developer will need to demonstrate through the EIA that a wind farm can be built on this site without significant loss or damage to these nationally important interests.</p> <p>Where peat is present, specific peat surveys should be carried out in line with Scottish Government guidance<sup>27</sup>.</p> <p>Include within the EIA Report a summary table in relation to peatland of national importance. While not essential, this would be extremely helpful in facilitating the assessment of potential impacts on peat, peatland habitat and carbon-rich soils.</p>	<p>Potential impacts of the Proposed Development on peatlands are discussed in Section 9.6.</p> <p>Calculations on peat loss are detailed in Technical Appendix A9.5: Draft Peat Management Plan (PMP).</p> <p>An Outline Biodiversity Enhancement Management Plan has been developed in consultation with the landowners as detailed in Technical Appendix A7.6.</p> <p>Phase 1 and 2 peat surveys carried out following relevant guidance<sup>27</sup> using methodology as detailed in Technical Appendix A9.4.</p> <p>Peatland of national importance summary table included in Technical Appendix 9.4.</p>
THC	Scoping Response (28 July 2022)	<p>3.20: Peat probing for all areas where development is proposed.</p> <p>3.22: Carbon balance calculations should be</p>	<p>Peat probing surveys were carried out following relevant guidance<sup>27</sup> using methodology as detailed</p>

Consultee	Type and Date	Summary of Consultation	Response to Consultee
		<p>undertaken and included within the EIAR.</p> <p>3.23: 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.</p> <p>3.24 The EIAR needs to address the nature of the hydrology and hydrogeology of the site, and of the potential impacts on water courses, water supplies including private supplies, water quality, water quantity and on aquatic flora and fauna. Impacts on watercourses, lochs, groundwater, other water features and sensitive receptors, such as water supplies, need to be assessed. Measures to prevent erosion, sedimentation or discolouration will be required, along with monitoring proposals and contingency plans. Assessment will need to recognise periods of high rainfall which will impact on any calculations of run-off, high flow in watercourses and hydrogeological matters.</p> <p>3.25: If culverting should be proposed, either in relation to new or upgraded tracks, then it should be noted that SEPA has a general presumption against modification, diversion or culverting of watercourses. Schemes should be designed to avoid crossing watercourses,</p>	<p>in Technical Appendix A9.4.</p> <p>Carbon Balance Assessment included as Technical Appendix 9.6.</p> <p>Geology and soils are considered in Section 9.5.</p> <p>Impacts on the hydrology and hydrogeology and receptors are considered in Section 9.6.</p> <p>Hydrological interests will be protected by embedded mitigation detailed in Section 9.8.</p> <p>Watercourse Crossings are considered in Technical Appendix A9.1.</p> <p>No abstractions of water supplies are proposed.</p> <p>Letter survey to identify and obtain information on any unregistered Private Water Supply (PWS) carried out in August 2022. Methodology and results are detailed in Technical Appendix A9.2.</p>

Consultee	Type and Date	Summary of Consultation	Response to Consultee
		<p>and to bridge watercourses where this cannot be avoided. 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. The table should be accompanied by photography of each watercourse affected and include dimensions of the watercourse. It may be useful for the Applicant to demonstrate choice of watercourse crossing by means of a decision tree, taking into account factors including catchment size (resultant flows), natural habitat and environmental concerns.</p> <p>3.26 The need for, and information on, abstractions of water supplies for concrete works or other operations should also be identified.</p> <p>3.27: Highland Council has some information on known supplies but it is not definitive. An on-site survey will be required.</p>	
SEPA	Scoping Response (23 June 2022)	<p>Requirement for a 50 m wide buffer to all waterbodies on site to be included in the finalised layout. No construction activities, including earthworks should be proposed within this buffer.</p> <p>If all watercourse crossings are designed to accommodate the 1 in 200-year event and other</p>	<p>50 m buffer applied to infrastructure layout. Following informal consultation meeting with SEPA, assessment of buffer encroachment is detailed in Section 9.6.</p> <p>All watercourse crossings will be</p>

Consultee	Type and Date	Summary of Consultation	Response to Consultee
		<p>infrastructure is located well away from watercourses the requirement for detailed flood assessment can be eliminated.</p> <p>Peat greater than 1m in depth is considered deep peat, and that the submission must demonstrate how the layout has been designed to avoid areas of deep peat. Phase 1 and Phase 2 peat probing data is made available as part of the application submission.</p> <p>The site-specific PMP should sit alongside a Habitat Management Plan which identifies where excavated peat can be used in peatland restoration.</p> <p>Biodiversity Net Gain from peatland restoration (on or off-site) and improvements to watercourses, such as the removal of any manmade features or re-meandering would be looked upon favourably.</p> <p>GWDTE must be scoped into the EIA and the layout of the Proposed Development must be modified to take account of any GWDTE that are present. We note GWDTE have not been classified within forested areas. However, whilst we accept that densely forested areas cannot be surveyed until after felling and site clearance, we expect all relevant available information (i.e., bedrock and superficial geology, topography/breaks in slopes, pre-forestry historic</p>	<p>designed to accommodate the one in 200 year flood event and outwith indicative flood mapping as detailed in Technical Appendix A9.1. No detailed flood assessment was considered required.</p> <p>Peat depth surveys carried out following relevant guidance<sup>27</sup> using methodology in agreement with SEPA (email 30/08/2022) as detailed in Technical Appendix A9.4.</p> <p>Details on excavated peat are included in Technical Appendix A9.5: Draft PMP.</p> <p>An Outline Habitat Management Plan has been developed in consultation with the landowners as detailed in Technical Appendix 7.6.</p> <p>Impacts from the Proposed Development on GWDTE have been considered and are detailed in Technical Appendix A9.3.</p>

Consultee	Type and Date	Summary of Consultation	Response to Consultee
SEPA	Scoping Response (1 March 2023)	<p>maps showing issues) to be used when designing the layout to minimise the likelihood that excavation for the development will impact on springs or seepages.</p> <p>Consider the Applicant's approach and intended methodology to the EIA robust regarding minimising the impact on volumes of peat.</p> <p>The impact on waterbody buffers maybe of concern depending on final site surveys in wetter months and the final design. Request the EIAR reports any subsequent breaches of the 50 m buffer and sets out any mitigation intended to avoid significant environmental effects in line with our scoping advice.</p> <p>In addition, with regards to watercourse crossing design and NPF4, built form must now be designed with an annual probability of being flooded of greater than 0.5% which must include an appropriate allowance for future climate change. Therefore, any watercourse crossings will be required to be designed to convey 1 in 200-year flow plus climate change and a freeboard allowance.</p> <p>The application will also now need to show compliance with Policy 5(d) of National Planning Framework 4 and we will expect to see extensive proposals for peatland restoration and</p>	<p>The outline Construction Management Plan (CEMP) (Technical Appendix A5.1) will lay out mitigation and indicate particular controls at T2, T6 and T7 due to encroaching on 50 m watercourse buffer.</p> <p>All watercourse crossings will be designed to accommodate the one in 200 year flood event plus climate change Technical Appendix A9.1.</p> <p>An Outline Biodiversity Enhancement Management Plan (OBEMP) is included in Appendix A7.6 which details how the Proposed Development would achieve biodiversity enhancements in line with NPF4<sup>11</sup>, including through peatland enhancement. A Draft PMP is included as Appendix A9.5 and details how extracted peat would be reused.</p>

Consultee	Type and Date	Summary of Consultation	Response to Consultee
		enhancement works to ensure that any disturbed peat is used to form a functioning peatland system capable of achieving carbon sequestration.	

Source: MacArthur Green, 2023

## 9.4. Assessment Methodology and Significance Criteria

### Scope of Assessment

- 9.4.1. This chapter considers the effects of construction, operation and decommissioning (including cumulatively) of the Proposed Development upon those hydrological, geological and hydrogeological features identified during the review of desk-based information and field surveys. This section describes the methodology used in the assessment of impacts.
- 9.4.2. It should be noted that residual effects of the hydrological regime may have consequences for the aquatic ecology and habitats connected to the Proposed Development area which are assessed in Chapter 7: Ecology.

### Scoped in/out of the assessment

- 9.4.3. On the basis of the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees (e.g., see Table 9.1: Summary of Consultation), the following features have been scoped out of detailed assessment in relation to geology, peat, hydrology and hydrogeology:
  - Impacts on Bedrock geology units;
  - Designated sites which are not hydrologically connected to the Proposed Development; and
  - Designated Drinking Water Protected Areas (DWPA) which are not hydrologically connected to the Proposed Development.

### Study Area

- 9.4.4. The hydrology and hydrogeology Study Area is based on the boundary of the Proposed Development Area, and a Wider Study Area of 5 kilometres (km) from the Proposed Development Area is proposed to assess potential downstream hydrological effects. The extent of the Proposed Development Area and wider study area are shown on Figure 9.1.

### Desk-Based Assessment

- 9.4.5. The desk study comprised of the following:
  - Identification of underlying geology and hydrogeology;
  - Description of surface water and hydrological features;
  - Collation of data provided through consultation;

- Identification of groundwater vulnerability;
- Identification of private drinking water abstractions and public water supplies; and
- Identification of flood risks.

9.4.6. The following sources of published information were used to determine baseline conditions;

- Met Office Climate Averages<sup>29</sup>;
- UKCEH Station Data<sup>30</sup>;
- River and loch waterbody catchments<sup>31</sup>;
- River Basin Management Plans and Maps<sup>32</sup>;
- SEPA Flood Maps and River Inundation map<sup>33</sup>;
- THC Open Map Data: Private Water Supplies<sup>34</sup>;
- British Geological Survey (BGS) Hydrogeology 1:625,000 map<sup>35</sup>;
- BGS 1:625,000 and 1:50,000 scale bedrock and superficial deposits map<sup>36</sup>;
- SNH (NatureScot) Soil Maps – Carbon and Peatland 2016 map<sup>37</sup>; and
- NatureScot SiteLink<sup>38</sup>.

## Data Requests

9.4.7. In addition to the Scoping Consultation outlined in Section 9.3, the following consultees were contacted to inform the hydrology, hydrogeology and PWS assessments;

- THC via Freedom of Information (FOI) request (submitted 8 June 2022) to obtain information on registered PWS within 5 km of the Proposed Development Area;
- SEPA FOI request (submitted 10 June 2022) for surface and groundwater abstractions within 5 km of Proposed Development Area; and
- THC via FOI request (submitted 25 July 2022) for flood incident records within 2 km of the Proposed Development Area. THC response received (issued 18 November 2022).

## Surveys

### Hydrology Walkover

9.4.8. A site walkover was conducted by MacArthur Green on the 30 August 2022. The site walkover covered the infrastructure layout and watercourses within the Proposed Development Area.

<sup>29</sup> Met Office (2022), *Climate Averages*. [Online] Available from- [UK climate averages - Met Office](https://www.metoffice.gov.uk/weather/forecast/climate-averages) (Accessed April 2022).

<sup>30</sup> <https://nrfa.ceh.ac.uk/data/station/spatial/1001>

<sup>31</sup> SEPA (2022), Water Environment Hub. [Online] Available from- <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>. (Accessed April 2022).

<sup>32</sup> SEPA (2015). River Basin Management Plan. [Online] Available from- <https://www.sepa.org.uk/data-visualisation/water-environment-hub/>. (Accessed April 2022).

<sup>33</sup> SEPA (2022), *Indicative River and Coastal Flood Map* (Scotland). 1:200. [Online] Available from - <https://map.sepa.org.uk/floodmap/map.htm>; (Accessed April 2022).

9.4.9. The purpose of the site walkover was to assess the local topography and general hydrological condition of the Proposed Development Area, characterise watercourses, assess proposed watercourse crossing points and the hydrological conditions at potential GWDTE sites. The survey consisted of visual inspection and geolocated surveying of watercourses across the Proposed Development Area. Full details of the watercourse crossings survey are included in Technical Appendix A9.1 Watercourse Crossings Assessment.

9.4.10. Conditions on the date of the survey were dry. The site visit was preceded by a period of dry weather and drainage channels on site were noted as dry at the time of the site visit.

9.4.11. A second visit was conducted by MacArthur Green on the 17 November 2022 to assess watercourse crossing locations following a design iteration. The weather was recorded as windy and dry during the survey. Heavy rain was recorded in the 24 hours prior to the survey being carried out and high water levels were noted in several of the watercourses within the Proposed Development Area.

### PWS Letter Survey

9.4.12. Nine properties hydrologically connected to the Proposed Development were contacted by letter questionnaires on 23 August 2022 to confirm if their property was supplied by a PWS and to gather information on details of the source and supply. The results of this are detailed in Technical Appendix A9.2 Private Water Supply Risk Assessment.

### Peat Probing and Coring

9.4.13. Peat depth probing was undertaken, at the Proposed Development Area, on the following dates:

- 3 to 5 March 2020 (Phase 1 probing);
- 29 August to 1 September 2022 (Phase 2 probing);
- 15 and 17 November 2022 (additional Phase 2 probing following design change); and
- 15 and 17 November 2022 (Phase 2 coring).

9.4.14. The purpose of this survey work was to confirm desk study findings and provide information on the nature of peat depth and extent. The methodology and results of peat probing and coring are provided within Technical Appendix A9.4: Watten Wind Farm, Phase 1 and 2 Peat Depth and Coring Survey Report. (MacArthur Green, 2023) and a summary of conditions encountered are summarised in the Geology Baseline Section 9.5 below.

### Assessment of Effects

9.4.15. The hydrology assessment is based on a source-pathway-receptor methodology which considers the sensitivity of the receptors and the magnitude of potential change on the receptors.

<sup>34</sup> The Highland Council (THC) (2022). *Private Water Supplies*. [Online] Available from- <https://map-highland.opendata.arcgis.com/datasets/private-water-supplies/explore?location=58.475225%2C-3.318944%2C11.45> (Accessed April 2022).

<sup>35</sup> British Geological Society (BGS) (1988), *Hydrological Map of Scotland*, 1:625 000 Scale Geology Series, Edinburgh.

<sup>36</sup> British Geological Society (BGS) (2022). Geindex 1:625,000 and 1:50,000 scale bedrock and superficial deposits map. [Online] Available from- <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/> (Accessed April 2022).

<sup>37</sup> Nature Scot (2022), *Carbon and Peatland Map 2016*. [Online] Available from <https://map.environment.gov.scot/sewebmap/>. (Accessed April 2022).

<sup>38</sup> Nature Scot (2022). *Site Link*. [Online] Available from- <https://sitelink.nature.scot/home> (Accessed April 2022).

### Likely Significant Effects

9.4.16. The assessment of the construction, operation and decommissioning phases of the Proposed Development have been structured around consideration of the following likely significant environmental effects on receptors:

- **Chemical Pollution Risk** - Oil/fuel/chemical pollution could occur as a result of release from contaminated land, accidental spillage or incorrect transport or storage of materials. Concrete preparation and refuelling procedures or leaching of concrete from turbine bases. This could affect the quality of surface water or groundwater bodies and indirectly effect ecological receptors and/or water users.
- **Water Quality** - Activities associated with the Proposed Development such as keyhole felling and cut and fill construction works could affect the quality of surface water or groundwater bodies and indirectly effect ecological receptors and/or water users.
- **Erosion and sedimentation** - Unmanaged erosion and suspended solids generated from ground disturbance, particularly during felling activities, could be mobilised by surface run-off. This could result in modifications to stream channel morphology and water quality and indirectly effect ecological receptors, flood risk and/or water users. Inappropriate water crossings could also result in blockages and localised flooding, with the potential to exacerbate erosion.
- **Fluvial flood risk, runoff volumes and rates** - Tracks and other hardstanding areas could increase runoff volumes and provide new preferential pathways. This may affect the response of the catchment to rainfall and downstream fluvial flood risk. This is likely during the operational phase only.
- **Impediments and/or changes to flow** – Construction of proposed infrastructure and man-made drainage could alter the direction of localised surface and subsurface flow paths and indirectly effect the pathway, quantity and volume of water reaching receptors (for example GWDTE or PWS).
- **Peat and soil loss** - SEPA regulatory position states “Developments on peat should seek to minimise peat excavation and disturbance to prevent unnecessary production of waste soils and peat”. Potential effects relating to peat disturbance and the subsequent effects from excavated peat and management of peat and peaty soils have been considered.
- **Peat stability** - Potential for peat destabilisation and peat slide risk on sloping ground where peat is present. Construction activities such as removal of surface vegetation and excavation of peat increase potential for slide. Peat slides can affect soils, damage sensitive habitats and potentially can modify drainage patterns and impact water quality through sedimentation.
- **Peat compaction** - Construction of hardstanding areas and movement of construction traffic, in the absence of construction good practice, can cause compaction of peat and soils which could reduce soil permeability, potentially leading to increased run-off and increased erosion.

9.4.17. Potential cumulative likely significant environmental effects during construction, operation and decommissioning are considered in this assessment.

### Sensitivity of Receptors

9.4.18. The sensitivity of the baseline environment conditions to each environmental effect has been assessed using a combination of predefined criteria and professional judgement in line with best practice guidance and legislation and is categorised as being high, medium or low. The predefined criteria associated with each category is outlined in Table 9.2: Framework for Determining Sensitivity of Receptors; receptors only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 9.2: Framework for Determining Sensitivity of Receptors

Sensitivity of Receptor	Definition
High	<ul style="list-style-type: none"> <li>• SEPA Water Framework Directive Water Body Classification current and target status: high-good or is close to the boundary of a classification: i.e., moderate to good or good to high.</li> <li>• Receptor is of high environmental importance or National or International value (e.g. Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), habitat for protected species), and, is dependent upon the hydrology or groundwater of the Proposed Development site.</li> <li>• Receptor acts as an active floodplain or other flood defence.</li> <li>• Critical infrastructure is located within the 0.5% Annual Exceedance Probability (AEP) flood extent of a receptor, before it leaves the hydrological study area.</li> <li>• Receptor is used for a public and/or private water supply.</li> <li>• Underlying aquifer classified by the BGS as “highly productive aquifer” of regional importance and local groundwater constitutes a valuable resource due to high quality and yield.</li> <li>• GWDTE within 250 m of excavations greater than 1 m in depth, and, within 100 m of excavations less than 1 m in depth, are assessed as being of high groundwater dependency.</li> <li>• Receptor is used for recreational use (e.g., bathing waters).</li> <li>• Land use is considered to have a high sensitivity to hydrological change (e.g., peatlands).</li> <li>• Class 1 or 2 priority peatland covers &gt;20% of the Proposed Development Area.</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• SEPA Water Framework Directive Water Body Classification current and target status: moderate.</li> <li>• Critical infrastructure is located within the 0.1% AEP flood extent of a receptor, before it leaves the hydrological study area.</li> <li>• Underlying aquifer is classified by BGS as a “moderately productivity aquifer”.</li> <li>• GWDTEs within 250 m of excavations greater than 1 m in depth, and, within 100 m of excavations less than 1 m in depth, are assessed as being of moderate groundwater dependency.</li> <li>• Receptor does not act as an active floodplain or other flood defence but is considered to contribute to natural flood management (e.g., organic soils).</li> <li>• Land use has moderate sensitivity to hydrological change (e.g., commercial forestry).</li> <li>• Hydrological receptor is of local importance (e.g., Local Nature Reserves).</li> <li>• Class 1 or 2 priority peatland, carbon-rich and peaty soils covers &lt;20% of the Proposed Development Area.</li> </ul>



Sensitivity of Receptor	Definition
Low	<ul style="list-style-type: none"> <li>SEPA Water Framework Directive Water Body Classification status: poor or bad.</li> <li>Critical infrastructure lies just out with the 0.5 to 0.1% AEP flood extent of a receptor, before it leaves the hydrological study area.</li> <li>Receptor not used for a public and/or private water supply.</li> <li>Underlying aquifer is classified by BGS as a “low productivity aquifer”.</li> <li>GWDTs within 250 m of excavations greater than 1 m in depth, and, within 100 m of excavations less than 1 m in depth, are not deemed to be groundwater dependent and rely on surface or only partial groundwater influences.</li> <li>Land use not sensitive to changes in hydrological regime (e.g., intensive grazing).</li> <li>Receptor does not act as an active flood plain or other flood defence.</li> <li>Receptor is not of local, regional, national, international or environmental importance.</li> <li>Hydrological receptor is not used for recreational use.</li> <li>Receptor contains non-peatland areas, with no carbon-rich and/or peaty soils.</li> </ul>

Source: MacArthur Green, 2023

### Magnitude Criteria

9.4.19. The magnitude of potential effects from the Proposed Development on receptors will be identified through consideration of the predicted degree of change to baseline conditions assessed in line with best practice guidance and legislation using a combination of professional judgement and predefined criteria. The criteria for assessing the magnitude of potential effects are detailed in Table 9.3: Magnitude of an Environmental Effect Criteria.

Table 9.3: Magnitude of an Environmental Effect Criteria

Magnitude	Definition
Substantial	<p>Total loss of, or alteration to, baseline receptors such that its characteristics would be fundamentally and adversely changed. The effect may be temporary or permanent.</p> <ul style="list-style-type: none"> <li>Short or long term change in hydrological conditions which will result in downgrading of the SEPA water quality status by two classes (i.e. from ‘High to ‘Moderate’).</li> <li>Major increase in the probability of onsite and offsite flooding increasing the need for flood prevention measures or impacting the floodplain potential for attenuation.</li> <li>Major (&gt;50%) or total loss of geological or peat receptors with complete severance impacting the feature integrity and functionality.</li> <li>Major (&gt; 50% of total study area) or total loss of highly dependent GWDTE where complete severance will impact feature integrity and functionality.</li> <li>A permanent or long term adverse change to groundwater quality, level and available yield.</li> </ul>
Moderate	<p>Loss of, or alteration to, baseline receptors such that its characteristics would be materially and adversely changed. The effect is temporary.</p>

Magnitude	Definition
	<ul style="list-style-type: none"> <li>Short or long-term change to hydrological conditions which will result in downgrading of the SEPA water quality status by one class (i.e. from ‘Good to ‘Moderate’).</li> <li>A moderate increase in the probability of flooding onsite and offsite increasing the need for flood prevention measures or impacting the floodplain potential for attenuation.</li> <li>Partial loss of a geological or peat receptor (5% to 50%) affecting feature integrity or causing moderate disruption to functionality.</li> <li>Partial loss (10% to 50% of study area) of a moderately dependent GWDTE which affects feature integrity or causing moderate disruption to functionality.</li> <li>Changes to local groundwater regime which may affect the use.</li> <li>Existing PWS yield and quality is reduced.</li> </ul>
Slight	<p>Small changes to the baseline receptors which are detectable, but the underlying characteristics of the baseline receptor would remain unchanged. The effect is temporary.</p> <ul style="list-style-type: none"> <li>Detectable, non-detrimental change to baseline hydrological conditions which will not result in downgrading of the SEPA water quality classification.</li> <li>Marginal increase in the probability of flooding onsite and offsite increasing the need for flood prevention measures or impacting the floodplain potential for attenuation.</li> <li>Detectable (loss between 5% to 10% of study area) or minor effect on GWDTE feature integrity which does not impact functionality.</li> <li>Minor changes to groundwater quality, level and yield do not affect existing geological or ecological baseline conditions.</li> </ul>
Negligible	<p>No perceptible change from the baseline conditions and approximates to the ‘no-change’ situation. These changes are close to or below the limit of detection.</p> <ul style="list-style-type: none"> <li>No change to SEPA Water Framework Directive (WFD) Classification status.</li> <li>No increase in flood risk probability onsite and offsite.</li> <li>Minimal (loss between 0.1% to 0.5% of the study area) or no detectable effect on GWDTE feature integrity and functionality.</li> <li>No perceptible changes to baseline hydrochemistry, geological resources or hydrological environment.</li> </ul>

Source: MacArthur Green, 2023

### Significance Criteria

9.4.20. The significance of a likely environment effect is defined by both the sensitivity of the receiving receptor and the magnitude of effect as shown in Table 9.4: Significance Matrix. Table 9.4 provides a guide to assist in decision making, however, it should not be considered a substitute for professional judgement and interpretation. In some cases, the magnitude of effect or sensitivity cannot be quantified with certainty and professional judgement remains the most effective method for identifying the predicted significance of an effect.

9.4.21. Likely significant environmental effects of ‘Major’ or ‘Major/Moderate’ significance are considered to be ‘significant’ in the context of the EIA Regulations.

Table 9.4: Significance Matrix

		Magnitude of Effect			
		Substantial	Moderate	Slight	Negligible
Sensitivity	High	Major	Major / Moderate	Moderate	Moderate /Minor
	Medium	Major / Moderate	Moderate	Moderate /Minor	Minor
	Low	Moderate	Moderate /Minor	Minor	Minor/Negligible

Source: Natural Power, 2023

### Assessment Limitations

9.4.22. In line with guidance, this assessment refers to and uses publicly available data sources and site-specific survey results. No water quality or intrusive investigations other than peat surveys as described in Technical Appendix A9.4 have been undertaken.

## 9.5. Baseline Description

9.5.1. Baseline characterisation of the Proposed Development Area has been undertaken through both a desk based assessment and a site walkover. The desk based assessment utilised a number of data sources as detailed in Section 9.4 Desk Based Assessment to gather relevant information on the hydrology, hydrogeological and geological receptors. This information is supplemented by data collected during a site walkover and reconnaissance of the Proposed Development Area. The baseline characterisation of the Proposed Development Area represents the environment in its current state, in the absence of the Proposed Development.

### Topography and Land Cover

9.5.2. Ground elevation within the Proposed Development Area ranges from ~60 metres Above Ordnance Datum (m AOD) at the south-eastern portion of the Proposed Development Area rising gradually to ~70 m AOD to the north-western and western boundaries of the Proposed Development Area. The northern tip of the Proposed Development Area reaches ~80 m AOD.

9.5.3. Land cover is mapped as coniferous woodland in the western and central portion of the Proposed Development Area. The remainder of the Proposed Development Area is mapped as inland rock indicative of bedrock near the surface and improved grassland. Discrete pockets of heather grassland are mapped along with riparian broadleaved mixed and yew woodland habitat mapped along the eastern banks of Black Burn. Further detail on habitats is contained in Chapter 7: Ecology.

### Climate

9.5.4. The north-east Scotland climate is generally mild and temperate. The closest rain gauge operated by SEPA, with data also available through the CEH NRFA<sup>30</sup>, is the Wick at Tarroul gauge (Station Number 1001), on the Wick

River located approximately 5.5 km south-west of the Proposed Development Area (ND262549) at 13 m AOD. The average annual rainfall for period 1961-1990 was 934 mm.

9.5.5. Precipitation data from the Meteorological Office<sup>29</sup> was reviewed for the nearest climate station to the Proposed Development. Wick John O Groats Airport is 14.85 km to the northwest of the Proposed Development, near the coast situated at 36 m AOD. The average annual rainfall (between 1991 to 2020) was 792.70 mm which is slightly drier than the SEPA Wick at Tarroul gauge and lower than the MetOffice Scotland North region (1702.52 mm between 1991 to 2020).

9.5.6. The annual average sunshine (between 1991 to 2020) is 1303.52 hours which is higher than the annual average for Scotland North of 1103.92 hours.

9.5.7. Table 9.5: Total Monthly Rainfall SEPA Halkirk Gauge 2020 below summarises the total monthly rainfall recorded in 2020 at Halkirk SEPA Gauge approximately 9.5 km north-west of the Proposed Development Area. (More recent 2021 and 2022 data not used due to incomplete available datasets).

Table 9.5: Total Monthly Rainfall SEPA Halkirk Gauge 2020

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total rainfall (mm)	68.2	103.8	28	35.2	75.2	77.6	57.4	31.8	52.8	179.6	65.2	98.6

Source: MacArthur Green, 2023

### Geology

9.5.8. The underlying bedrock geology of the Proposed Development Area is sandstone, siltstone and mudstones of the Berriedale Sandstone and Lybster Flagstone Formations<sup>36</sup> as shown in Figure 9.5. The majority of the Proposed Development Area is underlain by Berriedale sandstone formation and the southern area underlain by Lybster Flagstone Formation. The bedrock deposits are mapped as overlain by superficial deposits of till and peat.

9.5.9. Superficial deposits are shown in Figure 9.6. Superficial alluvium and fluvial deposits (gravel, sand and silt) are present where the main channel of the Burn of Acharole watercourse is located. The BGS superficial deposits map shows peat deposits as being extensive across the Proposed Development Area, located on areas of flatter topography in the north, west and south of the Proposed Development Area. Areas of superficial till deposits and alluvium deposits are more predominant in the centre and east, where the Burn of Acharole becomes more developed.

9.5.10. Two unnamed inferred faults intersect the Proposed Development Area through the centre and along the western boundary (north to south).

### Soils

9.5.11. The soils present across the Proposed Development Area are primarily organic peatland soils (dystrophic blanket peat<sup>39</sup>) with an area of mineral drift soils in the south-east.

<sup>39</sup> Scottish Government, National Soil Map of Scotland: Generalised Soil Type. Available Online at: [https://map.environment.gov.scot/Soil\\_maps/](https://map.environment.gov.scot/Soil_maps/) (Accessed 09/11/2022).

## Peat

- 9.5.12. The SNH Carbon and Peatland Map 2016 maps Class 1, 3 and 5 peatland as present across the majority of the Proposed Development Area, with smaller pockets of Class 4, as shown in Figure 7.2.
- 9.5.13. The Class 1 peatland is mapped under Wester Watten Moss in the centre of the Proposed Development Area and in two areas along the western boundary either side of Loch Burn. Class 1 and 2 peatland soils are defined as nationally important carbon-rich soils of deep peat and priority peatland habitat with high to potentially high conservation value, and restoration potential.
- 9.5.14. Class 3 peatlands are defined as carbon-rich soils, with some areas of deep peat, the dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Areas of Class 3 within the Proposed Development Area are generally shown to be mapped along the southern boundary extending up Red Burn in the east and also extending along the Black Burn riparian area to the Black Pools in the north.
- 9.5.15. Class 5 peat soils are defined as carbon-rich and deep peat, but no peatland vegetation recorded. Class 5 peat soils are mapped either side of Wester Watten Moss.
- 9.5.16. Results of peat depth probing and coring are detailed in Technical Appendix A9.4 Phase 1 and 2 Peat Depth and Coring Survey Report. Combining the results from the Phase 1 and Phase 2 depth surveys shows the majority of the peat Study Area (70.05 %) has a peat depth of  $\leq 1.0$  m or no peat (see also Figures 9.9 and 9.10). Areas where peat depth is less than 0.5 m is more appropriately considered, or referred to as, organo-mineral soils or peaty soils. Some areas of deeper peat were recorded within the peat Study Area as shown on Figure 9.9 and Figure 9.10. A maximum depth of 5.6 m was recorded near the western Proposed Development Area boundary. The deepest areas of peat in the west of the peat Study Area and underlying Wester Watten Moss are vegetated with conifer plantations indicating disturbance to the peat in these areas.

## Surface Hydrology

- 9.5.17. The Proposed Development is located within the wider surface water catchment of the Wick River and within the sub-catchment of the Upper Wick River (source to Loch Watten Burn, Waterbody ID: 20037<sup>37</sup>). The Proposed Development Area is within the catchment of the Wick at Tarroul Gauging Station (Station ID: 1001) on the Wick River located approximately 5.5 km south-west of the Proposed Development (ND262549) downstream of the Proposed Development.
- 9.5.18. Wick River discharges into Wick Bay in the North Sea approximately 14.5 km to the east.
- 9.5.19. The Burn of Acharole flows south-west to north-east across the southern boundary of the Proposed Development Area. The Burn of Acharole is a tributary of Scouthal Burn which drains into Wick River to the north-east. There are multiple smaller tributaries of the Burn of Acharole draining predominantly south towards the main channel of the watercourse. The minor sub-catchments of Acharole draining the Proposed Development Area are Black Burn, Red Burn, Loch Burn and Snottergill Burn. Figure 9.7 shows the Proposed Development infrastructure in relation to the minor sub-catchments draining the Proposed Development Area.
- 9.5.20. The Loch of Toftingall is located approximately 400 m to the west of the Proposed Development at its closest point. The loch drains to the south via Loch Burn into the Proposed Development Area to join the Burn of Acharole.
- 9.5.21. The Wick River (source to Loch Watten Burn) (Burn of Acharole) has an overall condition classification of 'Moderate' under the WFD Scotland River Basin Management Plans (RBMP). Wick Bay has an overall SEPA classification of Good. The Loch of Toftingall has an overall condition classification of 'Moderate'.

- 9.5.22. Table 9.6 below summarises the sub-catchments draining the Proposed Development Area as shown in Figure 9.7 Hydrological Catchments.

**Table 9.6: Sub-catchments draining the Proposed Development Area**

Wider Catchment	Major sub-catchment	Minor sub-catchments
Wick River (Upper Wick River source to Loch Watten Burn)	Burn of Acharole	Red Burn
		Black Burn
		Loch Burn
		Snottergill Burn

Source: MacArthur Green, 2023

## Hydrogeology

- 9.5.23. The groundwater unit underlying the Proposed Development Area is mapped by BGS<sup>36</sup> a moderately productive red sandstone aquifer (Class 2B) which will locally yield a small amount of groundwater. The groundwater unit is located within the wider Northern Highlands groundwater body which has an overall condition classification of 'Good' under the Water Framework Directive River Basin Management Plan<sup>32</sup>.
- 9.5.24. Superficial deposits of glacial till, peat and alluvium are found to be present across the Proposed Development Area. Glacial till and saturated peat deposits are largely impermeable promoting overland run-off, and prevent vertical hydraulic connectivity to groundwater. Alluvium deposits are concentrated near Acharole Burn at the southern boundary of the Proposed Development Area. Alluvium deposits are generally highly permeable and will form shallow groundwater units with hydraulic connectivity to watercourses.

## Private Water Supplies and Abstractions

- 9.5.25. THC Environmental Health Department was contacted for details of any private drinking water abstractions not authorised by SEPA within 5 km of the Proposed Development Area via a FOI request submitted on 8 June 2022. A response from THC was received on 10 August 2022 confirming the PWS sources and properties located within 5 km of the Proposed Development's boundary at the locations detailed in Table 9.7: Identified PWS within the Wider Hydrology Study Area of the Proposed Development.

**Table 9.7: Identified PWS within the Wider Hydrology Study Area of the Proposed Development**

PWS Name	Location (Easting, Northing)	Source Type	Supply Type	Approximate distance from Proposed Development
Achingale Mill	324055, 953483	Groundwater-Borehole	Domestic <50 persons	2,680 m
Lower Toftingall	317721, 954004	Groundwater- Spring	Domestic <50 persons	2,970 m

THC Private Water Supplies: FOI Request (June, 2022).

- 9.5.26. Achingale Mill is currently not habitable and unoccupied. It is located downstream from the Proposed Development Area in the Wick River catchment, however, PWS located >250 m from the Proposed Development, under LUPS-

GU31 the borehole is therefore not at risk from the Proposed Development. Lower Toftingall is located in a separate catchment (Waterbody ID: 100027) upstream to the Proposed Development and is therefore considered hydrologically disconnected to the Proposed Development Area.

- 9.5.27. A number of additional properties within the drainage pathways of the Proposed Development Area were also identified during the desktop study, which although not listed by THC may utilise an unregistered PWS. 9 properties were contacted by letter questionnaires on 23 August 2022 to confirm if the property was supplied by a PWS and to gather information on details of the source and supply. Of the 9 questionnaires sent, responses were received for 4 properties, all of which confirmed their property was supplied by Scottish Water Mains. No additional PWS were identified and no further assessment was considered necessary.
- 9.5.28. Further information on the location and details of PWS are provided in Technical Appendix A9.2 Private Water Supply Risk Assessment and PWS locations are shown on Figure 9.12.

### Public Water Supplies and Abstractions

- 9.5.29. No scoping response was received from Scottish Water.
- 9.5.30. A FOI request was submitted on 08/06/2022 to SEPA who hold information on abstractions greater than 10 m<sup>3</sup> per day. SEPA's response dated 29/06/2022 confirmed no SEPA authorised abstractions were located within 5 km of the search area (ND 20984 51657).
- 9.5.31. Drinking Water Protected Areas are bodies of water and their catchments which are used for the abstraction of water intended for human consumption as public water supplies. The Proposed Development is not located within an area designated as a Surface Water Drinking Water Protected Area.
- 9.5.32. The Proposed Development is underlain by the Caithness Groundwater Drinking Protection Area (ID: 150692) which has an Overall WFD classification status of Good<sup>31</sup>.

### Groundwater Dependent Terrestrial Ecosystems

- 9.5.33. GWDTE are generally found where groundwater is present at the surface. The presence of potential GWDTE were identified using existing National Vegetation Classification (NVC) surveys conducted in 2015 and 2020 (Technical Appendix A7.1). Further information on the location and type of potential GWDTE within the Proposed Development Area is included in Technical Appendix A9.3 GWDTE Assessment and potential GWDTEs are shown in Figure 7.4.
- 9.5.34. Habitats with potential to be groundwater dependent are identified primarily in the location of existing watercourses, margins, drains and soakaways as well as in the flatter, more well-drained area underlain by organic peat soils in the east of the Proposed Development Area.
- 9.5.35. Habitats which have potential of being highly groundwater dependent are mires, grassland, rush pasture, woodland and grassland. Areas of coniferous plantation in the centre and the west of the Proposed Development are associated with areas of deeper peatland and are not likely to be truly groundwater dependent as low permeability peat and clay deposits would be anticipated to restrict groundwater connectivity to the surface.
- 9.5.36. The assessed potential GWDTE NVCs sub-communities are considered reliant upon surface water or are ombrotrophic in nature across the entirety of the Proposed Development Area and therefore assessed to be generally of low groundwater dependency. Where habitat was assessed conservatively as moderate groundwater dependency near T2 location, the gentle topography and organic peat soil deposits present reduce the likelihood of the habitat being groundwater dependent.

### Designated Hydrological Receptors

- 9.5.37. The designated sites as outlined in Table 9.8 are within the Wider Study Area (5 km) of the Proposed Development Area and were assessed for hydrological connectivity to the Proposed Development. All Designated Sites are hydrologically disconnected from the Proposed Development.
- 9.5.38. Whilst not designated as yet, a nomination for World Heritage Site (WHS) status for Scotland's Flow Country was submitted in February 2023 to the United Nations Education Scientific and Cultural Organisation (UNESCO)<sup>40</sup>. A decision on the nomination bid is expected to be made in summer 2024. The Proposed Development Area overlaps with the proposed boundary of the Flow Country WHS which covers 187,026 ha of land, encompassing the Caithness and Sutherland SAC and SSSI and peatland habitat beyond. The footprint of the Proposed Development is not hydrologically connected to the nominated Flow Country WHS, due to separation by the Burn of Acharole.

Table 9.8: Designated Sites Hydrological Connectivity

Designated Site	Designation Qualifying Features	Distance from Proposed Development (m)	Hydrological Connectivity
Shielton Peatlands SSSI	Blanket Bog; Breeding Bird Assemblages	Adjacent (south)	Not connected – hydrologically separated by Burn of Acharole
Caithness and Sutherland Peatlands Ramsar	Blanket Bog; Breeding Bird Assemblages	Adjacent (south)	Not connected – hydrologically separated by Burn of Acharole
Caithness and Sutherland Peatlands SAC	Acid peat-stained lakes and ponds; Blanket bog; Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels; Depressions on peat substrates	Adjacent (south)	Not connected – hydrologically separated by Burn of Acharole
Loch Watten SAC	Naturally nutrient-rich lakes or lochs which are often dominated by pondweed	2.5 km (north-east)	Not connected – hydrologically separated by Loch Watten/Wick River catchment.
Loch Watten SSSI	Base-rich loch; Greylag goose, non-breeding, open water transition fen	2.5 km (north-east)	Not connected – hydrologically separated by Loch Watten/Wick River catchment.
Spittal Quarry SSSI	Earth Sciences (Geology) – Silurian – Devonian Chordata	2.9 km (north-west)	Not connected – hydrologically separated by Loch Watten/Wick River catchment
Leavad SSSI	Earth Sciences (Geology) – Quaternary of Scotland	4.5 km (south-west)	Not connected – hydrologically separated by catchment divide of Wick River and Little River

Source: MacArthur Green, 2023

<sup>40</sup> <https://www.theflowcountry.org.uk/world-heritage-site/> (Accessed 10/08/2023)

### Flood Risk

9.5.39. The Burn of Acharole and tributaries (Black Burn and Loch Burn) have a high (10% annual probability), medium (0.5% annual probability) and low (0.1% annual probability) likelihood of river flooding for flood extent areas<sup>33</sup>. The extent of flooding is primarily contained to the watercourse channels and established flood plains. The flood plain of the Burn of Acharole extends approximately 100 m from the river channel on either bank in the south of the Proposed Development Area.

### Summary of Receptors

9.5.40. Following initial assessment the following receptors were scoped out from further assessment:

- Geology;
- PWS (refer to Technical Appendix A9.2);
- Public Water Supplies;
- GWDTE (refer to Technical Appendix A9.3); and
- Designated Sites.

9.5.41. Following initial assessment the following receptors were scoped in for further assessment;

- Surface hydrology;
- Fluvial Flood Risk, Runoff Volumes and Rates;
- Groundwater/Hydrogeology; and
- Peat.

### Receptor Sensitivity

9.5.42. The sensitivity of the receptors have been assessed in relation to the identified likely significant effects as summarised in Table 9.9: Sensitivity of Scoped-In Receptors.

Table 9.9: Sensitivity of Scoped-In Receptors

Receptor	Sensitivity	Reason for Sensitivity	Environmental Effects Assessed
Surface Hydrology: All watercourses draining the Proposed Development Area (Burn of Acharole catchment)	Medium	Downstream receiving watercourse Wick River classified as 'Moderate' Overall Condition Status.	Chemical and silt pollution and water quality, erosion, changes to natural flow pathways and downstream flood risk.
Fluvial Flood Risk, Runoff Volumes and Rate	Medium	Infrastructure can cause constrictions in watercourse flow. Runoff rates can also be increased by Development hardstanding areas.	Watercourses crossed and the type of crossing together with the amount of hardstanding added to catchment areas.
Groundwater	Medium	Expected limited groundwater in localised bedrock and superficial deposits, moderately productive and low yielding aquifer.	Chemical and silt pollution, water quality, changes to natural flow pathways.

Receptor	Sensitivity	Reason for Sensitivity	Environmental Effects Assessed
Peatland	Low	Designated Class 1, 3, 4 and 5 peatland mapped on site. Class 1 confined to disturbed areas of coniferous plantation.	Peat and soil loss, peat stability and compaction.
Deep peat	High	Areas of deep peat (>1 m) recorded on site.	Peat and soil loss, peat stability and compaction. Chemical and silt pollution, water quality and changes to natural flow pathways.

Source: MacArthur Green, 2023

### 9.6. Assessment of Potential Effects

9.6.1. The assessment of likely significant environmental effects is based on the description of the Proposed Development outlined in Chapter 5: Project Description and is assessed for construction, operation, decommissioning and cumulative effects of the Proposed Development on the receptors. As detailed in Chapter 5, micro-siting has been assessed to allow the exact turbine location and infrastructure to be modified post consent, following detailed ground investigation and ground clearance (within 50 m).

9.6.2. In summary, in relation to the above discussed baseline, the Proposed Development consists of the following:

- 5.6 km<sup>2</sup> area of hardstanding;
- Temporary construction, substation and refuelling compound 79 m from Black Burn watercourse;
- Three new watercourse crossings;
- Seven turbines of which T2, T6 and T7 encroach within the 50 m watercourse buffer;
- No borrow pits are proposed; and
- Infrastructure on deep peat (>1 m) as detailed in design considerations.

### Construction

9.6.3. The construction activities as set out in Chapter 5: Project Description have the potential to impact hydrological receptors as detailed below. The initial assessment of potential effects is made prior to implementation of mitigation measures.

#### Surface Hydrology

##### Chemical Pollution Risk

9.6.4. There is potential for the accidental release of oil, fuel mechanical leaks from construction machinery and turbines as well as cement spills. This has the potential to temporarily impact on water quality of the receiving watercourse at and downstream of the works, in the absence of any mitigation, impacting freshwater quality and ecological value.

9.6.5. The potential risk of chemical pollution is greater the closer such activities are carried out to watercourses.

- 9.6.6. There are no borrow pits on site, therefore, to prevent contaminated material being washed mobilised into receiving watercourses, any imported substrate material should be geologically appropriate.
- 9.6.7. The magnitude of effect, prior to implementation of mitigation is Moderate, on a Medium Sensitivity receptor. Therefore, there is potential for a direct, temporary, medium-term effect of Moderate Significance on surface hydrology prior to mitigation; not significant in the context of the EIA Regulations.

#### Erosion and Sedimentation

- 9.6.8. There is potential for increased sediment loads generated from cut and fill works, exposed ground and any temporary stockpiles. This could modify watercourse channel morphology, affect water quality and indirectly affect ecological receptors, flood risk and users of the receiving watercourse downstream of the construction works in the absence of any mitigation.
- 9.6.9. There is potential for hardstanding and compacted surfaces to increase rates of surface runoff on the Proposed Development and for infrastructure to alter existing drainage pathways. Increases in surface runoff may in turn lead to higher risks of erosion and sedimentation.
- 9.6.10. The potential risk of erosion and sedimentation is greater the closer the works are carried out to watercourses and the steeper the topography within the Proposed Development Area.
- 9.6.11. At water crossings where correct care is not taken during the construction phase, disturbance of riverbed and banks can lead to the direct loss of aquatic flora and fauna, and the release of fine sediments and other pollutants that may negatively impact freshwater quality and ecological value.
- 9.6.12. The magnitude of effect, prior to implementation of mitigation is Moderate on a Medium sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of Moderate significance prior to the implementation of mitigation measures on watercourses; not significant in the context of the EIA Regulations.

#### Water Quality

- 9.6.13. Key-hole felling of coniferous plantation and run-off and leaching from clear fell areas and brash material may result in acidification of watercourses and increases to hydro-chemical parameters such as nitrates, phosphorous and Biochemical Oxygen Demand in watercourses prior to the implementation of mitigation measures.
- 9.6.14. Construction of tracks, turbines and lay down areas all have the potential of impacting water quality. The risk is increased with proximity to watercourses.
- 9.6.15. There are no borrow pits on site, therefore, any imported substrate material imported onto the Proposed Development Area should be geologically appropriate and not contaminated to prevent contaminated material being washed mobilised into receiving watercourses.
- 9.6.16. The magnitude of effect prior to mitigation is Substantial on a Medium sensitivity receptor, resulting in a direct, temporary, short-term effect of Major/ Moderate significance in the absence of mitigation and significant in the context of the EIA Regulations.

#### Fluvial Flood Risk, Runoff Volumes and Rates

- 9.6.17. Watercourse crossings have the potential to cause constraints to flow if inappropriately sized. This will increase flood risk upstream and cause potential alterations to surface water runoff pathways.

- 9.6.18. There is the potential for hardstanding and compacted surfaces to cause increased rates of surface runoff and for infrastructure to create preferential drainage pathways. Increased surface runoff may lead to higher risk of erosion and sedimentation and also increase flood risk downstream.
- 9.6.19. Acharole Burn and Black Burn are mapped as indicative flooding in localised zones along the banks, however, the proposed infrastructure in this area does not encroach the indicative flood plain. Where the infrastructure marginally encroaches the 50 m watercourse buffers at T2, T6 and T7, the topography is relatively flat and will not cause additional flood risk.
- 9.6.20. In the absence of mitigation, there is potential for a Moderate magnitude impact on a High sensitivity receptor resulting in an indirect, temporary and short-term effect of Major/ Moderate significance and significant in the context of the EIA Regulations.

#### Groundwater

##### Chemical Pollution Risk

- 9.6.21. The underlying groundwater unit is moderate productivity but has a classification of Good. Glacial till and saturated peat deposits are mapped underlying the Proposed Development Area are largely impermeable promoting overland run-off, and prevent vertical hydraulic connectivity to groundwater meaning groundwater is unlikely to be present near the surface across the majority of the Proposed Development. Permeable superficial alluvial deposits are mapped as present near the watercourses.
- 9.6.22. The magnitude of change, prior to implementation of mitigation is Slight, on a Medium sensitivity receptor. Therefore, there is potential for a direct, temporary, short-term effect of Moderate/Minor significance on groundwaters prior to mitigation; not significant in the context of the EIA Regulations.

##### Impediments and/or Changes to Flow

- 9.6.23. As discussed in Section 9.5 Baseline Description, there is anticipated to be limited interaction with groundwater. Shallow groundwater within the Proposed Development Area is likely to be limited due to the presence of impermeable peat deposits and will likely be constricted to the alluvial deposits along watercourses. Deeper groundwater within the bedrock is anticipated to flow via fractures with limited vertical hydrological flow due to interbedded lava units.
- 9.6.24. The magnitude of change prior to mitigation is Slight on a Medium sensitivity receptor, resulting in a direct, temporary, short-term effect of Moderate / Minor significance in the absence of mitigation; not significant in the context of the EIA Regulations.

##### Quality and Quantity

- 9.6.25. The PWS Risk Assessment Technical Appendix A9.2 concluded that no PWS are considered at risk from the Proposed Development due to a lack of hydrological connectivity to the drainage pathways of the Proposed Development and the distance between the Proposed Development and exclusion zones defined to be outwith 100 m (roads, tracks and trenches) and 250 m (foundations) buffers<sup>17</sup> from the identified PWS.
- 9.6.26. The magnitude of change prior to mitigation is Negligible on a High sensitivity receptor. Therefore, there is potential for indirect, temporary, short-term effect of Moderate/ Minor significance in the absence of mitigation; not significant in the context of the EIA Regulations.

## Peatland Deep Peat

### Impediments and/or Changes to Flow

- 9.6.27. Disruption of surface water flows and alterations to near-surface flows may occur at or downgradient of construction works potentially impacting habitats and peatland drainage patterns. GWDTEs were assessed to be not truly groundwater dependent within 250 m of the Proposed Development infrastructure and the detailed design will ensure connectivity of saturated areas in accordance with SEPA guidance.
- 9.6.28. There is potential for Substantial magnitude impact on a Medium sensitivity receptor, resulting in a direct, permanent, effect of Major/Moderate significance in the absence of mitigation and significant in the context of the EIA Regulations.

### Peat and Soil Loss

- 9.6.29. Construction activities requiring excavation works can lead to disturbance of peat, details of peat disturbance through excavations and subsequent re-use methods are included in Technical Appendix: A9.5 Draft PMP. Figure 9.11 shows the peat depth within the Proposed Development Area and beneath proposed infrastructure.
- 9.6.30. All turbines have been located in peat depths <1.0 m other than T6 which was recorded as 1.04 m. Although the Proposed Development has largely avoided areas of deep peat, it should be noted that the T6, T5 and T2 crane hardstanding and crane pads encroach marginally into the deeper peat areas (up to 2.5 m depth) and similarly short access track sections leading to T2; discrete pocket of peat within conifer plantation south of T4 junction and site access track boundary west of T7 encroach areas of deeper peat (up to 3.0 depth). Of these encroachments of deeper peat, only the Proposed Development access track boundary west of T7 area is mapped as Class 1 Peatland and the remaining areas as Class 5 Peatland.
- 9.6.31. In the absence of mitigation, there is a potential Moderate magnitude impact on a Medium sensitivity receptor, resulting in a direct, permanent effect of Moderate significance; not significant in the context of the EIA Regulations.

### Peat Stability

- 9.6.32. Construction activities have the potential to increase the likelihood of peat slides where infrastructure is placed on sloping ground where peat is present. Removal of surface vegetation and excavation of peat and soils from the bedding surface of the underlying rock increase potential for slide. Peat slides can affect habitats, or cause damage to soils which can reduce water quality and/or modify drainage patterns.
- 9.6.33. Peat depths are generally shallow (<1.0) under the majority of the Proposed Development footprint. Technical Appendix A9.7 Peat Landslide Hazard Risk Assessment (PLHRA) analysis indicates that the majority of the Proposed Development area lies within an area of negligible to low risk stability. Only one area of medium risk of peat instability has been identified across the Proposed Development Area which was discounted as it was located off the proposed access track and does not fall within influencing distance of any of the key Proposed Development infrastructure.
- 9.6.34. In the absence of mitigation, there is a potential Slight magnitude impact on a Medium sensitivity receptor, resulting in a direct, temporary effect of Moderate/ Minor significance in the absence of mitigation; not significant in the context of the EIA Regulations.

### Peat Compaction

- 9.6.35. The compaction of soil can be caused by construction of access tracks and movement of traffic in the absence of construction good practice. This can reduce soil permeability, potentially increasing run-off and erosion. The

superficial soils underlying the Proposed Development footprint are likely to have relatively low permeability. The total surface area affected by the footprint is approximately 0.06 km<sup>2</sup>, just under 1.1% of the total Proposed Development Area. The gentle topographic nature of Proposed Development Area will also limit any additional runoff and consequently the effect of compaction is unlikely to increase runoff significantly from existing conditions.

- 9.6.36. In the absence of mitigation, there is potential for a Slight magnitude impact on a Medium sensitivity receptor resulting in an indirect, temporary and short-term effect of Moderate/Minor significance; not significant in the context of the EIA Regulations.

## Operation

- 9.6.37. The potential risk of the release of pollutants or sediment from the activities relating to the operational phase of the Proposed Development is substantially lower than during construction due to decreased ground disturbance. No additional risks have been identified to Groundwater and Peatland/Deep Peat during operation. Risk identified to Surface Hydrology are detailed below.

## Surface Hydrology

### Chemical Pollution Risk

- 9.6.38. There is potential for chemical pollution to occur from minor spills and leaks from maintenance vehicles and as a result of mechanical/electrical issues at turbines and substations e.g., battery fires. This has the potential to temporarily impact on water quality of the receiving watercourse at and downstream of the works in the absence of any mitigation impacting freshwater quality and ecological value.
- 9.6.39. The gentle topographic gradient of the Proposed Development Area combined with the effect of vegetation roughness from conifer plantation and peatland vegetation will prevent rapid transfer of pollutants.
- 9.6.40. The magnitude of change, prior to implementation of mitigation is Slight, on a Medium sensitivity receptor. Therefore, there is potential for a direct, temporary, medium-term effect of Moderate/Minor significance on watercourses prior to mitigation; not significant in the context of the EIA Regulations.

### Changes Surface Runoff Volumes and Flows

- 9.6.41. Inadequately sized watercourse crossings will promote flood risk and alteration of surface water pathways.
- 9.6.42. Permanent infrastructure and hardstanding surfaces may lead to increased rates of surface runoff, leading to potential for increased risk of surface erosion and downstream flood risk. In addition, permanent infrastructure may disrupt near surface flows across the Proposed Development Area during the operational phase. Table 9.10 details the permanent hardstand cover in the Proposed Development Area.
- 9.6.43. Run-off rates would be expected to be relatively low due to the nature of the low permeability peat deposits and effect of roughness from conifer plantation and peatland vegetation on run-off within the Proposed Development Area. The addition of the Proposed Development infrastructure would be expected to have a minimal impact on the existing run-off scenario. The topography across the Proposed Development Area is gently sloping and any additional run-off is unlikely to be transferred at a rapid rate.

Table 9.10 Percentage permanent hardstand cover in catchment within the Proposed Development boundary

Sub- Catchment	% Permanent hardstanding cover
Red Burn	0.47%
Black Burn	1.08%
Loch Burn	3.52%
Snottergill Burn	2.96%

Source: MacArthur Green, 2023

9.6.44. The magnitude of change, prior to mitigation is Slight, on Medium sensitivity receptor, therefore, there is potential for a direct, effect of Moderate/Minor significance prior to implementation of mitigation measures; not significant in the context of the EIA Regulations.

### Decommissioning

9.6.45. The potential effects of the decommissioning of the Proposed Development are similar in nature to the potential effects during the construction period. Prior to decommission discussions will be held with the appropriate Regulatory Authorities to agree an appropriate Decommissioning Strategy.

9.6.46. As a result, the magnitude and significance of all effects associated with decommissioning are assessed as being Low and Negligible, and **Not Significant** in terms of the EIA Regulations.

### 9.7. Cumulative Effect Assessment

9.7.1. A cumulative effect is considered to be an additional effect on hydrological receptors (within the same catchment) arising from the Proposed Development in addition to the combination of the effects arising from other Developments. Operational wind farms are considered to contribute to baseline conditions.

9.7.2. At a distance of greater than 10 km, it is considered unlikely that other schemes will contribute to cumulative hydrological effects due to the influence of attenuation and dilution over distance. Therefore, to assess potential cumulative effects on the immediate catchment and hydrological regime, only proposed developments which require large scale construction and excavation (e.g. onshore wind farm developments) within approximately 10 km of the Proposed Development contributing to the Upper Wick River (source to Loch Watten Burn) catchment have been considered.

9.7.3. Data searches have not identified any consented large-scale developments within 10 km of the Proposed Development and within the same catchment and there is therefore no potential for cumulative effects with other Developments on hydrological receptors.

9.7.4. It is assumed that any new developments within hydrological connection to the Proposed Development would incorporate good practice drainage management measures into their respective designs to manage the rate, quantity and quality of surface water runoff to a level where effects on the water environment would be negligible.

9.7.5. It is considered that the addition of the Proposed Development (with negligible effects as assessed) would not give rise to significant cumulative effects during the construction or operational phase, when considered in-combination with cumulative developments for peat or hydrological receptors.

## 9.8. Mitigation and Residual Effects

### Design Considerations

9.8.1. The following constraints were considered in the design of the Proposed Development:

- Minimise the number of watercourse crossing structures. Three new watercourse crossings are required as follows:
  - WX01 channel is greater than 2 m wide and the most appropriate crossing type proposed is a bottomless pipe culvert which has been illustrated in Figure 5.13: Indicative Watercourse Crossing.
  - WX02 and WX03 infrastructure comprises a single track over watercourses less than 2 m in width. Bottomless pipe culverts have been proposed as the most appropriate crossing type for all 3 watercourse crossings.
- All watercourse crossings will be designed to convey the 0.5% AEP peak flow event in accordance with SEPA and Construction Industry Research and Information Association (CIRIA) guidance on culvert design and operation.
- Infrastructure is located out with a 50 m watercourse buffer where possible (with the exception of sections of access track leading to watercourse crossings and the locations of which are discussed further in Technical Appendix A9.1). The buffers are shown on Figure 9.2 Hydrological Constraints. Following discussion with SEPA in order to reduce the impact on areas of deep peat several minor encroachments (<50 m) of watercourse buffers by infrastructure are proposed as follows:
  - Associated hardstanding at T7 encroaches Hector's Burn watercourse buffer by approximately 25 m;
  - Associated hardstanding at T2 encroaches a tributary of Red Burn watercourse buffer by approximately 11 m;
  - Associated hardstanding at T6 encroaches the Loch Burn watercourse buffer by approximately 5 m; and
  - A 50 m buffer was initially added to the Black Pools. Following ground truthing which observed no water or obvious depression during the August 2022 site walkover at the southern mapped pools, the 50 m buffer was considered unnecessary.
- Mitigation measures detailed in Technical Appendix A5.1, Outline CEMP will be implemented to ensure runoff is managed appropriately and any chemical and sediment pollution is addressed to protect water quality.
- Identification of any potential GWDTEs and avoidance of any assessed as truly groundwater dependent;
- Identification of any water supply source locations;
- Identification of areas of deep peat to minimise excavation and transportation of peat, reduce potential for peat instability and minimise potential soil carbon loss. Floating tracks are proposed for track located on >0.7m peat depth. The following infrastructure overlaps with deep peat:
  - Approximately 200 m of track leading to T2 and T2 track blade laydown and hardstanding overlaps with an area of 1.01 m to 1.5 m with some discrete pockets of peat 1.51 to 2 m depth;
  - T5 is on the boundary of < 1m peat and 1.01 m to 1.5 m depth category. T5 blade laydown and crane pads are located on an area of 1.01 m to 1.5 m peat depth;
  - T6 and hardstanding on 1.0 m to 1.5 m depth and associated hardstanding overlapping with a small area of 2.01 m to 2.5 m category peat;
  - The access track leading from the Proposed Development entrance to T7 is located on areas of peat up < 3.0 m peat depth for approximately 0.002 km<sup>2</sup> and



- Discrete pocket of peat (<2 m) within conifer plantation is underlying approximately 38 m of the main access track south of the T4 junction.

## Mitigation

- 9.8.2. The mitigation measures included in the Technical Appendices detailed in the following text were taken into account within the assessment of effects during construction, operation and decommissioning stages.
- 9.8.3. The standard mitigation and best practice guidance for site drainage management, chemical and sediment pollution prevention and water quality monitoring is included in Technical Appendix A5.1, Outline CEMP. This will include:
- Sustainable Drainage System (SuDS) is detailed within Technical Appendix A5.1, Outline CEMP. This will include the use of check dams at appropriate intervals (as defined by the gradient of the drain) to reduce flow velocity and allow settlement of sediment loads prior to discharge to watercourses.
  - Where required, interceptor ditches will divert water to locations downstream of proposed excavation or soil disturbance works associated with the installation of turbine foundations, the development of construction compounds and batching plants, groundworks during the installation of the substation. These will be specified in a Pollution Prevention Plan (PPP).
  - Guidance on the requirement for CAR authorisation is outlined in Technical Appendix A9.1 Watercourse Crossing Assessment. Watercourse crossing construction will be carried out following best practice guidance as detailed in the CEMP.
  - As the potential GWDTE areas assessed are not considered likely to be groundwater dependent, specific mitigation with respect to groundwater supplies are not considered to be applicable. However, suitable drainage and surface water measures will be used to maintain hydrological connectivity in peatland and wetland habitats to prevent adverse impacts on surface water flow patterns.
- 9.8.4. A Pre-construction Site Investigation will be carried out in order to provide information from which to guide construction and any additional mitigation.

## Construction

### Surface Hydrology

#### Chemical Pollution Risk

- 9.8.5. Watercourse buffer distances between proposed construction works and watercourses have been maximised to reduce the potential for pollutants to affect the water environment. A 50 m buffer for major watercourses from proposed infrastructure (excluding watercourse crossings) has been adopted where possible as part of the embedded design process. These buffers were encroached at 3 locations by hardstanding at T2, T6 and T7 locations to reduce the impact of the Proposed Development layout on areas of deep peat. The maximum encroachment into a watercourse buffer is 25 m at T7. The slope gradient at these locations is 1.1m:1m which reduces the likelihood of rapid transfer of pollutants. During heavy rainfall events additional monitoring of these locations will be required.
- 9.8.6. The measures outlined in Section 5 of Technical Appendix A5.1, Outline CEMP, will effectively limit the release of chemical pollution. Regular monitoring of watercourses and drainage systems will provide an indication of the effectiveness of pollution prevention measures and detect any releases of chemicals, with the aim of intercepting such releases prior to discharge to the natural water environment.

- 9.8.7. Following implementation of measures outlined in the Technical Appendix A5.1, Outline CEMP, the magnitude of chemical pollution risk to surface water is assessed as Slight on a Medium sensitivity receptor and the potential effect is revised to Moderate/Minor significance, which is **not significant** in terms of the EIA regulations.

#### Erosion and Sedimentation

- 9.8.8. Due to the embedded design watercourse buffers and distance from proposed infrastructure, (excluding watercourse crossings), sediment loads from construction works carried by overland flow are likely to be entrained in vegetation and be diverted through existing drainage ditches before reaching receiving watercourses.
- 9.8.9. In addition to embedded design, implementation of measures outlined in Section 5 of Technical Appendix A5.1, Outline CEMP will minimise the release of sediments from construction works. As part of the SuDS to be employed onsite, as detailed in Section 5.2 of the CEMP, site drainage will be treated for excess sediment prior to discharge to the water environment to effectively limit any sediment entering receiving watercourses. Particular care to the design will be made at T2, T6 and T7 as a result of encroaching the 50 m watercourse buffer.
- 9.8.10. Following implementation of the measures outlined in the CEMP, the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

#### Water Quality

- 9.8.11. Part of the SuDS to be employed onsite, as detailed in Section 5.2 of the CEMP, site drainage from areas of key-hole felling will be treated for excess sediment prior to discharge to the water environment to effectively limit any sediment laden run-off from forestry areas entering receiving watercourses. Particular care to the design will be made at T2, T6 and T7 as a result of encroaching the 50 m watercourse buffer.
- 9.8.12. Following implementation of the measures outlined in the CEMP (Technical Appendix A5.1), the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

#### Fluvial Flood Risk, Runoff Volumes and Rates

- 9.8.13. The indicative culvert design is outlined in the CEMP, and detailed design plans will be agreed with SEPA prior to the construction phase in line with good practice i.e. to accommodate the 0.5% AEP peak flow event plus an allowance for climate change. As above, erosion and sedimentation mitigation as outlined in the CEMP will be implemented.
- 9.8.14. Following implementation of the detailed design plans alongside measures outlined in the CEMP, the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

## Groundwater

#### Chemical Pollution Risk

- 9.8.15. Embedded mitigation in the form of watercourse buffers near permeable alluvial deposits and the impermeable nature of the majority of the Proposed Development means there is limited potential for pollutants to come into contact with groundwater.
- 9.8.16. Measures outlined in Section 5 of the outline CEMP (Technical Appendix A5.1) will minimise the release of chemicals. An intrusive ground investigation prior to works commencing (including concrete pouring in excavations), will be carried out to assess the bedrock condition and degree of weathering or fracturing to establish

if any significant fracturing has potential for significant vertical groundwater flow. Implementation of best practice for dewatering of groundwater units will minimise the release of chemicals and concrete to groundwater.

- 9.8.17. Following assessment of bedrock condition and implementation best practice measures, the magnitude of effects is likely to be Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

#### Impediments and/or Changes to Flow

- 9.8.18. Drainage measures outlined in 5.2 of Appendix A5.1: Outline CEMP include cross drainage plans, installation of culverts and use of floating tracks where necessary to maintain continuity of shallow groundwater drainage patterns.
- 9.8.19. Following implementation of the measures outlined in the CEMP, the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations

#### Quality and Quantity

- 9.8.20. In addition to embedded design measures, implementation of mitigation outlined in Section 5 of Technical Appendix A5.1 Outline CEMP will minimise the release of sediment and chemical pollution from construction works. As part of the SuDS to be employed onsite, as detailed in Section 5 of the CEMP, site drainage will be treated for excess sediment prior to discharge to the water environment.
- 9.8.21. Following implementation of the measures outlined in the CEMP, the magnitude of effects is Negligible on a High sensitivity receptor, and the significance of effects remains assessed as being of Moderate/ Minor significance. This is **not significant** in terms of the EIA Regulations.

#### Peatland Deep Peat

##### Impediments and/or changes to flow

- 9.8.22. Drainage measures outlined in 5.2 of Appendix A5.1: Outline CEMP include cross drainage plans, installation of culverts and use of floating tracks where necessary to maintain continuity of drainage patterns.
- 9.8.23. Following implementation of the measures outlined in the CEMP, the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

##### Peat and Soil Loss

- 9.8.24. Following any further micro-siting after pre-construction ground investigation surveys and adopting the good practice and mitigation within the CEMP and Technical Appendix A9.5: Draft PMP, the magnitude of effects is likely to be Moderate/ minor on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

##### Peat Stability

- 9.8.25. Following implementation of the recommendations detailed in Technical Appendix A9.7: PHLRA, the magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

##### Peat Compaction

- 9.8.26. Following implementation of mitigation measures detailed in the CEMP and Draft PMP, the magnitude of effects is likely to be Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

## Operation

### Surface Hydrology

#### Chemical Pollution Risk

- 9.8.27. Watercourse buffer distances between proposed construction works and watercourses have been maximised to reduce the potential for pollutants to affect the water environment. A 50 m buffer for major watercourses from proposed infrastructure (excluding watercourse crossings) has been adopted where possible as part of the embedded design process. These buffers were encroached at 3 locations by hardstanding at T2, T6 and T7 locations to reduce the impact of the Proposed Development layout on areas of deep peat. The maximum encroachment into a watercourse buffer is 25 m at T7. The slope gradient at these locations is 1.1m:1m which reduces the likelihood of rapid transfer of pollutants.
- 9.8.28. The measures outlined in Section 5 of Technical Appendix A5.1, Outline CEMP, will effectively limit the release of chemical pollution. Regular monitoring of watercourses and drainage systems will provide an indication of the effectiveness of pollution prevention measures and detect any releases of chemicals, with the aim of intercepting such releases prior to discharge to the natural water environment.
- 9.8.29. Following implementation of measures outlined in the Technical Appendix A5.1, Outline CEMP, the magnitude of chemical pollution risk to surface water is assessed as Slight on a Medium sensitivity receptor and the potential effect is revised to Moderate/Minor significance, which is **not significant** in terms of the EIA regulations.

#### Changes Surface Runoff Volumes and Flows

- 9.8.30. Embedded measures, including 50 m watercourse buffers, and measures outlined in the CEMP such as SuDS will allow for attenuation of run-off to reduce the volume and flow rate of direct run-off to receiving watercourses. The magnitude of effects is Negligible on a Medium sensitivity receptor, and the significance of effects is assessed as being of Minor significance. This is **not significant** in terms of the EIA Regulations.

#### Fluvial Flood Risk, Runoff Volumes and Rates

- 9.8.31. Water crossings will be built in line with good practice i.e. to accommodate the 0.5% AEP peak flow event plus allowance for climate change.

## Residual Effects

- 9.8.32. Following implementation of appropriate mitigation measures for pollution prevention, sediment management as summarised in the preceding text and specified in the outline CEMP the residual effects on surface waters and groundwaters have the potential to be of a Negligible magnitude on the High sensitivity receptors and are therefore considered not significant.
- 9.8.33. Adherence to mitigation measures and best practice methods during the construction phase (as detailed in Technical Appendix A5.1: Outline CEMP) and specific guidance related to watercourse crossings referenced in Technical Appendix A9.1 are adhered to, residual effects associated with sedimentation and erosion on watercourses of High sensitivity would be of a Negligible magnitude and are considered not significant.
- 9.8.34. Specific guidance related to peat management is detailed in Technical Appendix A9.5: Draft PMP.

9.8.35. No additional residual effects are predicted for the operational phase of the Proposed Development.

### 9.9. Summary of Effects

9.9.1. This chapter considers the likely significant effects on hydrology, geology and hydrogeology associated with the construction, operation and decommissioning of the Proposed Development. Following the implementation of mitigation measures, it is assessed that the residual effects on hydrology, geology and hydrogeology are not considered to be significant in the context of the EIA Regulations. Table 9.11: Summary of Effects provides a summary of the likely significant effects considered, proposed mitigation commitments and the residual effects.

Table 9.11: Summary of Effects

Receptor	Sensitivity	Potential Effect	Significance of Effect before mitigation	Mitigation	Residual Effect
<b>Construction</b>					
Surface watercourses	Medium	Chemical pollution risk	Moderate	Adherence to buffers and CEMP Technical Appendix A5.1	Moderate/ minor
	Medium	Erosion and sedimentation	Moderate	SuDs and CEMP Technical Appendix A5.1	Moderate/ minor
	Medium	Water quality	Major/ moderate	SuDs and CEMP Technical Appendix A5.1	Minor
	High	Fluvial Flood risk, runoff volumes and rates	Major/ moderate	Appropriate design of water crossings and CEMP Appendix **	Moderate/ minor
Groundwater unit	Medium	Chemical pollution risk	Moderate/ minor	Adherence to buffers and CEMP Technical	Minor

Receptor	Sensitivity	Potential Effect	Significance of Effect before mitigation	Mitigation	Residual Effect
				Appendix A5.1	
	Medium	Impediments and/ or changes to flow	Moderate/ minor	CEMP	Minor
	High	Water Quality	Moderate/ minor	SuDs and CEMP Technical Appendix A5.1	Moderate/ minor
Peatland	High	Water Quantity	Moderate/ minor	SuDs and CEMP Technical Appendix A5.1	Moderate/ minor
	Medium	Impediments and/ or changes to flow	Major/ moderate	CEMP	None
	Medium	Peat soil loss	Moderate	CEMP/ PMP	Moderate/ minor
	Medium	Peat stability	Moderate/ minor	CEMP	None
Operational	Medium	Peat Compaction	Moderate/ minor	CEMP	None
	Surface watercourses	Medium	Chemical Pollution Risk	Moderate/ minor	Adherence to buffers and appropriate SuDs design
	Medium	Fluvial Flood risk, runoff volumes and rates	Moderate/ minor	Appropriate design of water crossings and CEMP Technical Appendix A5.1	Moderate/ minor

Source: MacArthur Green, 2023

## 9.10. Statement of Competence

Table 9.12 Statement of Competence

Discipline	Consultant	Company	Experience
Hydrology, Geology and Hydrogeology	Rob Sutton	MacArthur Green	<p>Rob is a Principal Hydrologist with over 15 years consultancy experience. Rob has worked on a range of EIA projects including major road developments and onshore windfarms throughout Scotland. He has provided support to clients during a public inquiry for a windfarm development regarding private water supplies concerns. He routinely oversees the review of water quality monitoring plans and the review of water quality data through baseline, construction and operation phases of windfarm development.</p> <p><b>Qualifications include:</b> Ph.D. Geography BSc Hons Geography (Earth Studie)</p>
Hydrology, Geology and Hydrogeology	Jenni Cunningham	MacArthur Green	<p>Jenni has 5 years consultancy experience undertaking hydrogeological assessments for a range of Developments in Northern Ireland and Scotland. This includes managing site investigations, data analysis and interpretive reporting. Currently Jenni is working on EIA projects for proposed onshore wind farms and providing advice and management relating to discharging planning conditions relating to the water environment and coordinating Ecological Clerk of Works on site.</p> <p><b>Qualifications include:</b> MA(Hons) Environmental Sustainability and Geography MSc Environmental Engineering</p>
Hydrology, Geology and Hydrogeology	Gordon Robb	SLR Consulting	<p>Gordon has more than 30 years' consultancy experience and specialises in the assessment of wind, hydrogen, solar, linear transmission and hydro power projects. He is based in Scotland and has worked recently in Argyll &amp; Bute. He knows key stakeholders and their typical requirements which avoids abortive work and streamlines assessments.</p> <p>He has recent planning hearing and inquiry experience which includes pollution risk to private water supplies. He also oversees many of the routine water monitoring contracts managed by SLR.</p> <p><b>Qualifications include:</b> BSc (Hons) Geography MSc Engineering Hydrology Master of Business Administration (MBA)</p>

Discipline	Consultant	Company	Experience
Hydrology, Geology and Hydrogeology	Alan Huntridge	SLR Consulting	<p>Alan is a Principal within SLR's Land Quality team with over 15 years' experience within the land quality sector. This experience has been gained undertaking and managing geological assessments for EIA, site investigations, risk assessments as well as design and implementation of remedial strategies for a wide variety of sites. Alan has been involved with a wide variety of projects from small urban Brownfield development projects through to large scale wind farm and power infrastructure projects.</p> <p>Currently, Alan is working on a number of EIA projects for proposed on-shore and offshore wind farms, providing both pre and post consent services, in geological and geotechnical services.</p> <p><b>Qualifications include:</b> MSc Waste Management and Environmental Management BSc Hons Environmental Management and Technology</p>
Hydrology, Geology and Hydrogeology	Ruari Watson	SLR Consulting	<p>Ruari has over 10 years' experience within the geotechnical engineering sector. Ruari is experienced in managing ground investigations (GI) projects from scoping stage to specifications, site works and interpretive reporting. In particular working for a number of renewable energy and electrical infrastructure clients. Ruari is also experienced in geotechnical analysis and reporting including preparation of desk studies, earthworks specifications, slope stability assessment, coal mining risk assessments (CMRA), peat assessments/reporting and ground investigation reports (GIR). Currently, Ruari has been working on a number of renewable projects for a variety of clients. He has been involved in engineering and geological assessments of a number of sub-station sites, cabling routes and transmission line routes in Scotland, including site selection, site investigation and outline design.</p> <p><b>Qualifications include:</b> BSc Hons Civil Engineering</p>

Source: MacArthur Green, 2023

## 9.11. Non-Technical Summary

- 9.11.1. Chapter 9: Hydrology, Geology and Hydrogeology evaluates the effects of the Watten Wind Farm (the "Proposed Development") on surface water hydrology, geology and hydrogeology. The Chapter is supported by the following Appendices: A9.1 Watercourse Crossing Assessment, A9.2 Private Water Supply Risk Assessment, A9.3 GWDTE Assessment; A9.4 Phase 1 and Phase 2 Peat Depth and Coring Survey Report; A9.5 Draft PMP, A9.6 Carbon Calculator Assessment; and A9.7 Peat Landslide and Hazard Risk Assessment.

- 9.11.2. This process established hydrological features that could potentially be affected by the Proposed Development. No potential effects on geology, private water supplies, public water supplies, GWDTE or statutory designated sites (including the nominated Flow Country WHS) were identified. The following receptors were taken forward to the assessment stage: surface hydrology; fluvial flood risk, runoff volumes and rates; groundwater/hydrogeology; and peat.
- 9.11.3. No significant decommissioning or cumulative effects were identified.
- 9.11.4. Chapter 9: Hydrology, Geology and Hydrogeology assessed that the Proposed Development, due to the embedded design buffer distances and the implementation of a Construction Environmental Management Plan (CEMP), the potential for all effects was not significant in terms of the EIA Regulations in relation to hydrology, geology and hydrogeology.

# Chapter 10

## Cultural Heritage

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## Glossary

Term	Definition
Artefact	An item of archaeological interest.
Baseline	In EIA, 'baseline conditions' are the environmental conditions in existence just before the occurrence of an impact – i.e., they are the conditions that would be affected. Baseline conditions are not the same as existing conditions, which are those in existence at the time of carrying out the EIA, because this may be some time in advance of the occurrence of an impact and environmental conditions may change in the intervening period.
BGS	British Geological Survey.
Bronze Age	The period of human activity between 2,500 BC and 700 BC.
Construction Environmental Management Plan (CEMP)	A plan prepared by a contractor before the start of construction work, detailing 'environmental aspects' that may be affected by the construction work and management methods to prevent any such effects. The CEMP would include methods and site management practices to be applied to prevent generation of nuisance dust, accidental pollution events and a range of other potential sources of accidental damage to the environment, and response and reporting procedures to minimise the damage in the event of a pollution incident.
Construction activity	Vegetation removal, topsoil stripping, temporary storage of materials, ground excavation and remodelling, bare earth, movement of construction vehicles and tall features such as cranes and other construction plant.
Desk study	A collation and review of relevant existing information available from published, archival or online sources, including for instance geological and hydrogeological mapping, historical maps, environmental records etc., allowing an assessment of risks to the human and environmental receptors to be undertaken.
Earthworks	The moving of soil or rock to reconfigure the topography of a site.
Environmental Impact Assessment	An assessment of certain types of major project of the significant effects that the project could have on the environment. The applicant is required to carry out the assessment by law, in this case under the Infrastructure Planning (Environmental Impact Assessment) Regulations, 2017.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Fieldwalking survey	Method of systematic non-intrusive survey involving walking across a plough field along transects to collect archaeological artefacts.
Geology	Geology is the study of solid earth, the material of which it is composed (principally rocks) and the processes by which they evolve.
Geophysical survey	Method of non-intrusive investigation involving the use of magnetometers to identify fluctuations in the earth's magnetic field which might indicate the presence of archaeological remains. Burnt remains and metals are best identified through this method of survey.
Heritage asset	An item of heritage interest, for example an historic building or an archaeological find.

Term	Definition
Historic Environment Records (HER)	A database maintained by individual counties or local authorities, containing records of archaeological sites, historic buildings and other aspects.
Historic landscape assessment types (HLA)	Historic landscape character types are distinctive and repeated combinations of components defining generic historic landscapes such as 'ancient woodland' or 'parliamentary enclosure'. The types used in this study were defined based on evidence from historic maps and other sources.
Iron Age	The period of human activity between 700 BC and 43 AD
Made Ground	Ground created by infilling an area with material taken from elsewhere; typically, reworked soils, rubble, gravel, sand or former waste material e.g., ash.
Medieval	The period of human activity between 1066 AD and 1550 AD.
Mesolithic	Middle Stone Age. The period of human activity between 10,000 BC and 4,500 BC.
Metal detector survey	Method of intrusive investigation involving the use of metal detectors to locate buried metal objects.
Mitigation	Measures which have the purpose of avoiding, reducing or compensating for adverse environmental impacts. It may also include measures to create environmental benefits.
Modern	The period of human activity from 1900 to the present day.
Neolithic	New Stone Age. The period of human activity between 4,500 BC and 2,500 BC.
Ordnance Datum	The standard measure of sea level in the UK, from which all heights are measured for mapping purposes.
Palaeolithic	Old Stone Age. The period of human and pre-human activity before around 10,000 BC.
Photomontage	A photorealistic image of the scheme, based on a 3D computer model of the scheme, overlaid onto a base photograph to visually represent the scheme. Features that would be removed as part of the scheme are removed from the base photograph.
Post-medieval	The period of human activity between 1550 AD and 1900 AD.
Prehistoric	The period before the year 43 AD.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).
Receptor	The existing environmental feature that would be affected by an impact – for instance, the population of a protected species, or a specific archaeological site, or the occupants of a residential property.
Roman	The period of human activity between 43 AD and 410 AD.
Saxon	The period of human activity between 410 AD and 1066 AD.
Statutory consultees	Organisations that EDF ER is required to consult.

Source: Headland Archaeology (UK) Ltd

## List of Abbreviations

Abbreviation		Description
CHVP	Cultural Heritage Viewpoint	Location from which a visualisation is produced for assessment of the Proposed Development upon Cultural Heritage
ClfA	Chartered Institute for Archaeologists	The leading professional body representing archaeologists working in the UK
EIAR	Environmental Impact Assessment Report	Environmental Impact Assessment Report
HA	Heritage Asset	Previously unrecorded heritage assets within the Proposed Development Area have been assigned a number (prefixed HA for Heritage Asset)
HER	Historic Environment Record	Regional database of known heritage assets
HES	Historic Environment Scotland	The lead public body established to investigate, care for and promote Scotland's historic environment
IEMA	Institute of Environmental Management and Assessment	The global professional body for individuals and organisations working, studying or interested in the environment and sustainability
IHBC	Institute for historic Building Conservation	The professional body for building conservation practitioners and historic environment experts working in the UK
ISA	Inner Study Area	The ISA is considered to hold archaeological potential for hitherto unknown archaeological remains, particularly in the eastern part of the ISA proposed for Habitat Management Unit B: Grassland Enhancement for Waders.
LB	Listed Building	A building placed on the four statutory list maintained by HES
LPA	Local Planning Authority	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment	Landscape and Visual Impact Assessment
MHG	N/A	Prefix to unique HER heritage asset reference numbers
NPF4	National Planning Framework 4	A statement of Scottish Government policy on how nationally important land use planning matters should be addressed
NRHE	National Record of the Historic Environment	National database of known heritage assets
NTS	Non-Technical Summary	Non-Technical Summary to EIAR.
SM	Scheduled Monument	A legally protected cultural heritage site
WSI	Written Scheme of Investigation	An agreed method statement

Abbreviation		Description
ZTV	Zone of Theoretical Visibility	A computer-generated tool to identify the likely (or theoretical) extent of visibility of a development

Source: Headland Archaeology (UK) Ltd



## 10.1. Introduction

- 10.1.1. This chapter of the EIA Report evaluates the effects of the proposed Watten Wind Farm ('the Proposed Development') on the Historic Environment (Archaeology and Cultural Heritage). The assessment was undertaken by Headland Archaeology (UK) Ltd.
- 10.1.2. A heritage asset is any element of the historic environment which has cultural significance. Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; assets may overlap or be nested within one another. Designated assets include Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas. Other assets may also be locally designated through policies in the Local Plan.
- 10.1.3. The majority of heritage assets are not designated. Some undesignated assets are recorded in Historic Environment Records (HERs) maintained by local authorities and other agencies. Many heritage assets are currently unrecorded, and the information contained in HERs is not definitive, since they may include features which, for instance, have been entirely removed, or are of uncertain location, dubious identification, or negligible importance. The identification of undesignated heritage assets is therefore to some extent a matter of professional judgement.
- 10.1.4. Some heritage assets may coincide with visual receptors or landscape character areas, which are assessed in Chapter 6: Landscape and Visual Impact Assessment (LVIA). In such cases, it is important to recognise the difference in approach between these two topics. Cultural heritage assessment addresses effects on the cultural heritage significance of heritage assets, which may result from, but are not equivalent to, visual impacts. LVIA focuses more on subjective present experience and amenity, while heritage has a focus on understanding, both intellectually and emotionally, across past, present and future generations. An effect on a landscape character area does not therefore equate to an effect on the cultural significance of heritage assets within it.

### Objectives

- 10.1.5. The objectives of this chapter are to:
- Describe the location, nature and extent of any known heritage assets or areas of archaeological potential which may be affected by the Proposed Development;
  - Provide an assessment of the importance of these assets;
  - Assess the likely scale of any effects on the historic environment posed by the Proposed Development;
  - Outline suitable mitigation measures to avoid, reduce or offset significant adverse effects; and
  - Provide an assessment of any residual effects remaining after mitigation.

### Summary of Conclusions

- 10.1.6. No direct or indirect physical impacts upon known heritage assets during the construction phase are identified, and accidental impacts are considered unlikely.
- 10.1.7. The Inner Study Area (ISA) is considered to hold archaeological potential for hitherto unknown archaeological remains, particularly in the eastern part of the ISA proposed for Habitat Management Unit B: Grassland Enhancement for Waders. There also remains a potential for paleoenvironmental/archaeological remains to be exposed as a result of the removal of peat during the construction phase.

- 10.1.8. A programme of mitigation shall be agreed with THC Historic Environment Team to offset any potential direct effects on unknown heritage assets which may exist within the ISA, to include potential impacts upon or beneath peat. Following agreement of these works **No Residual Effects** are anticipated upon potential heritage assets within the ISA.
- 10.1.9. In respect of the setting of heritage assets, residual operational effects of **Minor Adverse significance** which are **Not Significant** are predicted upon four Scheduled Monuments: SM90056/PiC297 Grey Cairns of Camster (only if/when intervening plantation is harvested), SM13632 Carn A' Chladha, broch, SM13634 Bail A' Chairn, broch, and SM721 Scouthal Burn, Chapel and The Clow.
- 10.1.10. Cumulative impact assessment considering other consented and submitted applications for wind farms has identified **No Significant Effects**.

## 10.2. Legislation, Policy and Guidance

- 10.2.1. The assessment has been undertaken with reference to relevant legislation, policy and guidance relating to the historic environment.

### Legislation

- 10.2.2. Scheduled Monuments and Listed Buildings are protected by statute.
- 10.2.3. Legislation regarding Scheduled Monuments is contained within The Ancient Monuments and Archaeological Areas Act 1979. Legislation regarding Listed Buildings is contained in The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997.
- 10.2.4. The 1979 Act makes no reference to the settings of Scheduled Monuments. The 1997 Act does, however, place a duty on the planning authority with respect to Listed Buildings and Conservation Areas, and their settings. Section 59 of the 1997 Act states (in part):
- "In considering whether to grant planning permission for development which affects a listed building or its setting, a planning authority or the Secretary of State, as the case may be, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses."*
- 10.2.5. The Historic Environment Scotland Act 2014 defines the role of the public body, Historic Environment Scotland (HES), and the processes for the designation of heritage assets, consents and rights of appeal.

### Policy

#### National Planning Policy

- 10.2.6. National Planning Framework (NPF) 4 Part 1 A National Spatial Strategy for Scotland 2045 describes how the future spatial development of Scotland can contribute to planning outcomes. It shows where there will be opportunities for growth and regeneration, investment in the low carbon economy, environmental enhancement, and improved connections across the country. The NPF4 Glossary defines the historic environment as *"the physical evidence for human activity that connects people with place, linked with the associations we can see, feel and understand"*. NPF4 Part 1 A National Spatial Strategy for Scotland 2045 describes how the future spatial development of Scotland can contribute to planning outcomes. It shows where there will be opportunities for growth and regeneration, investment in the low carbon economy, environmental enhancement, and improved connections across the country.

10.2.7. Historic Environment Policy for Scotland (HEPS) defines the Historic Environment and Scottish Government Policy. It sets out the vision and key principles on how to care for and protect Scotland's historic environment including designations of ancient monuments, principles for scheduling and listing, contexts for conservation areas, marine protected areas, gardens and designated landscapes, historic battlefields and consents and advice. HEPS provides further policy direction to NPF4 and sets out high level policies and core principles for decision-making affecting the historic environment.

10.2.8. The Scottish Government's planning policies in relation to the historic environment are set out in NPF4 Part 2 National Planning Policy (The Scottish Government, February 2023) Policy seven: Historic assets and places. NPF4 Policy seven applies its principles to designated and non-designated assets. Those relevant to the current assessment are as follows:

NPF4 – Part 2: Historic Assets and Places Policy 7

*"a) 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. The assessment should identify the likely visual or physical impact of any proposals for change, including cumulative effects and provide a sound basis for managing the impacts of change.*

*Proposals should also be informed by national policy and guidance on managing change in the historic environment, and information held within Historic Environment Records.*

*c) 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.*

*h) 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.*

*o) 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.*

*When new archaeological discoveries are made during the course of development works, they must be reported to the planning authority to enable agreement on appropriate inspection, recording and mitigation measures."*

## Local Planning Policy

10.2.9. The Highland Council (THC) adopted the Highland Wide Local Development Plan (HWLDP) in April 2012. Within the HWLDP, Policy 57 (Natural, Built and Cultural Heritage) is of relevance to this chapter.

10.2.10. This policy in part states:

*"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"*

*"Council also intends to adopt the Supplementary Guidance on the Highland Historic Environment Strategy. The main principles of this guidance will ensure that:*

- Future developments take account of the historic environment and that they are of a design and quality to enhance the historic environment bringing both economic and social benefits;*
- It sets a proactive, consistent approach to the protection of the historic environment."*

10.2.11. In August 2018 THC adopted the Caithness and Sutherland Local Development Plan (CSLDP) to be used in conjunction with the HWLDP. The CSLDP sets out a number of Key Outcomes, of relevance to this chapter is the Key Outcome for environment and heritage:

*"High quality places where the outstanding environment and natural, built and cultural heritage is celebrated and valued assets are safeguarded".*

## Guidance

10.2.12. The methodology for cultural heritage impact assessment is consistent with the Environmental Impact Assessment Handbook (v5 NatureScot & Historic Environment Scotland (HES) 2018), guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland, Appendix 1 (see Method of Assessment, Part 10.4).

10.2.13. HES also provides guidance on how to apply NPF4 Policy 7 in a series of documents entitled 'Managing Change in the Historic Environment', of which the guidance note on 'Setting' is relevant to this assessment: the methodology adopted for the identification and assessment of potential effects on setting follows the approach set out in 'Managing Change in the Historic Environment: Setting' (HES, 2016 updated 2020) and the 'Environmental Impact Assessment Handbook' (NatureScot & HES, 2018, v5 Appendix 1).

10.2.14. HES published 'Designation Policy and Selection Guidance' (DPSG, 2019) to accompany HEPS. DPSG outlines the policy and selection guidance used by HES when designating sites and places of national importance.

10.2.15. 'Planning Advice Note (PAN) 2/2011: Planning and Archaeology' provides technical advice to planning authorities and developers on dealing with archaeological remains. Among other issues, it covers the balance in planning decisions between the preservation of archaeological remains and the benefits of development; the circumstances under which developers can be required to provide further information, in the form of a field evaluation, to allow planning authorities to reach a decision; and measures that can be taken to mitigate adverse impacts.

10.2.16. Standards and Guidance published by the Chartered Institute for Archaeologists (CIfA) have been followed in preparing this assessment, in particular the 'Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment' (2014, updated 2020) and the 'Standard and guidance for historic environment desk-based assessment' (2014, updated 2017 & 2020).

10.2.17. This assessment has also been prepared with reference to Institute of Environmental Management and Assessment (IEMA), Institute for historic Building Conservation (IHBC) and CIfA's July 2021 publication 'Principles

of Cultural Heritage Impact Assessment in the UK'. This document presents good practice for assessment of the impact of a development proposal on cultural heritage assets which is consistent with the Principles.

10.2.18. This assessment has also been prepared in accordance with THC Standards for Archaeological Work (2012).

### 10.3. Consultations

10.3.1. Throughout the scoping exercises, and subsequently during the ongoing EIA process, relevant organisations were contacted with regards to the Proposed Development. Table 10.3 outlines the consultation responses received in relation to Cultural Heritage.

10.3.2. All consultee input to the scoping opinion and subsequent consultations was provided by HES, with no responses contributed by THC Historic Environment Team.

Table 10.1: Cultural heritage consultations

Consultation	Comment	Action
Scoping Opinion, 14 <sup>th</sup> September 2022 HES, Case ID 300058986	<i>We understand that the proposals comprise the development of up to eight wind turbines with a maximum tip height of up to 220 m ... we consider that the proposals are likely to give rise to significant adverse impacts on the setting of nearby heritage assets. We therefore recommend that mitigation by design is undertaken to reduce and avoid these impacts where possible.</i>	The Proposed Development has been reduced to seven turbines, as set out in Chapter 4: Site Selection and Design Evolution and Chapter 5: Project Description. Proposed infrastructure and habitat management has been designed to avoid all known heritage assets within the Proposed Development Area. Proposed turbines have been placed in the western part of the Proposed Development Area in order to minimise effects within the setting of Scheduled Monuments to the east. Scheduled Monument SM13634 Bail A' Chairn, broch has been excluded from the Proposed Development Area boundary in order to avoid potential physical impacts.
Scoping Opinion, 14 <sup>th</sup> September 2022 HES, Case ID 300058986	<i>Any assessment should pay particular attention to impacts on the setting of the below heritage assets:</i> <ul style="list-style-type: none"> <li>• Achingale Mill (Category A listed building, LB14976)</li> <li>• Bail a' Chairn, broch (Scheduled Monument, SM13634)</li> <li>• Carn a' Chladha, broch (Scheduled Monument, SM13632)</li> <li>• Scouthal Burn, chapel &amp; The Clow (Scheduled Monument, SM721)</li> <li>• Gallow Hillock, cairn on Backlass Hill (Scheduled Monument, SM450)</li> </ul> <i>We also suggest that consideration is given to the grouping of scheduled monuments located around the Loch of Yarrows to the east of Camster.</i>	A desk-based assessment has been undertaken, including a robust appraisal to identify heritage assets for which it is proposed are taken forward for detailed assessment in the EIA.  In advance of the EIA, a Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1) was submitted in full to THC and HES for comment, including a list of heritage assets for which detailed assessment in the EIA was proposed. This list included each of the asset's HES referenced as requiring assessment, together with: <ul style="list-style-type: none"> <li>• Possible Stone Circle, Acharole (non-designated heritage asset MHG1979)</li> </ul>

Consultation	Comment	Action
Consultation, 4 <sup>th</sup> November 2022 HES, Case ID 300058986, with follow-up Teams call 9 <sup>th</sup> November 2022	<i>We confirm that we are content for these heritage assets to be carried forward for detailed assessment within an EIA Report. We, nevertheless, have some issues with the narrative included within the 'Stage 1 Setting Assessment' document.</i>	The Desk-based Assessment also includes a detailed consideration of the grouping of scheduled monuments located around the Loch of Yarrows to the east of Camster.  Following a Teams call with HES the Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1) was redrafted and submitted (8 <sup>th</sup> November 2022) for comment.  In addition to the above list of heritage assets proposed for detailed assessment in the Environmental Impact Assessment Report (EIAR), the following was added: <ul style="list-style-type: none"> <li>• Grey Cairns of Camster (Scheduled Monument, SM90096, also a Property in Care)</li> </ul> The consultation included a list of visualisations (wirelines and photomontages) proposed to support the EIA for HES's comment.
Consultation, 21 <sup>st</sup> November 2022 HES, Case ID 300058986	<i>We welcome where the 'Stage 1 Setting Assessment' has been updated.</i>  <i>We note that further attention will be given to the Grey Cairns of Camster (Scheduled Monument, SM90056) as part of the EIA and welcome this.</i>  <i>We remain uncertain, however, regarding the potential for significant impacts on the settings of the below heritage assets:</i> <ul style="list-style-type: none"> <li>• Grey Cairn, broch 475 m SE of Lynegar (SM452)</li> <li>• Gallow Hill, long cairns and chambered cairn (SM483)</li> <li>• Knockglass, broch E of (SM561)</li> <li>• Nether Banks, broch 220m NNE of (SM609)</li> <li>• Strath, cairn &amp; hut circles 1071 m S of (SM3520)</li> </ul>	On 14 <sup>th</sup> December 2022, detailed 'Stage 1' Assessment results were provided by email to HES for each of the five additional heritage assets listed, with justification for proposals to scope the assets out from further detailed assessment in the EIA. The consultation was supported with wirelines for each asset.
Consultation, 23 <sup>rd</sup> - 27 <sup>th</sup> January 2023 HES, Case ID 300058986	HES replied to confirm the list of heritage assets requiring detailed assessment in the EIAR and the visualisations required in order to support the assessment.	Detailed assessment and supporting visualisations as presented in this EIA chapter is fully in accordance with comments received.

Source: Headland Archaeology (UK) Ltd

## 10.4. Method of Assessment

### Scope of Assessment

10.4.1. The cultural heritage assessment has been carried out in the following stages:

- Definition of baseline conditions, comprising desk-based study and visits to heritage assets, leading to the identification of the cultural significance and importance of heritage assets potentially affected by the Proposed Development;
- Assessment of the magnitude of impacts (physical, indirect, setting and cumulative) during construction and operation of the Proposed Development on cultural significance of heritage assets, informed by baseline information, site visits, Zone of Theoretical Visibility (ZTV) mapping, wireframes and photomontages;
- Proposal of mitigation measures to eliminate, reduce or offset adverse effects; and
- Assessment of the significance of effects, broadly a product of the asset's importance and the magnitude of the impact.

### Definition of Baseline Conditions

#### Study Areas

10.4.2. The ISA for the assessment presented in this chapter corresponds to the Proposed Development Area. Within this area, all heritage assets are considered for construction and operational effects. (Figure 10.1).

10.4.3. Assessment for this chapter has identified a number of locational discrepancies in the HER data in comparison with the source material (i.e., correctly georeferenced First Edition OS mapping (1877)). The correct NGRs are provided in the Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1) and its gazetteer (Annex 1), and the original and corrected locations of heritage assets are shown on Figure 10.1.

10.4.4. Heritage assets have been included in the assessment for overlapping Outer Study Areas (OSA) based on the level of importance assigned to the asset (see Table 10.4) to ensure that all potential significant effects are recognised (**Figure 10.2**):

- Up to 2 km from proposed turbines: Category C Listed Buildings, and non-designated heritage assets;
- Up to 5 km from proposed turbines: Conservation Areas and Category B Listed Buildings;
- Up to 10 km from proposed turbines: Scheduled Monuments;
- Up to 20 km from proposed turbines: Category A Listed Buildings, Inventory Gardens and Designed Landscapes, and Inventory Battlefields

10.4.5. In addition, beyond the OSAs as defined above, any other designated asset which is within the ZTV and considered exceptionally important and/or sensitive to visual change within its setting, and/or where long-distance views from or towards the asset are thought to contribute to cultural significance in the opinion of the assessor or consultees are included in the assessment. This is a rapid screening exercise, based on the approach set out in Managing Change in the Historic Environment: Setting (Historic Environment Scotland, 2016 updated 2020) and supplemented through scoping and further consultation with statutory consultees.

10.4.6. Only those monuments identified beyond the OSA requiring detailed assessment are added to the Gazetteer. In the case of this Proposed Development nine scheduled monuments are identified beyond the 10 km OSA and in

the ZTV, requiring detailed consideration in the Stage 1 assessment. Eight are in the vicinity of Loch Watenan and Loch of Yarrows. The ninth scheduled monument is SM483 Gallow Hill, long cairns and chambered cairn.

10.4.7. Criteria for the identification of assets that may be affected by the Proposed Development was based on the approach set out in Managing Change in the Historic Environment: Setting (HES, 2016 updated 2020) that sets out a range of factors which might form part of the setting of a heritage asset as follows:

- *“Current landscape or townscape context;*
- *Views to, from and across or beyond the historic asset or place;*
- *Key vistas: for instance, a ‘frame’ of trees, buildings or natural features that give the historic asset or place a context, whether intentional or not);*
- *The prominence of the historic asset or place in views throughout the surrounding area, bearing in mind that sites need not be visually prominent to have a setting;*
- *Aesthetic qualities;*
- *Character of the surrounding landscape;*
- *General and specific views including foregrounds and backdrops;*
- *Views from within an asset outwards over key elements in the surrounding landscape, such as the view from the principal room of a house, or from a roof terrace;*
- *Relationships with other features, both built and natural;*
- *Non-visual factors such as historical, artistic, literary, place name, or scenic associations, intellectual relationships (e.g., to a theory, plan, or design), or sensory factors; and*
- *A ‘sense of place’: the overall experience of an asset which may combine some of the above factors.”*

### Data Sources

10.4.8. The baseline for the assessment has been informed by a comprehensive Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, **Technical Appendix A10.1**), based on all readily available documentary sources, following the Chartered Institute for Archaeologists' (CIfA) 'Standard and Guidance for historic environment desk-based assessment' (2020). The following sources of information were referred to:

- Designation data downloaded from the HES website in January 2022;
- The National Record of the Historic Environment (NRHE), including the Canmore database and associated photographs, prints/drawings and manuscripts held by HES;
- Historic Environment Record (HER) data, digital extract received from Highlands Council in March 2022;
- Historic Landscape Assessment data, viewed through the HLAMap website;
- The National Collection of Aerial Photography (NCAP);
- Geological data available online from the British Geological Survey;
- Historic maps held by the National Library of Scotland;
- Unpublished maps and plans held by the National Records of Scotland;
- Relevant internet resources, including Google Maps, Google Earth, Bing satellite imagery and PastMap;
- Readily available published sources and unpublished archaeological reports.

10.4.9. A site visit was undertaken on 28<sup>th</sup> April 2022 in clear weather conditions. Notes were made regarding Proposed Development Area characteristics, any visible archaeology and geographical/geological features which may have a bearing on previous land use and archaeological survival, as well as those which may constrain subsequent archaeological investigation.

- 10.4.10. Records were made regarding extant archaeological features, such as earthworks or structural remains, any negative features, local topography and aspect, exposed geology, soils, watercourses, health and safety considerations, surface finds, and any other relevant information.
- 10.4.11. The OSA was visited on 29<sup>th</sup> April 2022 to carry out assessment of heritage assets that may be affected by the operation of the Proposed Development i.e., through effects on their settings and the contribution made by setting to their cultural significance.
- 10.4.12. Designated heritage assets are labelled throughout this assessment with the reference number assigned to them by HES (prefixed SM for Scheduled Monuments, and LB for Listed Buildings); non-designated assets are labelled with the MHG reference number in the HER or the Canmore ID in the NRHE. Previously unrecorded heritage assets within the ISA have been assigned a number (prefixed HA for Heritage Asset). A single asset number can refer to a group of related features, which may be recorded separately in the HER and other data sources.
- 10.4.13. Assets within the ISA are shown in Figure 10.1, with detailed descriptions compiled in a Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1). Cultural Heritage Viewpoints (CHVPs) within the OSA are shown in Figure 10.2.

### Potential for Unknown Heritage Assets in the ISA

- 10.4.14. The likelihood that undiscovered heritage assets may be present within the ISA is referred to as archaeological potential. Overall levels of potential can be assigned to different areas of the ISA, while recognising that the archaeological potential of any zone will relate to particular historical periods and types of evidence.
- 10.4.15. The following factors are considered in assessing archaeological potential:
- The distribution and character of known archaeological remains in the vicinity, based principally on an appraisal of data in THC HER and NRHE;
  - The history of archaeological fieldwork and research in the surrounding area, which may give an indication of the reliability and completeness of existing records;
  - Environmental factors such as geology, topography and soil quality, which would have influenced land-use in the past and can therefore be used to predict the distribution of archaeological remains;
  - Land-use factors affecting the survival of archaeological remains, such as deep ploughing or quarrying; and
  - Factors affecting the visibility of archaeological remains, which may relate to both environment and land-use, such as soils and geology (which may be more or less conducive to the formation of cropmarks), arable cultivation (which has potential to show cropmarks and create surface artefact scatters), vegetation (which can conceal or damage upstanding features and surface finds) and superficial deposits such as peat and alluvium (which can mask archaeological features).
- 10.4.16. In the Archaeological Potential section of this chapter, the likelihood that the ISA may contain undiscovered heritage assets, their likely location and potential density, and their likely level of importance is assessed, described, and justified.

### Assessment Methodology

- 10.4.17. Effects on the historic environment can arise through direct physical impacts, impacts on setting or indirect impacts:
- Direct physical impacts describe those development activities that directly cause damage to the fabric of a heritage asset. Typically, these activities are related to construction works and will only occur within the ISA.

- An impact on the setting of a heritage asset occurs when the presence of a development changes the surroundings of a heritage asset in such a way that it affects (beneficially or adversely) the cultural significance of that asset. Visual impacts are most commonly encountered, but other environmental factors such as noise, light or air quality can be relevant in some cases. Impacts may be encountered at all stages in the life cycle of a development from construction to decommissioning, but they are only likely to lead to significant effects during the prolonged operational stage of the development.
- Indirect impacts describe secondary processes, triggered by the development, that lead to the degradation or preservation of heritage assets. For example, changes to hydrology may affect archaeological preservation; or changes to the setting of a building may affect the viability of its current use and thus lead to dereliction.

- 10.4.18. Likely significant direct or indirect effects on known and unknown heritage assets are discussed in terms of the risk that a significant effect could occur. The level of risk depends on the level of archaeological potential combined with the nature and scale of disturbance associated with construction activities and may vary between high and negligible for different elements or activities associated with a development, or for the development as a whole.
- 10.4.19. Likely significant effects on the settings of heritage assets are identified from an initial desk-based appraisal of data from HES and the HER, and consideration of current maps and aerial images. Photomontage and wireline visualisations have been prepared to illustrate changes to key views, and to aid assessment where potential setting effects have been identified (Volume 2). The visualisations have been produced by the Landscape and Visual team, and the methodology for preparing these is described in Chapter 6: LVIA.

### Impact Assessment Criteria

#### Heritage Importance and Cultural Significance

- 10.4.20. Cultural heritage impact assessment is concerned with effects on cultural significance, which is a quality that applies to all heritage assets, and as defined by HES (Environmental Impact Assessment Handbook, NatureScot & HES 2018, v5 Appendix 1 page 175), relates to the ways in which a heritage asset is valued both by specialists and the public. The cultural significance of a heritage asset will derive from factors including the asset's fabric, setting, context and associations. This use of the word 'significance', referring to the range of values attached to an asset, should not be confused with the unrelated usage in EIA where the significance of an effect reflects the weight that should be attached to it in a planning decision.
- 10.4.21. Cultural significance is assessed in relation to the criteria in DPSG Annexes 1-6, which are intended primarily to inform decisions regarding heritage designations but may also be applied more generally in identifying the 'special characteristics' of a heritage asset, which contribute to its significance and should be protected, conserved and enhanced according to the NPF4 Policy Principles. DPSG Annex 1 is widely applicable in assessing the cultural significance of archaeological sites and monuments, for instance, while the criteria in Annex 2 can be used in defining the architectural or historic interest of buildings, whether listed or not. Cultural significance of assets is considered in terms described in DPSG Annex 1:
- Intrinsic Characteristics- those inherent in the monument i.e., "*how the physical remains of a site or place contribute to our knowledge of the past*";
  - Contextual Characteristics – those relating to the monument's place in the landscape or in the body of existing knowledge i.e., "*how a site or place relates to its surroundings and/or to our existing knowledge of the past*"; and
  - Associative Characteristics – subjective associations, including those with current or past aesthetic preferences i.e., "*how a site or place relates to people, practices, events and/or historic and social movements*".

- 10.4.22. The special characteristics which contribute to an asset’s cultural significance may include elements of its setting. Setting is defined in ‘Managing Change in the Historic Environment: Setting’ (HES 2016 updated 2020, Section 1) as “*the way the surroundings of a historic asset or place contribute to how it is understood, appreciated and experienced*”. The setting of a heritage asset is defined and analysed according to Stage 2 of the three-stage approach promoted in ‘MCHE: Setting’, with reference to factors listed on pages 9-10 (see Assessment of the magnitude of impacts on cultural significance, below). The relevance of these factors to the understanding, appreciation and experience of the asset determines how, and to what extent, an asset’s cultural significance derives from its setting. All heritage assets have settings; however, in some cases, setting may contribute very little to the asset’s significance, or only certain elements of the setting may be relevant.
- 10.4.23. Operational wind energy developments (and any other existing developments that may also be relevant) are therefore described as part of the existing baseline in the impact assessment section.
- 10.4.24. NPF4 does not define ‘integrity’ in the context of Policy 7.h, therefore for the purposes of the assessment, HES recommend that the following shared definition for the concept of integrity of setting is used: ‘changes to factors of setting that contribute to cultural significance such that the understanding, appreciation and experience of an asset are not adequately retained will affect the integrity of setting.’
- 10.4.25. The importance of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of non-designated assets, the professional judgement of the assessor (Table 10.4). Heritage assets of national importance and international importance are assigned a high and very high level respectively. Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas are, by definition, of national importance.
- 10.4.26. The criterion for Listing is that a building is of ‘special architectural or historic interest’; following DPSG Annex 2.19, Category A refers to ‘outstanding examples of a particular period, style or building type’, Category B to ‘major examples of a particular period, style or building type’, and Category C to ‘representative examples of a particular period, style or building type’.
- 10.4.27. Heritage Assets are defined as “*Features, buildings or places that provide physical evidence of past human activity identified as being of sufficient value to this and future generations to merit consideration in the planning system*” (NatureScot & HES 2018, Environmental Impact Assessment Handbook, v5, p.122). Any feature which does not merit consideration in planning decisions due to its cultural significance may be said to have negligible heritage importance; in general, such features are not considered as heritage assets and are excluded from the assessment (see accompanying Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, **Technical Appendix A10.1**)).
- 10.4.28. Heritage assets for which a level of importance cannot be defined based on current information are defined as ‘Uncertain’ Importance, and any impacts will result in an Uncertain effect significance.

**Table 10.2: Criteria for assessing the importance of heritage assets**

Importance	Criteria
Very High (International)	World Heritage Sites and other assets of equal international importance, that contribute to international research objectives
High (National)	Inventory Gardens and Designed Landscapes, Scheduled Monuments, Protected Wreck Sites, Inventory Historic Battlefields, Category A and B Listed Buildings, Historic Marine Protected Areas, and non-designated heritage assets of equivalent importance that contribute to national research objectives
Medium (Regional)	Conservation Areas, Category C Listed Buildings, undesignated assets of regional importance except where their particular characteristics merit a higher level of importance, heritage assets on local lists and non-designated assets that contribute to regional research objectives
Low (Local)	Locally listed heritage assets, except where their particular characteristics merit a higher level of importance, undesignated heritage assets of Local importance, including assets that may already be partially damaged

Source: Headland Archaeology (UK) Ltd

**Assessment of the Magnitude of Impact upon Cultural Significance**

- 10.4.29. The magnitude of an impact is a measure of the degree to which the cultural significance of a heritage asset will potentially change as a result of the Proposed Development (NatureScot & HES 2018, Environmental Impact Assessment Handbook, v5 Appendix 1, para 42).
- 10.4.30. Conclusions of the assessed magnitude of impacts is a product of the consideration of the elements of an asset and its setting that contribute to its cultural significance and the degree to which the Proposed Development would change these contributing elements. The assessment therefore reflects the varying degrees of sensitivity of different assets to change brought about by different types of development.
- 10.4.31. This definition of magnitude and assessment methodology applies to likely effects resulting from change in the setting as well as likely physical effects on the fabric of an asset.
- 10.4.32. The methodology adopted for the identification and assessment of potential effects resulting from change in setting follows the approach set out in Managing Change in the Historic Environment: Setting (HES, 2016 updated 2020) and the Environmental Impact Assessment Handbook (NatureScot & HES, 2018, v5 Appendix 1). The guidance sets out three stages in assessing the effect of development on the setting of a heritage asset or place as follows:
- Stage 1: Identify the historic assets that might be affected by a development;
  - Stage 2: define and analysis the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced; and
  - Stage 3: evaluate potential effect of the proposed changes on the setting, and the extent to which any negative effects can be mitigated.
- 10.4.33. It is important to note that the magnitude of an impact resulting from an effect on setting is not a direct measure of the visual prominence, scale, proximity or other attributes of the Proposed Development itself, or of the extent to which the setting itself is changed. Moreover, it is necessary to consider whether, and to what extent, the characteristics of the setting which would be changed contribute to the asset’s cultural significance (NatureScot & HES 2018, Environmental Impact Assessment Handbook, v5 Appendix 1, paras 42 and 43).

10.4.34. Magnitude is assessed as high/medium/low/negligible, and adverse or beneficial, or no effect, using the criteria in Table 10.5 as a guide. In assessing the likely effects of a development, it is often necessary to take into account various effects which affect an asset’s cultural significance in different ways. For instance, there may be adverse effects on an asset’s fabric and beneficial effects on cultural significance resulting from change in setting arising from a development which would not otherwise occur in a ‘do-nothing’ scenario; a heritage asset that might otherwise degrade over time could be preserved or consolidated as a consequence of a development. The impact assessment identifies beneficial and adverse impacts for consideration separately.

**Table 10.3: Criteria for assessing magnitude of impact upon cultural significance of heritage assets**

Magnitude of Impact	Criteria
High Beneficial	Alterations to an asset and/or its setting resulting in considerable increase in appreciation, understanding or awareness of the asset’s cultural significance; Or Preservation of an asset and/or its setting where it would otherwise suffer considerable loss of cultural significance in the do-nothing scenario.
Medium Beneficial	Alterations to an asset and/or its setting resulting in moderate increase in appreciation, understanding or awareness of the asset’s cultural significance; Or Preservation of an asset and/or its setting where it would otherwise suffer moderate loss of cultural significance in the do-nothing scenario.
Low Beneficial	Alterations to an asset and/or its setting resulting in a slight increase in appreciation, understanding or awareness of the asset’s cultural significance; Or Preservation of an asset and/or its setting where it would otherwise suffer slight loss of cultural significance in the do-nothing scenario.
Negligible	No material change upon appreciation, understanding or awareness of heritage asset’s cultural significance.
Low Adverse	Alterations to an asset and/or its setting resulting in a slight loss of cultural significance or appreciation, understanding or awareness of the asset’s cultural significance.
Medium Adverse	Alterations to an asset and/or its setting resulting in a moderate loss of cultural significance or appreciation, understanding or awareness of the asset’s cultural significance.
High Adverse	Alterations to an asset and/or its setting resulting in a considerable loss of cultural significance or appreciation, understanding or awareness of the asset’s cultural significance.

Source: Headland Archaeology (UK) Ltd

**Mitigation**

10.4.35. Assessment of impacts is an iterative part of the design process. For any identified effect the preferred mitigation option is always to avoid or reduce effects through design, or through precautionary measures such as fencing off heritage assets during construction works to avoid accidental direct effects. Effects which cannot be eliminated in these ways will lead to residual effects.

10.4.36. Adverse direct or indirect physical effects may be mitigated by an appropriate level of survey, excavation, recording, analysis and publication of the results, in accordance with a written scheme of investigation (NPF4 Policy 7.o and PAN2/2011 sections 25-27).

**Assessment of the Significance of Effects**

10.4.37. The significance of an effect (‘EIA significance’) on the cultural significance of a heritage asset, resulting from a direct or indirect physical effect or an effect on its setting, is assessed by combining the magnitude of the impact and the importance of the heritage asset. The matrix in Table 10.6 provides a guide to decision-making but is not a substitute for professional judgement and interpretation, particularly where the asset importance or effect magnitude levels are not clear or are borderline between categories. EIA significance may be described on a continuous scale from none to major.

10.4.38. Following the Criteria for Assessing the Importance of Heritage Assets presented in Table 10.4 any feature which does not merit consideration in planning decisions due to its cultural significance thus of Negligible importance are excluded from the impact assessment as a significant effect in EIA is not possible.

10.4.39. It is common practice to identify EIA effects as significant or not significant, and in this assessment residual adverse effects indicated as **Major** and **Moderate** will be regarded as being significant effects in terms of the relevant legislation in the scenario presented above.

10.4.40. Heritage assets for which a level of importance cannot be defined based on current information are defined as ‘Uncertain’ Importance, and any impacts will result in an Uncertain effect significance.

10.4.41. Effect significance conclusions are expressed in the impact assessment as ‘Beneficial’ or ‘Adverse’.

10.4.42. In all cases conclusions will also be expressed in terms of the relevant Policy tests.

**Table 10.4: Significance of effect matrix**

		Magnitude of Impact			
		High	Medium	Low	Negligible
Importance	Very High	Major	Major	Major/Moderate	Negligible
	High	Major	Major or Moderate	Moderate/Minor	Negligible
	Medium	Moderate	Moderate or Minor	Minor	Negligible
	Low	Moderate or Minor	Minor	Negligible	Negligible

Source: Headland Archaeology (UK) Ltd

**Assessment of Cumulative Effects**

10.4.43. A cumulative effect occurs where the magnitude of the combined effect of two or more developments is greater than that of the developments considered individually. The impact assessment for the Proposed Development on its own merits identifies the impact of that development alone upon cultural significance of heritage assets relative to a baseline scenario that includes all operational/under construction wind farms. The cumulative impact, using the same criteria of impact magnitude (as defined in Table 10.5), assesses the impact of the Proposed Development combined with the impact of wind farm developments that are consented but not yet built, those under construction, and those that are currently at application stage (for which sufficient detail is known) relative to the baseline scenario.

10.4.44. Cumulative effects are considered in this chapter for heritage assets where an effect of Minor or greater significance has been identified as a result of the Proposed Development. The purpose of this threshold is to ensure that the assessment remains proportionate and focused on those cases where there is potential for an EIA-significant effect to arise were the Proposed Development to be consented.

- 10.4.45. Developments considered as part of the cumulative assessment are identified from the agreed list presented in Chapter 6: LVIA and those with the potential to result in a cumulative effect are shown on the CHVP visualisations supporting this chapter (Figures 10.3 – 10.12).

### Assessment Limitations

- 10.4.46. Information held by public data sources is generally considered to be reliable; however, the following general points are noted:
- There is no LIDAR data available for the ISA on the Scottish Remote Sensing Portal;
  - Documentary sources are rare before the medieval period;
  - Whilst it is accepted that historic documents may be biased depending on the author, with content seen through the lens of context, wherever such documentary sources are used in assessing archaeological potential professional judgment is used in their interpretation in that the functionality of the document is considered;
  - HER records can be limited because opportunities for research, fieldwork and discovery depend on the situation of commercial development and occasional research projects, rather than the result of a more structured research framework. A lack of data within the HER records does not necessarily equal an absence of archaeology;
  - Where archaeological sites have been identified solely from aerial imagery without confirmation from archaeological excavation or supporting evidence in the form of find-spots for example, it is possible the interpretation may be revised in the light of further investigation;
  - The significance of sites can be difficult to identify from HER records, depending on the accuracy and reliability of the original source;
  - There can often be a lack of dating evidence for archaeological sites; and
  - Any archaeological site visit has inherent limitations, primarily because archaeological remains below ground level may have no surface indicators.

### Effects Scoped Out

- 10.4.47. In agreement with consultees through Scoping, assessment of construction phase setting effects is scoped out of this chapter as they will be temporary and are not considered to be significant due to their very short duration. (This applies to setting effects during construction only. Direct and indirect (physical) impacts remain scoped in).
- 10.4.48. The extent of ground disturbance associated with decommissioning will not extend beyond the construction footprint and so decommissioning effects on heritage assets within the Proposed Development Area will not occur. Any residual operational phase setting effects will be reversed. Assessment of decommissioning effects is scoped out of this chapter in agreement with consultees through Scoping.

## 10.5. Baseline

- 10.5.1. The full list of known heritage assets within the Study Areas is presented in the gazetteer appended to accompanying Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1). The significance of these assets is discussed by period in the Assessment of Heritage Significance section.

## Overview of the Historic Environment

### Inner Study Area

- 10.5.2. The bedrock geology within the ISA is sedimentary, comprising Lybster Flagstone Formation - siltstone, mudstone and sandstone in the west and Berriedale Sandstone Formation - siltstone, mudstone and sandstone in the east. Superficial deposits are recorded as Peat (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>). The National Soil Map of Scotland records this as Dystrophic blanket peat ([https://map.environment.gov.scot/Soil\\_maps/](https://map.environment.gov.scot/Soil_maps/)). Nearer to the Burn of Acharole are superficial deposits of the Devensian era – Diamicton Till, Glaciofluvial Deposits of gravel, sand and silt, and Alluvium - clay, silt, sand and gravel. Results of peat depth probing and coring are detailed in Volume 3, Technical Appendix A9.4 Phase 1 and 2 Peat Depth and Coring Survey Report. Combining the results from the Phase 1 and Phase 2 depth surveys shows the majority of the peat Study Area (70.05 %) has a peat depth of  $\leq 1.0$  m or no peat (see Figures 9.9 & 9.10). Areas where peat depth is less than 0.5 m is more appropriately considered, or referred to as, organo-mineral soils or peaty soils. Some areas of deeper peat were recorded within the peat Study Area. A maximum depth of 5.6 m was recorded near the western Proposed Development Area boundary. The deepest areas of peat in the west of the peat Study Area and underlying Wester Watten Moss are vegetated with conifer plantations indicating disturbance to the peat in these areas.
- 10.5.3. There are no designated heritage assets within the ISA, although Scheduled Monument SM13634 Bail A' Chairn, broch is surrounded on all sides by the ISA boundary, having been excluded from the Proposed Development Area boundary.
- 10.5.4. There are 12 known non-designated heritage assets recorded on the NRHE/THC HER within the ISA. In addition, this assessment has identified a further nine heritage assets within the ISA from a review of historic mapping and aerial photos, and walkover survey.
- 10.5.5. Following an assessment of importance carried out in Volume 3, Technical Appendix A10.1, only those assets of low or higher importance are considered in the EIA and shown on Figure 10.1, as there is no potential for a significant effect resulting from an impact from the Proposed Development on a feature of negligible importance.



Table 10.5: Known heritage assets within the ISA

Ref	Name	Description	E	N	Period	Status	Importance
SM13634	Bail A' Chairn, broch	Prehistoric domestic and defensive: broch	322816	951715	Prehistoric	Scheduled Monument	High
MHG18401	Acharole	FARMSTEAD; SHEEP FOLD	321950	951420	Later historic	Non-designated	Low
MHG19814	Druim Dubh	FARMSTEAD	320655	952242	Later historic	Non-designated	Low
MHG20025	Viewfield	BUILDING	321490	953120	Later historic	Non-designated	Low
MHG18400	Acharole	BUILDING	322340	951462	Later historic	Non-designated	Low
MHG18396	Ballacharn	FARMSTEAD	322910	951590	Later historic	Non-designated	Low
MHG1980	Bronze age cist with inhumation burial - Acharole	SHORT CIST; INHUMATION	322424	951650	Prehistoric	Non-designated	Low
MHG1979	Possible Stone Circle, Acharole	STONE CIRCLE	322342	951680	Prehistoric	Non-designated	Low
MHG19134	West Watten Holdings	FARMSTEAD; SHEEP FOLD	322751	951974	Later historic	Non-designated	Low
MHG19135	Acharole	BUILDING	322187	951938	Later historic	Non-designated	Low
MHG1967 (a)	Hut circle, Shielton	HUT CIRCLE	320753	950772	Prehistoric	Non-designated	Low
MHG1967 (b)	Hut circle, Shielton	HUT CIRCLE	322673	951465	Prehistoric	Non-designated	Low
MHG19142	Ballacharn	ENCLOSURE	322111	951287	Later historic	Non-designated	Low
90907		BUILDING	321950	951420	Later historic	Non-designated	Low
HA1	Enclosure	Square enclosure visible in 1946, 1988, and modern aerial photography	320603	951482	Later historic	Non-designated	Low

Ref	Name	Description	E	N	Period	Status	Importance
HA2	Building	Building on first ed OS 1877	321028	952804	Later historic	Non-designated	Low
HA3	Building	Chalybeate building on 1st ed OS 1877	320763	952488	Later historic	Non-designated	Low
HA4	Sheepfold	Sheepfold on 1st ed OS 1877	320270	951098	Later historic	Non-designated	Low
HA5	Building	Shielton building on 1st ed OS 1877	320634	950978	Later historic	Non-designated	Low
HA13	Mound	Possible mound	321339	951975	Uncertain	Non-designated	Low
HA14	Mound	Possible mound	321295	952082	Uncertain	Non-designated	Low
HA15	Sheep shelter	Sheep shelter on 1st ed OS 1877	322438	951955	Later historic	Non-designated	Low
HA16	Sheep fold and 'Old lime kiln'	Sheep fold and 'Old lime kiln' on 1st ed OS 1877	322153	951680	Later historic	Non-designated	Low

Source: Headland Archaeology (UK) Ltd

### Archaeological Potential of the Inner Study Area

- 10.5.6. Following surveys for this assessment it is considered that there is negligible potential for any further upstanding cultural heritage assets within the ISA. Any hitherto unknown remains will be preserved below-ground and are likely to be truncated.
- 10.5.7. The areas proposed for habitat management in the eastern part of the ISA, and particularly in proximity to watercourses, are of medium Prehistoric archaeological potential, as evidenced by the presence of a scheduled Iron Age broch as well as two Bronze Age hut circles, a possible Neolithic or Bronze Age stone circle and a Bronze Age cist burial. The character of the areas proposed for infrastructure during this period, however, would have largely comprised undrained moorland; the evidence suggests the area of proposed turbines would have been largely unsuitable for settlement throughout the Prehistoric periods. Archaeological potential for significant Prehistoric period remains within the areas proposed for infrastructure within the ISA is therefore considered to be low.
- 10.5.8. Chapter 9: Hydrology, Geology and Hydrogeology identifies peat within the ISA. Peat survives under waterlogged anaerobic conditions and therefore has excellent preservation conditions for organic material. It may also seal an undisturbed ground surface with contemporary (i.e., Prehistoric) archaeological remains. Study of the organic remains preserved within stratified peat deposits enables the construction of a narrative of changes to the surrounding environment brought about by human activities and natural events in the prehistoric and historic periods. Any Prehistoric remains that may be preserved within the ISA and potentially associated with the scheduled monument SM13624 Bail A' Chairn, broch, and within or beneath peat, are likely to be of no more than Medium importance.

- 10.5.9. There is evidence of settlement activity in the ISA in the later historic periods, after drainage was implemented. Archaeological potential for any further historic period remains within the areas proposed for infrastructure within the ISA is therefore considered to be low. Any hitherto unknown archaeological remains within the ISA, if present, are likely to relate to pastoral agriculture and would be of Low importance.
- 10.5.10. The potential for hitherto unknown archaeological remains is reduced by the establishment of commercial forestry across the ISA and associated deep ploughing which would have largely destroyed any remains present.

## Heritage Assets Considered for Setting Effects

### Outer Study Area

- 10.5.11. Within 2 km of the proposed turbines there are four scheduled monuments and 42 non-designated heritage assets.
- 10.5.12. Within 2-5 km of the proposed turbines there are 13 scheduled monuments, one Category A listed building and one Category B listed building.
- 10.5.13. Within 5-10 km of the proposed turbines there are 36 scheduled monuments.
- 10.5.14. Within 10-20 km of the proposed turbines there are 16 Category A listed buildings and nine scheduled monuments within the ZTV.
- 10.5.15. No heritage assets have been identified within the ZTV beyond 20 km for which setting contributes to cultural significance such that a significant impact is anticipated as a result of the Proposed Development over this distance.
- 10.5.16. Utilising the ZTV, in the Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1), each heritage asset in the ISA and OSA has been considered for further detailed assessment in this chapter based on whether it is likely that its cultural significance could be harmed through development within its setting. Heritage assets agreed with consultees and considered for setting effects are shown on Figure 10.2.
- 10.5.17. There are no Inventory Gardens and Designed Landscapes, Conservation Areas or Inventory Battlefields within the ISA or OSA.
- 10.5.18. There are no World Heritage Sites (WHS) in the ISA or OSA. The Flow Country is on the tentative list for World Heritage Site status. Nominated as a peatland, the status is proposed for designation as a 'natural' (ecological) site, rather than for cultural reasons, and the area is not considered a heritage asset.
- 10.5.19. Five scheduled monuments (SMs) (including one Property in Care), one Category A listed building (LB) and one non-designated heritage asset presented in Table 10.8 are retained for detailed assessment in this chapter, supported with photomontage and/or wireline visualisations as appropriate.

Table 10.6: Heritage assets considered for setting effects

Ref	Name	Status
SM13632	Carn A' Chladha, broch	Scheduled Monument
SM13634	Bail A' Chairn, broch	Scheduled Monument
SM450	Gallow Hillock, cairn on Backlass Hill	Scheduled Monument
SM721	Scouthal Burn, chapel & The Clow	Scheduled Monument
SM90056/PiC297	Grey Cairns of Camster	Scheduled Monument/Property in Care
LB14976	Achingale Mill	Category A Listed Building
MHG1979	Possible Stone Circle, Acharole	Non-designated

Source: Headland Archaeology (UK) Ltd

## 10.6. Assessment of Potential Effects

- 10.6.1. Potential effects are presented in this section after taking into account any inherent mitigation designed into the project set out in Chapter 4: Site Selection and Design Evolution and Chapter 5: Project Description.

### Construction Effects

- 10.6.2. Development activities within the ISA have the potential to truncate or remove buried archaeological remains, resulting in a direct impact on these assets. Direct physical impacts may occur during construction as a result of intrusive groundworks, comprising enabling works, any areas of cut and fill, bulk excavation and topsoil stripping, construction compound establishment, and excavations for turbine and crane footings, roads, utilities and landscaping.
- 10.6.3. Habitat management proposals with the potential to damage buried archaeological remains include root damage as a result of tree planting (Management Unit C: Riparian Planting) and excavation for the establishment of wader scrapes (Management Unit B: Grassland Enhancement for Waders).
- 10.6.4. Accidental direct physical impacts within the ISA may arise should activities such as, but not limited to, ancillary drainage works and uncontrolled plant movement take place in the vicinity of heritage assets.
- 10.6.5. Indirect impacts describe secondary processes, triggered by the development, that lead to the degradation or preservation of heritage assets. For example, changes to hydrology may affect archaeological preservation; or changes to the setting of a building may affect the viability of its current use and thus lead to dereliction.

### Direct Physical Impacts

- 10.6.6. There are 22 known heritage assets of Low importance located within the ISA, presented in Table 10.7.
- 10.6.7. All known heritage assets have been avoided through design and will not be directly physically impacted by the Proposed Development infrastructure. This assessment accounts for 50 m micro-siting provision. There is one known heritage asset located within the micro-siting provision: HA5, the extant farm building of Shielton, which lies 22 m from the proposed track between turbines T3 and T4. The Applicant has confirmed that at this location, the track will not be micro-sited such that it would result in the demolition of HA5.
- 10.6.8. Buffer zones of 30 m have been included around known heritage assets in Management Units B & C on the Outline Biodiversity Enhancement Management Plan (OBEMP) and detail is included in the OBEMP report that no tree planting or wader scrapes will be undertaken in these areas.

- 10.6.9. No indirect (physical) impacts are anticipated.
- 10.6.10. No heritage assets located in the ISA are in proximity to the Proposed Development infrastructure such that accidental damage is considered likely.

### Archaeological Potential

- 10.6.11. The area of the ISA proposed for Proposed Development infrastructure is considered to be of low archaeological potential for hitherto unknown archaeological remains.
- 10.6.12. The area within the ISA proposed for habitat Management Unit B: Grassland Enhancement for Waders is considered to be of medium archaeological potential for prehistoric remains, potentially of up to Medium importance.
- 10.6.13. All turbines have been located in peat depths <1.0 m other than T6 which was recorded as 1.04 m. Although the Proposed Development has largely avoided areas of deep peat, it should be noted that the T6, T5 and T2 crane hardstanding and crane pads encroach marginally into the deeper peat areas (up to 2.5 m depth) and similarly short access track sections leading to T2; discrete pocket of peat within conifer plantation south of T4 junction and access track boundary west of T7 encroach areas of deeper peat (up to 3.0 depth). Of these encroachments of deeper peat, only the access track boundary west of T7 area is mapped as Class 1 Peatland and the remaining areas as Class 5 Peatland. There therefore remains a potential for paleoenvironmental deposits to be directly physically impacted as a result of the removal of peat during the construction phase, and for direct physical construction impacts on previously unknown archaeological remains potentially of up to Medium importance.
- 10.6.14. Effect significance cannot be fully assessed for unknown heritage assets, as neither the cultural significance of the asset nor the magnitude of the impact can be known. Consequently, an assessment of construction effects upon archaeological potential is considered.
- 10.6.15. The assessment of archaeological potential has identified that any remains may be of up to Medium importance. If significant remains are present and discovered during construction phase groundworks, preservation in situ will be implemented where possible (such as in Management Unit B: Grassland Enhancement for Waders, any wader scrapes that expose significant archaeological remains could be ceased and backfilled). Archaeological remains are unlikely therefore to be fully removed and as such this may result in a construction-phase physical impact of up to moderate magnitude. Without mitigation, therefore, a physical impact upon archaeological remains discovered during construction-phase could result in an effect of up to **Minor Adverse Significance** which is **Not Significant**.

### Operational Effects

- 10.6.16. As agreed with consultees through submission of the Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1), five Scheduled Monuments (including one Property in Care), one Category A LB and one non-designated heritage asset presented in Table 10.8 are retained for detailed assessment in this chapter, supported with photomontage and/or wireline visualisations as appropriate. Heritage assets agreed with consultees and considered for setting effects are shown on Figure 10.2.

## Scheduled Monuments

### Brochs

- 10.6.17. Brochs were Iron Age fortified structures that date from approximately 600 BCE to 400 CE and comprised a squat tower with a small, single and easily defensible entrance. Some of the better-preserved examples contain evidence for a suspended floor, and most were constructed with an inner and outer wall tied together with wide stones, thereby forming galleries or passageways within the structure. They occur throughout coastal highland Scotland, with outliers recorded further south.
- 10.6.18. The intrinsic archaeological interest in the fabric of brochs lies in their potential data source on the architecture, domestic life and the social motives behind the construction of such massive structures during the Iron Age. The nature of these structures suggests that defence was a priority, although symbols of power and the avoidance of conflict is also a significant factor. Brochs are commonly sited on mounds with views over the surrounding area, along valleys, or to monitor important routes through the landscape; brochs are also often located close to areas of cultivatable land suggesting that agriculture was also of importance to those that constructed them.
- 10.6.19. The contextual value of brochs comes from their relationship with the surrounding landscape, as prominently visible monuments, often over long distances, with intervisibility with contemporary structures, possibly to assert ownership over a territory. It is understood through excavation that brochs were often constructed over existing Bronze Age remains, possibly further asserting ties and ownership over landscapes.
- 10.6.20. The high concentration of brochs in the OSA demonstrates that the area of influence of each broch was probably not intended to cover vast areas, but that complex social inter-relationships are a likely factor of their significance which may be understood through analysis of their nested settings. This points to wider community ties stretching across Caithness in the Iron Age.
- SM13634 Bail A' Chairn, broch*
- 10.6.21. The remains of SM13634 Bail A' Chairn, broch exist as a complex stone-built substantial roundhouse, dating to the Iron Age (between 600 BC and AD 400). The monument is visible as an oval mound up to 5.5 m high with a terrace approximately 4 m wide running round it. To its north are the remains of a slight ditch and bank. It is located approximately 60 m above sea level and is surround by level, open ground approximately 190 m west of the Burn of Acharole.
- 10.6.22. The mound on which the broch is located is artificial or, if natural, has been significantly altered. The terrace rises from ground level by around 3 m as it circles the mound from the south-west to the south-east in a clockwise direction. The broch is visible as a smaller turf-covered mound but excavation in 1904 has shown that the broch was 17.5 m in diameter with the wall approximately 4 m thick at the entrance located on the east side. Excavation also revealed internal details such as doorways, internal upright flagstone partitions, recesses and intramural stairways. The broch entrance has an extended passageway, a secondary feature. It is unclear from the available evidence where this entrance was, but the HER entry MHG1981 suggests it may have faced southwards.
- 10.6.23. As a scheduled monument, this asset is of high (national) importance.
- 10.6.24. The monument is located in a pasture field set in a wider largely rough-grazed rural landscape. The wider natural landform of the broch's situation is flat. Relative to the numerous other broch remains in the study area for this assessment, the broch mound is particularly prominent, and is readily experienced from the nearby unnamed road to the north-west, from within the field in which it is set, and also the surrounding fields. The monument is experienced prominently within a radius of c. 1 km in all directions, and is particularly prominent on approach from the south-west, as it is skylined on the horizon.

- 10.6.25. The immediate landscape comprises fields enclosed by post-and-wire fences, and modern farm buildings. Due to the relatively level topography of the landscape there are open views from the broch in all directions. From the road, the operational Camster Wind Farm is visible directly beyond the broch mound, 4 km to the south-east. From the broch, the operational Wathegar Wind Farm is visible 5.5 km to the east and the operational Halsary Wind Farm is visible 4 km away, on the horizon looking west.
- 10.6.26. When the broch was newly built and at full height, it would have been a dominant feature in the landscape; although this is no longer the case, the original intention contributes to its significance, and the remaining mound continues to be experienced prominently. It is likely that the broch would have been placed to be intervisible with SM13632 Carn A' Chladha, broch, c. 700 m to the north-east, and with a view over its controlled/farmed hinterland with direct access to the Burn of Acharole. The positioning close to the watercourse is characteristic of these monuments in Caithness and it is possible that the broch was positioned to aid navigation, or possibly to control access through the landscape via these routeways. It is this intervisibility with likely contemporary monuments, and the immediately surrounding agricultural and water resources that comprised the likely the territory of those that built the broch, which provides context and therefore contributes to the significance of the monument.
- 10.6.27. Habitat management as part of the Proposed Development as specified in the OBEMP in the area around the broch would comprise: Management Unit B (77.3 ha) across an area of current pasture. Prescriptions include: *"Where a tall, dense (>30 % rush cover) sward of rushes has established, cut rushes to create a more open habitat, baling cuttings for removal to avoid ground smothering; Construct wader scrapes, following advice set out for this (FAS 2017, RSPB 2003) and with consideration of the local hydrological setting; Manage grazing within Management Unit B to allow an optimal grassland mosaic to be maintained suitable for wader nesting and foraging."* It is considered that the habitat management proposals would have no impact on the understanding, appreciation and experience of the cultural significance of SM13634 Bail A' Chairn, broch.
- 10.6.28. Photomontage CHVP5, Figure 10.7 shows that all of the proposed turbines would be visible, including full towers, hubs and blades in views from SM13634 Bail A' Chairn, broch. The nearest proposed turbine (T2) would be located 1.3 km to the west of the monument. Photomontage CHVP6, Figure 10.8 indicates that in views back towards the monument from the Burn of Acharole, the Proposed Development would be prominently visible, backdropping the monument. The Proposed Development would not be visible in views either to or from the (tentative) southern entrance, or in views towards the north-east on approach or east from the unnamed road in which the monument also appears prominently.
- 10.6.29. The Proposed Development would therefore be visible in views from within what is interpreted as the broch's original intended hinterland to the east and may distract from an appreciation of the intentional prominence for display purposes in this view, which contributes to its cultural significance. However, the setting would be preserved other than within these limited views. Whilst the Proposed Development would change views from the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance. The broch's intentional landscape position in relation to SM13632 Carn A' Chladha, broch, with a view over its controlled/farmed hinterland with direct access to/views over/controlling the Burn of Acharole, as well as the broch's original intentional prominence over a wide area, would be retained.
- 10.6.30. It is therefore considered that the Proposed Development would have a Low Adverse magnitude impact on the cultural significance of SM13634 Bail A' Chairn, broch, an asset of High (National) importance, resulting in an effect of **Minor Adverse Significance** which is **Not Significant**.
- 10.6.31. In the terms NPF4 Policy 7.h the understanding, appreciation and experience of Scheduled Monument SM13634 Bail A' Chairn, broch would be adequately retained such that the integrity of setting would not be significantly adversely affected. Whilst the Proposed Development would change views towards the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance.
- SM13632 Carn A' Chladha, broch*
- 10.6.32. The remains of SM13632 Carn A' Chladha, broch exist as a complex stone-built substantial roundhouse, dating to the Iron Age (between 600 BC and AD 400). It is visible as a grass-covered stony mound 3 m high and c. 21 m in diameter. The monument is located approximately 50 m above sea level, on the south-west end of a narrow spur of rising land and lies approximately 100 m west of Scouthal Burn.
- 10.6.33. The broch is prominently sited on an artificially altered mound at the south-west end of a natural spur that rises from ground level at its north-east end. This spur appears to have formed the approach to the broch which sits on a levelled mound approximately 1 m high with a terrace between 1 m and 3.5 m wide running round it which broadens out at the approach to the broch.
- 10.6.34. As a scheduled monument, this asset is of high (national) importance.
- 10.6.35. The monument is located in rough pasture. The situation of the broch is dominated by the natural scarp landform on which it is located, and this natural landform obscures any visibility of the remains of the broch from the road to its immediate east. The monument is experienced prominently, however, from the north along which the spur landform has been augmented as an approach.
- 10.6.36. The immediate landscape comprises largely rough-grazed rural pasture with scattered woodlands, with the adjacent unnamed road enclosed by post-and-wire fences, and Scouthal Burn the prominent landscape features. Due to the relatively level topography of the landscape there are open views from the broch in all directions. From the broch, the operational Camster Wind Farm is visible on the horizon, 5 km to the east, operational Wathegar Wind Farm is visible on the horizon 5 km to the south-east and operational Halsary Wind Farm is visible on the horizon 6.5 km to the south-west.
- 10.6.37. When the broch was newly built and at full height, it would have been a dominant feature in the landscape; although this is no longer the case, the original intention contributes to its heritage significance, and the remaining mound continues to be experienced as a prominent feature in the landscape. It is likely that the broch would have been placed to be intervisible with SM13634 Bail A' Chairn, broch, c. 700 m to the south-west, and with a view over its controlled/farmed hinterland with direct access to Scouthal Burn. The positioning close to the watercourse is characteristic of these monuments in Caithness and it is possible that the broch was positioned to aid navigation, or possibly to control access through the landscape via these routeways. It is this intervisibility with likely contemporary monuments, and the immediately surrounding agricultural and water resources that comprised the territory of those that built the broch, which provides context and therefore contributes to the significance of the monument.
- 10.6.38. Wireline CHVP4, **Figure 10.6** indicates that all of the proposed turbines would be visible, including partial towers, hubs and blades in views from SM13632 Carn A' Chladha, broch. The nearest proposed turbine (T2) would be located 1.7 km to the south-west of the monument. Photomontage CHVP3, **Figure 10.5** indicates that in views on its approach, the Proposed Development would be visible, with just the hubs of five turbines and blade tips of two turbines visible offset to the north monument. The broch's skylined prominence would be unobscured and would appear taller than all but two of the proposed turbines from this approach position. Photomontage CHVP8, **Figure 10.10** shows that in westward views towards SM13632 Carn A' Chladha, broch (from SM721 Scouthal Burn, Chapel & The Clow), the prominent profile of the broch would remain discernible, albeit through trees lining the banks of the Burn of Acharole.

- 10.6.39. The Proposed Development would therefore be visible in views that could be interpreted as constructed or intentional and may distract from an appreciation of the intentional prominence for display purposes in this view, which contributes to its cultural significance. However, the setting would be preserved other than within this limited view. Whilst the Proposed Development would change views from the monument, given the distance of separation, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance. The broch's intentional landscape position in relation to SM13634 Bail A' Chairn, broch, with a view over its controlled/farmed hinterland with direct access to/views over/controlling the Scouthal Burn, as well as the broch's original intentional prominence over a wide area, would remain apparent.
- 10.6.40. It is therefore considered that the Proposed Development would have a Low Adverse magnitude impact on the cultural significance of SM13632 Carn A' Chladha, broch, an asset of High (National) importance, resulting in an effect of **Minor Adverse Significance** which is **Not Significant**.
- 10.6.41. In the terms NPF4 Policy 7.h the understanding, appreciation and experience of Scheduled Monument SM13634 Bail A' Chairn, broch would be adequately retained such that the integrity of setting would not be significantly adversely affected. Whilst the Proposed Development would change views towards the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance.

### Cairns

- 10.6.42. Cairn monuments within the OSA form part of a group of chambered cairns in north-east Caithness which appear to have been located to serve a community settled on the well-drained soils of the area (Davidson & Henshall, 1991). The intrinsic archaeological interest in the fabric of prehistoric funerary cairns lies in their physical remains, where excavation would allow interpretation of information regarding funerary practices in the Neolithic to Early Bronze Age.
- 10.6.43. All cairn monuments have a setting which contributes to their significance. Contextually, the siting in the landscape and relative position with other monuments provide insights into the societies that built them, in terms of where contemporary settlement may have been located and whether related features in the landscape were significant. It is likely that cairns would have been placed to be intervisible with contemporary settlement and other prominent monuments.
- SM90056/PiC297 Grey Cairns of Camster*
- 10.6.44. SM90056/PiC297 Grey Cairns of Camster comprises a chambered long cairn and two chambered round cairns dating from the Neolithic period, probably built and in use between 3800 BC and 2500 BC. The long cairn survives as a substantial trapezoidal cairn of exposed stone with two internal chambers and short horns at each end defining forecourts. The chambered round cairns are visible as substantial stone mounds, the northern-most contains a single chamber while the southern cairn is tumbled with evidence for the presence of a chamber. The long cairn and northern round cairn have been excavated and substantially reconstructed. The monument is located on level moorland, around 170 m above sea level.
- 10.6.45. The long cairn measures 60.5 m in length including the horns, by 17 m wide across the façade at the north end, narrowing to about 9 m half way along. The profile of the cairn rises over two burial chambers in the north end, while the south part is relatively level. The cairn has a long history of investigation. Considerable consolidation and reconstruction of the cairn has taken place. The northern round cairn lies around 170 m to the south-southeast. It measures around 22 m north to south by about 19 m east to west and is 3.7 m high. An eastern facing passage leads to a central chamber with corbelled roof. The cairn has also been restored and consolidated. The second round cairn, situated about 115 m south-southwest measures about 9 m in diameter and 0.4 m in height. The centre of the cairn has been disturbed, exposing the remains of a cist or central chamber.

- 10.6.46. As a scheduled monument, this group of assets is of high (national) importance.
- 10.6.47. A site visit has determined that the monuments are intentionally located in an inconspicuous location, with no view of the sea or mountains. It is notable that should long distance views have been intended by the builders of SM90056, there are locations nearby where views of both the sea and distant mountains could have been afforded. The fact that these locations were not chosen indicates that such views do not contribute to significance, and the monuments are intended to be experienced in a relatively enclosed setting, possibly to be 'revealed' on approach. There is no clear intentional relationship of the siting of the Grey Cairns of Camster and the distant landscape to the north-west, or indeed any distant landscapes in any direction. It is likely that contemporary settlement would have been located nearby, from which the impressive cairns could have been used and possibly seen. The location of any such related settlement is not known.
- 10.6.48. The scheduled cairns are located in a slightly undulating landscape, with each cairn located on a relative high point. This leads to local prominence, and when viewed from the adjacent lower parts of the landscape, the cairns are from some locations skylined and imposing.
- 10.6.49. On approach towards the Grey Cairns of Camster along the unnamed road from the south there are clear views of the operational Camster Wind Farm 2.2 km to the north. The presence of the existing operational Camster Wind Farm, prominently visible on northward approach along the unnamed road towards the Grey Cairns of Camster does not preclude an interpretation of the landscape setting of this asset. Similarly, the presence of the Proposed Development would not preclude speculation regarding the location of any contemporary settlement, the location of which would contribute to the significance of the Grey Cairns of Camster.
- 10.6.50. Intervisibility between the group of four cairns would be unaffected by the Proposed Development. From slightly lower elevations beneath the road, between the monuments, the Proposed Development would be screened by existing plantation to the north. Similarly, where the cairns are experienced prominently skylined from adjacent positions, the Proposed Development would not be visible.
- 10.6.51. Photomontage CHVP10, Figure 10.12 shows that from the public road where visitors are encouraged to disembark their vehicle to begin their experience of the cairns on foot, the Proposed Development would not be visible, being obscured by plantation on the hillside to the north of the Scheduled Monuments. The nearest proposed turbine (T3) would be located 8.5 km to the north-west of the monuments. Whilst a 'bare earth' wireline visualisation suggests visibility of distant turbines where the landscape drops away to the north-west, in reality these are currently screened by surrounding plantation. In the same way that the current presence and screening of this wider landscape produced by the plantation does not preclude an understanding of the setting of the cairns as described above, and the contribution this makes to their significance, it is considered that the presence of the Proposed Development 8.5 km to the north-west would not affect an ability to experience the cairns' cultural significance or understand and appreciate the contribution made by setting. However, as demonstrated by the photowire, if/when the plantation on the horizon at Rowens Hill/Craigy Call is harvested and in the interim period until it is re-established, the Proposed Development would potentially distract a visitor in initial views towards Camster long cairn from this vantage point. There is no evidence that the cairn was constructed to be viewed from the position of the modern road. It may be that the cairns were experienced in a wooded situation. Nevertheless, a visitor's experience of the monument would potentially be adversely affected, even for a time-limited period.
- 10.6.52. It is therefore considered that the Proposed Development would have a Low Adverse magnitude impact on the cultural significance of SM90056/PiC297 Grey Cairns of Camster, an asset of High (National) importance, resulting in an effect of **Minor Adverse Significance** which is **Not Significant**.

10.6.53. In the terms NPF4 Policy 7.h the understanding, appreciation and experience of Scheduled Monument SM90056/PiC297 Grey Cairns of Camster would be adequately retained such that the integrity of setting would not be significantly adversely affected.

*SM450 Gallow Hillock, cairn on Backlass Hill*

10.6.54. The HES scheduling description describes the remains of SM450 Gallow Hillock, cairn on Backlass Hill as a grass-covered mound situated at 110 m OD on the top of Backlass Hill. It is circular, 1.2 m in height with maximum dimensions 24 m north-east – south-west by 21 m transversely. The mound rises to a flat top with a diameter of c.11 m. The HER description tentatively describes the monument as a cairn, and discounts interpretation of a possible long cairn. Historical mapping shows the presence of an old market stance, and it may be that the cairn was reused as a gallows hill in the Middle Ages as part of an area used for markets and the administration of justice.

10.6.55. As a scheduled monument, this asset is of high (national) importance.

10.6.56. A site visit has determined that the asset is difficult to experience, as demonstrated on Photomontage CHVP7, Figure 10.9b the monument location in the foreground is overgrown with gorse, within tussocky grass. The List description indicates that, if it were cleared of gorse, it would be experienced as a wide and low mound. Although situated on a relative hilltop position (i.e., within a largely flat Caithness landscape), it is not a prominent monument that is visible over distances beyond positions directly adjacent to it. From the cairn's location, it is experienced in open moorland. In the foreground are modern farm buildings. Being a relative high-point within in otherwise largely flat landscape, there are open views from the cairn in all directions, except where these are foreshortened by woodland blocks to both the east and the west. There are vantage views to the south-west over the operational Halsary and Causeymire wind farms and to the distant upland of Ben Alisky on the horizon beyond.

10.6.57. When the cairn was newly built and at full height, it may have been more prominently visible over longer distances, perhaps intended to be visible from contemporary lochside settlement below to the north-east, at Loch Watten; although this is no longer the case, the original intention contributes to its significance. No views from Backlass Hill towards any specific monuments are identified as significant. Wireline CHVP7, **Figure 10.9a** shows the relative location of MHG1979 Possible Stone Circle, Acharole, potentially contemporary with SM450 Gallow Hillock, cairn on Backlass Hill. Today, existing blocks of plantation prevent any intervisibility with this monument. Nevertheless, should the plantation block be removed, the Proposed Development would not intervene between this, or any other monuments on the lower ground that may have been intended to be intervisible.

10.6.58. It is this surrounding landscape that was likely the territory of those that built the cairn, which provides context and therefore contributes to the significance of the monument.

10.6.59. Photomontage CHVP7, **Figure 10.9** shows that all of the proposed turbines would be visible, including full towers, hubs and blades in views from SM450 Gallow Hillock, cairn on Backlass Hill. The nearest proposed turbine (T1) would be located 2 km to the south of the monument.

10.6.60. The presence of the existing operational Halsary and Causeymire wind farms to the west of the ISA does not preclude an interpretation of the landscape setting of SM450 Gallow Hillock, cairn on Backlass Hill. Whilst the Proposed Development would change views from the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance. The cairn's intentional landscape position on a relative high-point and overlooking adjacent arable land, as well as the cairn's original intentional local prominence, would be retained. As the cairn is no longer experienced as a prominent landscape feature over long distances from possible contemporary lochside settlement to the north-east, there is no potential for the Proposed Development to challenge its prominence.

10.6.61. It is therefore considered that the Proposed Development would have a Negligible magnitude impact on the cultural significance of SM450 Gallow Hillock, cairn on Backlass Hill, an asset of High (National) importance, resulting in an effect of **Negligible Significance** which is **Not Significant**.

10.6.62. In the terms NPF4 Policy 7.h the understanding, appreciation and experience of Scheduled Monument SM450 Gallow Hillock, cairn on Backlass Hill would be adequately retained such that the integrity of setting would not be significantly adversely affected.

**Ecclesiastical Sites**

*SM721 Scouthal Burn, Chapel & The Clow*

10.6.63. The scheduled area of SM721 Scouthal Burn, Chapel & The Clow includes MHG17474, a post-medieval period township (The Clow) and MHG1976, an Early Medieval – 18th century Clow Chapel. The area is known as 'The Clow', probably from 'Cladh' - a churchyard.

10.6.64. As a scheduled monument, this asset is of high (national) importance.

10.6.65. St Mary's Chapel was described in 1726 as fragmentary, consisting of a chancel and a nave and standing in a graveyard. Records suggest that the burial place was only for strangers and unbaptised children. Inspection of The Clow in 1965 identified no trace of the graveyard. The interior wall face of the nave survived at this time to a maximum height of 0.5 m. Extensive documentary research by RCAHMS failed to locate any early reference to the site, but excavation in 1975-7 indicated that the nave was secondary, and that the chancel is the only remnant of a unicameral structure whose proportions of roughly four to one suggest a later date than Early Christian. A line of burning was thought to suggest presence of an earlier timber church. It seems to have been abandoned altogether by c.1770.

10.6.66. The graveyard was identified during two excavations in the 1970s and 1980s revealed decapitated skulls placed in small cists. HES has suggested that it is therefore possible the site was used to bury victims of execution, possibly those who were tried at Gallows Hillock to the west. To the west of the chapel several earthwork enclosures were described, including the foundations of four ruined buildings, one of which contains a corn-drying kiln and another of which is a longhouse measuring 21 x 5 m divided into five compartments. Excavation in 1977 identified a mill dating to the 18th and 19th century.

10.6.67. The Red Well (MHG13706), believed to be a holy or healing well, is located across the Southal Burn and on the west side of the road, however, whilst associated with The Clow, it is not part of the scheduling.

10.6.68. A site visit for this assessment has identified that the site is experienced as grassed earthworks only, with no structures visible. The intrinsic significance of the site is largely preserved below ground remains. The scheduled monument is located on a low plateau, east of and in a bend of the Scouthal Burn, at the base of a steep natural landform to the east which encloses it. The immediate landscape of the monument is dominated by Scouthal Burn, with surrounding rough pasture, overgrown in places by gorse. There are no long-distance views to or from the monument. The monument is experienced from the unnamed road that passes to the west, but otherwise it is located in an enclosed situation, with no views beyond c.200 m. Although the modern road approaches the chapel site on its western side, due to the barrier presented by the burn, it may be that it was originally approached from its eastern side. There is a bridge over the burn, however, which may have had a historical predecessor.

10.6.69. The site of the Chapel is overlooked by SM13632 Carn a' Chladha, broch, located on a prominent natural scarp c.175 m to the south-west. The broch may have been abandoned in the Early Christian period, when the Chapel was thought to have established. Whilst this represents a continuity in settlement of the vicinity, there is no evidence that intervisibility between the monuments contributes to the significance of either monument. It is

possible that the Chapel was established at this adjacent location in order to re-use the building stone from the broch.

- 10.6.70. Despite the apparent association through the presence of decapitated skulls at The Clow with SM450 Gallow Hillock, cairn on Backlass Hill, reused as a gallows hill in the Middle Ages as part of an area used for markets and the administration of justice, there is no direct line of sight between The Clow and Gallow Hillock.
- 10.6.71. Given its enclosed landscape situation, it is likely that the location of the chapel was chosen as an isolated place of introspection, possibly to be hidden from view. Other than the presence of the adjacent modern road, this remains the case today, and provides context and therefore contributes to the significance of the monument; albeit, the earthwork remains themselves are not experienced as a Chapel/graveyard any longer.
- 10.6.72. The later settlement remains, comprising enclosures, buildings, kiln and a mill, are likely to have been located in order to take advantage of the water and power provided by the adjacent Scouthal Burn. The surrounding land is likely to have been exploited for its pasture and it is these elements of the landscape that contribute to the significance of the later phases of the monument.
- 10.6.73. Photomontage CHVP8, **Figure 10.10** shows that three of the proposed turbines would be visible, with partial towers and hubs of two turbines, and the hub and blades only of the third turbine in views from SM721 Scouthal Burn, Chapel & The Clow. Landform screens the majority of the remainder of the proposed turbines, and existing trees on the near horizon, lining the northern boundary of the scheduled monument/Burn of Acharole, will provide screening of the blade tips of four proposed turbines. Perambulation within the designated area is likely to increase or decrease this degree of existing screening from trees depending on the precise location. The nearest proposed turbine (T2) would be located 1.9 km to the west of the monument.
- 10.6.74. No adverse effect is anticipated upon the later settlement remains of SM721 Scouthal Burn, The Clow. It would remain possible to understand, appreciate and experience factors of its setting that contribute to the cultural significance of the enclosures, buildings, kiln and a mill, i.e., Scouthal Burn and the surrounding rough pasture.
- 10.6.75. The visual and physical proximal relationship with SM13632 Carn A' Chladha, broch, allowing for a possible interpretation of the location of the chapel for the convenience of the re-use of building stone, would be retained.
- 10.6.76. Photomontage CHVP8, **Figure 10.10** indicates that the location of SM450 Gallow Hillock, cairn on Backlass Hill is currently screened from view from within the designation boundary of SM721 by a plantation block at West Watten Holdings. There is no evidence that the two Scheduled Monuments were positioned to be intervisible, nevertheless, the Proposed Development would not be located in the interim space to impact upon views in this direction should the plantation be removed, and the presence of the Proposed Development in the landscape would not preclude interpretations of an association between it and SM721 Scouthal Burn, Chapel & The Clow in the Middle Ages.
- 10.6.77. The Proposed Development would however become visible in views from within SM721 Scouthal Burn, Chapel (and graveyard). The presence of the Proposed Development may distract from an appreciation of the original intended position in the landscape as an isolated place of introspection, which contributes to its cultural significance. The monument is no longer experienced as a chapel and graveyard, being as it is earthwork remains only. Whilst the Proposed Development would change views from the monument, it would remain possible to speculate on the original layout and appearance of the chapel, its possible original access to the east or the west of the burn, and to understand, appreciate and experience its location in a relatively enclosed position.
- 10.6.78. It is therefore considered that the Proposed Development would have a Low Adverse magnitude impact on the cultural significance of SM721 Scouthal Burn, Chapel & The Clow, an asset of High (National) importance, resulting in an effect of **Minor Adverse Significance** which is **Not Significant**.

- 10.6.79. In the terms NPF4 Policy 7.h the understanding, appreciation and experience of Scheduled Monument SM721 Scouthal Burn, Chapel & The Clow would be adequately retained such that the integrity of setting would not be significantly adversely affected. Whilst the Proposed Development would change views from the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance.

### Listed Buildings

#### LB14976 Achingale Mill

- 10.6.80. LB14976 Achingale Mill is a disused early-mid 19th century, 3-storey L-plan mill constructed of rubble. The north arm of the mill consists of a kiln with a piended roof. One large and one small over-shot wheel is present at the east gable, both served by an overhead wooden lade leading from the adjacent burn bank to the south, into which the mill is built. A large timber cantilevered square chute projects at the south elevation, breaking the wallhead into another piended roof. There is a lean-to at the rear with a gabled dormer and piended Caithness slate roofs. The mill was described in *The Industrial Archaeology of Scotland* as "One of the best Caithness mills" (Hume, 1977), however it is currently on the Building at Risk Register (892811).
- 10.6.81. As a Category A Listed Building, this asset is of high (national) importance.
- 10.6.82. The mill is located alongside Scouthal Burn which provided power for its operation via the wooden lades. The mill stands alone in a largely flat landscape and therefore is experienced as a prominent landmark (which is the case for all buildings in such a landscape). The mill provides a historic character to a localised area otherwise characterised only by post-and-wire enclosed arable and pasture fields. Located in the base of the wide valley created by Scouthal Burn, the mill's situation is enclosed by natural landforms in all directions. Views are limited to no further than 1 km, but typically c.250 m. Outward views from the mill do not contribute to the significance of the mill, which was situated in order to exploit the adjacent water source. It is the association with the Scouthal Burn which provides functional context and therefore contributes to the significance of the mill.
- 10.6.83. The local landmark status of the mill, the historical character this provides to the vicinity, and the association with Scouthal Burn is best appreciated from the road to the north, represented by photomontage CHVP1, **Figure 10.3**. (This visualisation is included with the caveat that the landforms in the image appear to be man-made, such that they do not accord with the topographical model used to create the photomontage. There is therefore a discrepancy between the theoretical visibility in the photomontage as compared with the wireline. The producers of the visualisation have confirmed that the wireline is correct). This visualisation shows that the blade tips of three of the proposed turbines would be visible, partly screened by the landform of the burn's valley, visible at a distance of 3.1 km to the south-west. LB14976 Achingale Mill would remain visible as a prominent landmark 200 m to the south, with a considerable degree of separation. Wireline CHVP2, **Figure 10.4** shows that from the mill itself, the hubs and blades of six turbines would be visible, with only the blade tips of the remaining turbine visible at a distance of 3 km.
- 10.6.84. Whilst the Proposed Development would change views from the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance. The cairn's intentional landscape position adjacent to Scouthal Burn, as well as the mill's prominence as a local landmark and its historical contribution to the character of the vicinity would remain readily apparent. Views in the direction of the Proposed Development do not contribute to the significance of the mill and changes within these views would have no impact.

10.6.85. It is therefore considered that the Proposed Development would have a Negligible magnitude impact on the cultural significance of LB14976 Achingale Mill, an asset of High (National) importance, resulting in an effect of **Negligible Significance** which is **Not Significant**.

10.6.86. In the terms NPF4 Policy 7.c, the Proposed Development would preserve the character, special architectural or historic interest of the listed building.

#### Non-designated Heritage Assets

##### *MHG1979 Possible Stone Circle, Acharole*

10.6.87. MHG1979 comprises only two stones, one of which remains standing. The eastern stone is 1.5 m high and the western stone which lies displaced is 1.8 m long. The stones are interpreted as the remains of a stone circle. If the interpretation is correct, it has been badly disturbed or damaged, hence, it is not scheduled.

10.6.88. As a non-designated heritage asset of uncertain interpretation, it is of low (local) importance.

10.6.89. A site visit has determined that the one remaining standing stone is not prominently visible. It is experienced at the boundary of an improved pasture field and rough pasture. In general, the wider landscape is flat and open. The possible stone circle is located on a slight slope with a southerly aspect which fore-shortens views to the north and west. Although in an open landscape, due to slight natural undulations, views from the monument do not extend beyond 1-2 km. There are no clear focal points within the landscape that the monument was likely to have been placed to respect, nor guided sightlines towards it created by natural landforms.

10.6.90. Given its height, the monument was most likely intended to function within a relatively local environment. It is this immediately surrounding landscape that was the territory of those that built the stone circle and which may have included contemporary settlement, which provides context and therefore contributes to the significance of the monument.

10.6.91. It is possible that contemporary settlement may have been located within the ISA, where turbines are proposed, given its proximity, however this is unconfirmed. It is acknowledged that there is a slight intervening natural landform, suggesting that this is unlikely.

10.6.92. Wireline CHVP7, Figure 10.9 shows that all of the proposed turbines would be visible, including full towers, hubs and blades in views from MHG1979 Possible Stone Circle, Acharole. The nearest proposed turbine (T2) would be located 870 m to the north-west of the monument.

10.6.93. Whilst the Proposed Development would change views from the monument, it would remain possible to understand, appreciate and experience factors of its setting that contribute to its cultural significance, including the stone circle's positioning to be visible from any nearby settlement. Although the location of adjacent contemporary settlement is unknown, the presence of the Proposed Development would not preclude speculation regarding its location. As the single remaining standing stone is no longer experienced as a stone circle, nor as a prominent landscape feature, there is no potential for the Proposed Development to challenge its prominence or to block important views towards it.

10.6.94. It is therefore considered that the Proposed Development would have a Negligible magnitude impact on the cultural significance of MHG1979 Possible Stone Circle, Acharole, an asset of Low (Local) importance, resulting in an effect of **Negligible Significance** which is **Not Significant**.

## 10.7. Additional Mitigation

10.7.1. The preferred mitigation option in respect of direct, physical impacts is always to avoid or reduce impacts through design, or through precautionary measures such as fencing off of heritage assets during construction works. Impacts which cannot be eliminated in these ways will lead to residual effects.

### Mitigation During Construction

10.7.2. No direct physical impacts upon known heritage assets are identified and no potential accidental impacts from activities such as uncontrolled plant movement in the vicinity of heritage assets are anticipated.

10.7.3. Although no direct (physical) impacts are anticipated, it is proposed that the Scheduled Monument SM13634 Bail A' Chairn, broch, located directly adjacent to the Proposed Development Area, and the non-designated heritage asset MHG1979 Possible Stone Circle, Acharole, are protected throughout construction works with temporary and non-intrusive fencing erected at a 30 m buffer from the monuments.

10.7.4. The ISA is considered to hold archaeological potential for hitherto unknown archaeological remains, particularly in the eastern part of the ISA proposed for habitat Management Unit B: Grassland Enhancement for Waders.

10.7.5. There also remains a potential for paleoenvironmental/archaeological remains to be exposed as a result of the removal of peat during the construction phase. The design of the Proposed Development has endeavoured to minimise the potential for direct and indirect impacts on peat/paleoenvironmental remains (see **Chapter 9: Hydrology, Geology and Hydrogeology**). Where infrastructure for the Proposed Development is located in peat, embedded mitigation has been applied at design stage. Generally, access tracks that cross deep peat (>0.7 m depth) will be floated which will mean that there should be no excavation of peat in these areas. A range of mitigation measures are contained in the Draft Peat Management Plan (Volume 3, Technical Appendix A9.5) to minimise excavation and transportation of peat, reduce potential for peat instability and minimise potential soil carbon loss. The following infrastructure overlaps with deep peat:

- Approximately 200 m of track leading to T2 and T2 track blade laydown and hardstanding overlaps with an area of 1.01 m to 1.5 m peat depth, with some discrete pockets 1.51 to 2 m depth.
- T5 is on the boundary of < 1 m peat and 1.01 m to 1.5 m depth category. T5 blade laydown and crane pads are located on an area of 1.01 m to 1.5 m peat depth.
- T6 and hardstanding on 1.0 m to 1.5 m depth and associated hardstanding overlapping with a small area of 2.01 m to 2.5 m category peat.
- The access track leading from the Proposed Development entrance to T7 is located on areas of peat up to < 3.0 m depth for approximately 0.002 km<sup>2</sup>.
- Discrete pocket of peat (<2 m) within conifer plantation is underlying approximately 38 m of the main access track south of the T4 junction.

10.7.6. Adverse direct (physical) effects may be mitigated by an appropriate level of survey, excavation, recording, analysis and publication of the results, in accordance with a written scheme of investigation (NPF4 Policy 7.o and PAN2/2011, sections 25-27). It is proposed that mitigation focuses on any groundworks within areas of peat, and also monitors the excavations for wader scrapes in OBEMP Management Unit B.

10.7.7. Any physical construction effects upon previously unknown cultural heritage assets (archaeological potential) of up to **Minor Adverse Significance** which is **Not Significant** will therefore be mitigated through a programme of archaeological investigation and recording works. These will include potential impacts upon or beneath peat. A programme and scope of mitigation works will be specified in a Written Scheme of Investigation (WSI) which will



be agreed with THC Historic Environment Team in advance of commencement and be requested as a condition of any consent.

### Mitigation During Operation

- 10.7.8. The layout of the Proposed Development has been designed to minimise cultural heritage setting effects. Inherent mitigation designed into the project is set out in Chapter 4: Design Evolution and Chapter 5: Project Description.
- 10.7.9. As a result, no significant operational effects are predicted on the setting of cultural heritage assets from the operation of the Proposed Development. No additional mitigation is proposed.

## 10.8. Residual Effects

- 10.8.1. Potential effects of the Proposed Development upon heritage assets resulting from its construction, operation and decommissioning are considered below.

### Residual Construction Phase Effects

- 10.8.2. The ISA is considered to be potential for hitherto unknown archaeological remains within the ISA. Based on the assessment of known heritage assets in the vicinity, the effect resulting from an impact upon archaeological remains discovered during the construction-phase may be of up to **Major Adverse significance, which is Significant**.
- 10.8.3. A programme of mitigation shall be agreed with THC Historic Environment Team to offset any potential direct effects on unknown heritage assets which may exist within the ISA, to include potential impacts upon or beneath peat. Following agreement of these works, **No Residual Effects** are anticipated upon potential heritage assets within the ISA.

### Residual Operational Effects

- 10.8.4. In respect of the setting of heritage assets, residual operational effects of **Minor Adverse Significance** which are **Not Significant** are predicted upon four Scheduled Monuments: SM90056/PiC297 Grey Cairns of Camster (only if/when intervening plantation is harvested) (CHVP10, Figure 10.12), SM13632 Carn A' Chladha, broch (CHVP3, Figure 10.5 & CHVP4, Figure 10.6), SM13634 Bail A' Chairn, broch (CHVP5, Figure 10.7 & CHVP6, Figure 10.8), and SM721 Scouthal Burn, Chapel and The Clow (CHVP8, Figure 10.10).
- 10.8.5. Operational effects of Negligible Significance are not of material consideration and therefore not considered residual effects.

## 10.9. Cumulative Effects

- 10.9.1. The cumulative effects of the Proposed Development with the developments of consented, or at application, wind farm developments (as described in Chapter 6: LVIA) have been considered.

### Cumulative Construction Effects

- 10.9.2. In terms of direct physical effects, due to the nature of previously unrecorded cultural heritage assets likely to be found in the ISA, it is considered that there is no potential for cumulative construction effects on previously

unrecorded cultural heritage assets. Any effects will be contained within the ISA, and none will be further directly impacted by any other developments outside this area.

### Cumulative Operational Effects

- 10.9.3. Cumulative operational effects can occur when the contribution made to the cultural significance of a heritage asset is directly altered by the Proposed Development in combination with other developments. The assessment of effects uses the same methodology applied in considering the likely effects of Proposed Development alone. All analysis of asset significance and the contribution made by setting remains unchanged. All that is altered is the nature of change predicted for the one or more scenarios under consideration.
- 10.9.4. Cumulative operational effects are considered in cases where an effect of Minor or greater significance has been predicted on the setting of a heritage asset as a result of the Proposed Development.
- 10.9.5. In terms of operational impacts upon the cultural significance of heritage assets in the study area through development within their setting, an effect of **Minor Adverse Significance** is anticipated upon three scheduled monuments. For the cumulative assessment, other proposed developments are considered where they also feature prominently within views of or towards these assets, as demonstrated by visualisations.
- SM90056/PiC297 Grey Cairns of Camster (CHVP10, Figure 10.12)*
- 10.9.6. Due to intervening distance and angles of view, an assessment accounting for the other proposed schemes visible in the photowire cumulatively with the Proposed Development results in the same impact magnitude as the Proposed Development in isolation, such that the assessed impact magnitude is unlikely to be increased.
- SM13632 Carn A' Chladha, broch (CHVP3, Figure 10.5 & CHVP4, Figure 10.6)*
- 10.9.7. No cumulative schemes are located within parts of the landscape that are considered to contribute to the monument's cultural significance such that the assessed impact magnitude concluded for the Proposed Development in isolation is likely to be increased.
- SM13634 Bail A' Chairn, broch (CHVP5, Figure 10.7 & CHVP6, Figure 10.8)*
- 10.9.8. No cumulative schemes are located within parts of the landscape that are considered to contribute to the monument's cultural significance such that the assessed impact magnitude concluded for the Proposed Development in isolation is likely to be increased.
- SM721 Scouthal Burn, Chapel and The Clow (CHVP8, Figure 10.10)*
- 10.9.9. No cumulative schemes are located within parts of the landscape that are considered to contribute to the monument's cultural significance such that the assessed impact magnitude concluded for the Proposed Development in isolation is likely to be increased.

### Cumulative Assessment Conclusion

- 10.9.10. No cumulative impacts of increased magnitude are therefore predicted for known cultural heritage assets from any combination of developments in comparison with the assessment conclusions of the Proposed Development in isolation presented in this chapter, therefore the cumulative significance remains **Not Significant**.

## 10.10. Statement of Significance

- 10.10.1. No direct or indirect physical impacts upon known heritage assets during the construction phase are identified, and accidental impacts are considered unlikely.
- 10.10.2. Following a programme of construction phase archaeological works to be agreed with THC Historic Environment Team through post-consent submission of a WSI, there would be no residual construction effects on any currently unknown archaeological remains within the ISA, or accidental impacts upon known heritage assets.
- 10.10.3. In respect of the setting of heritage assets, residual operational effects of **Minor Adverse significance** which are **Not Significant** are predicted upon four Scheduled Monuments: SM90056/PiC297 Grey Cairns of Camster (only if/when intervening plantation is harvested), SM13632 Carn A' Chladha, broch, SM13634 Bail A' Chairn, broch, and SM721 Scouthal Burn, Chapel and The Clow.
- 10.10.4. Cumulative impact assessment, considering other consented and submitted applications for wind farms in the vicinity has identified **No Significant Effects** as a result of the Proposed Development (see Section 10.9).
- 10.10.5. In conclusion, it is predicted that there would be **No Significant Effects** upon cultural heritage as a result of the Proposed Development.

## 10.11. Statement of Competence

- 10.11.1. Headland Archaeology (UK) Ltd is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA), an audited status which confirms that its work is carried out in accordance with the highest standards of the profession. Headland Archaeology (UK) Ltd, as part of the RSK Group, is also recognised by the Institute of Historic Building Conservation (IHBC) under their 'Historic Environment Service Provider Recognition' scheme. This quality assurance standard acknowledges that RSK works to the conservation standards of the IHBC, the UK's lead body for built and historic environment practitioners and specialists.
- 10.11.2. Headland Archaeology (UK) Ltd operates a quality management system to help ensure all projects are managed in a professional and transparent manner, which enables it to qualify for ISO 9001 (Quality Management), ISO 45001 (health and safety management) and ISO 14001 (environmental management).

Table 10.7: Statement of competence

Discipline	Consultant	Company	Experience
Cultural Heritage	Owen Raybould	Headland Archaeology (UK) Ltd	<p>Owen has 21 years of professional experience in the historic environment sector. He leads on wind farm work at Headland and has undertaken responsible work in Environmental Impact Assessment and historic environment consultancy since 2007. Owen is currently actively involved in the management and delivery of 17 wind farm EIAR projects in Scotland.</p> <p>Through the management of projects relating to the historic environment, and the provision of supporting planning documentation over this period, Owen has an in-depth understanding of legislation, policy, regulation and guidance and approach to EIA.</p> <p><b>Qualifications include:</b></p> <p>BSc (Hons) Archaeological Science</p> <p>Member of the Chartered Institute of Archaeologists (MCIfA)</p> <p>Member of the Institute for Historic Building Conservation (IHBC)</p>

## 10.12. Non-Technical Summary

### Methodology

- 10.12.1. This chapter assesses potential effects upon the Historic Environment (Archaeology and Cultural Heritage) as a result of the Proposed Development. Assessment of potential direct and indirect (physical) effects and effects upon cultural significance through development within the setting of heritage assets is presented separately for the construction and operation stages of the Proposed Development., including potential cumulative effects.
- 10.12.2. The assessment has been compiled with reference to all relevant legislation, planning policy and guidance documents of Historic Environment Scotland (HES), the Chartered Institute for Archaeologists (CIfA) and IEMA. Through Scoping, Headland Archaeology (UK) Ltd, part of the RSK Group, consulted with statutory consultees to agree the methodology employed in the assessment and to identify specific heritage assets requiring detailed assessment. The methodology and study areas used in the assessment have been formulated as a result of this consultation.
- 10.12.3. Within the Inner Study Area (ISA), also referred to as Proposed Development Area, all heritage assets are assessed for potential construction and operational effects. The Outer Study Area (OSA) is defined by the zone of theoretical visibility (ZTV) of the development to identify any heritage assets that may be affected by the operation of the Proposed Development, i.e., through effects within their settings and the contribution setting makes to the cultural significance of the asset. The baseline for the assessment has been informed by a Cultural Heritage Baseline and Stage 1 Setting Assessment (Volume 3, Technical Appendix A10.1) based on all relevant and readily available documentary sources and site visits.

### Baseline Conditions

- 10.12.4. There are no designated heritage assets within the ISA, although Scheduled Monument SM13634 Bail A' Chairn, broch is surrounded on all sides by the ISA boundary, having been excluded from the Proposed Development Area.
- 10.12.5. There are 12 known non-designated heritage assets recorded on the NRHE/THC HER within the ISA. In addition, this assessment has identified a further nine heritage assets within the ISA from a review of historic mapping and aerial photos, and walkover survey.
- 10.12.6. Within 2 km of the proposed turbines there are four scheduled monuments and 42 non-designated heritage assets. Within 2-5 km of the proposed turbines there are 13 scheduled monuments, one Category A listed building and one Category B listed building. Within 5-10 km of the proposed turbines there are 36 scheduled monuments. Within 10-20 km of the proposed turbines there are 16 Category A listed buildings and nine scheduled monuments within the ZTV. Setting Assessment considers each heritage asset in the OSA in turn to identify those assets in the ZTV which have a wider landscape setting that contributes to their cultural significance and whether it is likely that cultural significance could be harmed by the Proposed Development. In agreement with consultees, the potential impact of the Proposed Development within the settings of five scheduled monuments (including one Property in Care), one Category A listed building (LB) and one non-designated heritage asset have been assessed in detail.

### Potential Impacts

- 10.12.7. No direct or indirect physical impacts upon known heritage assets during the construction phase are identified, and accidental impacts are considered unlikely.
- 10.12.8. The ISA is considered to hold archaeological potential for hitherto unknown archaeological remains, particularly in the eastern part of the ISA proposed for habitat Management Unit B: Grassland Enhancement for Waders. There also remains a potential for paleoenvironmental/archaeological remains to be exposed as a result of the removal of peat during the construction phase.
- 10.12.9. A programme of mitigation shall be agreed with THC Historic Environment Team to offset any potential direct effects on unknown heritage assets which may exist within the ISA, to include potential impacts upon or beneath peat. Following agreement of these works, **No Residual Effects** are anticipated upon potential heritage assets within the ISA.
- 10.12.10. In respect of the setting of heritage assets, residual operational effects of **Minor Adverse significance** which are **Not Significant** are predicted upon four Scheduled Monuments: SM90056/PiC297 Grey Cairns of Camster (only if/when intervening plantation is harvested), SM13632 Carn A' Chladha, broch, SM13634 Bail A' Chairn, broch, and SM721 Scouthal Burn, Chapel and The Clow.
- 10.12.11. Cumulative impact assessment, considering other operational, consented and submitted applications for wind farms in the OSA, has identified **No Significant Effects**.

# Chapter 11

## Forestry

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## Glossary

Term	Definition
Compensatory Planting	Compensatory planting may be required as part of any development where there would be permanent woodland loss. The extent of any compensatory planting required is calculated as per the requirements of the Scottish Government's Control of Woodland Removal Policy.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Forest Certification	Forest certification is a voluntary process whereby an independent third party assesses the quality of forest management and production against a set of standards (UKWAS). Forest certification, and associated labelling, is a way of informing consumers about the sustainability of the forests from which wood and other forest products were produced.
Replanting/ Restocking	Interchangeable terms to describe planting replacement trees in an area after it has been felled.
Silviculture	Silviculture is the practice of controlling the growth, composition/structure, and quality of forests to meet values and needs, specifically timber production.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).
UKFS	The UK Forestry Standard is the reference standard for sustainable forest management across the UK, and applies to all woodland, regardless of who owns or manages it. The standard ensures that international agreements and conventions on areas such as sustainable forest management, climate change, biodiversity and the protection of water resources are applied in the UK. The standard outlines the context for forestry in the UK. It sets out the approach of the UK governments to sustainable forest management by defining requirements and guidelines and providing a basis for regulation and monitoring - including national and international reporting.
UKWAS	The UK Woodland Assurance Standard is an independent certification standard for verifying sustainable woodland management in the UK that is used for both Forest Stewardship Council® (FSC®) and the Programme for the Endorsement of Forest Certification (PEFC) certification.

Term	Definition
Windblow	Windblow is the result of extreme wind events which can cause major problems for forests such as: uprooting and breaking trees, preventing emergency services access and; disrupting electricity, water, phone, gas services and public transport. While catastrophic windblow events are rare, their frequency, scale and location are unpredictable.

Source: DGA Forestry LLP

## List of Abbreviations

Abbreviation	Description
AOD	Above Ordnance Datum
CEMP	Construction Environmental Management Plan
cm	Centimetre
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Act
FCS	Forestry Commission Scotland, the predecessor organisation to Scottish Forestry
FES	Forest Enterprise Scotland, the predecessor organisation to Forestry and Land Scotland
FISA	Forest Industry Safety Accord
FLS	Forestry and Land Scotland, responsible for the management of the NFE
FSA	Forestry Study Area
ha	Hectare
HFWS	Highland Forestry and Woodland Strategy
m	Metre
NFE	National Forest Estate
NPF	National Planning Framework
rWFD	Revised Waste Framework Directive
SEPA	Scottish Environment Protection Agency
SF	Scottish Forestry, the body responsible for regulatory, policy and support functions
SFS	Scottish Forestry Strategy
SSSI	Site of Special Scientific Interest
THC	The Highland Council
UKFS	UK Forestry Standard
UKWAS	UK Woodland Assurance Standard

Source: DGA Forestry LLP

## 11.1. Introduction

- 11.1.1. This Chapter considers the potential implications of the Proposed Development on the woodland resource within the Proposed Development Area and its long-term management. This Chapter was prepared by DGA Forestry LLP. The forestry assessment has identified that areas of forestry would require to be felled for the construction and operation of the Proposed Development. Proposed on site replanting and additional planting of native woodland results in an increase in the area of stocked woodland within the Proposed Development site boundary.
- 11.1.2. Forestry is not regarded as a receptor for Environmental Impact Assessment (EIA) purposes. Commercial forests are a dynamic environment and their structure continually undergoes change due to the following:
- Normal felling and restocking by the landowner;
  - Natural events, such as storm damage, pests or diseases; and
  - External factors, such as a wind farms or other development.
- 11.1.3. This Chapter therefore describes:
- The plans as a result of the Proposed Development for felling, restocking and forest management practices;
  - The process by which these were derived; and
  - The changes to the physical structure of the forestry within the Proposed Development Area.
- 11.1.4. This Chapter discusses the issue of forestry waste arising from the Proposed Development.
- 11.1.5. The forestry proposals are interrelated with environmental effects, which are assessed separately in other chapters of the Environmental Impact Assessment Report (EIAR). This Chapter should therefore be read in conjunction with other EIAR chapters, for example: Chapter 4: Site Selection and Design Evolution; Chapter 6: Landscape and Visual; Chapter 7: Ecology; Chapter 8 Ornithology; and Chapter 9: Hydrology, Geology and Hydrogeology as they are interrelated to the proposed changes in the forest structure.
- 11.1.6. The responsibility for the management of the remainder of the forest out with the site boundary lies with the landowners and therefore the wider felling operations, restocking, and aftercare operations within these areas do not form part of the proposed development for which consent is sought.
- 11.1.7. Two of the proposed wind turbines and associated infrastructure, as shown on Figure 1.2: Site Layout, are located partially within existing commercial forestry plantations. The woodlands are privately owned and managed. The forestry proposals have been developed to:
- Identify areas of forest to be removed for the construction and operation of the Proposed Development;
  - Identify those areas which may or may not be replanted as part of the Proposed Development; and
  - Propose management practices for the forestry works.
- 11.1.8. In general, throughout this Chapter data labelled 'baseline' refers to the current crop composition and any existing plans without any modification as a result of the Proposed Development. Data labelled 'Proposed Development' refers to the forestry plans incorporating the Proposed Development infrastructure.
- 11.1.9. This Chapter is structured as follows:
- Planning, Policy and Guidance;
  - Consultation;
  - Forestry Study Area;

- Forest Plans;
- Development of the Wind Farm Forest Plan;
- Baseline;
- Proposed Development Forest Plan;
- Requirement for Compensatory Planting;
- Forestry Waste;
- Forestry Management Practices;
- Summary; and
- Statement of Competence.

### Planning Policy and Guidance

- 11.1.10. Relevant overarching planning policies for the proposed development are detailed within Chapter 2: Legal and Policy Context and the Planning and Renewable Energy Policy Statement that accompanies the application. A desktop study was undertaken drawing upon published National, Regional and local level publications, assessments and guidance to establish the broad planning and forestry context within which the Proposed Development is located.
- 11.1.11. Forestry related policies and documents listed below have been considered within the forestry assessment. The following section provides an outline of those planning and other policies which are relevant to the Proposed Development, and in particular to forestry.

#### Forestry and Land Management (Scotland) Act 2018

- 11.1.12. Until 1st April 2019, the Scottish Ministers owned the National Forest Estate (NFE), provided funding and had responsibility for forestry strategy and policy, but the management of the NFE and delivery of forestry functions had been the responsibility of the Forestry Commissioners.
- 11.1.13. The Forestry Commission was a cross-border public authority and a United Kingdom non-ministerial department with a statutory Board of Commissioners. The Commission was made up of a number of parts, including in Scotland:
- Forest Enterprise Scotland (FES), which carried out forestry operations and managed the NFE on Scottish Ministers' behalf; and
  - Forestry Commission Scotland (FCS), which was responsible for the other forestry functions in Scotland.
- 11.1.14. When full devolution of forestry to the Scottish Government was completed on 1 April 2019, FCS and FES became two new agencies of the Scottish Government:
- Scottish Forestry (SF), responsible for regulatory, policy and support functions; and
  - Forestry and Land Scotland (FLS), responsible for the management of the NFE and any other land managed for the purposes of the Forestry and Land Management (Scotland) Act 2018.
- 11.1.15. With the introduction of the Forestry and Land Management (Scotland) Act 2018<sup>1</sup> and its associated Regulations on 1 April 2019, the old regulatory regime of felling control under the Forestry Act 1967<sup>2</sup> was repealed in Scotland. From 1 April 2019, anyone wishing to fell trees in Scotland requires a Felling Permission issued by SF, unless an

<sup>1</sup> The Scottish Government (2018). The Forestry and Land Management (Scotland) Act 2018, Edinburgh. Available at <http://www.legislation.gov.uk/asp/2018/8/contents/enacted> [Accessed 12/07/2023]

<sup>2</sup> UK Government (1967). Forestry Act 1967 (as amended). HMSO, London. Available at <https://www.legislation.gov.uk/ukpga/1967/10/contents> [Accessed 12/07/2023]

exemption applies or another form of felling approval such as a felling licence (including a forest plan) has previously been issued.

- 11.1.16. Under the new Regulations felling which is authorised by planning permission consent continues to be exempt from the Regulations and does not require a Felling Permission issued by SF.

### Scotland's Forestry Strategy 2019 - 2029

- 11.1.17. Scotland's Forestry Strategy 2019 – 2029 (SFS)<sup>3</sup>, was published in 2019 after a consultation period. The Strategy provides an overview of contemporary Scottish forestry; presents the Scottish Government's 50-year vision for Scotland's forests and woodlands; and sets out a 10-year framework for action.

- 11.1.18. The vision is that *"...in 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy and flourishing communities."*

- 11.1.19. It lists a number of objectives summarised below:

- Increase the contribution of forests and woodlands to Scotland's sustainable and inclusive economic growth;
- Improve the resilience of Scotland's forests and woodlands and increase their contribution to a healthy and high quality environment; and
- Increase the use of Scotland's forest and woodland resources to enable more people to improve their health, well-being and life chances.

- 11.1.20. It further describes the priorities as:

- Ensuring forests and woodlands are sustainably managed;
- Expanding the area of forests and woodlands, recognising wider land-use objectives;
- Improving efficiency and productivity, and developing markets;
- Increasing the adaptability and resilience of forests and woodlands;
- Enhancing the environmental benefits provided by forests and woodlands; and
- Engaging more people, communities and businesses in the creation, management and use of forests and woodlands.

- 11.1.21. There are ambitious targets included within the SFS for new woodland creation:

- 10,000 hectares (ha) per year in 2018;
- 12,000 ha per year from 2020/21;
- 14,000 ha per year from 2022/23; and
- 15,000 ha per year from 2024/25.

- 11.1.22. The stated objective is to increase Scotland's woodland cover from the current 18.5% to 21% by 2032.

### Scotland's Third Land Use Strategy 2021 - 2026

- 11.1.23. Scotland's Third Land Use Strategy 2021 – 2026<sup>4</sup> stresses the importance of forestry in the balancing the demands on land use in Scotland and its transition to a net zero economy. It states: *"...there will need to be a significant land use change from current uses to forestry and peatland restoration."* This will involve rapidly increasing the

pace of woodland and forest creation. To support this, Scotland's Forestry Strategy 2019 – 2029 emphasises the continued protection of Scotland's forest resource.

### National Planning Framework 4

- 11.1.24. National Planning Framework 4 (NPF4)<sup>5</sup> was laid before the Scottish Parliament on 8 November 2022. The Scottish Parliament voted to approve NPF4 on 11 January 2023 and it was adopted by the Scottish Ministers on 13 February 2023. NPF4 states that development proposals involving woodland removal will only be supported where they will achieve significant and clearly defined additional public benefits in accordance with relevant Scottish Government policy on woodland removal and, where woodland is removed, compensatory planting will most likely be expected to be delivered.

- 11.1.25. It further states that development proposals on sites which include an area of existing woodland or land identified in the relevant Forestry and Woodland Strategy as being suitable for woodland creation will only be supported where the enhancement and improvement of woodlands and the planting of new trees on the site (in accordance with the Forestry and Woodland Strategy) are integrated into the design.

### Right Tree in the Right Place

- 11.1.26. 'Right Tree in the Right Place - Planning for Forestry & Woodlands' 2010<sup>6</sup> sets out detailed guidance to planning authorities when considering development proposals involving forestry and woodland. It advises that planning authorities should:

- Assess the current and likely future public benefits (social, economic and environmental) deriving from the existing woodland;
- Determine whether the development should be modified or the woodland redesigned to avoid or reduce woodland loss (e.g. by accommodating new development within 'open space' within woodlands);
- Where woodland loss cannot be avoided, assess the public benefit of a proposed development to see if it would justify the loss of the woodland;
- Consider whether any loss of woodland should be mitigated by compensatory planting; and
- Consider whether any felling consent needs to specify the timing of forestry operations to avoid disturbance to wildlife present on the Proposed Development.

- 11.1.27. If an authority decides that a development proposal involving woodland loss should receive planning permission, it should specify the precise area of felling permitted and ensure that planning conditions and/or agreements would ensure the provision of any compensatory planting which is required.

### Control of Woodland Removal Policy

- 11.1.28. In parallel with the SFS and other national policies on woodland expansion, there is a strong presumption against permanent deforestation unless it addresses other environmental concerns. In Scotland, such deforestation is

<sup>3</sup> The Scottish Government (2019). Scotland's Forestry Strategy 2019 -2029, Edinburgh.

<sup>4</sup> Scottish Government (2021): Scotland's Third Land Use Strategy 2021 – 2026. Available at <https://www.gov.scot/publications/scotlands-third-land-use-strategy-2021-2026-getting-best-land/> [Accessed 12/07/2023]

<sup>5</sup> The Scottish Government (2022). National Planning Framework 4 Revised Draft. Available at <https://www.gov.scot/publications/national-planning-framework-4-revised-draft/> [Accessed 12/07/2023]

<sup>6</sup> Forestry Commission Scotland (2010): Right Tree in the Right Place - Planning for Forestry & Woodlands. Forestry Commission, Edinburgh.



dealt with under the Scottish Government's 'Control of Woodland Removal Policy' 2009<sup>7</sup>. The guidance relating to the implementation of the policy was revised and updated in 2019<sup>8</sup>.

- 11.1.29. The purpose of the policy is to provide direction for decisions on woodland removal in Scotland. The policy document lays out the background to the policy, places it into the current policy and regulatory context, and discusses the principles, criteria and process for managing the policy implementation. The following paragraphs summarise the policy relevant to the Proposed Development.
- 11.1.30. The principal aims of the policy include:
- To provide a strategic framework for appropriate woodland removal; and
  - To support climate change mitigation and adaptation in Scotland.
- 11.1.31. The guiding principles behind the policy include:
- There is a strong presumption in favour of protecting Scotland's woodland resources; and
  - Woodland removal should be allowed only where it would achieve significant and clearly defined additional public benefits. In appropriate cases, a proposal for compensatory planting may form part of this balance.
- 11.1.32. Woodland removal, without a requirement for compensatory planting, is most likely to be appropriate where it would contribute significantly to:
- Enhancing priority habitats and their connectivity;
  - Enhancing populations of priority species;
  - Enhancing nationally important landscapes, designated historic environments and geological Sites of Special Scientific Interest (SSSI);
  - Improving conservation of water or soil resources; or
  - Public safety.
- 11.1.33. Woodland removal, with compensatory planting, is most likely to be appropriate where it would contribute significantly to:
- Helping Scotland mitigate and adapt to climate change;
  - Enhancing sustainable economic growth or rural/community development;
  - Supporting Scotland as a tourist destination;
  - Encouraging recreational activities and public enjoyment of the outdoor environment;
  - Reducing natural threats to forests or other land; or
  - Increasing the social, economic or environmental quality of Scotland's woodland cover.
- 11.1.34. The consequences of the policy are stated as:
- Minimising the inappropriate loss of woodland cover in Scotland;
  - Enabling appropriate woodland removal to proceed with no net loss of woodland -related public benefits other than in those circumstances detailed in the policy; and

- Facilitating achievement of the Scottish Government's woodland expansion ambition in a way that integrates with other policy drivers (such as increasing sustainable economic growth, tackling climate change, rural/community development, renewable energy and biodiversity objectives).

- 11.1.35. Addressing the policy requirements can be met through changes to forest design, increasing designed open space, changing the woodland type, changing the management intensity, or completing off site compensation planting.

### Development Guidance - Highland Forestry and Woodland Strategy

- 11.1.36. The 2018 Highland Forest & Woodland Strategy<sup>9</sup> (HFWS) is one of a series of Development Guidance documents prepared by The Highland Council (THC) to support its Highland-wide Local Development<sup>10</sup>.
- 11.1.37. The HFWS sets out the important roles that forestry will continue to play in delivering a wide range of sustainable economic and rural development, environmental, social and community benefits. It presents the key issues, challenges and opportunities, together with a refreshed vision, strategic aims and objectives for the future expansion and stewardship of the Highland forest and woodland resource and associated industries over the next 20 years. It is essentially a refresh of the 2006 Highland Forestry and Woodland Strategy and will be reviewed on a five yearly basis.
- 11.1.38. In paragraph 4.7 it recognises that a key strategic issue facing not only the Highland region but elsewhere in Scotland is the net loss of woodland cover. It reiterates THC will continue to implement the Scottish Government's Control of Woodland Removal Policy when considering developments that involve the loss of trees and woodland.
- 11.1.39. The HFWS will link closely with THC's Trees, Woodland and Development Supplementary Guidance<sup>11</sup> published in 2013. This cites wind farms as one of the most significant causes of woodland removal in Scotland. The guidance further states:
- THC will consider the cumulative impact of wind farms on the woodland resource within an area when assessing applications;
  - To help mitigate against the loss of woodland, developers should look at opportunities for wind farms to co-exist with woodland, providing mutual benefits such as improvements to the public road infrastructure to facilitate the extraction of timber;
  - THC has a strong presumption in favour of protecting its woodland resource. Development proposals involving woodland removal will only be supported where they offer clear and significant public benefit; and
  - While the Control of Woodland Removal policy will accept compensatory planting anywhere within Scotland, THC has a strong preference for planting to remain within the Highlands.

### Consultation

- 11.1.40. In addition to formal scoping, consultation was undertaken, by DGA Forestry LLP, throughout the EIA process with the relevant stakeholders to inform the assessment and understand their position. A summary of this is provided in Table 11.1 below.

<sup>7</sup> Forestry Commission Scotland (2009). The Scottish Government's Policy on Control of Woodland Removal. Edinburgh.

<sup>8</sup> Forestry Commission Scotland (2019): Scottish Government's policy on control of woodland removal: implementation guidance. Available at <https://forestry.gov.scot/publications/349-scottish-government-s-policy-on-control-of-woodland-removal-implementation-guidance> [Accessed 12/07/2023]

<sup>9</sup> The Highland Council (2018): Highland Forest and Woodland Strategy. Available at [https://www.highland.gov.uk/downloads/file/891/highland\\_forest\\_and\\_woodland\\_strategy](https://www.highland.gov.uk/downloads/file/891/highland_forest_and_woodland_strategy) [Accessed 12/07/2023]

<sup>10</sup> The Highland Council (2012): Highland -wide Local Development Plan. Available at [https://highland.gov.uk/info/178/local\\_and\\_statutory\\_development\\_plans/199/highland-wide\\_local\\_development\\_plan](https://highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan) [Accessed 12/07/2023]

<sup>11</sup> The Highland council (2013): Trees, Woodland and Development Supplementary Guidance. Available at [https://www.highland.gov.uk/downloads/file/354/trees\\_woodlands\\_and\\_development\\_supplementary\\_guidance](https://www.highland.gov.uk/downloads/file/354/trees_woodlands_and_development_supplementary_guidance) [Accessed 12/07/2023]

Table 11.1: Consultations

Consultee	Comment Summary	Response
Scottish Forestry (SF)	<p>Recommends that all impacts on woodland are set out in one section of the Environmental Impact Assessment Report (EIA Report) for the Proposed Development.</p> <p>Any woodland removal for development purposes will be subject to Scottish Government's Policy on Control of Woodland Removal.</p> <p>Any proposed compensatory planting areas will be the subject of the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017.</p> <p>Any additional felling which is not part of the planning application will require permission from SF under the Forestry and Land Management (Scotland) Act 2018 (the Act).</p>	<p>A standalone forestry chapter has been prepared as part of the EIAR detailing felling and restocking proposals for the Proposed Development. It identifies the changes to the forestry structure within the Proposed Development site boundary.</p> <p>The Proposed Development forestry plans take into account The Scottish Government's Control of Woodland Removal Policy and the associated implementation guidance. The changes to the area of woodland would be assessed as per Annex V of the implementation guidance.</p> <p>Noted.</p> <p>Noted.</p>
THC	<p>It is advised that a specific chapter on forestry is included in the EIAR</p> <p>Compliance with the Scottish Government's Control of Woodland Removal Policy must be demonstrated.</p>	<p>See response above.</p> <p>See response above.</p>
SEPA	<p>Request a map and table detailing forest removal.</p> <p>Key holing must be used wherever possible.</p> <p>Forest removal and forest waste.</p>	<p>See response above</p> <p>The Proposed Development infrastructure will be keyholed into young crops or, where entire coupes have to be felled for forestry management purposes, into the restocking design.</p> <p>Where relevant the comments regarding forest waste; forest removal; and the use of timber residues for ecological benefit will be addressed by the relevant disciplines within the EIA team.</p>

## 11.2. Forestry Study Area

- 11.2.1. The Forestry Study Area (FSA), as shown on Figure 11.1, extends to approximately 141.30 ha and is comprised of privately owned and managed woodlands within the Proposed Development Area.
- 11.2.2. The forests are comprised largely of commercial conifers with areas of mixed broadleaves and open ground. Further information on the composition of the woodlands in the FSA is provided in the baseline description below.

### Forest Plan

- 11.2.3. One of the original key objectives of the Forestry Commission was forest expansion, in both state and private forests, to produce a strategic reserve of timber, and consequently, a limited range of species was planted. More recently, greater emphasis has been placed on developing multi-purpose forests, which require a restructuring of age and species in existing woodlands. Restructuring is achieved through the forest planning process.
- 11.2.4. A Forest Plan relates to individual forests or groups of woodlands. It describes the woodlands, places them in context with the surrounding area, and identifies issues that are relevant to the woodland or forest. Forest Plans describe how the long-term strategy would meet the management objectives of the owner, the criteria of the UK 'Forestry Standard' (UKFS)<sup>12</sup> and the UK 'Woodland Assurance Standard 4th Edition' (UKWAS)<sup>13</sup>, under which the woodlands would be managed if certificated.
- 11.2.5. A Forest Plan involves a scoping exercise whereby the views of Statutory Consultees, neighbours and stakeholders are sought, resulting in an agreed Scoping Opinion. The results of the scoping exercise are incorporated into the Forest Plan. The Forest Plan covers social and environment aspects, such as conservation, archaeology, landscape and the local community, in addition to forestry and silvicultural considerations.
- 11.2.6. Restructuring of age class and species are important factors in this process to ensure proposals meet the current standards. A Proposed Development Forest Plan is prepared along the same principles with the relevant information being provided by other members of the project team. A baseline Forest Plan (without wind farm) will typically contain felling and restocking proposals covering a 10 year period in detail, with outline proposals for the remainder of the forest.
- 11.2.7. There is no baseline forest plan for the forestry within the Proposed Development Area.

### Development of a Wind Farm Forest Plan

#### Introduction

- 11.2.8. This section describes the process by which a typical Wind Farm or Proposed Development Forest Plan is prepared. Existing crop information is collated from the landowner including current forestry information on species, planting year and felling and restocking plans where available. This is followed by field surveys and further desk-based assessment as necessary. In this case only very limited data was provided by the landowners and the baseline composition of the forest is based on field observations and aerial photographs.
- 11.2.9. Details of wind turbine locations, new tracks, storage compounds, substation compound and other infrastructure are provided by other disciplines within the project team. This data is then amalgamated with the forestry data to construct the forestry proposals for the Proposed Development.
- 11.2.10. The location of wind turbines and infrastructure is heavily influenced by environmental constraints and technical considerations (e.g. sensitive habitats, wind resource capture, or ground conditions). The final location of

<sup>12</sup> Forestry Commission (2017). The UK Forestry Standard: The Government's Approach to Sustainable Forestry, Forestry Commission, Edinburgh.

<sup>13</sup> UKWAS (2018). The UK Woodland Assurance Standard Fourth Edition, UKWAS, Edinburgh.

infrastructure takes the various site constraints into consideration. Land management requirements associated with the construction of the Proposed Development would also be incorporated into the forestry proposals, where appropriate.

- 11.2.11. Within forests and woodlands, areas of crop may require to be felled to accommodate the construction and operation of the Proposed Development. The felling programme for the Proposed Development would largely be driven by technical constraints relating to both forestry and development.
- 11.2.12. In this case, taking into account the constraints, a 2.0 ha (80 metre radius) 'keyhole' was adopted around wind turbines. A 10 m buffer has been applied around other temporary and permanent infrastructure, in addition to the footprint of the infrastructure. An indicative 30 m corridor has been applied to all new access tracks or upgraded existing tracks within forestry to be used for component delivery and construction purposes. This would be reviewed at the detailed design stage post consent and prior to construction.

### Proposed Development Felling Plan

- 11.2.13. Felling required for a development can be divided into two categories:
- Firstly, that required during the construction phase of the Proposed Development, which for the purposes of this assessment, has been anticipated as commencing in 2026; and
  - Secondly, felling required during the operational period of the Proposed Development.
- 11.2.14. In this case there is no felling required out with that required for the construction phase.
- 11.2.15. The crops were assessed to identify those areas which would require to be felled for the reasons described above. Due to the crop growth rates and current crop height, it has been assessed that the infrastructure within woodland areas would require a combination of keyholing in certain areas and clear felling of entire coupes back to either a wind firm edge or management boundary. Where entire coupes are to be felled, the infrastructure would be incorporated into the Proposed Development Restocking Species Plan.
- 11.2.16. Additional minor felling may be required for forest management purposes, for example, to reduce the risk of subsequent windblow; to reduce coupe isolation and fragmentation; and to ensure access for future forest operations.
- 11.2.17. The resultant Proposed Development Felling Plan (Figure 11.2) shows which woodlands within the FSA would be felled as a result of the Proposed Development and when this felling would take place.

### Proposed Development Restocking Species Plan

- 11.2.18. The Proposed Development Restocking Species Plan would show the species composition of the forest after the Proposed Development felling and restocking had been completed. This would include the species of areas not being felled for the Proposed Development together with any replanting of felled areas and on site additional planting. The majority of the areas to be felled for the Proposed Development would be restocked except for:
- Land required for the Proposed Development's permanent infrastructure subject to the buffer zones described above; and
  - Land to be left unplanted for forest management; or forest design purposes.

- 11.2.19. It has been assumed that, where possible or relevant, some temporary infrastructure would be re-instated and available for restocking post construction.
- 11.2.20. In preparing the Wind Farm Species Restocking Plan, a number of points would be considered as detailed below:
- Fragmentation of coupes would be minimised as much as possible;
  - Coupe shapes would be modified to ensure that access for future forestry operations, principally harvesting, is maintained; and
  - Coupe shapes and edges would be modified to follow good practice.
- 11.2.21. Species composition would be considered taking into account the Proposed Development operational requirements such as separation distances between wind turbines and forest edges, landowner objectives and forestry policies.
- 11.2.22. The Proposed Development forestry felling and restocking proposals are assessed by each of the separate environmental disciplines/consultants as part of the EIA process where required, and the effects are reported in individual chapters of this EIA Report and their supporting appendices.

## 11.3. Baseline

- 11.3.1. The study area consists of conifer forestry located on land to the east of the Halsary Wind Farm and approximately 3 km to the south-west of Watten. No planting year data for the forestry was available at the time of the preparation of this Chapter. Based on the dates of the approved Woodland Grant Schemes available on the SF publicly available Map Viewer<sup>14</sup> it is understood the woodlands were planted between 1993 and 2003 under three separate Woodland Grant Scheme applications. The grant scheme applications comprised mainly of commercial conifers with small areas of broadleaves, with areas of open ground. Evidence from aerial photographs and field surveys suggest that the broadleaf elements of the new woodland creation largely failed. The current species composition is broadly similar to the original planting design and is detailed in Table 11.2.
- 11.3.2. The forest areas are located at heights ranging from 60 m to 75 m approximately above ordnance datum (AOD). The forest lies within a generally flat, gently undulating and generally smooth landform. The forests have not yet reached the production phase and there has been no thinning or felling. The soils are largely blanket peat with small areas of peaty gleys and alluvial soils (further information on hydrology, geology and hydrogeology is provided in Chapter 9 of the EIAR).
- 11.3.3. An initial desk-based assessment identified there are no woodlands within the Proposed Development Area recorded in the Ancient Woodland Inventory Scotland (Scottish Natural Heritage, 2010)<sup>15</sup>. One small area is recorded as native woodland in the Native Woodland Survey of Scotland (Forestry Commission Scotland, 2013)<sup>16</sup>, but this was believed to have been planted as part of the Woodland Grant Schemes. There is no approved Forest Plan covering the forest.

<sup>14</sup> Scottish Forestry Map Viewer. Available at <https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18> [Accessed 12/07/2023]

<sup>15</sup> Scottish Natural Heritage. (2010) Ancient Woodland Inventory Scotland [Online] Available at <https://map.environment.gov.scot/sewebmap/> [Accessed 12/07/2023]

<sup>16</sup> Forestry Commission Scotland. (2013) The Native Woodland survey of Scotland [Online]. Available at <https://scottishforestry.maps.arcgis.com/apps/webappviewer/index.html?id=0d6125cfe892439ab0e5d0b74d9acc18> [Accessed 12/07/2023]

## Baseline Conditions

### Current Species

- 11.3.4. The current baseline species composition of the woodlands within the FSA is shown in Figure 11.1 and summarised in Table 11.2 below.
- 11.3.5. Please note there may be minor discrepancies in the totals within the tables contained in this Chapter. This is due to rounding of the individual values for the different parameters in the database.

Table 11.2: Baseline Species Composition

Species	Area (ha)	Area (%)
Sitka spruce/Lodgepole pine	72.64	51.41
Mixed broadleaves	2.46	1.74
Open ground	15.25	10.79
Other land	42.06	29.77
Failed Woodland	8.89	6.29
<b>Total</b>	<b>141.30</b>	<b>100.00</b>

- 11.3.6. The main species are commercial conifers, principally Sitka spruce in mixture with Lodgepole pine, which accounts for approximately 51.41% of the total FSA. Broadleaf woodland accounts for 1.74% of the FSA. Open ground accounts for approximately 10.79%. The area of other land is agricultural land. There are areas which appear to have been prepared for planting and have either failed or were not planted. These areas comprise 8.89 ha (6.29%) of the FSA.

## Proposed Development Forest Plan

### Introduction

- 11.3.7. The effect of the Proposed Development on the structure of the woodlands within the FSA has been compared against the baseline. In the absence of a baseline forest plan this has focussed on the baseline species composition and the stocked woodland area.

### Proposed Development Felling Plan

- 11.3.8. The Proposed Development felling plan is shown on Figure 11.2 and summarised in Table 11.3 below.

Table 11.3: Proposed Development Felling Plan

Felling Phase	Area(ha)	Area(%)
No felling	66.20	46.85
Phase 1: 2024-2028	11.24	7.96
Outside plan period	63.86	45.19
<b>Total</b>	<b>141.30</b>	<b>100.00</b>

- 11.3.9. A total of 11.24 ha will require to be felled to enable the construction and operation of the Proposed Development. As stated in section 11.1, only felling required for the construction and operation of the Proposed Development is included in the Proposed Development felling plan. Felling outside of the construction phase will be the responsibility of the landowner as part of their ongoing management.

- 11.3.10. Generally felling within a forest plan is described in detail for the first 10 years. "Outside plan period" is used to describe crops where felling will be after the initial 10 year period where the timing of felling will be determined at a later date.

### Proposed Development Restocking Species Plan

- 11.3.11. The baseline species composition has been amended to integrate the Proposed Development infrastructure requirements into the forest design and to take account of the site conditions. The Proposed Development Restocking Species Plan is shown in Figure 11.3 and summarised in Table 11.4. Proposed Development open ground refers to the permanent loss of crop to Proposed Development infrastructure.

Table 11.4: Proposed Development Restocking Species

Restock Species	Area (ha)	Area (%)
Sitka spruce/Lodgepole pine	69.15	48.94
Mixed broadleaves	9.79	6.93
Open ground	15.25	10.79
Other land	42.06	29.77
Proposed Development open ground	5.05	3.58
<b>Total</b>	<b>141.30</b>	<b>100.00</b>

- 11.3.12. The change in area of stocked woodland in the forests due to the Proposed Development is shown in Table 11.5 below.

Table 11.5: Stocked Woodland Area Comparison

Description	Baseline (ha)	Proposed Development (ha)	Variance (ha)
Stocked Woodland	75.1	78.94	3.84
Unstocked	24.14	20.30	-3.84
<b>Total</b>	<b>141.30</b>	<b>100.00</b>	

- 11.3.13. Proposed Development infrastructure accounts for 5.05 ha. However, the total area of woodland within the FSA increases by 3.84 ha. This is due to on-site replanting and additional planting which offset the areas occupied by the Proposed Development infrastructure.

## Requirement for Compensatory Planting

11.3.14. As a result of the Proposed Development forestry plans there would be an increase in the area of stocked woodland within the Proposed Development site boundary. As such there will be no requirement for offsite compensatory planting.

## Forestry Waste

11.3.15. The Scottish Environment Protection Agency (SEPA) guidance document WST-G-027, 'Management of Forestry Waste' (SEPA, 2017)<sup>17</sup> highlights that all waste producers have a statutory duty to adopt the waste hierarchy as per the Waste (Scotland) Regulations 2012 (the Scottish Government, 2012)<sup>18</sup>, which amended Section 34 of the Environmental Protection Act (EPA) 1990 (duty of care) (UK Government, 1990)<sup>19</sup>. This places a specific duty on any person who produces, keeps or manages (controlled) waste to take all such measures available to them to apply the waste hierarchy in Article 4 (1) of the revised Waste Framework Directive (rWFD)<sup>20</sup>, which is:

- Prevention;
- Preparing for re-use;
- Recycling;
- Other recovery, including energy recovery; and
- Disposal, in a way which delivers the best overall environmental outcome.

11.3.16. Further guidance is contained in the document LUPS-GU27, 'Use of Trees Cleared to Facilitate Proposed Development on Afforested Land' (SEPA, 2014)<sup>21</sup>.

11.3.17. A hierarchy of uses for forestry materials is proposed, derived from the waste hierarchy contained within the Regulations, summarised as follows:

- Prevention via the production of timber products and associated materials for use in timber and other markets;
- The re-use of materials on-site for a valid purpose, where such a use exists e.g. track construction including floating tracks;
- There is no valid re-cycling use for forestry residues;
- Other recovery via collection and use as biomass for energy recovery or other markets, where not included above; and
- Where no valid on-site or off-site use can be found for the material, disposal would be in a way that is considered to deliver the best overall environmental outcome.

11.3.18. Where no valid on-site or off-site use, or other disposal method, can be found for the material, it should be regarded as waste and handled accordingly. Disposal of timber residues as waste in or on land requires a landfill permit or a waste exemption licence and should be considered the option of last resort.

11.3.19. As discussed in this Chapter, the crops will be replanted except where required for infrastructure associated with the Proposed Development. Brash would be left in situ to provide nutrients for the next rotation where the crops are being replanted as per standard forestry practice. Where crops are not being replanted brash would be removed and treated in line with the proposed hierarchy described above.

11.3.20. Stumps would be left in situ as per good practice guidance, except where excavated as part of the construction activities. Excavated stumps would be treated in line with the proposed hierarchy described above.

11.3.21. In areas of lower yielding crops, into which the Proposed Development infrastructure would be keyholed, the objective would be to recover as much merchantable timber as possible. Failing that to treat them in line with the hierarchy outlined above. Where suitable, whole trees would be extracted and used in the biomass market. As a result, it is anticipated the forestry waste arising from the works will be minimal.

11.3.22. It is proposed that full consideration and further clarification on this issue would be included in a Forestry Waste Management Plan to form part of the Construction Environmental Management Plan (CEMP) following receipt of planning consent and prior to commencement of construction.

## Forestry Management Practices

### Crop Clearance

11.3.23. Areas of crops of sufficient tree size and standing volume would be harvested conventionally. Timber operations would be undertaken with conventional harvesting and forwarding equipment utilising, as required, flotation tracks (flotation devices are fitted to each machine wheel, giving the machines very low ground pressure and minimising the ground disturbance during the forestry operations).

11.3.24. Stem wood down to 7 centimetres (cm) or below would be removed from site and sold into the timber markets. The harvester would maximise timber recovery wherever possible, this would result in the maximum timber volume being recovered to ensure the volume used in the brash mats is kept to a minimum. On wetter ground the harvester would build stronger brash mats to ensure there would be minimal damage to the peat and soil structure by the forwarder during extraction. On soft ground, the bottom layers of brash mats become embedded into the soil and removal could result in more environmental damage than leaving the material to naturally degrade.

11.3.25. Stumps would be left in situ as per the guidance contained in the Forestry Commission Research Note "Environmental effects of stump and root harvesting" (Forestry Commission, 2011)<sup>22</sup> except where they would be removed for excavated tracks, wind turbine foundations and other infrastructure requiring excavation. Such material would be treated as described above.

### Restocking/Planting Methodology

11.3.26. Restocking would be carried out to current standard practice and in accordance with the guidelines contained in the UKFS and UKWAS as a minimum, where applicable. The methodology would vary depending on the type of

<sup>17</sup> SEPA (2017): SEPA Guidance Notes WST-G-027. *Management of Forestry Waste*. Available at [https://www.sepa.org.uk/media/28957/forestry\\_waste\\_guidance\\_note.pdf](https://www.sepa.org.uk/media/28957/forestry_waste_guidance_note.pdf) [Accessed 12/07/2023]

<sup>18</sup> The Scottish Government (2012): The Waste (Scotland) Regulations 2012 No. 148. Available at <https://www.legislation.gov.uk/sdsi/2012/9780111016657> [Accessed 12/07/2023]

<sup>19</sup> UK Environmental Protection Act 1990 1990 c. 43 Part II Duty of care etc. as respects waste Section 34. Available at <http://www.legislation.gov.uk/ukpga/1990/43/section/34> [Accessed 12/07/2023]

<sup>20</sup> EU Waste Legislation Waste Framework Directive. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098> [Accessed 12/07/2023]

<sup>21</sup> SEPA (2014): LUPS-GU27. *Use of Trees Cleared to Facilitate Development of Afforested Land*. Available at [https://www.sepa.org.uk/media/143799/use\\_of\\_trees\\_cleared\\_to\\_facilitate\\_development\\_on\\_afforested\\_land\\_sepa\\_snh\\_fcs\\_guidance\\_-\\_april\\_2014.pdf](https://www.sepa.org.uk/media/143799/use_of_trees_cleared_to_facilitate_development_on_afforested_land_sepa_snh_fcs_guidance_-_april_2014.pdf) [Accessed 12/07/2023]

<sup>22</sup> Forestry Commission Research Note. *Environmental effects of stump and root harvesting*. (Forestry Commission, 2011). Available at <https://www.forestresearch.gov.uk/publications/environmental-effects-of-stump-and-root-harvesting/#:~:text=Poor%20practice%20can%20lead%20to,archaeological%20heritage%20and%20tree%20health.> [Accessed 12/07/2023]

restocking being carried out. The following information is provided for guidance only as to the restocking methodology which may be adopted.

11.3.27. On commercial conifer areas the methodology would normally include:

- Site preparation by machine cultivation and drainage;
- Manual planting;
- Subsequent follow-up establishment operations such as the replacement of failures, weeding and protection measures until the crops are satisfactorily established; and
- Replanting would be carried out with the conifer species identified in the restocking plan at the minimum density of 2,500 trees per ha.

11.3.28. Restocking within the broadleaf woodland areas would be carried out to the same specification with the following changes:

- A lower planting density of 1,600 trees per ha; and
- The principal species would be mixed native broadleaves including, for example, downy and silver birch with small components of other species as appropriate to site such as oak, rowan, hazel, gean, grey willow, goat willow, alder and woody shrubs.

#### Aftercare Works

11.3.29. Aftercare establishment works would normally include, but are not limited to, the following:

- The woodlands would be beaten up (replacement of failures) to ensure satisfactory stocking levels by year five, broadleaf woodlands by year 10;
- The woodlands would be weeded as necessary to ensure satisfactory establishment by year five/year 10 for broadleaf woodlands;
- The woodlands would be protected against pine weevils by management inspections and remedial treatment as necessary;
- The woodlands would be protected against browsing damage from wild and domestic animals;
- The woodlands would be protected against fire;
- Fertiliser would be applied as necessary to ensure satisfactory establishment and growth; and
- Other works as reasonably required ensuring satisfactory establishment of the woodlands.

#### Standards and Guidelines

11.3.30. All forestry operations would be carried out in accordance with current good practice and guidelines. This would include, but not be limited to:

- UK Forestry Standard (Forestry Commission 2017);
- Forest Industry Safety Accord Guides (or equivalent) (FISA, 2014)<sup>23</sup>; and
- Current relevant legislation including, but not limited to, Health and Safety at Work Act 1974 (UK Government, 2014)<sup>24</sup>.

<sup>23</sup> Forest Industry Safety Accord (2014). FISA Safety Guides (various). Edinburgh.

#### 11.4. Conclusion

11.4.1. The FSA extends to 141.30 ha and is comprised of privately owned and managed woodlands.

11.4.2. Felling would be advanced on 11.24 ha for construction of the Proposed Development.

11.4.3. As a result of the Proposed Development replanting plan there would be an increase in the area of stocked woodland within the FSA of 3.84 ha. The species composition of the forest would change as a result of the Proposed Development forestry proposals. In particular, the area of broadleaf woodland would increase by 7.33 ha while the area of conifers would decrease by 3.49 ha.

11.4.4. As a result of the onsite replanting and compensatory planting there would be a net increase in the stocked area of woodland of 3.84 ha and therefore no off site compensatory planting would be required.

#### 11.5. Statement of Competence

Table 11.6: Statement of Competence

Discipline	Consultant	Company	Experience
Forestry	Sandy Anderson	DGA Forestry LLP	<p>Sandy is the senior partner of DGA Forestry LLP and the forestry team leader. He graduated from Edinburgh University in 1975 with a BSc Ecological Science (Honours: Forestry) and Glasgow University in 1986 with a Master of Business Administration (Distinction). He has been a Member of the Institute of Chartered Foresters since 1972.</p> <p>He has over 45 years' experience in forest management and consultancy, in both the private and public sectors covering all aspects of forestry in the UK. He worked for the Forestry Commission from 1975 to 1987. He joined DGA Forestry in 1987, becoming a partner in 1988 and senior partner in 2002.</p> <p>Since 2000 he has been involved in over 100 wind farm or other development projects within forestry plantations in a variety of roles, ranging from advice to landowners on the negotiation of wind farm option agreements and leases; contributions to numerous Environmental Statements and Reports; contributions to Public Inquiries; management of forestry operations during the construction phase; preparation of and contributions to Habitat Management Plans; and specialist advice on specific topics.</p>

<sup>24</sup> UK Government (1974): Health and Safety at Work etc. Act 1974. Available at <http://www.legislation.gov.uk/ukpga/1974/37/contents> [Accessed 12/07/2023]

## 11.6. Non-Technical Summary

- 11.6.1. Part of the Proposed Development is located within commercial forestry. The forestry assessment has identified that areas of forestry would require to be felled for the construction and operation of the Proposed Development.
- 11.6.2. Forestry is not being regarded as a receptor for EIA purposes. Commercial forests are dynamic and their structure continually undergoes change due to normal felling and restocking by the landowner; natural events, such as storm damage, pests or diseases; and external factors, such as a wind farm or other developments. The forestry proposals are interrelated with environmental effects, which are assessed separately in other chapters of the EIA Report.
- 11.6.3. The forestry proposals have been developed to identify areas of forest to be removed for the construction and operation of the Proposed Development; and those areas which may or may not be replanted on site.
- 11.6.4. The Forestry Study Area (FSA) extends to approximately 141.30 ha of privately owned and managed woodlands. The forests are comprised largely of commercial conifers with areas of mixed broadleaves and open ground planted in the late 1990s. The crops are in the mid rotation phase and there are no current felling or replanting programmes.
- 11.6.5. A total of 11.24 ha will require to be felled to enable the construction and operation of the Proposed Development. The majority of the areas to be felled for the proposed development would be restocked except for land required for the Proposed Development's permanent infrastructure and land to be left unplanted for forest management; or forest design purposes.
- 11.6.6. On site replanting of felled areas and additional planting of native woodland results in an increase in the area of stocked woodland. There would be an increase of 3.84 ha within the FSA. No additional off site compensatory planting will be required.

# Chapter 12

## Traffic and Transport

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from a proposed development
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment (Scotland) Regulations 2017 Regulation 5
The Applicant	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm Development
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
AADT	Average Annual Daily Traffic
AIL	Abnormal Indivisible Loads
ATC	Automatic Traffic Count
BESS	Battery Energy Storage System
BoP	Balance of Plant
CMS	Construction Method Statement
CTMP	Construction Traffic Management Plan
DAS	Design Advisory Services
DfT	Department of Transport
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
FTMP	Framework Traffic Management Plan
HGV	Heavy Goods Vehicles
IEMA	Institute of Environmental Management and Assessment
LGV	Light Goods Vehicles
LV	Low Voltage
NPC	Natural Power Consultants
PAN	Planning Advice Note
SR	Scoping Response
TMP	Traffic Management Plan
TIA	Traffic Impact Assessment

## 12.1 INTRODUCTION

- 12.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) assesses the effects due to the traffic and transport impacts for the construction of the Proposed Development.
- 12.1.2 Construction traffic required to construct the wind farm falls into three broad categories; namely Abnormal Indivisible Loads (AILs), Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs). The site entrance is located on the A9 via the existing Halsary Wind Farm entrance south of Mybster.
- 12.1.3 The construction of the Proposed Development is expected to last approximately 12 months, from site mobilisation through to installation and commissioning of the turbines, ending with site re-instatement and demobilisation.
- 12.1.4 The following Appendices accompany this Environmental Impact Assessment (EIA) chapter:
- Technical Appendix A12.1, Abnormal Indivisible Load Route Survey; and
  - Technical Appendix A12.2, Framework Traffic Management Plan.
- 12.1.5 This traffic and transport assessment assesses the traffic impacts associated with the Proposed Development. The assessment considers a worst-case scenario and assumes all stone would need to be imported onto site and all foundation concrete would need to be brought to site in ready mix lorries.
- 12.1.6 In addition, the traffic impacts associated with the abnormal load deliveries are also assessed. An Abnormal Load Access Assessment, including swept path analysis at particular pinch points was prepared by Pell Frischmann in order to demonstrate the viability of the proposed abnormal load route.
- 12.1.7 The assessment concludes that, with the incorporation of suitable mitigation measures secured through a Construction Traffic Management Plan, there will be no significant traffic effects associated with the Proposed Development.
- 12.1.8 A Framework Traffic Management Plan (FTMP) has been prepared and is included in Technical Appendix 12.2. Following appointment, the Balance of Plant (BoP) contractor will update this FTMP to provide a detailed plan prior to the commencement of works.

## 12.2 LEGISLATION POLICY AND GUIDANCE

- 12.2.1 This section outlines the legislation, policy and guidance which has informed the assessment. The transport and traffic issues described in the following planning advice and guidance documents have been taken into account in this assessment:
- Scotland's National Planning Framework 4 (2023), The Scottish Government;
  - Planning Advice Note (PAN) 75: Transport and Planning (2005), The Scottish Government;
  - Onshore Wind Turbines; Online Renewables Planning Advice, The Scottish Government;
  - Transport Assessment Guidance (2012), Transport Scotland;
  - Onshore Wind Energy: Supplementary Planning Guidance, The Highland Council (2016);and
  - Guidelines for the Environmental Assessment of Road Traffic (1993), Institute of Environmental Assessment (IEA), now the Institute of Environmental Management and Assessment (IEMA).

### Scotland's National Planning Framework 4 (2023)

- 12.2.2 NPF4 is the Scottish Government national spatial strategy for Scotland, setting out spatial principles, regional priorities, national developments and national planning policy. The intention of the policy is to encourage, promote

and facilitate development that addresses the global climate emergency and nature crisis. The following policy is applicable in relation to traffic and transport for wind farm development:

- Policy 11: Project design and mitigation will demonstrate how impacts on road traffic and on adjacent trunk roads, including during construction, are addressed.

### Planning Advice Note: PAN 75 – Planning for Transport

- 12.2.3 Paragraph 41 of PAN75 notes that:

*“All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of impact of the proposal. This will provide an indication of whether a transport assessment should be carried out. As a change of use could result in different travel characteristics a transport assessment should be requested where the change is likely to result in a material change in trips. For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact.”*

### Onshore Wind Turbines; Online Renewables Planning Advice

- 12.2.4 The Scottish Government introduced online renewables planning advice in February 2011. This has subsequently been updated with the most recent specific advice note regarding onshore wind turbines published in May 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines including landscape impact, impacts on wildlife and ecology, shadow flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.
- 12.2.5 Regarding road traffic impacts, the guidance notes that in siting wind turbines close to major roads, pre-application discussions are advisable. This is particularly important for the movement of large components (abnormal load routing) during the construction period, periodic maintenance and for decommissioning.

### Transport Assessment Guidance

- 12.2.6 The Transport Assessment Guidance has been prepared to assist in the preparation of Transport Assessments for development proposals in Scotland.
- 12.2.7 The Transport Assessment Guidance sets out requirements according to the scale of development being proposed. The guidance notes that a Transport Assessment will assist planning authorities and other decision makers to appraise the operational implications of a development and that the environmental impacts of a development proposal are generally outside the remit of the Transport Assessment process.

### Guidelines for the Environmental Assessment of Road Traffic (IEMA Guidance)

- 12.2.8 The IEMA Guidance is for the assessment of the environmental impact of road traffic associated with major new developments. Their purpose is to provide the basis for systematic, consistent and comprehensive coverage for the appraisal of traffic impacts for development projects.
- 12.2.9 The document includes guidance on how the sensitivity of receptors should be assessed, contains rules to help determine which links in the study area should be considered for detailed assessment and identifies the key impacts that are most important when assessing the magnitude of traffic effects from an individual development.
- 12.2.10 The IEMA Guidance has been followed in this chapter and provides the basis of the methodology adopted in this assessment.

## Legislation, Policy and Guidance Summary

12.2.11 Much of the above legislation, policy and guidance deals principally with developments that generate significant increases in travel as a direct consequence of their function (e.g. retail parks, housing, etc) and measures to implement a more sustainable transport solution. The traffic generated by the Proposed Development would almost entirely be limited to vehicle movements during the construction phase. As such, the impact of traffic from the Proposed Development is temporary and of a short-term duration when compared to developments such as retail parks where the traffic impact can be permanent and for a long duration of typically a 60 year design span.

## 12.3 CONSULTATIONS

12.3.1 The Highland Council and Transport Scotland were consulted, in respect of the Proposed Development, via the initial Scoping Report.

### Scoping

12.3.2 Below is a summary of the main scoping responses from both the Highland Council and Transport Scotland.

Table 12.1: Summary of scoping consultation responses

Consultee	Scoping Comment	Response
Transport Scotland	Assume worst case scenario that all construction materials will be sourced offsite.	All Traffic Impact Assessment (TIA) movements based on offsite material deliveries.
Transport Scotland & Highland Council	Access Route Assessment to be undertaken to determine pinch points, road and structures modifications.	AIL assessment undertaken by independent sub-contractor.
Transport Scotland	Inclusion of A99 between Wick and Latheron to be included within the traffic assessment if AIL's being delivered to Wick.	Port of Wick has not been selected as a suitable port for the transport of AILs so will therefore not be assessed.
Highland Council/Transport Scotland	TIA should only assess movements for associated construction traffic and not operations and decommissioning	TIA assesses impacts of construction vehicle movements only.
Highland Council	Inclusion of a Construction Traffic Management Plan	Agreed to include this as a planning condition.

### Post-Scoping Consultation

12.3.3 Meetings have been held post Consultation Response with the Highland Council Roads and Structures departments to further discuss the Proposed Development and traffic implications. The key points raised during this meeting were:

- Confirmation of AIL assessment routes and suitability of Wick Harbour;
- Confirmation of assumed construction material routes;
- Traffic flow baseline data year of 2019 to be used within TIA;

- No requirement for growth factors to be applied to traffic data; and
- Concrete deliveries should not travel through the village of the Proposed Development and empty load restriction is to be placed on the B870.

### Impacts Scoped Out of Assessment

- 12.3.4 It has been agreed via the Scoping Response and meetings with Transport Scotland and Highland Council that the requirement to consider traffic effects during operation and decommissioning should not be included within the TIA contained within the EIAR. Traffic effects during operation will be negligible as these will be limited to occasional maintenance visits by van. Decommissioning traffic will be less than that during construction as some below ground infrastructure is likely to be left in-situ and components will be broken down on-site prior to removal which will result in less traffic than was experienced during construction.
- 12.3.5 As requested as part of Transport Scotland's scoping response, the impact of AIL vehicles only on the A99 between Latheron and Wick was to be included within the road links analysed as part of the TIA. This request was based on the assumption that AIL routes would be delivered from the Port of Wick. However, as detailed in Section 12.6, the Port of Wick has been deemed unsuitable as a port for the delivery of AIL equipment. As a result, the A99 between Wick and Latheron will not be assessed as part of this EIA Chapter.

### Impacts Scoped into the Assessment

- 12.3.6 This assessment will consider the potential impacts of increased road traffic on receptors, specifically considering the following potential impacts:
- Severance;
  - Driver Delay;
  - Pedestrian and Cyclist Amenity;
  - Pedestrian Delay; and
  - Pedestrian Fear and Intimidation;

## 12.4 METHOD OF ASSESSMENT

12.4.1 The methodology employed in this assessment has been developed from guidance given in the "Guidelines for the Environmental Assessment of Road Traffic" (IEMA 1993). To assess the effects of the additional traffic generated by the Proposed Development during the construction phase, the sequence of steps detailed below has been followed.

- Establishment of baseline traffic conditions;
- Estimate the traffic numbers and routing for the Proposed Development;
- Determine the magnitude of effect to the baseline traffic conditions due to the Proposed Development;
- Undertake a screening test to delimit the scale and extent of the assessment;
- Identify and assess the sensitivity of receptors with best practise embedded mitigation considered;
- Synthesise the sensitivity of the receptor with the magnitude of effect to determine the significance of effect.
- If the significance is elevated, review opportunities to mitigate the effects and re-assess the significance of effect.

### Site Visit/s or Surveys

12.4.2 A site survey walkover was undertaken where the roads, detailed in Section 12.6, were surveyed for general condition, adequacy of vehicle types, passing places and areas of concern.

### Study Area

12.4.3 The study area is defined as the routes which are likely to be used by construction traffic for the delivery of plant and materials. As the precise origin of all construction materials is not currently known this assessment has sought to identify the routes which are likely to experience the greatest increase in traffic based upon the location of likely sources of materials (e.g. ports, quarries and centres of population). Further information on the routes which have been assessed is provide in Section 12.6.

### Assessment of Sensitivity

12.4.4 When judging the sensitivity of the road to the anticipated temporary increase in traffic movements associated with the Proposed Development, a variety of considerations were taken in account including classification of the road, proximity of schools, housing and local amenities and existing traffic management (e.g. roundabouts, passing places etc.).

12.4.5 The sensitivity of the roads used for this project has been assessed in accordance with the IEMA Guidelines and although not providing specific criteria for evaluating sensitivity, for the purpose of this assessment, a scale of 'low', 'medium' and 'high' has been used.

12.4.6 The assessment has considered three categories of receptors, which consist of the following;

- Public road network and road users;
- Local settlements along the proposed access route(s); and
- Road structure.

12.4.7 The effects on the proposed route and surrounding communities have been assessed with regards to severance, driver and pedestrian delay, safety, pedestrian amenity and fear and intimidation, in line with the IEMA Guidelines. The effects of factors such as noise and ecological impact are assessed in the relevant chapters of this EIAR.

12.4.8 Table 12.2 details the receptors and criteria used to assess their sensitivity with respects to traffic impacts. The effects of factors such as noise and ecological impacts are assessed in their respective chapters.

Table 12.2: Sensitivity of Receptor Criteria

Receptor Group	Impact	Low	Medium	High
Settlements	Severance	Settlement with no or limited facilities. Adequate walkways, wide, interconnected, providing adequate separation between pedestrians and traffic. Designated pedestrian crossing points to link walkways,	Settlement with some and key facilities. Pedestrian walkways, narrow in places, gaps to interconnectivity and limited separation between pedestrians and traffic. No formal designated pedestrian crossing points, may have traffic islands.	Settlement with a wide range of facilities. No or limited pedestrian walkways, narrow with no separation between pedestrians and traffic. No designated pedestrian crossings points.

Receptor Group	Impact	Low	Medium	High
Road Network & Users	Driver Delay	Major or strategic road networks such as motorways, or a road network with suitable capacity to absorb an increase in traffic. No capacity issues raised by Roads Authority.	Road networks with some capacity to absorb an increase in traffic. Capacity issues identified at specific junctions or specific times of day.	Road network with little or no capacity to absorb an increase in traffic. Capacity issues identified at multiple junctions or extended periods of the day.
Settlements	Pedestrian Delay	Settlement with little pedestrian activity. Designated pedestrian crossing points.	Settlement with some pedestrian activity. Informal pedestrian crossing points such as traffic islands.	Settlement with high pedestrian activity. No pedestrian crossing points.
Road Network & Users and Settlements	Pedestrian and Cyclist Amenity	Settlement with little pedestrian or cycle activity. Wide footpaths, segregated cycle lanes.	Settlement with some pedestrian and cycle activity. Popular cycle route, not on the National Cycle Network. Footpaths narrow in places. Non segregated cycle lanes or wide road with sufficient space for cyclists.	Settlement with high pedestrian and cycle activity. Route on the National Cycle Network. No or limited footpaths. No cycle lanes or road width narrow with limited space for cyclists.
Settlements	Pedestrian Intimidation	Settlement with little pedestrian activity. Wide footpaths, space or guardrails providing separation to traffic.	Settlement with some pedestrian activity. Footpaths narrow in places, some guardrails providing separation to traffic.	Settlement with high pedestrian activity. Footpaths narrow and no separation to traffic.
Road Network & Users and Settlements	Safety	Major road with limited junctions and hazards designed to current standards. Space of physical segregation between traffic, cyclists and pedestrians. No serious or fatal accidents from	More localised roads with some junctions and hazards (bends, constrained geometry, sections of poor visibility). No physical segregation between traffic and cyclists and pedestrians. No fatal accidents from previous five years of data.	Road with several junctions and hazards (sharp bends, constrained geometry, poor visibility). No segregation between traffic and cyclists and pedestrians. Fatal accident(s) from previous five years of data. Near to sensitive

Receptor Group	Impact	Low	Medium	High
		previous 5 years of data.		locations such as hospitals, retirement homes, schools, places of worship, public open spaces and tourist attractions.
Road Network & Users	Road Structure	Major roads with no obvious physical defects and well maintained. Visual inspections suggest designed to current standards with good road foundation.	Regional roads with some minor physical defects being maintained. Visual inspections suggest adequate design and road foundation.	Local roads with some physical defects or local roads, infrequently maintained with reoccurring physical defects. Visual inspections suggest poor design and road foundation (e.g. floating road).

Source: Natural Power, 2023

### Road Network and Road Users

12.4.9 In this chapter, the sensitivity of the road networks and its users has been determined with respect to its capacity to absorb an increase in traffic. A road with a high capacity to absorb an increase in traffic will have a lower sensitivity to change than a road with little or no capacity to absorb an increase in traffic.

### Magnitude of Effect

12.4.10 The magnitude of traffic effects is a function of the existing traffic volumes, the percentage increase due to the proposals, the changes in type and the temporal distribution of traffic. The IEMA Guidelines identify magnitude thresholds based on percentage changes in traffic levels as being applicable to severance and intimidation effects. The magnitude of effects arising from the increase in traffic volumes (taken as being either the traffic flow including all vehicles or the HGV traffic flow, whichever is higher) is categorised in Table 12.3.

Table 12.3: Magnitude of Change Criteria

Magnitude	Criteria	Percentage Increase
High	Total loss or major alteration to key elements/features of the baseline conditions	>90%
Medium	Partial loss or alteration to one or more key elements/features or baseline conditions	60-90%
Low	Minor shift away from baseline conditions	30-60%
Negligible	Very slight change from baseline conditions	<30%

Source: IEMA

- 12.4.11 The determination of the magnitude of the effects was undertaken by reviewing the proposals for the Proposed Development, establishing the parameters of the additional road traffic that may cause an effect, and quantifying these effects.
- 12.4.12 The assessment has considered both the change in magnitude of the effects as well as their absolute levels.
- 12.4.13 Consideration was given to the composition of the traffic on the road network under both baseline and predicted conditions. For example, LGVs generally have less effect on traffic and the road system than HGVs. Within the assessment the estimated numbers of LGVs, HGVs and abnormal load vehicles associated with the Proposed Development have been calculated and the resultant percentage increase in these vehicles compared to baseline conditions established to determine the increase in traffic.
- 12.4.14 Consideration was given to the timing and duration of traffic effects. For example, LGVs may be concentrated to particular times of the day and week (start / end of the working day from Monday to Friday) whereas HGVs may be spread over the working day. Abnormal loads may have a considerable effect on the road congestion and delay if they occur during peak periods. Without details of the contractor's proposed working methods, suppliers, detailed construction sequencing, contractor's material procurement procedures and deliveries it was considered inappropriate to include timing and duration of traffic within the assessment. Therefore, good practice recommendations are made for the contractor to manage the timing of works and deliveries to avoid peak traffic periods.
- 12.4.15 When considering the magnitude of the effects it should be recognised that the traffic generated by the Proposed Development would be short term due entirely to vehicle movements relating to the construction phase of the Proposed Development. Following completion of the construction phase, traffic levels will return to their baseline conditions as the impact of vehicle movements during the operational phase, largely LGVs, is deemed to be negligible within the context of baseline traffic.

### Screening Test

- 12.4.16 The IEMA Guidelines suggest two general rules for establishing the increase in traffic levels that are likely to affect the environmental conditions of the road, and that therefore warrant consideration, namely:
  - **Rule 1** - Include highway links where traffic flows would increase by more than 30% (or the number of HGVs would increase by more than 30%); and
  - **Rule 2** - Include any other specifically sensitive areas where traffic flows would increase by 10% or more. (IEA Guidelines Paragraph 3.20 defines sensitive areas as including "accident blackspots, conservation areas, hospitals, links with pedestrian flows etc."). Paragraph 3.20 also notes that "normally it would not be appropriate to consider links where traffic flows have changed by less than 10% unless there is a significant change in the composition of traffic, e.g. a large increase in the number of heavy goods vehicles."
- 12.4.17 Where the predicted increase in traffic flow is lower than these thresholds, the IEMA guidelines suggest that the significance of the effects can be stated to be low or insignificant, and further detailed assessments are not warranted. Further guidance is given for Rule 1 with regard to certain aspects of traffic effects. These indicate that projected changes in traffic of less than 10% create no discernible environmental effect.
- 12.4.18 These guidelines are intended to be used for the assessment of the environmental effect of road traffic associated with major new developments. The assessment is therefore more pertinent to the operational phase of the wind farm than the construction phase. However, they are used here to assess the short-term transport flow during construction.
- 12.4.19 The matrix shown in Table 12.4 below has been used for traffic assessment.

Table 12.4 - Screening Criteria

Rule 1	Rule 2	Further assessment required
Yes	Yes	Yes
Yes	No	Yes
No	Yes	Yes
No	No	No

Source: IEMA

### Receptor Identification

12.4.20 The IEMA Guidelines identifies receptors that may be sensitive to changes in the traffic conditions resulting from a Proposed Development. A review of the surrounding area, and consultation with the Highland Council has been undertaken to identify receptors potentially affected by the Proposed Development. For the purposes of this assessment, receptors have been grouped as detailed in Table 12.5.

Table 12.5 - Receptor Identification

Receptor Group	Receptors
Settlements	Pedestrians, cyclists, sensitive locations (hospitals, churches, schools) rural properties adjacent to road
Road Network and Users	Road structure, drivers, cyclists

Source: IEMA

### Assessment of Significance

12.4.21 The significance of any given effect is taken to be a synthesis of both the magnitude of the effect and the sensitivity of the receptor. The criteria used in determining significance are set out in Table 12.6.

Table 12.6 - Significance of Effect

Magnitude of Change		High	Medium	Low	Negligible
Sensitivity	High	Major	Major/Moderate	Moderate	Moderate/Minor
	Medium	Major/Moderate	Moderate	Moderate/Minor	Minor
	Low	Moderate	Moderate/Minor	Minor	Minor/Negligible

Note: Only major and major/moderate are considered significant in terms of the EIA Regulations

Source: IEMA

### Embedded Mitigation

12.4.22 Embedded mitigation is considered to be measures that have been incorporated into the design of the Proposed Development. In terms of traffic and transport, embedded mitigation is primarily delivered through measures typically included within the Construction Traffic Management Plan (CTMP). It is expected a condition will be applied to any consent for the Proposed Development for a CTMP to be prepared prior to construction works commencing.

12.4.23 The CTMP will be tailored to suit the requirements of the Proposed Development. Embedded mitigation are good practice measures which have been detailed in the FTMP, regardless of the outcomes of the TIA and are included in the Proposed Development when determining the sensitivity of receptors. Where traffic effects are assessed as being significant, then impact mitigation measures will be considered to reduce the effects to acceptable levels.

12.4.24 The following embedded mitigation measures have been adopted using standard mitigation measures which have been included in the FTMP:

- Scheduling of HGV deliveries to avoid peak times;
- Temporary signage to direct HGV drivers to the proposed development and advise of routes not permitted;
- Temporary signage to inform both drivers and pedestrians of risks and highlight rights of ways/ priorities;
- Reduced speed limits;
- Scheduling of construction activities, with focus on concrete and AIL deliveries to reduce deliveries whilst key activities are occurring;
- Trial run for AIL movements prior to commencement of construction;
- Proactive consultation with roads authorities and police to co-ordinate AIL deliveries; and
- Proactive consultation with the local roads authorities, the local community and individuals who will be most affected during the construction period.

### Local Settlements

12.4.25 The effects on the surrounding environment are focussed on the effects on the adjacent settlements in terms of pedestrian severance, pedestrian delay, pedestrian and cyclist amenity, pedestrian intimidation and pedestrian safety.

12.4.26 Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery and is used to describe the factors that separate people from other people and places. For example, severance may result from the difficulty of crossing a heavily trafficked road.

12.4.27 Changes in the volume, composition or speed of traffic may affect the ability of people to cross roads and, therefore, increases in traffic levels can lead to increases to pedestrian delay. Pedestrian delay will also depend on factors such as level of pedestrian activity, visibility, and presence of pedestrian crossing points. For example, a settlement with several designated pedestrian crossing points will be less sensitive to increased traffic volumes than a settlement with few or no designated pedestrian crossing points.

12.4.28 Pedestrian and cyclist amenity can be broadly defined as the perceived pleasantness of a journey and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic. For example, a settlement with wide pavements and segregated cycle lanes will be less sensitive to increased traffic volumes than a settlement with narrow pavements.

12.4.29 Intimidation experienced by pedestrians is dependent on the volume of traffic, its composition, its proximity to people and the perceived lack of protection caused by such factors as pavement widths, traffic speed and vehicle size. For example, a settlement with narrow pavements and no pedestrian guardrails will be more sensitive to increased traffic volumes than a settlement with wide pavements that are lined with pedestrian guardrails.

12.4.30 Safety is affected by such matters as traffic speed, traffic volumes and complexities in the road structure. For example, a straight road is easier to navigate than a road with several junctions and bends, which can lead to increased safety risk. Similarly, the presence of islands can create locations where pedestrians cross the road rather than using the designated crossing points.

## Road Structure

12.4.31 The sensitivity of the road structure has been assessed based on its importance and a high-level visual assessment of its condition. For example, a national route or motorway in good condition will be less sensitive to an increase in traffic flow than a local route with some physical defects.

12.4.32 Table 12.7 below summarises the sensitivity criteria adopted for the different receptors.

Table 12.7 - Receptor Grouping and Sensitivity Criteria

Receptor	Low Sensitivity	Medium Sensitivity	High Sensitivity
Public Road Network and Users	Major routes with no junctions, such as motorways, or a road network with suitable capacity to absorb an increase in traffic.	Road networks with some capacity to absorb an increase in traffic.	Road network with little to no capacity to absorb an increase in traffic.
Local Settlements	Local settlements and properties which are set back from the route and/or are located on a single side of the route.	Local settlements and properties which are near the route and/or potentially on both sides of the route. Limited requirements to cross the road. Adequate pedestrian provisions (i.e. footpaths are available where needed, albeit may be narrow. Crossing facilities, some level of barrier provision.	Local settlements and properties directly fronting the route and/or are located on both sides of the route. Facilities and services result in requirement to cross the road. Poor pedestrian provisions (i.e. limited or no footpaths, narrow footpaths no barrier provisions). Neat to sensitive locations such as hospitals, retirement homes, schools, places of worship, public open spaces and tourist attractions.
Road Structure	Major roads with no obvious physical defects.	Regional roads with some minor physical defects.	Local roads with some physical defects or local roads, infrequently maintained with reoccurring physical defects.

Source: IEMA

12.4.33 This Traffic and Transport assessment has been based on a number of conservative assumptions. The most important in terms of the impact on traffic flows being the construction programme/sequencing, source of stone and concrete deliveries. These assumptions can only be clarified post consent and once a BoP contractor is

engaged. Hence the requirement for a detailed CTMP to be prepared and approved prior to construction commencing.

## Impact Mitigation

12.4.34 Where the assessment identifies impacts considered significant in EIA terms, then specific impact mitigation measures will be developed. The significance of effect will then be re-assessed with the incorporation of the impact mitigation. The impact mitigation measures will then be incorporated into the CTMP for the Proposed Development.

## 12.5 UNCERTAINTIES AND ASSUMPTIONS

12.5.1 A range of uncertainties are present with any assessment of traffic effects. With respect to this EIAR, such uncertainties and assumptions are detailed in the following text. These uncertainties are minimised by maintaining conservative assumptions and the provision of estimates based on recent wind farm construction experience.

### Existing Traffic Flows

12.5.2 The assessment relies on the availability and accuracy of traffic flow data to establish baseline traffic conditions on the surrounding network. The available data for the routes assessed is extensive covering a sufficiently broad time frame. This ensures that the baseline traffic conditions derived for this road is an accurate reflection of actual road conditions. The exception to this is for the stretch of road between Mybster and Watten where no existing traffic count data was available. As such, a 1-week traffic count survey was undertaken.

### Traffic Generation

12.5.3 The estimated traffic generated by the Proposed Development comprises general construction loads such as bulk materials; abnormal loads for turbine components; and LGVs. Best estimates based on Natural Power Consultants Limited (Natural Power) and the Applicants experience have been used (with conservative assumptions) for each of these components, including:

- Concrete for turbine bases (assumptions have been made as to base sizes and concrete designs);
- Geogrids and culverts for road construction (assumptions have been made as to the likely number of cross drains and culverts required and the pavement design);
- LGVs (construction worker traffic) for the construction period (it is not possible to exactly determine the likely size of the construction team); and
- The duration and sequencing of the construction period will affect the calculation of traffic intensities. If the actual programme is lengthened the traffic intensities would be lower than those assumed. Conversely, but unlikely, if the construction period were to be shortened the traffic intensities would increase.

### Assessment of Traffic Effects

12.5.4 The methods for assessing the likely effects on traffic volumes, delays and trip times are subject to some uncertainty. These methods have been developed by roads authorities and research bodies over a number of decades and have been found to be reasonably representative. However, the actual capacity of a road segment or junction at any given time may differ from the calculated value due to a wide range of factors.

### Uncertainties and Assumptions - Conclusion

12.5.5 It is considered that there is sufficient information to enable an informed decision to be taken as to the identification and assessment of likely significant effects.

## 12.6 BASELINE

### Construction Traffic Routes

- 12.6.1 Several roads have been identified as being potential construction material and AIL road routes. These are as follows:
- A9 between Latheron and Georgemas;
  - A9 south of Latheron (AIL's only);
  - A882 from Wick to Georgemas; and
  - B870 from Watten to Mybster.
- 12.6.2 The site entrance is located directly onto the A9 via the existing Halsary Wind Farm entrance. A variety of routes will be used by construction traffic depending on the point of origin.

### Abnormal Indivisible Load Routes

- 12.6.3 An AIL survey has been undertaken for the major component deliveries with two preferred routes from the Port of Nigg and Scrabster Harbour being identified. Port of Wick was deemed unsuitable for AIL deliveries.
- 12.6.4 The route from the Port of Nigg for AILs would be as follows:
- From the Port of Nigg, exit onto the B9175 joining the A9; and
  - Loads would then head northbound on the A9 towards Latheron and then westbound onto the A9 towards the existing Halsary Wind farm site entrance.
- 12.6.5 The route from Scrabster: for AILs would be as follows:
- Loads would exit the harbour onto the A9, continuing south towards the existing Halsary Windfarm site entrance.
- 12.6.6 The AIL route assessment identified a number of pinch points from both Scrabster and Nigg to the site entrance as detailed in Technical Appendix A12.1. The proposed modifications to enable AIL loads to navigate these pinch points range from traffic management measures, oversail within private property, temporary removal of street furniture, vegetation trimming and construction of temporary overrun areas. Certain locations along both routes will require 3<sup>rd</sup> party land agreements due to either oversail or overrun. The extents of any road modifications and traffic management will be detailed within the CTMP once a haulage and equipment supplier has been selected.
- 12.6.7 The impact of construction of modification works associated with AIL deliveries is considered minor, especially given their short duration and low number over the programme of the Proposed Development. It is therefore not considered appropriate to access the potential traffic impacts associated with construction of the off-site improvement works.

### General Construction Traffic Routes

- 12.6.8 General construction traffic would comprise HGVs for the delivery of all plant and materials excluding the AIL turbine components. The origin of these materials is not currently known as suppliers have not yet been appointed. Considering the volume of traffic generated by these deliveries, it is reasonable to break them down into two categories: aggregate/concrete deliveries and other deliveries.
- 12.6.9 The source of general materials (i.e. 'other deliveries') is not currently known, however it is reasonable to assume that the majority of such deliveries will originate from centres of population to the south and will approach the Proposed Development via the A9.

- 12.6.10 Given the proximity of a supplier of ready-mix concrete to the North East of the Proposed Development Area this assessment has considered the potential for concrete to be sourced from this location. Thus routes approaching the Proposed Development area from the North East have been considered. It should be noted that no commercial agreements have been reached (at the time of writing) between the supplier mentioned in this assessment and the Applicant, therefore it is possible that the source of materials may change prior to the commencement of construction.

### Concrete/Aggregate Routes

- 12.6.11 The nearest supplier of ready-mix concrete to the Proposed Development Area is at Bower Quarry operated by John Gunn & Sons Ltd. This is located approximately 10 km by road to the North East of the Proposed Development. During consultation with THC (as described in Paragraph 12.3.3) it was agreed that no concrete deliveries would pass through the village of Watten and that an 'empty load restriction' would be placed on the B870. Therefore, assuming concrete is sourced from Bower Quarry there will be separate approach and departure routes for concrete waggons:
- 12.6.12 Approach Route:
- Depart Bower Quarry turning right onto unnamed road South West bound;
  - Turn left onto A882 South East bound for approximately 800 m;
  - Turn right onto unnamed minor road South West bound;
  - Turn right onto B870 Westbound;
  - Turn left onto A9 Southbound; and
  - Turn left into site entrance.
- 12.6.13 Due to the 'empty load restriction' on the B870 the departure route for concrete waggons will be as follows:
- Depart Site Entrance, turning right onto A9 Northbound;
  - Continue on A9 to Georgemas;
  - Turn right onto A882 South East bound;
  - Turn left onto unnamed road towards quarry; and
  - Turn left into Bower Quarry.
- 12.6.14 There are a number of other quarries which might be used for the supply of aggregates to the Proposed Development. These are primarily located on or near to the A9 and therefore the route to and from site if one of these suppliers is selected will be via the A9.

### Road Description

#### A882 Wick to Georgemas

- 12.6.15 The A882 which is maintained by the Highland Council runs between Wick and Georgemas. It is a two-lane 60 mph single carriageway and is the main road entry to Wick from the west, passing through villages such as Watten and Bilbster. It also serves as entry points to single house dwellings, farmland and existing wind farms of Camster and Bilbster. The overall condition of the A882 is considered to be good, with clear visibility and road markings throughout.

#### A9 Latheron to Georgemas

- 12.6.16 The A9 from Latheron to Georgemas is a trunk road operated by Transport Scotland and is a two lane 60 mph single carriageway and serves as the main road route to Scrabster, a busy port and harbour. It passes through



Mybster and Spital. This stretch of the A9 has also previously been used for AILs for Halsary Windfarm. The overall condition of the A9 is considered to be good, with clear visibility, road markings and several lay-bys throughout.

### B870 Watten to Mybster

12.6.17 The B870 is a narrow single track road with passing places from Mybster (A9) to Watten (A882) servicing mainly private dwellings, farmland and Spital Quarry. The road is of moderate condition, with narrow passing places and low radius bends in places.

### A9 South of Latheron

12.6.18 The A9 south of Latheron is a trunk road operated by Transport Scotland. It is a two-lane single carriageway and is in good condition being the main road link between Inverness and Wick. This section of road has been previously used for AIL routes from the Port of Nigg to Wick and serves general HGVs to the town of Wick and further north. This stretch of road is part of the North Coast 500 route with the overall condition considered to be good, with clear visibility, road markings and several lay-bys throughout. It should be noted that this section of road is only assumed to be used for AIL deliveries from the Port of Nigg to site.

### Baseline Traffic Flows

12.6.19 Table 12.8 shows the Traffic Flows which have been used in this assessment. Traffic flows have been derived from two sources, Department for Transport (DfT) traffic counts which are publicly available information, and from an automatic traffic count (ATC) which was undertaken as part of this assessment. Traffic count locations are shown in Figure 12.1.

12.6.20 The ATC was undertaken on the B870 during the period 08/10/22 to 14/10/22. It is acknowledged that this was during the October school holidays, however this would not adversely affect the outcome of the assessment as a lower baseline traffic flow level would result in a higher percentage increase in traffic being predicted. Therefore, this survey is consistent with providing a worst case scenario assessment.

Table 12.8: Baseline Traffic Flow

Ref.	Source	Year	Location	Average Daily Traffic		
				Total Traffic	HGVs	%HGVs
1	DFT	2019	A9 South of Latheron	2146	225	10.5
2	DFT	2019	A9 Between Latheron and Achavanich	1026	151	14.7
3	DFT	2019	A9 between Mybster and Georgemas	1488	92	6.2
4	DFT	2019	A882 between Georgemas and Watten	1893	96	5.1
5	ATC	2022	B870 between A9 and Watten	892	89	10.0

Source: DfT and Site Data

12.6.21 The most up to date data for the DfT traffic counters is 2021. However, it was agreed with THC that baseline data from 2019 would give a truer representation of road data as years 2020 and 2021 were distorted due to covid travel restrictions. The exception to this is the B870 from Watten to Mybster. As there was no existing traffic count data from DfT Road Traffic Statistics, a one week traffic count survey was undertaken in October 2022 to establish

baseline data. Consideration was given to adjusting the data by applying standard growth factors. However, for the following reasons it was considered more appropriate to maintain the 2019 figures:

- Applying the standard growth factors would result in an increased annual average daily traffic (AADT) figure for the roads. Therefore, any increase in traffic due to the Proposed Development would be measured against this increased AADT figure, resulting in lower percentage increases than presented in this assessment. Therefore, maintaining the latest AADT figures will present a conservative assessment;
- Current transport planning policies are generally all aimed at reducing traffic flows and adopting more sustainable transport methods. It is hoped in future the impact of these policies will result in a reduction in traffic flows. As such it is considered contradictory to forecast increasing traffic flows in the future in which to set as a baseline for the assessment; and
- The longer-term impact of COVID 19 on traffic flows is unknown at this stage. The temporary change in working patterns during and following the COVID pandemic (i.e. increased working from home) may become a more permanent state with the potential to reduce traffic flows.

### Road Traffic Collision Assessment

12.6.22 A review of all serious and fatal road traffic collisions (RTCs) on the B870 west of the minor road to Dunn and the A9 within 5 miles north or south of the site entrance was undertaken using data supplied by Crashmap<sup>1</sup> for the last five years. This review indicated that there were no serious or fatal RTCs in these locations.

## 12.7 INITIAL SCREENING ASSESSMENT

### Quantification of Development Activities

- 12.7.1 A programme of construction activities has been included within Chapter 5: Project Description.
- 12.7.2 Most vehicles used during the construction activities would be below the width requirement for wide loads, with the exception of the turbine deliveries (nacelle, tower sections and blades) and possibly the 800/1000 tonne and 400/500 (or less) tonne cranes that would be used for the erection of the turbines. The roads authorities and local constabulary are likely to request a police escort necessary for the abnormal loads. The cranes are likely to require only a single journey along the public road to and from the Proposed Development. Road axle weights would not exceed regulated levels unless agreed with the relevant authorities. Consultations with the Highland Council will be held prior to movement of any abnormal loads.
- 12.7.3 Vehicles and equipment would be delivered to site at the commencement of the relevant construction phase and would remain on site until work relating to that stage was completed. Such equipment would include excavators, dump trucks and bulldozers for access track and crane pad earthworks, drainage, turbine foundations and cable installation, and cranes for erecting the turbines. An indicative list of the equipment needed is given in Chapter 5: Project Description.
- 12.7.4 Each vehicle travelling to the Proposed Development will generate two "vehicle movements"; one movement to the proposed wind farm and one movement away from the Proposed Development i.e. 1 delivery to the Proposed Development = 2 vehicle movements.
- 12.7.5 This chapter assesses the worst-case scenario and assumes all stone would need to be imported onto site and all foundation concrete would need to be brought to site in ready mix lorries.
- 12.7.6 In addition to the deliveries noted above, the abnormal load deliveries have also been assessed. The number of these vehicles has been included within the assessment of general construction traffic to ensure a robust assessment including all vehicles. It is however important to consider the effect of these particular vehicles in

<sup>1</sup> [www.crashmap.co.uk](http://www.crashmap.co.uk) [Accessed 09/08/2023]

isolation, as the effects are quite different to those attributed to general construction traffic, hence they have been assessed separately.

12.7.7 Indicative HGV traffic loads for the various phases of the construction operations are as follows:

- Mobilisation to Site:** Mobilisation to site would involve the transport of plant for the construction works (including dump trucks, dozers/graders, excavators, forklifts), temporary office facilities, welfare units and storage containers, and general construction equipment such as fencing for site compounds and fuel bowsers. It is estimated up to 63 HGV deliveries (126 movements) would be required for site mobilisation.
- Forestry Work:** An area of forestry, approximately 75.1 ha is required to be felled as part of the development which amounts to 70 deliveries (140 movements).
- Stone for Site Tracks, Crane Pads and Compounds:** It is assumed that all stone for the site tracks, crane pads, substation and BESS compounds would be imported from a local quarry. For 4.78 km of access track, 7 turbine crane-pads and associated hardstand laydown areas it is estimated around 30,500 tonnes of stone would be required, resulting in around 1,486 HGV deliveries (2,972 movements). Crane hardstandings along with the substation and BESS compound areas are expected to generate 2,342 deliveries (4,684 movements) giving a total of 3,828 stone deliveries and 7,656 movements.
- Geogrid and Culverts:** An allowance has been included for laying geogrids along the access tracks and crane-pads. Geogrid rolls are generally 4 m wide and therefore it is assumed two geogrids would be required per length of track to provide sufficient width coverage. For 4.78 km of track and 7 crane-pads it is estimated 83 rolls of geogrid at 75 m per roll would be required. It is estimated a total of 9 deliveries would be required (18 movements). Similarly, an allowance has been included for culverts for drainage and pipe crossings at a rate of one culvert for every 100 m of track plus an additional allowance for specific locations resulting in an estimate of 32 culverts. It is estimated a total of 1 delivery would be required (2 movements) to deliver 32 culverts. Therefore a total of 10 deliveries or 20 movements are required for geogrid and culverts.
- Turbine Foundations:** Based upon the proposed tip heights it is estimated a typical gravity foundation design would require up to 1,000 m<sup>3</sup> of concrete and 135 tonnes of steel reinforcement. A typical concrete lorry can carry between 6 to 8 cubic metres of concrete; therefore 167 concrete deliveries are required per turbine foundation. Foundations are poured continuously over a single 10-hour day, therefore approximately 17 deliveries per hour will be required to complete the pour. To present a worst-case scenario, this TIA assumes ready-mix concrete rather than an onsite batching plant. For ready-mix concrete it is estimated 1,169 HGV deliveries (2,338 movements) would be required. For reinforcement it is estimated 63 HGV deliveries (126 movements) would be required. Combined this equates to 1,232 HGV deliveries (2,464 movements) for the turbine foundations.
- Turbine Abnormal Loads:** For the size of turbines being considered for the site, the abnormal loads would consist of 3 blade deliveries, up to 3 tower section deliveries, 1 nacelle delivery and 1 hub delivery (8 abnormal load deliveries per turbine). The transport of abnormal loads is undertaken by specialist vehicles designed and manufactured for the purpose of wind turbine component delivery. These vehicles are designed such that following delivery, they can reduce to a standard HGV size. Hence, although they arrive to site as an abnormal load, they leave as a standard HGV. In this assessment, they are included in the HGV numbers although they are referred to as abnormal loads. Hence, there would be 56 abnormal load deliveries (112 movements) for transporting the turbine components to site.
- Cranes and Misc. Turbine Components:** Around 4 HGV deliveries for items that would be fitted within the turbines would be required for each turbine. The cranes (larger 800/1,000 tonne and smaller 400/500 tonne crane) for assembling the wind turbines would be brought to site at the start of turbine assembly and remain on site until completion. It is estimated up to approximately 36 HGV deliveries (72 movements) would be

required for mobilising and demobilising the cranes. It is estimated up to approximately 36 HGV deliveries (72 movements) at the start of turbine assembly works, 56 HGV deliveries (112 movements) throughout the turbine assembly period and 36 HGV deliveries (72 movements) following completion of turbine assembly.

- Cable Installation:** Cable installation includes the Low Voltage (LV) electrical cables, SCADA signalling/control cables and sand associated with the cable bedding and surround in the cable trench. It is estimated 4 HGV deliveries would be required for the LV cables, 2 HGV deliveries for the SCADA cables and 194 HGV deliveries for the sand bedding and surround. This equates to a total of 200 HGV deliveries (400 movements) for the cable installation.
- Substation Construction:** Construction of the substation will require the delivery of electrical components, switchgear, concrete for the foundations and structure of the control building, fencing and other miscellaneous materials and equipment. This is estimated to require a total of 60 HGV deliveries, resulting in 120 HGV vehicle movements for this phase of works.
- BESS Installation:** The main BESS components are made up of battery units, transformers and inverters. This equates to a total of 23 deliveries (46 movements). In addition to the main BESS components, associated infrastructure such as concrete foundations, internal cabling and fencing will also require to be transported to site resulting in 77 deliveries (154 movements). Therefore, the total number of deliveries associated with the BESS is 100, resulting in 200 vehicle movements.
- Transport of site personnel:** Up to 40 car/van movements per day are anticipated for construction personnel and any small deliveries, at the peak of the site activity.

Table 12.9: Construction Item HGV Movement Summary

Item	HGV Deliveries	HGV Movements	Notes
Mobilisation to Site	63	126	
Tree Felling	70	140	
Stone	3,522	7,044	Full import assumed for all tracks and hardstandings
Geogrids and Culverts	10	20	
Turbine Foundations	1,232	2,464	Based upon ready-mix concrete. Movements included for both concrete and steel reinforcement.
Wind Turbine Abnormal Loads	56	112	Included in the HGV numbers although referred to as abnormal loads
Cranes and Misc. Turbine Components	99	198	
Cable Installation	200	400	
Substation	60	120	
BESS Component	100	200	
Turbine Transformers and Housing	7	14	
Demobilisation	63	126	
<b>Total</b>	<b>5,482</b>	<b>10,963</b>	

Source: Natural Power, 2023

12.7.8 The increase in traffic movements that would be generated by the Proposed Development have been assessed against the baseline traffic flow figures for each road in Table 12.8. The construction of the Proposed Development is estimated to lead to around 10,963 HGV movements (including AILs, excluding concrete deliveries) and 8,227 light personnel and LGV movements over the proposed 12-month period.

12.7.9 Table 12.10 and Chart 12.1 illustrates this distribution of traffic over the 12-month construction period. Within the table, the turbine foundations numbers only include for reinforcement deliveries as it is not considered appropriate to simply distribute HGV numbers for concrete pours for the foundations over a month duration. Concrete pours for turbine foundations typically take place over a single day and hence the estimated 1,000 m<sup>3</sup> of concrete for a foundation would be delivered by HGVs within typically a 10-to-12-hour period. Therefore, the effect of this is discussed separately below.

12.7.10 Months five and six are expected to generate the most average daily movements circa 88 HGV movements and 39 LGV movements per day are anticipated during those months.

Chart 12.1 - Distribution of Total Vehicle Movements

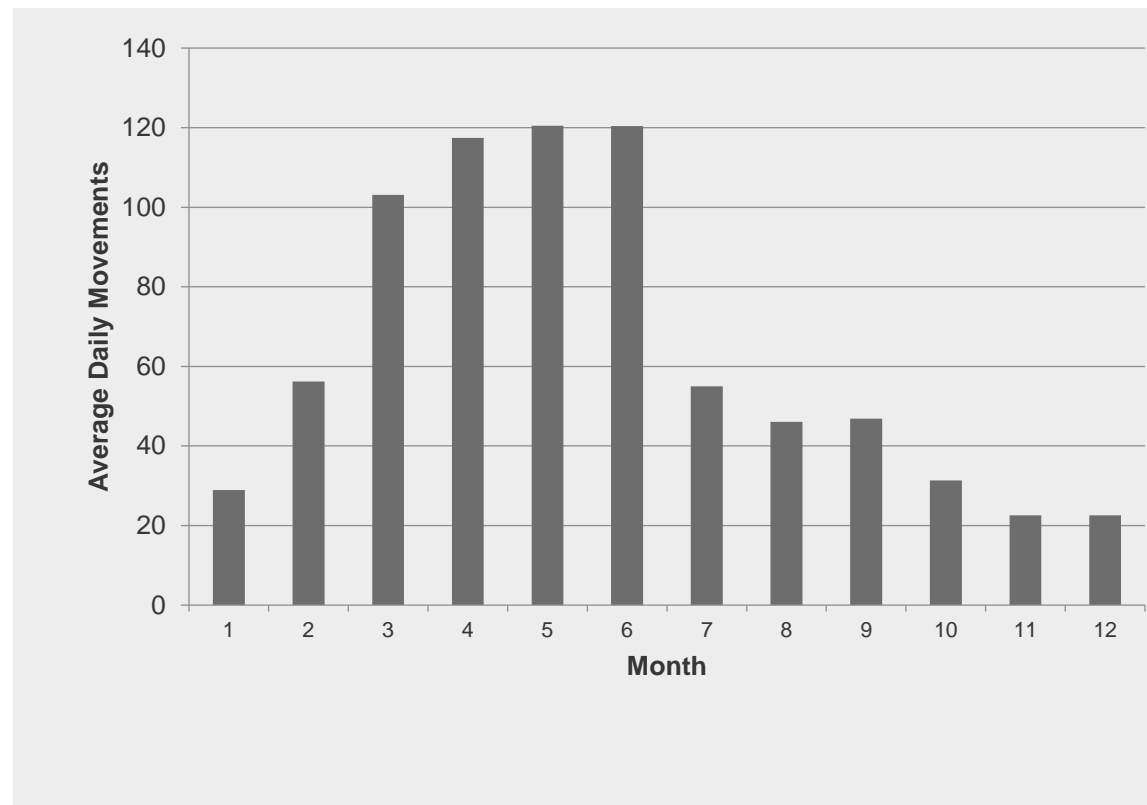


Table 12.10 Predicted Vehicle Movements during Construction

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
<b>Heavy Goods Vehicles Movements (including abnormal loads)</b>												
Mobilisation to site	63	63										
Forestry	70	70										
Access and Site Tracks		596	596	596	596	588						
Hardstandings: Crane, BESS and Substation			1018	1018	1018	1018						
Geogrids & Culverts		4	4	4	4	4						
Turbine foundations					36	36	36	18				
Turbine Transformer and Housing						7	7					
Turbine Abnormal Loads							38	38	36			
Turbine Assembly, Commissioning and Testing							91	20	87			
Substation					30	30	30	30				
BESS Components							42	42	42	40		
Cabling				100	100	100	100					
Demob / Site clearance											63	63
<b>Monthly HGV Total Movements</b>	<b>133</b>	<b>733</b>	<b>1618</b>	<b>1718</b>	<b>1784</b>	<b>1783</b>	<b>344</b>	<b>148</b>	<b>165</b>	<b>40</b>	<b>63</b>	<b>63</b>
<b>Light Vehicle Movements (car, minibuses and small van deliveries)</b>												
Forestry LGV	70	70										
General Construction Traffic	433	433	650	866	866	866	866	866	866	650	433	433
<b>Monthly total LGV Movements</b>	<b>503</b>	<b>503</b>	<b>650</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>866</b>	<b>650</b>	<b>433</b>	<b>433</b>
<b>Monthly Total Vehicle Movements (LGV &amp; HGV)</b>	<b>636</b>	<b>1236</b>	<b>2268</b>	<b>2584</b>	<b>2650</b>	<b>2649</b>	<b>1210</b>	<b>1014</b>	<b>1031</b>	<b>690</b>	<b>496</b>	<b>496</b>
<b>Average Daily Movements (assumes 5 working days per week)</b>	<b>29</b>	<b>56</b>	<b>103</b>	<b>117</b>	<b>120</b>	<b>120</b>	<b>55</b>	<b>46</b>	<b>47</b>	<b>31</b>	<b>23</b>	<b>23</b>
<b>Average Daily HGV Movements (assumes 5 working days per week)</b>	<b>6</b>	<b>33</b>	<b>74</b>	<b>78</b>	<b>81</b>	<b>81</b>	<b>16</b>	<b>7</b>	<b>8</b>	<b>2</b>	<b>3</b>	<b>3</b>

Source: Natural Power, 2023

### Distribution of Construction Traffic

12.7.11 Due to the distribution of traffic count locations on routes surrounding the Proposed Development Area it is not appropriate to assign 100% of traffic for the Proposed Development to each. In reality it is assumed that the majority of traffic will approach the Proposed Development Area from the south and west as this is in the direction of the A9 trunk road, and major population centres to the south. Limited traffic is expected to approach from the east towards Wick, as there are no sources of construction material in this direction with the exception of concrete which is described below.

12.7.12 Concrete may potentially be sourced from Bower Quarry, as discussed in Paragraph 12.6.11. This would result in traffic using the B870 on approach, although as discussed an 'empty load restriction' has been agreed therefore departing vehicles will use the A9 via Georgemas. Concrete vehicle movements comprise up to 167 deliveries per day when foundations are being poured.

12.7.13 The following approach to the distribution of traffic has been taken, it has been assumed that:

- 100% of traffic will pass points 1 and 2;
- 75% of traffic will pass points 3 and 4; and
- No HGV traffic will pass point 5 except during concrete pouring which is discussed separately.

12.7.14 Traffic count locations are indicated on Figure 12.1.

Table 12.11 Estimated % Increase in Traffic over Construction Period (Excluding Concrete)

Ref.	Road	Construction Month											
		1	2	3	4	5	6	7	8	9	10	11	12
		% Increase in Total Traffic											
1	A9	1.4	2.6	4.8	5.5	5.6	5.6	2.6	2.1	2.2	1.5	1.1	1.1
2	A9	2.8	5.5	10.0	11.4	11.7	11.7	5.4	4.5	4.6	3.1	2.2	2.2
3	A9	1.5	2.9	5.2	5.9	6.1	6.1	2.8	2.3	2.4	1.6	1.1	1.1
4	A882	1.2	2.2	4.1	4.7	4.8	4.8	2.2	1.8	1.9	1.2	0.9	0.9
5	B870	1.9	1.9	2.5	3.3	3.3	3.3	3.3	3.3	3.3	2.5	1.7	1.7
		% Increase in HGVs											
1	A9	2.8	14.9	32.7	34.7	36.0	36.0	6.9	3.0	3.3	0.8	1.3	1.3
2	A9	4.2	22.2	48.7	51.7	53.7	53.7	10.4	4.5	5.0	1.2	1.9	1.9
3	A9	5.1	27.3	60.0	63.7	66.1	66.1	12.7	5.5	6.1	1.5	2.3	2.3
4	A882	4.9	26.2	57.5	61.0	63.4	63.3	12.2	5.3	5.9	1.4	2.2	2.2
5	B870	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Natural Power, 2023

12.7.15 Assessing the criteria in Tables 12.1 and 12.2 against the distribution of traffic movements in the above bullets, all roads described within Table 12.11 exceed Rule 1 for % increase in HGVs by more than 30%. As such all road links have been taken forward for further assessment to ensure a worst case-scenario is considered.

12.7.16 As noted previously within Section 12.6, the vehicle movement numbers set out in Table 12.11 and percentage increases do not include for the concrete foundation pours. For a 1,000 m<sup>3</sup> foundation it is anticipated 167 HGV deliveries (334 movements) will be required over a single 10–12-hour period. With seven foundations, this increase in traffic will occur on seven separate days over the 4-month foundation construction period, equating to up to two days per month.

12.7.17 As discussed in Paragraph 12.7.13 concrete may be sourced from Bower Quarry, in which case it would use the B870 and A882. A restriction on the B870 as described in the aforementioned paragraph means that only 50% of the concrete movements (167 per day) would use this route.

Table 12.12: Increased traffic on Turbine Foundation Pouring Days

Location	Total Movements	HGV Movements	Total % Increase	HGV % Increase	Magnitude
1	2601	641	21%	185%	High
2	1481	567	44%	275%	High
3	1913	487	29%	429%	High
4	2318	491	22%	411%	High
5	1089	256	22%	188%	High

Source: Natural Power, 2023

12.7.18 The impacts resulting from the turbine foundation concrete pours are infrequent and over a very short period, the concrete foundation pours have therefore not been taken further in this assessment. Mitigation measures will be in place to ensure that the short term occasional impacts on concrete pours are minimised, these measures are described in the FTMP.

### Operation Period

12.7.19 Through the operational life of the Proposed Development there would be irregular and limited traffic movements consisting almost entirely of cars or vans for the service and maintenance of the Proposed Development Area. The number of vehicle movements during operation is infrequent and of a very low number such that the magnitude of their effect is considered to be negligible, leading to Negligible/Low Significance, when assessed using the significance criteria. It would be appropriate for the wind farm operators to be aware of any local road sensitivities. During any major repair works required (e.g., to one of the turbines) cranes and HGV vehicles may need to visit site. Due to the low number of vehicles required this would still be considered to be of Negligible/Low Significance leading to "Not Significant" in EIA terms and no further assessment has been undertaken.

### Decommissioning Period

12.7.20 The method of decommissioning would be agreed with the Highland Council as outlined in Chapter 5: Project Description. In line with current practice all turbine components, including blades, nacelles and towers would be removed from the site. If not to be re-used, turbine components would likely be cut to manageable sizes on site to allow use of normal HGV vehicles. Above ground infrastructure would be removed with foundations generally removed to around 1 m below ground level, with the remainder left in-situ. Therefore, the HGV movements will be less than during the construction period. The decommissioning would be likely to take place over a similar timescale for construction. Baseline traffic flows on all of the affected roads may have altered by the end of the up to 35 year lifetime of the Proposed Development leading to the possibility of a different effect on the roads for HGV traffic. It is envisaged that the decommissioning would result in lesser effects than those identified for this

assessment and would thus have a Negligible/Low Significance and no further assessment has been undertaken. Decommissioning would be managed in accordance with a decommissioning plan to be agreed with relevant authorities at the time.

## 12.8 ASSESSMENT OF POTENTIAL EFFECTS

- 12.8.1 This section assesses the resulting environmental effects for receptors requiring detailed assessment in accordance with Rules 1 and 2 of the IEMA Guidelines, specifically, links where traffic flows would increase by more than 30% and/or sensitive areas where traffic flows would increase by 10% or more.
- 12.8.2 All routes in the study require detailed assessment in line with the above criteria. The impact of the abnormal loads on the A9 has been assessed separately.
- 12.8.3 The impact of turbine concrete foundations pours on routes are discussed in Paragraph 12.8.8.

### Assessment of Receptor Sensitivity

- 12.8.4 A detailed assessment of the receptors on each of the road links has been undertaken and their sensitivity assessed in accordance with the criteria outlined in Section 12.5. Table 12.13 summarises the assessment of the sensitivity (L = Low, M = Medium, H = High) for the receptors identified on the applicable road links.

Table 12.13: Receptor sensitivity assessment

Receptor Description	Effect	L	M	H	Rationale
<b>Public Road Network and users</b>					
A9 between Latheron and Mybster . Ref 1 and 2	Increase in HGV movements	x			Two lane single carriageway major road that is well maintained with reasonably good geometry. Generally considered to have capacity to absorb an increase in traffic. Road has been used for past wind farm developments within the area.
	Vehicle delays due to increase in traffic	x			
A9 between Mybster and Georgemas. Ref 3	Increase in HGV movements	x			Two lane single carriageway major road that is well maintained with reasonably good geometry. Generally considered to have capacity to absorb more traffic. Road has been used for past wind farm developments within the area.
	Vehicle delays due to increase in traffic	x			
A882 between Georgemas and Watten. Ref 4	Increase in HGV movements	x			Two lane single carriageway road of moderate condition. Road caters for existing A&W Sinclair Quarry which emphasises the road has capacity to absorb an increase in traffic.

Receptor Description	Effect	L	M	H	Rationale
	Vehicle delays due to increase in traffic	x			
B870 between Watten and Mybster. Ref 5	Increase in HGV movements		x		Single track road with formal intervisible passing places and a low baseline traffic flow level. This road has capacity to absorb additional traffic.
	Vehicle delays due to increase in traffic		x		
<b>Local Settlements</b>					
Watten Village (A882)	Pedestrian Severance		x		Two lane single carriageway with properties, Watten Primary School, Watten Free Church and shops fronting onto A882. Footpaths on both sides along majority of route. On street parking. Speed reduction measures in place through settlement. Zebra crossing for accessing either side of street.
	Pedestrian Delay		x		
	Pedestrian Amenity		x		
	Pedestrian Fear and Intimidation		x		
	Pedestrian Safety		x		
Loch Watten Caravan Park (A882)	Pedestrian Severance	x			Properties set back from the A882. No requirements or facilities for pedestrian access to A882
	Pedestrian Delay	x			
	Pedestrian Amenity	x			
	Pedestrian Fear and Intimidation	x			
	Pedestrian Safety	x			
Spital (A9 between Georgemas and Mybster)	Pedestrian Severance		x		Two lane single carriageway with properties, fronting onto the A9 on both sides. Footpaths on one side along majority of route. Speed reduction measures in place through settlement. No traffic lights or zebra crossings for accessing either side of the street.
	Pedestrian Delay		x		
	Pedestrian Amenity		x		

Receptor Description	Effect	L	M	H	Rationale
	Pedestrian Fear and Intimidation		x		Settlement is located on major trunk road so there should be an expectation of heavy traffic.
	Pedestrian Safety		x		
Latheron Junction (A9)	Pedestrian severance		x		Two lane single carriageway with properties, fronting onto the A9 on both sides. Footpaths on one side along majority of route. Speed reduction measures in place through settlement. No traffic lights or zebra crossings for accessing either side of the street. Settlement located on major trunk road.
	Pedestrian delay		x		
	Pedestrian Amenity		x		
	Pedestrian Fear and Intimidation		x		
	Pedestrian Safety		x		
<b>Road Structure</b>					
A9 between Latheron and Mybster. Ref 1 and 2	Degradation of road structure	x			Two lane single carriageway that is a major road link between Inverness and Thurso. Road is designed to carry vehicle loads with no obvious defects. Road caters for past Wind Farm developments within the area.
A9 between Mybster and Georgemas. Ref 3	Degradation of road structure	x			Two lane single carriageway that is a major road link between Inverness and Thurso. Road is designed to carry vehicle loads with no obvious defects. Road caters for past Wind Farm developments within the area.
A882 between Georgemas and Watten. Ref 4	Degradation of road structure	x			Two lane single carriageway road that is designed to carry vehicle loads with no obvious defects. Road caters for past Wind Farm developments within the area
B870 between Watten and Mybster. Ref 5	Degradation of road structure		x		Minor rural road linking Mybster to Watten. Evidence of past repair and maintenance.

Source: NPC

### Assessment of Construction Effects

12.8.5 Based on the criteria table 12.3, the following magnitude of effect have been assigned to the road links:

1. A9 South of Latheron, maximum increase of **36.0%** in HGVs, results in magnitude of **low**.
2. A9 between Latheron and Achavanich, maximum increase of **53.7%** in HGVs, results in magnitude of **medium**.
3. A9 Mybster to Georgemas, maximum increase of **66.1%** in HGVs, results in magnitude of **medium**.
4. A882 between Georgemas and Watten maximum increase of **63.4%** in HGVs, results in magnitude of **low**.
5. B870 between Mybster and Watten, maximum increase 0% in HGVs, results in magnitude of **negligible**.

12.8.6 Synthesising the sensitivity and magnitude provides the resultant effect for these road links and associated receptors as detailed in Table 12.14.

Table 12.14: Unmitigated Significance of Effect

Receptor Description	Effect	Sensitivity	Magnitude	Effect	Significance
<b>Public Road Network and Users</b>					
A9 between Latheron and Mybster Ref 1 and 2.	Increase in HGV movements Vehicle delays due to increase in traffic	Low	Medium Low	Moderate/Minor Minor	Not significant Not significant
A9 between Georgemas and Mybster, Ref 3.	Increase in HGV movements Vehicle delays due to increase in traffic	Low	High High	Moderate Moderate	Not significant Not significant
A882 between Georgemas and Watten. Ref 4	Increase in HGV movements Vehicle delays due to increase in traffic	Low	High High	Moderate Moderate	Not significant Not significant
B870 between Watten and Mybster. Ref 5	Increase in HGV movements Vehicle delays due to increase in traffic	Medium	Negligible Negligible	Minor Minor	Not significant Not Significant
<b>Local Settlement</b>					
	Pedestrian severance	Medium	Medium	Moderate	Not significant
	Pedestrian delay	Medium	Medium	Moderate	Not significant
	Pedestrian Amenity	Medium	Medium	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Medium	Moderate	Not significant

Receptor Description	Effect	Sensitivity	Magnitude	Effect	Significance
Watten Village <sup>2</sup> (A882) Ref 4	Pedestrian Safety	Medium	Medium	Moderate	Not significant
Loch Watten Caravan Park (A882) Ref 4	Pedestrian severance	Low	Medium	Moderate/Minor	Not significant
	Pedestrian delay	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Amenity	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Fear and Intimidation	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Safety	Low	Medium	Moderate/Minor	Not significant
Spittal (A9 between Georgemas and Mybster) Ref 3	Pedestrian severance	Medium	Medium	Moderate	Not significant
	Pedestrian delay	Medium	Medium	Moderate	Not significant
	Pedestrian Amenity	Medium	Medium	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Medium	Moderate	Not significant
	Pedestrian Safety	Medium	Medium	Moderate	Not significant
Latheron Junction A9. Ref 1/2	Pedestrian severance	Medium	Low	Moderate	Not significant
	Pedestrian delay	Medium	Low	Moderate	Not significant
	Pedestrian Amenity	Medium	Low	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Low	Moderate	Not significant
	Pedestrian Safety	Medium	Low	Moderate	Not significant
<b>Road Structure</b>					

Receptor Description	Effect	Sensitivity	Magnitude	Effect	Significance
A9 between Latheron and Mybste. Ref 1 and 2	Degradation of roads structure	Low	Low	Low	Not significant
A9 between Georgemas and Mybster. Ref 3	Degradation of road structure	Low	Medium	Moderate/Minor	Not significant
A882 between Georgemas and Watten. Ref 4	Degradation of road structure	Low	Medium	Moderate/Minor	Not significant
B870 between Watten and Mybster. Ref 5	Degradation of road structure	Medium	Low <sup>3</sup>	Moderate/Minor	Not Significant

Source: Natural Power, 2023

12.8.7 As demonstrated in the above tables no significant effects have been identified in relation to traffic and transport, taking into account the embedded mitigation.

### Turbine Foundation Concrete Pours

12.8.8 To provide a worst-case analysis, the assessment assumes ready-mix concrete. The concrete turbine foundation pour HGV numbers were not included in the above assessment and have been assessed separately. A 1,000 m<sup>3</sup> foundation is anticipated to require 167 HGV deliveries (334 movements) over a single 10–12-hour period. With seven foundations, this increase in traffic will occur on seven separate days over the 4-month foundation construction period, equating to around two days per month. Given the criticality of the foundation pours and the number of HGV movements involved it is assumed limited, if any, other site works would be undertaken on a foundation pour day to ensure concrete deliveries through the site road network remain un-interrupted.

12.8.9 For such a unique and infrequent event it is not considered appropriate to apply the same methodology to assess the impact of this. It is recognised that, given the close proximity of the Proposed Development entrance to some of the receptors (properties), turbine foundation concrete pours will have an impact, despite their extremely short durations (i.e. 10-12 hours) and limited occurrences (i.e. seven times over a four month period).

12.8.10 Several mitigation measures have been agreed in consultation with Highland Council to minimise the effects of concrete pours on the village of Watten and B870 road. These mitigation measures are detailed in Paragraph 12.9.1.

<sup>3</sup> Based upon overall view of HGV traffic increase, taking into account occasional nature of concrete traffic.

<sup>2</sup> Note that no HGV traffic should pass through Watten Village. Traffic here is limited to construction personnel cars/vans.



12.8.11 Given the limited duration of concrete pours, and the agreed mitigation measures no significant effects are predicted in the professional opinion of Natural Power.

### Effect of Abnormal Loads

12.8.12 As noted previously, the abnormal load numbers have been included within the assessment of general construction traffic to ensure a robust assessment including all vehicles. It is however important to consider the effect of these particular vehicles in isolation, as the effects are quite different to those attributed to general construction traffic.

12.8.13 The primary impact associated with the transportation of abnormal loads is considered to be driver delays on other road users. The impact on local settlements (i.e. severance, pedestrian, delay, safety, etc) and road structure are not considered to merit further detailed assessment as:

- The duration of an abnormal load delivery through/past the settlement is short (i.e. a timescale of minutes).
- A significant level of preparation goes into planning these deliveries with the police and local authorities and the management/control measures in place during the delivery (i.e. police escorts, etc).
- Prior to any abnormal load delivery, the structural capacity of the road and bridges/culverts would be assessed, and any strengthening works implemented. The necessary permits to deliver abnormal loads would not be released from the relevant road authorities until they are satisfied that this aspect has been fully addressed.

12.8.14 As part of the EIAR an Abnormal Load Access Assessment was undertaken to assess the abnormal load delivery route from both the Port of Nigg and Scrabster Harbour to the Proposed Development. In the Abnormal Load Access Assessment 48 points of interest were identified for AIL deliveries via the Port of Nigg, while 7 points of interest were identified from Scrabster to the Proposed Development entrance.

12.8.15 The transportation of abnormal loads requires careful planning in consultation with the Local Authority, Police Scotland and Transport Scotland. The anticipated distribution of abnormal loads indicates that abnormal loads would occur over a 3-month period with a peak vehicle movement of 40 per month.

12.8.16 During the period when the loads are being transported there is potentially some effect on driver delays. This effect is increased at junction locations where vehicles in both directions would be required to wait until each load has negotiated the obstacle. There are sections where the abnormal load would use both carriageways while negotiating a pinch point or narrow sections of the road. This possible cause for journey delay to other road users would occur along the route from port to site.

12.8.17 Discussions with Police Scotland would determine the likely traffic management arrangements for these vehicle movements. These would be incorporated into the construction programme and the Traffic Management Plan to be produced by the contractors and would be agreed with the Highland Council, Police Scotland and Transport Scotland prior to commencement of construction. Particularly important details to be established within the CTMP would include determining an acceptable time for transporting abnormal loads and the number of loads it may be possible to transport at one time. It has been assumed that each abnormal load would require an escort of two police vehicles and one haulage company escort vehicle.

12.8.18 Careful management of the timing of the abnormal loads and management of the traffic during abnormal load delivery would minimise driver delay. There are various options available to minimise the impact of journey delay, such as:

- Night-time deliveries of the abnormal loads to avoid delays to the general public; and/or
- Scheduling deliveries to avoid peak travel times at sensitive locations (e.g. morning and evening peak on the A9).

12.8.19 The abnormal load will, for certain bends on the A9, be required to utilise the full width of the carriageway. Oncoming vehicles to the abnormal load would be stopped via the escort vehicle which will delay traffic for a short period of time.

12.8.20 Driver delay may also occur on the A9 Meikle Ferry roundabout and B9175/A9 roundabout where the abnormal load is required to contraflow roundabouts. Such delays should be limited to a matter of minutes as the AIL vehicle negotiates the particular junction. Following the junction, the route is predominantly on dual carriageway/motorway and hence any vehicles would be able pass the AIL convoy.

12.8.21 Proactive communication with the local community and road users on the delivery arrangements, dates and timings of the abnormal load deliveries will also provide advance warning to residents on the route and frequent road users. This will enable them to plan their journeys and avoid abnormal load delivery times if possible.

12.8.22 Given the delay which will be incurred by road users during the AIL delivery, along with the frequency of the event while taking cognisance of the short duration of AIL deliveries over the lifetime of the wind farm, in Natural Power's professional opinion it is considered the effect on driver delay is assessed to be moderate and mitigation measures should be considered to reduce the effect, these will be detailed in the FTMP.

12.8.23 Following implementation of the measures outlined in the FTMP the effect of abnormal loads is at worst low and therefore not significant in EIA terms.

### Abnormal Load Modification Works

12.8.24 In order to facilitate the delivery of abnormal loads from the Port of entry to the site entrance, a number of road links require small areas of road widening for overrun and removal of street furniture and vegetation for oversail. The effect on driver delay is expected to be low, however, mitigation measures should be considered to reduce the effect.

## 12.9 MITIGATION

12.9.1 The suitability and effectiveness of mitigation measures would need to be considered in detail to develop a set of traffic control measures. Key to this would be proactive consultation during both the pre-construction and construction stages with the local authority and particularly the local community and individuals who will be most affected during the construction period. These consultations should aim to determine the traffic related factors that are of greatest concern to the local community and target appropriate mitigation measures. Throughout the construction period the local community should be kept abreast of the traffic measures so they are aware of and understand HGV numbers, timings, particular busy periods and durations.

12.9.2 In addition to the impact mitigation, there are several mitigation measures proposed as standard good practice for wind farm construction and would be incorporated into the CTMP regardless of the outcome of the traffic impact assessment. As such, these mitigation measures will further mitigate impacts which were determined to be not significant.

### Standard Mitigation and Good Practice Measures

12.9.3 The following mitigation and good practice measures would be included in the CTMP:

- Consultation with the Highland Council road department on all transport issues and to make sure that deliveries do not conflict with other scheduled road works. For the same reason Transport Scotland would also be consulted with reference to trunk roads;
- Public notifications and liaison during the construction phase of planned vehicle movements (i.e. turbine deliveries and timings, HGV numbers, timings, particular busy periods and durations);

- Pre-commencement road condition survey in a format agreeable with the Council and ongoing condition surveys throughout the construction stage to assess the integrity of the road network and provide early indication of damage or wear.
- Detailed sequencing of construction activities to reduce HGV vehicle movements and reduce peak movements where possible;
- Scheduling of HGV deliveries to avoid peak times (e.g. morning, evening, school drop off and pick up times and major events within the area) as far as reasonably possible; and
- Temporary signage through the peak construction periods to inform construction traffic, public road users and pedestrians of the risks.

### Pedestrian and Property Mitigation

12.9.4 Pedestrian receptors (severance, amenity, fear and intimidation, and safety) are primarily within the three settlements along the route, namely Latheron, Watten and Spital. A range of measures would be available to mitigate these effects, including:

- HGVs are prohibited from travelling through the village of Watten;
- Scheduling of HGV deliveries to avoid peak times;
- Temporary signage through the peak construction periods to inform both drivers and pedestrians of the risks and highlight rights of ways/priorities;
- Consideration of installation of a temporary pedestrian crossing on the A9 at Spital to reduce the severance sensitivity. Decision on this would be taken in consultation with the local community once the location of suppliers has been identified.

### Abnormal Load Deliveries - Mitigation

12.9.5 The following would be undertaken in respect of the abnormal loads delivery and would be set out in the CTMP:

- Advance notification to the local community and property owners along the delivery route. These will set out the nature of improvement works within their local area and detailed programmes to ensure the local residents are as informed and aware of the works as can be. Prior to the commencement of deliveries then relevant residents on the AIL route would be informed of the timing of deliveries;
- Road signs at suitable locations to advise of the closures, opening times and alternative routes that can be used;
- AIL deliveries scheduled out-with peak periods (i.e. morning and evening commute and school drop off/pick-up); and
- Provision to ensure immediate re-opening of the road in the case of an emergency or to allow emergency vehicles to pass through.

## 12.10 RESIDUAL EFFECTS

12.10.1 No significant residual effects were identified in relation to traffic and transport.

Table 12.15: Summary of residual effects resulting from the proposed wind farm development

Receptor	Impact	Sensitivity (mitigated)	Magnitude of Impact (mitigated)	Residual Effect	Significance
A9 between Latheron and Mybster (Ref. 1 and 2)	Increase in HGV movements	Low	Minor	Moderate/Minor	Not significant
	Vehicle delays due to increase in traffic	Low	Minor	Minor	Not significant
A9 between Georgemas and Mybster (Ref. 3)	Increase in HGV movements	Low	High	Moderate	Not significant
	Vehicle delays due to increase in traffic	Low	High	Moderate	Not significant
A882 between Georgemas and Watten (Ref. 4)	Increase in HGV movements	Low	High	Moderate	Not significant
	Vehicle delays due to increase in traffic	Low	High	Moderate	Not significant
B870 between Watten and Mybster (Ref. 5)	Increase in HGV movements	Medium	Negligible	Minor	Not significant
	Vehicle delays due to increase in traffic	Medium	Negligible	Minor	Not Significant
Watten Village (A882) (Ref. 4)	Pedestrian severance	Medium	Medium	Moderate	Not significant
	Pedestrian delay	Medium	Medium	Moderate	Not significant
	Pedestrian Amenity	Medium	Medium	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Medium	Moderate	Not significant
	Pedestrian Safety	Medium	Medium	Moderate	Not significant
Loch Watten Caravan Park (Ref. 4)	Pedestrian severance	Low	Medium	Moderate/Minor	Not significant
	Pedestrian delay	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Amenity	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Fear and Intimidation	Low	Medium	Moderate/Minor	Not significant
	Pedestrian Safety	Low	Medium	Moderate/Minor	Not significant
A9 Spital (between Georgemas and Mybster)	Pedestrian severance	Medium	Medium	Moderate	Not significant
	Pedestrian delay	Medium	Medium	Moderate	Not significant
	Pedestrian Amenity	Medium	Medium	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Medium	Moderate	Not significant
	Pedestrian Safety	Medium	Medium	Moderate	Not significant
Latheron Junction A9	Pedestrian severance	Medium	Low	Moderate	Not significant
	Pedestrian delay	Medium	Low	Moderate	Not significant
	Pedestrian Amenity	Medium	Low	Moderate	Not significant
	Pedestrian Fear and Intimidation	Medium	Low	Moderate	Not significant
	Pedestrian Safety	Medium	Low	Moderate	Not significant
A9 between Latheron and Mybster	Degradation of road structure	Low	Medium	Moderate/Minor	Not significant
A9 between Georgemas and Mybster	Degradation of road structure	Low	Medium	Moderate/Minor	Not significant
B870 between Watten and Mybster	Degradation of road structure	Low	Low	Moderate/Minor	Not significant
B870 between Watten and Mybster	Degradation of road structure	Medium	Medium	Moderate/Minor	Not Significant

Source: Natural Power, 2023

### Turbine Foundation Concrete Pours

12.10.2 The concrete turbine foundation pours were assessed separately as it was not considered appropriate to apply the same methodology to such a unique and infrequent event. Based on Natural Power’s professional opinion it is considered the adoption and mitigation measures would reduce the impact of concrete deliveries associated with the wind turbine foundations and as such, the effect on the road links within Section 12.7 is not considered significant.

### Abnormal Load Deliveries

12.10.3 The potential driver delay associated with the abnormal load deliveries was assessed. With the adoption of the mitigation measures, which would need to be agreed during the abnormal load permitting process with the contracted turbine supplier, their haulier, Police Scotland and the Roads Authority, it is Natural Power’s professional opinion the residual effects would be Minor and not significant in EIA terms.

## 12.11 CUMULATIVE EFFECTS

12.11.1 Other developments in the areas served by the roads assessed herein may generate their own construction, operational and decommissioning traffic. The greatest changes in traffic associated with the proposed development will be short term, occurring during the construction phase. Developments which have the potential to cause cumulative effects have been identified from THC Planning Portal and the Scottish Government’s Energy Consents Unit (ECU).

12.11.2 This cumulative assessment has considered the peak construction phase impacts, excluding concrete delivery, of all nearby major developments which share a common route or routes with the Proposed Development. A worst-case scenario has been assumed where the peak phase of each cumulative development coincides with the peak phase of the Proposed Development, however, it is highly unlikely that these phases would coincide. It is reasonable to exclude concrete delivery days for the following reasons:

- It is highly unlikely that all cumulative developments will be constructed at the same time, and less likely that the peak phases of each will overlap;
- There is a limited supply of ready-mix concrete within the local area, and it is highly unlikely that suppliers would be able to support the pouring of all cumulative development’s foundations simultaneously; and
- The principal contractors of each development should collaborate to ensure that peak traffic associated with concrete delivery days do not coincide for neighbouring developments.

12.11.3 Where available, predicted traffic information for each of the cumulative developments has been taken from their respective Environmental Statements, where such information was not available an estimated traffic level has been calculated using a pro-rata approach considering the number of turbines at the respective development in comparison with the Proposed Development.

12.11.4 Table 12.16 below indicates all the developments which have the potential to be cumulative developments. The ‘locations’ column provides the traffic count locations which the development has the potential to affect, this information has been gathered by reviewing the published route to site for general construction traffic for each development.

12.11.5 It should be noted that there are significant differences between the predicted peak traffic levels below, the primary reason for this is due to whether each development has on-site borrow pits or not. Where this information is not available, i.e. the ‘estimated’ developments the assumption is that they do not have on-site borrow pits (i.e. a worst case assumption).

Table 12.16 - Cumulative Development Information

Name	No. Turbines	Total Traffic*	HGV Traffic*	Locations	Source
Achlachan Wind Farm	3	43	28	3 and 5	EIAR
Camster II Wind Farm	11	262	232	1, 2, 4 and 5	EIAR
Golticlay Wind Farm	12	422	392	1	EIAR
Lychrobbie Wind Farm	1	18	12	1	Estimated
Slickly Wind Farm	11	45	19	1	EIAR
Tacher Wind Farm	3	55	38	1 and 2	Estimated
Tormsdale Wind Farm	10	106	26	1, 2 and 3	EIAR

\*Peak month average daily traffic

Source: THC planning portal, ECU and information listed in Source column

12.11.6 Table 12.17 below indicates the predicted traffic at each location in the worst case cumulative scenario and the corresponding percentage increase in traffic during the peak month at each location.

Table 12.17 - Cumulative Traffic Increase

Location	Baseline Traffic		Predicted Traffic		% Increase	
	Total	HGV	Total	HGV	Total	HGV
1	2146	225	3181	1032	48	359
2	1026	151	1576	1410	54	834
3	1488	92	1764	1630	19	1672
4	1893	96	2282	416	21	333
5	892	89	1281	409	44	360

Source: NPC

12.11.7 As discussed, the above represents a worst-case scenario which is highly unlikely to occur due to the aforementioned reasons. The Applicant and Principal Contractor will maintain a proactive dialogue with nearby developments to minimise the coincidence of peak traffic demands as far as reasonably practicable.

12.11.8 It is therefore considered that the cumulative effects of traffic and transportation are at worst low and not significant in EIA terms.

## 12.12 STATEMENT OF SIGNIFICANCE

- 12.12.1 The traffic and transport assessment has assessed the traffic impacts associated with the Proposed Development. The assessment considered a worst-case scenario and assumes all stone would need to be imported onto site and all foundation concrete would need to be brought to site in ready mix lorries.
- 12.12.2 In addition, the traffic impacts associated with the abnormal load deliveries were also assessed. An Abnormal Load Access Assessment, including swept path analysis at particular pinch points was also prepared demonstrating the viability of the proposed abnormal load route and is included as Technical Appendix A12.1 to this chapter.
- 12.12.3 The assessment concludes that, with the incorporation of suitable mitigation measures secured through a CTMP, there will be no significant traffic effects associated with the Proposed Development.
- 12.12.4 In relation to potential cumulative impacts, these are predicted to be 'Negligible / Low' depending on if other developments are constructed concurrently. If the construction of the Proposed Development coincided with another, using the same transport routes, then communication with the other developers would take place with the aim to mitigate effects to a non-significant level. This would be delivered through the CTMP.

## 12.13 STATEMENT OF COMPETENCE

- 12.13.1 Natural Power's Design and Advisory Services (DAS) team have over 20 years' experience in undertaking access assessments, traffic impact assessment, transport studies and traffic management plans for the renewable industry. As well as undertaking these assessments, the DAS team regularly undertake due diligence reviews of third-party access studies for project financial closure. The team works closely with developers, turbine suppliers and haulage contractors to keep abreast of the latest developments in turbine component transport.
- 12.13.2 The DAS team is involved in all stages of wind farm developments from conception, through planning, planning condition discharge, construction and asset management/maintenance. This range provides the team with detailed experience of the various stages and how the traffic related issues follow and influence these stages. This experience is particularly valuable for the current planning stage where the traffic impacts and preliminary traffic management plan will be picked up and further refined during planning condition discharge and into construction.

# Chapter 13

## Aviation and Telecommunication

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Minimum Obstacle Clearance Altitude (MOCA)	The minimum altitude for a defined segment that provides the required obstacle clearance.
Minimum Sector Altitude (MSA)	The Minimum Sector Altitude is the lowest altitude which may be used which will provide a minimum clearance of 300 m (1,000 ft) above all objects located within a given radius of an aerodrome.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The development area within the red line boundary (application area).

Sources: 15-Ref09\_Doc 8168 PANS-OPS Vol I Flight Procedures and Natural Power.

## List of Abbreviations

Abbreviation	Description
AIP	Aeronautical Information Publication
ANO	Air Navigation Order
ASACS	Air Surveillance and Control System
ATC	Air Traffic Control
BT	British Telecom
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HAL	Highlands and Islands Airports – safeguarding operator of Wick John O’Groats Airport
ICAO	International Civil Aviation Organization
IFP	Instrument Flight Procedure
JRC	Joint Radio Company- a communications consultee
km	Kilometre
m	metres
MBNL	Mobile Broadband Network Limited
MHz	megahertz
MOCA	Minimum Obstacle Clearance Altitude
MOD	Ministry of Defence
MSA	Minimum Sector Altitude
PAR	Precision Approach Radar
PSR	Primary Surveillance Radar
RAF	Royal Air Force
UHF	Ultra High Frequency

## 13.1. Introduction

- 13.1.1. This chapter is based on work completed by Pager Power Limited and should be read in conjunction with Technical Appendices A13.1 - A13.3 of this Environmental Impact Assessment Report (EIAR) where the specific impact assessment relating to Aviation and Telecommunication is presented.
- 13.1.2. Any wind development has the potential to cause a variety of effects on telecommunications, aviation and radar infrastructure by introducing new physical structures (turbines) into an area. Large structures can affect this infrastructure in predominantly two ways, these are:
- The blocking and/or reflection of radio signals from telecommunications infrastructure, radar installations and other navigation aids.
  - By presenting a collision risk for aircraft.
- 13.1.3. This chapter describes the existing environment with respect to telecommunications and aviation (including radar), and the potential impacts to their operations as a result of construction and operation of the Proposed Development. Where required, the associated impact significance is provided, and the appropriate mitigation options are presented.
- 13.1.4. During the course of the Environmental Impact Assessment (EIA) process, Pager Power was commissioned to produce specialist reports included in Technical Appendices to investigate the impact of the Proposed Development. Technical Appendix A13.1 comprises a Telecommunication Impact Assessment, A13.2 an Airwave Network Interference Assessment and A13.3 an Aviation Impact Assessment.

## 13.2. Legislation, Policy and Guidance

- 13.2.1. The relevant guidance for each discipline is provided in the following sub-sections.

### Telecommunications

- 13.2.2. There is no legislation or formal policy with comprehensive or quantitative methodologies for the management of telecommunications issues. The documents below represent the guidance and industry best-practice for the topic in respect of wind energy developments:
- International Telecommunications Union (1992), *Assessment of impairment caused to television reception by a wind turbine, Recommendation ITU-R BT805*<sup>1</sup>;
  - International Telecommunications Union (2010), *ITU-R BT.2142-1*<sup>2</sup>;
  - Bacon (2002), *A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance*<sup>3</sup>;

<sup>1</sup> International Telecommunications Union (1992), *Assessment of impairment caused to television reception by a wind turbine, Recommendation ITU-R BT805*.

<sup>2</sup> International Telecommunications Union (2010), *ITU-R BT.2142-1*

<sup>3</sup> Bacon (2002), *A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance*.

<sup>4</sup> JRC (2014): *Calculation of Wind Turbine clearance zones for JRC UHF (460 MHz) Telemetry Systems when turbine sizes and locations are accurately known – Issue 4.2*.

<sup>5</sup> CAA (2019) CAP 168. Available at <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=6114> [Accessed 12/07/2023]

<sup>6</sup> CAA (2019) CAP 670. Available at <https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=9124> [Accessed 12/07/2023]

- Joint Radio Company (JRC) (2014): *Calculation of Wind Turbine clearance zones for JRC Ultra High Frequency (UHF) (460 MHz) Telemetry Systems when turbine sizes and locations are accurately known – Issue 4.2*<sup>4</sup>;

### Aviation

- 13.2.3. Guidance and policy in respect of Aviation are dictated primarily by the Civil Aviation Publications (CAP) which are produced by the CAA. There is also policy provided by the Ministry of Defence (MOD) and National Air Traffic Service (NATS). Specific document guidance documents relevant to the Proposed Development include:
- CAA (2022), *CAP 168: Licensing of Aerodromes – Edition 12*<sup>5</sup>;
  - CAA (2019), *CAP 670: Air Traffic Services Safety Requirements – Edition 3*<sup>6</sup>;
  - CAA (2020), *CAP 738: Safeguarding of Aerodromes – Edition 3*<sup>7</sup>;
  - Civil Aviation Authority (2016), *CAP 764: CAA Policy and Guidelines on Wind Turbines – Edition 6*<sup>8</sup>;
  - CAA (2018) *CAP 777: Air Traffic Control (ATC) Surveillance Minimum Altitude Charts in UK Airspace Policy and Design Criteria*<sup>9</sup>;
  - International Civil Aviation Organization (ICAO) *Procedures for Air Navigation Services, Aircraft Operations, Volume II Construction of Visual and Instrument Flight Procedures, Fifth Edition*<sup>10</sup>;
  - NATS Aeronautical Information Publication (AIP) (digital resource, various publication dates)<sup>11</sup>;
  - Air Navigation Order (ANO), 2016 – government legislation<sup>12</sup>.

## 13.3. Consultation

- 13.3.1. In addition to the formal scoping, consultation was undertaken, by Pager Power, throughout the EIA process with the relevant stakeholders to inform the assessment and understand their position. A summary of this is provided in Table 13.1 below.

<sup>7</sup> CAA (2020) CAP 738. Available at <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=576> [Accessed 12/07/2023]

<sup>8</sup> CAA (2016) CAP 764. Available at <https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=5609> [Accessed 12/07/2023]

<sup>9</sup> CAA (2018) CAP 777, Available at <https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=5674> [Accessed 12/07/2023]

<sup>10</sup> ICAO *Procedures for Air Navigation Services, Aircraft Operations, Volume II Construction of Visual and Instrument Flight Procedures, Fifth Edition*

<sup>11</sup> NATS Aeronautical Information Publication (AIP) (digital resource, various publication dates). Available at <https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/> [Accessed 12/07/2023]

<sup>12</sup> Air Navigation Order, 2016 – government legislation. Available at <https://www.legislation.gov.uk/ukxi/2016/765/contents/made> [Accessed 12/07/2023]



Table 13.1: Telecommunication Consultation Overview

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Airwave	<p>Consulted in August 2022 for a previous layout with a request for them to produce an assessment.</p> <p>Airwave assessment received in October 2022 with no objection. Pager Power responded with the current layout details to identify whether this changed their position. No response was received.</p> <p>Airwave chased by email in early and late November, with the latest response stating it is assumed that Airwave's position remains the same in the absence of any response. No further response has been received to date.</p>	No issues expected.	<p>It is assumed that Airwave has no infrastructure in this area considering the details presented in their initial assessment.</p> <p>No objection is expected.</p>
Arqiva	<p>Consulted in August 2022. No objection and no link details were provided.</p> <p>Reconsulted with the current layout in December 2022 and responded with no objection.</p>		<p>Link data available in 2018 has been plotted.</p> <p>No objection received.</p> <p>No further action.</p>
Atkins	<p>Consulted in August 2022. No objection and no link details were provided.</p> <p>Reconsulted with the current layout in December 2022 and responded with no objection.</p>	No issues raised.	<p>No link data provided.</p> <p>No objection received.</p> <p>No further action.</p>
British Telecom (BT)	<p>Consulted in August 2022. No objection and no link details were provided.</p> <p>Reconsulted with the current layout in December 2022 and responded with no objection.</p>	No issues raised.	<p>No link data provided.</p> <p>No objection received.</p> <p>No further action.</p>
Mobile Broadband Network	<p>Consulted in August 2022 with no objection. Link details received.</p>	No issues raised.	<p>Link path shown with August 2022 consultation however the link path is over 2.5</p>

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Limited (MBNL)	<p>Reconsulted with the current layout in December 2022 and responded with no objection.</p>		<p>kilometre (km) from the nearest turbine, with the link being outside of the red line boundary.</p> <p>No objection received.</p> <p>No further action.</p>
JRC	<p>The JRC was Consulted in August 2022, and an objection was received. A detailed JRC assessment was therefore requested in September 2022. The assessment was received in October 2022.</p> <p>The assessment was reviewed in October 2022, with clarifications sought from the JRC. Additional constraint information was received from the JRC.</p> <p>In November 2022, the JRC was consulted regarding potential mitigation. A meeting was held in December 2022 to discuss the mitigation options available.</p>	<p>Conflicts with safeguarding criteria are associated with one communications link which crosses the Proposed Development Area due to one wind turbine.</p>	<p>The JRC assessment received in 2022 narrowed down the constraints to one link. Turbine seven is currently located within the exclusion zone defined by the JRC.</p> <p>Mitigation discussions are ongoing however an objection is expected. A condition attached to any consent forthcoming to mitigate the impacts would be appropriate in the absence of any mitigation being agreed before the application for the consent of the Proposed Development is decided.</p>
O2/Virgin	<p>Consulted in August 2022 with no objection.</p> <p>Reconsulted with the current layout in December 2022 and responded with no objection.</p>	No issues raised.	<p>No link data provided.</p> <p>No objection received.</p> <p>No further action.</p>
Vodafone	<p>Consulted in August 2022 with no objection. Link details received.</p> <p>Reconsulted with the current layout in December 2022.</p>	No issues raised.	<p>Link details supplied within the August 2022 consultation.</p> <p>No objection expected.</p>

13.3.2. Further details of consultation responses received for telecommunications are provided in Technical Appendix A13.1.

Table 13.2: Aviation Consultation Overview

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Met Office	None, well beyond safeguarding range of any Met radar	-	No further action.
MOD	<p>The MOD confirmed an initial objection on the grounds of possible radar impacts to Royal Air Force (RAF) Lossiemouth Primary Surveillance Radar (PSR) in June 2022 for a previous layout design.</p> <p>In August 2022, following further analysis, the MOD was consulted with a request for them to review their analysis.</p> <p>In September 2022, MOD responded with no objection on radar grounds. The MOD requested aviation lighting.</p> <p>In October 2022 the MOD was consulted regarding the proposed layout – a formal response is awaited.</p>	<p>No issues raised based on previous consultation and no change to this position is anticipated.</p>	<p>A condition attached to any consent forthcoming with respect to aviation lighting is anticipated.</p> <p>No objection expected.</p>
NATS	<p>NATS was consulted in September 2022.</p> <p>NATS confirmed later in September that they have no objection based on a previous layout design.</p> <p>In December 2022, NATS was re-consulted regarding the proposed layout and responded with no objection.</p>	No issues raised.	No objection received. No further action.
Wick John O'Groats Airport – safeguarded by Highlands and Islands Airport (HIAL)	<p>Wick John O'Groats Airport was consulted in September 2022 and raised a number of issues.</p> <p>Pager Power responded with technical queries and narrowed down the potential issues to that of the possible</p>	<p>The Proposed Development will infringe the clearance requirement for the Minimum Obstacle Clearance Altitude (MOCA). A maximum reduction in tip height of 14 m to 206 m above ground level would be required to</p>	<p>Initial objection expected on the grounds of Minimum Sector Altitudes.</p> <p>Consultation is ongoing.</p>

Consultee	Scoping/Other Consultation	Issue Raised	Response/Action Taken
	<p>impact upon Instrument Flight Procedures (IFPs). It was agreed that aviation lighting would be agreed via a suitably worded condition attached to any consent forthcoming.</p> <p>An IFP assessment was undertaken by Wick John O'Groats Airport's Approved Procedure Design Organisation in October 2022. This was received in November 2022.</p>	<p>comply with the current MOCA.</p> <p>Consultation is ongoing with Wick John O'Groats Airport (HIAL) to identify whether an airspace change is achievable to accommodate the Proposed Development.</p>	

13.3.3. Further details of consultation responses received for aviation are provided in Technical Appendix A13.3.

### 13.4. Method of Assessment

#### Telecommunications

13.4.1. Telecommunications infrastructure was identified through consultation with the relevant communication stakeholders (see Table 13.1). The Proposed Development details were provided to the stakeholders, who then apply their own safeguarding criteria radii based on the turbine locations to identify telecommunications infrastructure.

#### Aviation

13.4.2. Consultation criteria for civil aviation stakeholders is defined in Chapter 4 of 'CAP 764: Policy and Guidelines on Wind Turbines' (CAP 764)<sup>8</sup> (see Table 13.2 for a summary of consultation) and the recommended distances, for consultation, in so far as they are relevant, are as follows:

- Airfield with a surveillance radar – 30 km;
- Non radar licensed aerodrome with a runway of more than 1,100 metres (m) – 17 km;
- Non radar licensed aerodrome with a runway of less than 1,100 m – 5 km;
- Licensed aerodromes where the turbines would lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
- Unlicensed aerodromes with runways of more than 800 m – 4 km;
- Unlicensed aerodromes with runways of less than 800 m – 3 km;
- Gliding sites – 10 km; and
- Other aviation activity such as parachute sites and microlight sites within 3 km – in such instances developers are referred to appropriate organisations.

13.4.3. CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all wind turbine developments will be approved, or within which they will always be objected to. These ranges

are intended as a prompt for further discussion between developers and aviation stakeholders. On this basis, the following identification criteria was used based on Pager Power’s experience:

- UK AIP listed Civil Aerodromes and Heliports within 15 km of the Proposed Development Area;
- Unlicensed airfields within 10 km of the Proposed Development Area;
- Civil Airport ATC radars within 40 km of the site centre or that are within line of sight to the wind turbines;
- NATS en-route radar sites within 100 km of the site centre or that are within line of sight to the wind turbines;
- En-Route radio navigation beacons within 10 km of the Proposed Development Area;
- Use of the on-line NATS self-assessment maps;
- MOD Air Surveillance and Control System (ASACS) radar sites within with radio line of sight to the Development. 100 km of the Proposed Development Area;
- Military Aerodromes within 60 km of the Proposed Development Area;
- Military Air Traffic Control (ATC) radar sites within 60 km of the Proposed Development Area or that are within line of sight to the wind turbines;
- Military Precision Approach Radar (PAR) radar sites within 40 km of the Proposed Development Area;
- MOD Tactical Training Areas within 10km of the Proposed Development Area;
- Meteorological Radars within 20 km of the Proposed Development Area;
- Other significant aviation issues which require consideration.

### 13.5. Desk Based Research and Data Source

#### Telecommunications

13.5.1. Telecommunications infrastructure information was provided by consultees through consultation.

#### Aviation

13.5.2. The relevant aviation and defence infrastructure was identified through a national database maintained by Pager Power based on information provided in aviation charts and maps, as well as previous consultation with aviation and defence stakeholders.

### 13.6. Baseline

#### Telecommunications

13.6.1. There are no existing wind farms in the immediate surrounding area that would be considered significant with respect to telecommunications safeguarding.

13.6.2. All relevant telecommunications stakeholders were consulted. The communication link details provided, in respect of the Proposed Development and its vicinity, are presented in Table 13.3.

Table 13.3: Communication Links that Cross within 2 km of the Proposed Development Area

Link	Operator
Arqiva Link 1	Arqiva
Arqiva Link 2	Arqiva
Vodafone 0950529/1	Vodafone
-	JRC – the JRC has not agreed to provide link details.

#### Aviation

13.6.3. There are no existing wind farm developments at the time of preparing this chapter that would be considered significant with respect to aviation and defence safeguarding issues identified in this instance.

13.6.4. Table 13.4 sets out the aviation and radar infrastructure which were identified by Pager Power in their assessment.

Table 13.4: Identified Aviation Infrastructure within 100 km of the Proposed Development Area

Aviation Infrastructure/ Stakeholder	Comment
NATS En-Route Radar Sites	No NATS En-route Radar lie within 100 km of the site centre and no NATS beacons lie within 10 km of the site centre. The closest radar is Allanshill PSR located over 110 km from the Proposed Development. The Proposed Development is below line of sight to the PSR.
UK Aeronautical Information Publication listed Civil Aerodromes and Heliports	One UK AIP listed Civil Aerodromes and Heliports exists within 15 km of the Proposed Development - this is Wick John O’Groats Airport, which is approximately 12.5 km from the Proposed Development.
Unlicensed Airfields	None identified within 10 km of the Proposed Development.
Civil Airport Air Traffic Control Radar	No significant airports known to have ATC radar lie within 40 km of the site centre.
Military Radar	RAF Lossiemouth PSR is, on average, 82 km from the Proposed Development. Five of the seven wind turbines are in marginal line of sight to this radar however detectability analysis revealed the wind turbines would be highly unlikely to be detectable.
Military Low Flying	According to the MOD published Low Flying Consultation Zones, the Proposed Development is located within a “ <i>Low priority military low flying area less likely to raise concerns</i> ”.
Meteorological Radar	There are no meteorological radar installations within a radius of 20 km from the site centre.

## 13.7. Assessment of Potential Effects

13.7.1. The significance criteria and presentation of the potential effects caused by the Proposed Development are presented in the following sections.

### Magnitude of Effect

13.7.2. Each effect is assessed based on its magnitude and the sensitivity of the affected receptor. The magnitude of effect classifications is presented in Table 13.5. The definitions are based on best practice and project experience.

Table 13.5: Defining Magnitude of Impact

Magnitude of Impact	Criteria for assessing impact
High	Total loss or substantial alteration to key features of the baseline conditions such that receptor attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more key features of the baseline conditions such that receptor attributes will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the alteration will be discernible but not material. The underlying attributes of the baseline condition will be largely unchanged.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

### Sensitivity of Receptor

13.7.3. The classifications of receptor sensitivity are presented in Table 13.6. The definitions are based on best practice and project experience.

Table 13.6: Defining Sensitivity of Receptor

Sensitivity	Examples of receptor
High	The receptor has little ability to absorb change without fundamentally altering its present character or is of international or national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character or is of high importance.
Low	The receptor is tolerant of change without detriment to its character or is of low or local importance.

### Significance of Effect

13.7.4. The significance of an environmental effect is determined by the interaction of magnitude and sensitivity. The Significance of Effect Matrix is set out in Table 13.7. The definitions are based on best practice and project experience.

Table 13.7: Matrix for Assessing Significance of Effect

Level of Significance	Sensitivity		
	High	Medium	Low
High	Major adverse	Major adverse	Moderate adverse
Moderate	Major adverse	Moderate adverse	Moderate adverse
Low	Minor adverse	Minor adverse	Minor adverse
Negligible	Negligible	Negligible	Negligible

### Telecommunications

13.7.5. The potential effect of wind turbines on telecommunication links is the partial or complete loss of information transferred via radio waves which are interfered with by wind turbines, be it the static structure or rotating blade. The effect is dependent on numerous factors including the relative location of the links ends to the wind turbines, the level of visibility between link ends and wind turbines, the link's frequency and the number of wind turbines in proximity to a link path. Therefore, the resulting effect on individual point-to-point links will vary.

13.7.6. A 'Moderate' or higher magnitude of impact to telecommunications systems would result in a significant effect. This is where a loss or alteration to the baseline conditions would materially change the receptor attributes i.e., telecommunications systems were significantly affected such that there was a loss in the data being transmitted.

13.7.7. With regard to receptor sensitivity, any location where telecommunications systems are significantly affected beyond baseline conditions (such that a point-to-point link was rendered ineffective), a significant effect would occur. This could be for multiple point-to-point links, where mitigation would be required for all. Therefore, any permanent legal receptor where telecommunications systems previously operated effectively is considered to be of 'Medium' sensitivity.

13.7.8. Overall, the Significance of Effect, which would be considered 'significant' in the professional opinion of Pager Power is 'Moderate Adverse' or greater, and mitigation would be required.

13.7.9. In this instance, one communications link has been identified, operated by the JRC, which crosses the Proposed Development. One wind turbine would be within the safeguarded area of the link, as defined by the JRC. The Magnitude of Impact is Moderate, and the Sensitivity of the receptor is Medium. The overall Significance of Effect is Moderate Adverse, and mitigation is required.

13.7.10. The above classification considers the operational phase. The Significance of Effect during construction or decommissioning in terms of effects will be less than or equal to the Significance of Effect during operation. Any mitigation would be needed in place prior to any above ground work commencing.

### Aviation

13.7.11. The effect upon aviation and radar systems is dependent on numerous factors including the size, number and location of wind turbines relative to the aviation infrastructure. Therefore, the resulting effect on the relevant infrastructure will vary.

13.7.12. A 'Moderate' or higher magnitude of impact to aviation infrastructure would result in a significant effect. This is where a technical or operational impact would materially affect safety.

13.7.13. With regard to receptor sensitive, any location where aviation infrastructure and/or operations were significantly affected beyond baseline conditions, a significant effect would occur. However, aviation infrastructure varies

significantly and therefore sensitivity can range from 'Low' to 'High'.

- 13.7.14. Overall, the level of effect which would be considered 'significant' with respect to EIA is if the resultant significance of effect is 'Moderate Adverse' or greater.
- 13.7.15. In this instance, the Proposed Development would infringe the Minimum Obstacle Clearance Altitude by a maximum of 14 m for operations associated with Wick John O'Groats Airport. The Magnitude of Impact is Moderate, and the Sensitivity of the receptor is Medium. The overall Significance of Effect is Moderate Adverse, and mitigation is required.
- 13.7.16. The above classification considers the operational phase. The Significance of Effect during construction or decommissioning in terms of effects will be less than or equal to the Significance of Effect during operation. Any mitigation would be needed in place prior to any above ground work commencing.
- 13.7.17. There are no other aviation effects associated with the Proposed Development.

## 13.8. Mitigation

### Telecommunications

- 13.8.1. There is currently no inbuilt mitigation, however an alternative turbine position is being investigated within micro-siting tolerances alongside the use of alternative link technology to identify whether the turbine could be moved outside of the exclusion zone associated with the JRC link. Micro-siting allows the exact turbine location and infrastructure to be modified post consent, following detailed ground investigation and ground clearance (within 50 m). If this is not possible, the link will need to be re-routed.
- 13.8.2. It will be ensured, likely through a condition attached to any consent forthcoming, that mitigation is in place ahead of the Proposed Development being erected to ensure no interference during the construction period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before first operation of the Proposed Development.

### Aviation

- 13.8.3. There is currently no inbuilt mitigation, however mitigation in the form of an amendment to the airspace around Wick John O'Groats Airport is to be explored with HIAL. The change required would be an increase of 100 ft to the Minimum Sector Altitude.
- 13.8.4. It will be ensured, likely through a condition attached to any consent forthcoming, that mitigation is in place ahead of the Proposed Development being erected to ensure there is no impact to the safety of operations at Wick John O'Groats Airport during the construction period, especially as cranes will likely be a consideration due to their height. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before the element of the construction process begins that would infringe the current Minimum Sector Altitude.
- 13.8.5. Aviation lighting is an inherent mitigation requirement due to the turbine measuring 150 m or more above ground level. This is a legal requirement under Article 222 of the ANO 2016 unless the CAA dictate otherwise. The basic requirement is for medium intensity 'steady' red aviation lights, rated at 2,000 candela, to be fitted at nacelle level.

In addition, the CAA initially requires low intensity lights to be fitted at the intermediate level on the turbine tower. The intermediate tower lights would be 32 candela.

- 13.8.6. Factors including the final layout and proximity to existing obstructions will determine the aviation lighting design. There is also the possibility that technological systems such as light dimming or radar activated lighting could be implemented to reduce the need for the lights to be constantly lit at their maximum intensity. The final lighting scheme will be determined post-consent, in consultation with the CAA and MOD.

## 13.9. Residual Effects

- 13.9.1. Negligible residual effects are anticipated. Any significant effects will be mitigated to restore baseline levels. Therefore, no residual effects are predicted for telecommunications or aviation infrastructure.

## 13.10. Cumulative Effects

- 13.10.1. No cumulative effects are anticipated. All possible aviation or communications cumulative effects are in isolation whereby cumulative effects are not anticipated.

## 13.11. Statement of Significance

- 13.11.1. The overall Significance of Effect is Moderate Adverse for impacts associated with one telecommunications link safeguarded by the JRC.
- 13.11.2. The overall Significance of Effect is Moderate Adverse for impacts associated with operations at Wick John O'Groats Airport due to infringements of the MSA, which means the MOCA will not be maintained.
- 13.11.3. Mitigation is required for both impacts which are typical and proven for wind developments. Mitigation options for telecommunications infrastructure are well known and commonplace. Initial analysis has shown that an airspace change to accommodate the Proposed Development with respect Wick John O'Groats Airport's operations is achievable. Mitigation talks with the JRC and Wick John O'Groats Airport/HIAL are ongoing.

## 13.12. Statement of Competence

- 13.12.1. The author of this chapter has over 10 years of experience assessing wind turbine effects upon telecommunications and aviation issues, from single turbine developments up to or in excess 20 turbines.
- 13.12.2. As a company, Pager Power was established in 1997 with projects completed in over 54 countries. The company comprises a team of experts to provide technical expertise and guidance on a range of consenting issues for large and small developments. Initially, the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:
- Renewable energy projects.
  - Building developments.
  - Aviation and telecommunication systems.

### 13.13. Non-Technical Summary

- 13.13.1. The Joint Radio Company (JRC) provided an initial objection to the Proposed Development because one communications link crosses the Proposed Development Area. One wind turbine is currently located within the exclusion zone associated with this communications link, as defined by the JRC. Consultation with the JRC to understand their position and to identify a way forward is ongoing. Mitigation will be required.
- 13.13.2. The Proposed Development would currently infringe the Minimum Sector Altitude associated with aviation operations at Wick John O'Groats Airport, which is located approximately 14.5 km east of the nearest wind turbine. This means the Minimum Obstacle Clearance Altitude will not be maintained in the Proposed Development's/airspace's current design. This is due to the overall altitude of the Proposed Development. Consultation with Wick John O'Groats Airport is ongoing to identify whether an airspace change is achievable to accommodate the Proposed Development. Crane operations will be considered within this change.
- 13.13.3. All other aviation and communications concerns have been previously signed off through consultation.
- 13.13.4. Aviation lighting will be a requirement, and a lighting scheme should be established post-consent. The Proposed Development will have to be marked on the associated aviation chart.

# Chapter 14

## Noise

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## Glossary

Term	Definition
Daytime Hours	07:00 to 23:00 every day
Decibel	the ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. A logarithmic scale is used in noise level measurements because of this wide range. The scale used is the decibel (dB) scale which extends from 0 to 140 decibels (dB) corresponding to the intensity of the sound level.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations).
L <sub>90</sub>	: index represents the noise level exceeded for 90 percent of the measurement period and is used to indicate quieter times during the measurement period. It is often used to measure the background noise level. The L <sub>A90,10min</sub> is the A-weighted background noise level over a ten minute measurement sample.
Noise emission	the noise energy emitted by a source (e.g. a wind turbine).
Noise immission	the sound pressure level detected at a given location (e.g. the nearest dwelling).
Night Time Hours	ETSU-R-97 defines the night time hours as 23.00 to 07.00 every day.
Quiet Daytime Hours	ETSU-R-97 defines the amenity hours as 18.00 to 23.00 Monday to Friday, 13.00 to 23.00 on Saturdays and 07.00 to 23.00 on Sundays.
Standardised Wind Speed	a wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m using a roughness length of 0.05 for standardisation purpose (in accordance with the IEC 61400-11 standard).
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).
Wind Shear	the increase of wind speed with height above the ground.

## Abbreviations

Abbreviation	Description
AM	Amplitude Modulation
AOD	Above Ordnance Datum
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
dB	Decibel
ECU	Energy Consents Unit
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations)
FI	Financial Involvement
FML	Fixed Minimum Limit
GPG	Good Practice Guidance
GW	Gigawatts
IOA	Institute of Acoustics
km	kilometre
LFN	Low Frequency Noise
m	metres
MW	Megawatts
NAL	Noise Assessment Location
Natural Power	Natural Power Consultants Limited
NWG	Noise Working Group
PAN	Planning Advice Note
SSNL	Site Specific Noise Limit
THC	The Highland Council
TNL	Total ETSU-R-97 Noise Limit



## 14.1. Introduction

- 14.1.1. This Chapter considers the likely significant effects with respect to the noise associated with the operation of the Proposed Development.
- 14.1.2. The specific objectives of the Chapter are to:
- describe the noise baseline;
  - describe the assessment methodology and significance criteria used in completing the impact assessment;
  - describe the potential effects (including cumulative effects);
  - describe the mitigation measures proposed to address likely significant effects (if required); and
  - assess the residual effects remaining following the implementation of mitigation (if required).
- 14.1.3. This Chapter is supported by the following figures and appendices:
- Figure 14.1: Noise Assessment and Wind Turbine Locations;
  - Figure 14.2: Cumulative Wind Turbine Locations; and
  - Technical Appendix A14.1: Operational Noise Report.
- 14.1.4. The Figures and the supporting Technical Appendix are referenced in the text where relevant.

## 14.2. Legislation, Policy and Guidance

- 14.2.1. The assessment used the following combination of guidance and assessment methodologies:
- National Planning Framework 4, (Scottish Government, 2023)<sup>1</sup>
  - Planning Advice Note (PAN) 1/2011: ‘Planning and Noise’ (Scottish Government, 2011)<sup>2</sup>;
  - Web Based Renewables Advice: ‘Onshore Wind Turbines’ (Scottish Government, 2014)<sup>3</sup>;
  - ETSU-R-97 ‘The Assessment and Rating of Noise from Wind Farms’ (NWG, 1996)<sup>4</sup>;
  - ISO 9613-2:1996 ‘Acoustics – Attenuation of sound during propagation outdoors Part 2: General method of calculation’ (ISO, 1996)<sup>5</sup>; and
  - Institute of Acoustics (IOA) ‘A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise’ (IOA GPG, 2013)<sup>6</sup>.
- 14.2.2. The above documents are discussed in detail within Section 2 of Technical Appendix A14.1: Operational Noise Report, where relevant.

<sup>1</sup> Scottish Government (2023). National Planning Framework 4. Available from - <https://www.gov.scot/publications/national-planning-framework-4/> [Accessed 09/08/2023]

<sup>2</sup> Scottish Government (2011). PAN 1/2011 Planning and Noise Scotland

<sup>3</sup> Scottish Government (2014) Web Based Renewables Advice: ‘Onshore Wind Turbines’ [Online] Available from - <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/> [Accessed 09/08/2023]

<sup>4</sup> The Working Group on Noise from Wind Turbines (1996). ETSU-R-97 The Assessment and Rating of Noise From Wind Farms. UK: Energy Technology Support Unit

## 14.3. Consultations

- 14.3.1. An Environmental Impact Assessment (EIA) Scoping Opinion for the Proposed Development was issued in September 2022 by the Energy Consents Unit (ECU) on behalf of the Scottish Government. A summary of consultation responses received as part of the scoping exercise and response / actions taken, is given in Table 14.1 below. A summary of the post-scoping consultation and response is given in Table 14.2 below.

Table 14.1: Scoping Consultation Response - Noise

Consultee	Summary of Response	Response/Action taken
ECU – Scoping	The final list of receptors for the noise assessment should be agreed with the Highland Council (THC).	The final list of noise sensitive receptors was submitted to the THC as part of the detailed consultation undertaken with the Council which is summarised below. THC did not highlight any additional receptors in their consultation response.
THC - Scoping	The noise report should be formatted as per Table 6.1 of the IOA Good Practice Guidance (GPG).  THC stated that the assessment should be undertaken in accordance with ETSU-R-97 and the IOA GPG. It also details target noise levels based on simplified 35 Decibel (dB) or a composite level of 35 dB (daytime) or 38 dB (night time) or background plus 5 dB. It states that due to low background noise levels in the highlands, the night time lower limit based on 43 dB is not considered acceptable. The limits detailed above should also apply to cumulative noise. Where existing consented limits are higher than the limits	Technical Appendix A14.1 provides all the relevant information as detailed within Table 6.1 of the IOA GPG.  The operational noise assessment has been undertaken in accordance with ETSU-R-97 and the IOA GPG. A Total Noise limit (for all schemes to operate within) has been derived based on a fixed minimum noise of 38 dB daytime and 43 dB night time or background plus 5 dB whichever is the greater.  The Site Specific Noise Limits (SSNL) have been derived using a FML of 35 dB daytime and 43 dB night time or background plus 5dB whichever is the greater, whilst taking account of the noise limit that could theoretically be used by other schemes.

<sup>5</sup> ISO (1996). ISO 9613-2:1996 Acoustics – Attenuation of Sound during Propagation Outdoors: Part 2 – General Method of Calculation. Geneva: International Organization for Standardisation.

<sup>6</sup> IOA (2013). A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise’. UK: Institute of Acoustics.

Consultee	Summary of Response	Response/Action taken
	<p>should be agreed with the Council Environmental Health Officer (EHO). For cumulative noise exposure should also be considered. THC stated that if construction works were to take place out with typical working hours which are taken to be 8am to 7pm Monday to Friday and 8am to 1pm on Saturdays then a construction noise assessment would be required</p>	<p>The night time noise limits have been derived based on Government Guidance which refers to ETSU-R-97 and the use of 43 dB or background +5 dB. Noise Exposure is considered in Table 6.11 of Technical Appendix A14.1. Construction and decommissioning works will be undertaken within typical working hours and as such a detailed construction and decommissioning noise assessment has not been undertaken.</p>

Table 14.2: Post-scoping Consultation Response - Noise

Consultee	Summary of Consultation	Response
THC	<p>Provided more detailed information on the proposed noise assessment methodologies (use of ETSU-R-97 and the IOA GPG) including the proposed re-use of the previously collected background noise data sets from Halsary wind farm, the approach to wind shear and adjusting limits to consider the higher hub heights being proposed for the Proposed Development. In addition, information on proposed noise assessment locations and cumulative turbines to be considered in the cumulative noise assessment were provided. Information on the choice of FML was also provided. Given the number of existing schemes, a daytime limit towards the upper end of the range 35-40 dB was suggested and that the noise assessment would provide justification for the final choice of FML.</p>	<p>An EHO from THC stated that they agreed with:</p> <ul style="list-style-type: none"> <li>the proposed assessment methodology (ETSU-R-97 and IOA GPG);</li> <li>the re-use of the Halsary data (adjusted to take account of wind shear); and</li> <li>to the use of available significant headroom with a +2 dB margin above predicted noise levels when deriving SSNL for the Proposed Development.</li> </ul> <p>The EHO acknowledged that <i>'this a very busy part of the world in terms of wind farm activity and I understand that the only way forward for future development is to increase fixed limits beyond which Highland Council would normally look for. As you have mentioned any proposal to increase daytime fixed limits beyond 35dB LA90 would need to be accompanied by an argument supporting that decision in terms of the criteria identified in ETSU i.e. number of dwellings in the neighbourhood of the wind farm, the effect of noise limits on the number of kWh generated and the duration and level of exposure.'</i></p>

14.3.2. The daytime FML chosen for the assessment is detailed in Table 14.1 above and within Section 14.6 below. The justification for the choice of FML is included within Table 6.11 of Technical Appendix A14.1.

### Impacts Scoped Out

#### Wind Farm and Battery Energy Storage System (BESS) Construction Noise

14.3.3. Construction and decommissioning works will be undertaken within typical working hours and as such a detailed construction and decommissioning noise assessment for the wind farm and BESS developments has not been undertaken and has been scoped out of the Environmental Impact Assessment Report (EIAR).

### BESS Operational Noise

- 14.3.4. The proposed BESS development is located within the centre of the wind farm site (to the north west of T4 as shown on Figure 1.1). Due to the separation distance between the proposed BESS and the nearest noise sensitive receptor to the east (~1.5 kilometres (km)), operational noise levels from the BESS are expected to be low. On that basis it has been scoped out of the EIAR.

## Impacts Scoped In

### Wind Farm

- 14.3.5. Operation
- Potential impact of operational noise from the proposed development at noise sensitive receptors located in proximity to the proposed development; and
  - Potential impact of cumulative operational noise from the proposed development operating concurrently with other operational, consented and proposed (planning application submitted) developments in the area.

## 14.4. Method of Assessment

- 14.4.1. The assessment has been undertaken in accordance with ETSU-R-97 and current good practice. ETSU-R-97 provides a robust basis for determining acceptable noise limits for wind farm developments. Consequently, the test applied to operational noise is whether or not the calculated wind farm noise levels at nearby noise sensitive properties would be below the noise limits derived in accordance with ETSU-R-97.
- 14.4.2. The need for a cumulative noise assessment was considered in accordance with the guidance contained within the IOA GPG. There are a number of operational and consented wind farm developments in proximity to the Proposed Development (See Figure 14.2), therefore in order to consider the likely cumulative noise impacts, the noise assessment was undertaken in three separate stages:
- Stage 1 – establish the ‘Total ETSU-R-97 Noise Limits’ (TNL) for each Noise Assessment Location (NAL);
  - Stage 2 – undertake noise predictions to determine whether the contribution from the Proposed Development on its own is within 10 dB of the noise predictions from other wind turbines within the area. Where turbine predictions are within 10 dB then a likely cumulative noise assessment should be undertaken, and the results compared to the TNL; and
  - Stage 3 – establish the ‘Site Specific Noise Limits’ (SSNL) for the Proposed Development and compare the noise predictions from the Proposed Development on its own against the SSNL.
- 14.4.3. The TNL is applicable to all operational and consented wind farms in the area so a set of SSNL are derived to control the specific noise from the Proposed Development.
- 14.4.4. The aim of the operational noise assessment therefore is to establish the TNL, determine the likely impacts of the Proposed Development at the nearest noise sensitive receptors, derive SSNL and to demonstrate that the Proposed Development can meet the limits (i.e. noise levels will be at or below).
- 14.4.5. The exact model of wind turbine to be used for the Proposed Development will be the result of a future tendering process should consent be granted. Achievement of the noise limits determined by this assessment would be a key determining factor in the final choice of wind turbine. Predictions of wind turbine noise for the Proposed Development were based upon the sound power level data for a candidate wind turbine, the Vestas V162,

6.8 megawatts (MW) with serrated trailing edge blades and a hub height of 139 metres (m), as it is considered representative of the type of wind turbine likely to be installed at the Proposed Development.

- 14.4.6. All the operational and consented wind turbines modelled, inclusive of those used in the cumulative noise assessment, are shown on Figure 14.2 and summarised in Table 1.1 of Technical Appendix A14.1. Uncertainty in sound power data for the Proposed Development has been accounted for using the guidance contained within Section 4.2 of the IOA GPG.
- 14.4.7. Noise predictions have been undertaken using the propagation model contained within Part 2 of International Standard ISO 9613-2, ‘Acoustics – Attenuation of sound during propagation outdoors’. The model calculates, on an octave band basis, attenuation due to geometric spreading, atmospheric absorption and ground effects. The noise model was set up to provide realistic noise predictions, including mixed ground attenuation ( $G=0.5$ ) and atmospheric attenuation relating to 70% Relative Humidity and 10°C.
- 14.4.8. Typically wind farm noise assessments assume all properties are downwind of all wind turbines at all times (as this would result in the highest wind turbine noise levels). However, where properties are located in between groups of wind turbines, or when turbines are spread over a wide angle of view, they cannot be downwind of all wind turbines simultaneously so it is appropriate to consider the effect of wind direction on predicted noise levels. Directivity has been considered using the guidance in the IOA GPG (further information can be found in Section 6.3 of Technical Appendix A14.1).
- 14.4.9. In line with the IOA GPG, an assessment has been undertaken to determine whether a concave ground profile correction (+3 dB) or barrier correction (-2 dB), is required due to the topography between the wind turbines and the noise sensitive receptors. Propagation across a valley (concave ground) increases the number of reflection paths, and in turn, has the potential to increase sound levels at a given receptor. Topographical screening effects from terrain surrounding a wind farm can result in reductions in the observed sound level between the source and receiver where no line of sight is present. A concave ground and barrier correction was found to be required for a number of wind turbines at a number of receptors (as detailed in Annex 5, Technical Appendix A14.1). Topographical corrections have been applied where necessary to the predictions presented in all tables and graphs.
- ### Assessment of Effects
- 14.4.10. PAN 1/2011 ‘Planning and Noise’ provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. PAN 1/2011 refers to the Web-based planning advice on renewable technologies for Onshore Wind Turbines which states that ETSU-R-97 should be used to assess and rate noise from wind energy developments. ETSU-R-97 does not define significance criteria but describes a framework for the measurement of wind farm noise and gives indicative noise levels considered to offer a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development. Achievement of ETSU-R-97 derived noise limits ensures that wind turbine noise will comply with current Government guidance.
- 14.4.11. In terms of The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations) (EIA Regulations), the use of the term “significance” in this Chapter refers to compliance / non-compliance with the ETSU-R-97 derived noise limits. For situations where predicted wind turbine noise meets or is less than the noise limits defined in ETSU-R-97, then the noise effects are deemed not significant. Any breach of the ETSU-R-97 derived noise limits due to the Proposed Development is deemed to result in a significant effect.
- 14.4.12. For the purposes of this assessment, residential dwellings are considered to be noise sensitive receptors.

### Limitations and Assumptions

14.4.13. A candidate wind turbine has been used for predictions of operational noise from the Proposed Development. The final model of wind turbine to be used may differ from that presented here, however the operational noise levels from the Proposed Development would have to comply with the noise limits imposed within the noise condition attached to any consent. No other assumptions or data gaps have been identified.

## 14.5. Baseline

### Current Baseline

14.5.1. The proposed development is located within a rural location where existing background noise levels at the noise sensitive receptors are generally considered to be low. The predominant noise sources in the area include wind induced noise (wind passing through vegetation and around buildings), local watercourses, agricultural noise and birdsong. At some receptors the soundscape is affected by road traffic noise and noise from existing operational turbines. Background noise monitoring was undertaken previously as part of noise assessment works for Halsary Windfarm at a number of receptors proximate to the Proposed Development. No additional background noise monitoring was undertaken for the Proposed Development because of the potential influence that existing operational schemes would have had on background noise levels.

### Future Baseline

14.5.2. It is possible that noise propagation and resulting noise immission levels could change over the life of the project due to climate change (as noise attenuation is influenced by air temperature, relative humidity and ground conditions). However, noise limits would be set for the lifetime of the project and the operator would be required to meet them for the lifetime of the wind farm. If climate change resulted in the exceedance of limits, turbine noise could be reduced through mode management measures. There are no other known current or predicted future processes that are likely to change the baseline conditions.

### Identified Sensitive Receptors

14.5.3. A total of twelve noise sensitive receptors were chosen as representative Noise Assessment Locations (NALs). The NALs chosen were generally the closest receptors to the Proposed Development and other wind farm developments.

14.5.4. The NALs refer to the position in the curtilage of a property as detailed in Table 14.3 and shown on Figure 14.1. This approach ensures that the assessment considers the worst case (loudest) noise immission level expected at the noise sensitive receptor.

Table 14.3: Operational Noise Assessment Locations

NAL	Easting	Northing	Elevation (m Above Ordnance Datum (AOD))	Approximate Distance to Nearest Watten Wind Turbine (m)*
NAL1 - 21-22 West Watten	322129	951069	54	1,045
NAL2 - 18 West Watten**	322732	951988	60	1,230
NAL3 - 17 West Watten	323726	953001	30	2,476
NAL4 - Banks Lodge	323596	953668	37	2,734
NAL5 - 14 West Watten	322725	953796	56	2,246
NAL6 - Newton	321516	953837	81	1,650
NAL7 - Lanergill	319088	954460	87	2,931
NAL8 - Backlass Hill	320404	953609	83	1,540
NAL9 - Leanmore Lodge	320998	953313	87	1,080
NAL10 - Achnamoine	317790	953867	93	3,306
NAL11 - Knockglass House	317440	953236	102	3,102
NAL12 – Mybster	316910	952189	100	3,063

\* Please note the distances to nearest turbines quoted above may differ from those reported elsewhere. Distances for the noise assessment are taken from the nearest turbine to the closest edge of the amenity area (usually the garden).

\*\* the occupiers are financially involved with the Proposed Development.

## 14.6. Assessment of Potential Effects

### Setting the Total ETSU-R-97 Noise Limits (Stage 1)

14.6.1. Background noise monitoring was undertaken at a number of properties proximate to the Proposed Development as part of the November 2009 EIAR prepared for Halsary Windfarm. Extracts from the noise report are included within Annex 3 of Technical Appendix A14.1.

14.6.2. The baseline datasets collected as part of Halsary Windfarm have been adjusted to take account of wind shear such that they correlate with wind speeds at the Proposed Development. The steps below outline the process that was adopted:

- A wind resource model was created by Natural Power Consultants Limited (Natural Power).
- The model considered wind speed data from a meteorological mast and Lidar unit and this was used to determine 'speed up values' to determine the ratio of the wind speeds at the height of the 70 m mast used for Halsary Windfarm and the proposed hub height (139 m) at the Proposed Development. A speed up factor of 1.15 indicates that measurements of 1 ms<sup>-1</sup> at the meteorological mast located near Halsary are expected to equate to a wind speed of 1.15 ms<sup>-1</sup> at the Proposed Development. The standard deviation of the speed up factor was also calculated for each 1 ms<sup>-1</sup> wind speed bin.

- The data provided by Natural Power were then used by TNEI to adjust the background noise data using the following steps:
  - The background noise levels presented for Halsary Windfarm (which were standardised to 10 m) were presented relative to wind speed at 70 m;
  - The background noise levels were then set relative to hub height (139 m) at the Proposed Development. This was achieved by multiplying the values by the average speed up value plus one standard deviation (to represent a cautious approach); and
  - The background noise levels were then set relative to standardised wind speeds at the Proposed Development to accord with good practice.

- 14.6.3. The adjustments applied, along with the accompanying wind shear report are included within Annex 4 of Technical Appendix A14.1.
- 14.6.4. The TNL have been established for each of the NALs detailed in Table 14.3 above. A TNL based on the daytime Fixed Minimum Limit (FML) of 38 dB has been adopted for day time periods and 43 dB during the night time period. A TNL of 45 dB, has been used where the occupiers of a property are Financially Involved (FI) with the wind farm (e.g. the occupiers of 18 West Watten are FI with the Proposed Development). Further justification for the choice of daytime fixed minimum noise limits is included within Section 6.7 of Technical Appendix A14.1.
- 14.6.5. The TNL are summarised in Tables 14.4 and 14.5 below.

Table 14.4: Total ETSU-R-97 Noise Limit – applicable to the daytime period

NAL	Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - 21-22 West Watten	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL2 - 18 West Watten	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.1	48.1
NAL3 - 17 West Watten	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL4 - Banks Lodge	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL5 - 14 West Watten	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL6 - Newton	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL7 - Lanergill	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL8 - Backlass Hill	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL9 - Leanmore Lodge	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
NAL10 - Achnamoine	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.9	40.9	42.9	45.0	46.5
NAL11 - Knockglass House	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.9	40.9	42.9	45.0	46.5
NAL12 – Mybster	38.0	38.0	38.0	38.0	38.0	38.0	38.0	39.3	41.3	43.2	45.0	46.2

Table 14.5: Total ETSU-R-97 Noise Limit – applicable to the night time period

NAL	Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
	1	2	3	4	5	6	7	8	9	10	11	12
NAL1 - 21-22 West Watten	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL2 - 18 West Watten	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.6
NAL3 - 17 West Watten	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL4 - Banks Lodge	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL5 - 14 West Watten	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL6 - Newton	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL7 - Lanergill	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL8 - Backlass Hill	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL9 - Leanmore Lodge	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
NAL10 - Achnamoine	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.4
NAL11 - Knockglass House	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.4
NAL12 – Mybster	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	44.1

### Predicting the Likely Effects and the Requirement for a Cumulative Noise Assessment (Stage 2)

- 14.6.6. As detailed in Section 14.4 above, where the predictions from the Proposed Development are within 10 dB of the total cumulative predictions from all other schemes then a cumulative assessment is required. In this case, the predictions from the Proposed Development are > 10 dB below the cumulative predictions from all other schemes at one NAL (NAL12). At NALs 1-11, cumulative noise predictions are within 10 dB therefore a cumulative assessment was undertaken at those NALs. A list of cumulative schemes considered in the assessment is provided in Table 1.1 of Technical Appendix 14.1.
- 14.6.7. Predicted noise levels from all schemes (including the Proposed Development) were compared to the TNL and as shown in Tables 14.6 and 14.7, the predicted wind turbine noise immission levels from all schemes are below the TNLs under all conditions and at all NALs during both daytime and night time periods. There would be **no significant effects**. For some turbine models considered in the cumulative assessment noise data was not available for wind speeds less than 5 ms<sup>-1</sup> therefore no cumulative predictions are included for wind speeds less than 5 ms<sup>-1</sup>.

Table 14.6: TNL Compliance Table – Day time

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – 21-22 West Watten	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	33.1	36.2	36.6	37.0	37.1	37.2	37.3	37.3
	Exceedence Level	-	-	-	-	-4.9	-1.8	-1.4	-1.5	-3.9	-6.3	-8.8	-10.8
NAL2 – 18 West Watten	TNL LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.1	48.1
	Predictions LA90	-	-	-	-	31.3	34.4	35.0	35.4	35.6	35.7	35.7	35.7
	Exceedence Level	-	-	-	-	-13.7	-10.6	-10.0	-9.6	-9.4	-9.3	-10.4	-12.4
NAL3 – 17 West Watten	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	27.3	30.4	31.3	31.8	32.0	32.2	32.4	32.5
	Exceedence Level	-	-	-	-	-10.7	-7.6	-6.7	-6.7	-9.0	-11.3	-13.7	-15.6
NAL4 – Banks Lodge	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	26.8	29.8	30.8	31.2	31.5	31.7	31.9	32.1
	Exceedence Level	-	-	-	-	-11.2	-8.2	-7.2	-7.3	-9.5	-11.8	-14.2	-16.0
NAL5 – 14 West Watten	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	27.6	30.7	31.6	32.1	32.4	32.6	32.9	33.1
	Exceedence Level	-	-	-	-	-10.4	-7.3	-6.4	-6.4	-8.6	-10.9	-13.2	-15.0
NAL6 - Newton	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	29.5	32.7	33.4	33.9	34.1	34.3	34.4	34.4
	Exceedence Level	-	-	-	-	-8.5	-5.3	-4.6	-4.6	-6.9	-9.2	-11.7	-13.7
NAL7 - Lanergill	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	29.3	31.5	32.4	32.9	33.4	33.6	33.6	33.7

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL8 – Backlass Hill	Exceedence Level	-	-	-	-	-8.7	-6.5	-5.6	-5.6	-7.6	-9.9	-12.5	-14.4
	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	31.3	34.1	34.7	35.1	35.4	35.5	35.6	35.6
NAL9 – Leanmore Lodge	Exceedence Level	-	-	-	-	-6.7	-3.9	-3.3	-3.4	-5.6	-8.0	-10.5	-12.5
	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	-	-	32.7	35.7	36.2	36.6	36.8	36.9	37.0	37.0
NAL10 - Achnamoine	Exceedence Level	-	-	-	-	-5.3	-2.3	-1.8	-1.9	-4.2	-6.6	-9.1	-11.1
	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.9	40.9	42.9	45.0	46.5
	Predictions LA90	-	-	-	-	31.4	33.4	34.3	34.7	35.3	35.6	35.6	35.6
NAL11 – Knockglass House	Exceedence Level	-	-	-	-	-6.6	-4.6	-3.7	-4.2	-5.6	-7.3	-9.4	-10.9
	TNL LA90	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.9	40.9	42.9	45.0	46.5
	Predictions LA90	-	-	-	-	33.4	35.2	36.2	36.6	37.2	37.5	37.5	37.5
	Exceedence Level	-	-	-	-	-4.6	-2.8	-1.8	-2.3	-3.7	-5.4	-7.5	-9.0

Table 14.7: TNL Compliance Table – Night time

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – 21-22 West Watten	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	33.1	36.2	36.6	37.0	37.1	37.2	37.3	37.3
	Exceedence Level	-	-	-	-	-9.9	-6.8	-6.4	-6.0	-5.9	-5.8	-5.7	-8.3
NAL2 – 18 West Watten	TNL LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.6
	Predictions LA90	-	-	-	-	31.3	34.4	35.0	35.4	35.6	35.7	35.7	35.7
	Exceedence Level	-	-	-	-	-13.7	-10.6	-10.0	-9.6	-9.4	-9.3	-9.3	-9.9
NAL3 – 17 West Watten	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	27.3	30.4	31.3	31.8	32.0	32.2	32.4	32.5
	Exceedence Level	-	-	-	-	-15.7	-12.6	-11.7	-11.2	-11.0	-10.8	-10.6	-13.1
NAL4 – Banks Lodge	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	26.8	29.8	30.8	31.2	31.5	31.7	31.9	32.1
	Exceedence Level	-	-	-	-	-16.2	-13.2	-12.2	-11.8	-11.5	-11.3	-11.1	-13.5
NAL5 – 14 West Watten	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	27.6	30.7	31.6	32.1	32.4	32.6	32.9	33.1
	Exceedence Level	-	-	-	-	-15.4	-12.3	-11.4	-10.9	-10.6	-10.4	-10.1	-12.5
NAL6 - Newton	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	29.5	32.7	33.4	33.9	34.1	34.3	34.4	34.4
	Exceedence Level	-	-	-	-	-13.5	-10.3	-9.6	-9.1	-8.9	-8.7	-8.6	-11.2
NAL7 - Lanergill	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	29.3	31.5	32.4	32.9	33.4	33.6	33.6	33.7

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL8 – Backlass Hill	Exceedence Level	-	-	-	-	-13.7	-11.5	-10.6	-10.1	-9.6	-9.4	-9.4	-11.9
	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	31.3	34.1	34.7	35.1	35.4	35.5	35.6	35.6
NAL9 – Leanmore Lodge	Exceedence Level	-	-	-	-	-11.7	-8.9	-8.3	-7.9	-7.6	-7.5	-7.4	-10.0
	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	-	-	32.7	35.7	36.2	36.6	36.8	36.9	37.0	37.0
NAL10 - Achnamoine	Exceedence Level	-	-	-	-	-10.3	-7.3	-6.8	-6.4	-6.2	-6.1	-6.0	-8.6
	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.4
	Predictions LA90	-	-	-	-	31.4	33.4	34.3	34.7	35.3	35.6	35.6	35.6
NAL11 - Knockglass House	Exceedence Level	-	-	-	-	-11.6	-9.6	-8.7	-8.3	-7.7	-7.4	-7.4	-7.8
	TNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.4
	Predictions LA90	-	-	-	-	33.4	35.2	36.2	36.6	37.2	37.5	37.5	37.5
NAL11 - Knockglass House	Exceedence Level	-	-	-	-	-9.6	-7.8	-6.8	-6.4	-5.8	-5.5	-5.5	-5.9

**Operational Phase - Derivation of Site Specific Noise Limits for the Proposed Development (Stage 3)**

14.6.8. The SSNL have been derived in accordance with the IOA GPG, as summarised in Table 6.8 of Technical Appendix A14.1. The approach adopted at each NAL is summarised below;

- At NALs 1 and 3 -9, there is significant headroom (>5 dB margin) between the cumulative noise predictions from the other wind farm developments and the TNL. A 2 dB buffer was added to the turbine noise predictions from the other wind farm developments and the resulting 'cautious' predictions of cumulative wind turbine noise from the other wind farms were then logarithmically subtracted from the TNL (subject to the lower FML of 35 dB or background plus 5 dB whichever is the greater for the daytime periods).
- At NAL2 operational noise from the other wind farm developments would be at least 10 dB below the TNLs. At this receptor (the occupiers of which are FI with the Proposed Development) it would be appropriate to allocate the entire noise limit to the Proposed Development, as the other wind farms would use a negligible proportion of the TNL.

- At NALs 10 and 11 the likely predictions level from other schemes were found to be within 5 dB of the TNLs therefore significant headroom was not available. The SSNL has been set 10 dB below the TNL at the relevant wind speeds.

14.6.9. The SSNL are summarised in Tables 14.8 and 14.9. Predicted noise levels from the Proposed Development were compared to the SSNL and as shown in Tables 14.8 and 14.9, the predicted wind turbine noise immission levels from the Proposed Development are below the SSNLs under all conditions and at all NALs during both daytime and night time periods. Initially, a minor exceedance (0.3 dB) of the daytime limit was predicted at NAL1 at 6 ms<sup>-1</sup> for a limited range of wind directions. The predictions presented in Table 14.8 are based on the assumption that the minor exceedance would be mitigated through the application of mode management. There would be **no significant effects**.

14.6.10. Figures A1.4a to A1.4k (Annex 1 of Technical Appendix A14.1) show the calculated wind turbine noise immission levels at the noise sensitive receptors which have been plotted as a function of wind speed at 10 m height.

Table 14.8: SSNL Compliance Table – Day time

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – 21-22 West Watten	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.5	39.8	43.5	46.1	48.1
	Predictions LA90	-	-	26.0	27.0	31.9	<b>35.0*</b>	35.4	35.8	35.9	35.9	35.9	36.0
	Exceedence Level	-	-	-9.0	-8.0	-3.1	<b>0.0*</b>	-0.6	-0.7	-3.9	-7.6	-10.2	-12.1
NAL2 – 18 West Watten	SSNL LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	46.1	48.1
	Predictions LA90	-	-	23.4	24.4	29.3	32.7	32.8	33.2	33.3	33.3	33.3	33.4
	Exceedence Level	-	-	-21.6	-20.6	-15.7	-12.3	-12.2	-11.8	-11.7	-11.7	-12.8	-14.7
NAL3 – 17 West Watten	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	37.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	17.1	18.1	23.0	26.4	26.5	26.9	27.0	27.0	27.0	27.1
	Exceedence Level	-	-	-17.9	-16.9	-12.0	-8.6	-9.5	-10.6	-14.0	-16.5	-19.1	-21.0
NAL4 – Banks Lodge	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	37.5	41.0	43.5	46.1	48.1
	Predictions LA90	-	-	16.3	17.3	22.1	25.5	25.6	26.1	26.1	26.1	26.2	26.2
	Exceedence Level	-	-	-18.7	-17.7	-12.9	-9.5	-10.4	-11.4	-14.9	-17.4	-19.9	-21.9
*NA L5	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	37.5	41.0	43.5	46.1	48.1

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL6 - Newton	Predictions LA90	-	-	18.6	19.5	24.4	27.8	27.9	28.3	28.4	28.4	28.5	28.5
	Exceedence Level	-	-	-16.4	-15.5	-10.6	-7.2	-8.1	-9.2	-12.6	-15.1	-17.6	-19.6
	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	37.2	40.2	43.5	46.1	48.1
NAL7 - Lanergill	Predictions LA90	-	-	21.2	22.2	27.1	30.5	30.6	31.0	31.1	31.1	31.1	31.2
	Exceedence Level	-	-	-13.8	-12.8	-7.9	-4.5	-5.4	-6.2	-9.1	-12.4	-15.0	-16.9
	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.7	39.9	43.5	46.1	48.1
NAL8 – Backlass Hill	Predictions LA90	-	-	16.8	17.8	22.6	26.0	26.1	26.6	26.6	26.7	26.7	26.7
	Exceedence Level	-	-	-18.2	-17.2	-12.4	-9.0	-9.9	-10.1	-13.3	-16.8	-19.4	-21.4
	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.7	39.9	43.5	46.1	48.1
NAL9 – Leanmore Lodge	Predictions LA90	-	-	22.5	23.5	28.4	31.8	31.9	32.3	32.3	32.4	32.4	32.5
	Exceedence Level	-	-	-12.5	-11.5	-6.6	-3.2	-4.1	-4.4	-7.6	-11.1	-13.7	-15.6
	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	36.0	36.6	39.8	43.5	46.1	48.1
NAL10 - Achnamoine	Predictions LA90	-	-	24.9	25.9	30.8	34.2	34.3	34.7	34.8	34.8	34.8	34.9
	Exceedence Level	-	-	-10.1	-9.1	-4.2	-0.8	-1.7	-1.9	-5.0	-8.7	-11.3	-13.2
	SSNL LA90	35.0	35.0	35.0	35.0	35.0	35.0	28.0	28.9	38.8	41.6	44.2	46.5
NAL11 – Knockglass House	Predictions LA90	-	-	15.6	16.6	21.4	24.8	24.9	25.4	25.4	25.4	25.5	25.5
	Exceedence Level	-	-	-19.4	-18.4	-13.6	-10.2	-3.1	-3.5	-13.4	-16.2	-18.7	-21.0
	SSNL LA90	35.0	35.0	35.0	35.0	28.0	28.0	28.0	28.9	30.9	40.5	43.7	45.6
NAL11 – Knockglass House	Predictions LA90	-	-	15.9	16.9	21.8	25.2	25.3	25.7	25.8	25.8	25.8	25.9
	Exceedence Level	-	-	-19.1	-18.1	-6.2	-2.8	-2.7	-3.2	-5.1	-14.7	-17.9	-19.7
	SSNL LA90	35.0	35.0	35.0	35.0	28.0	28.0	28.0	28.9	30.9	40.5	43.7	45.6

\*mode management applied at 6 ms<sup>-1</sup>



Table 14.9: SSNL Compliance Table – Night time

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL1 – 21-22 West Watten	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	26.0	27.0	31.9	35.3	35.4	35.8	35.9	35.9	35.9	36.0
	Exceedence Level	-	-	-17.0	-16.0	-11.1	-7.7	-7.6	-7.2	-7.1	-7.1	-7.1	-9.6
NAL2 – 18 West Watten	SSNL LA90	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.6
	Predictions LA90	-	-	23.4	24.4	29.3	32.7	32.8	33.2	33.3	33.3	33.3	33.4
	Exceedence Level	-	-	-21.6	-20.6	-15.7	-12.3	-12.2	-11.8	-11.7	-11.7	-11.7	-12.2
NAL3 – 17 West Watten	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	17.1	18.1	23.0	26.4	26.5	26.9	27.0	27.0	27.0	27.1
	Exceedence Level	-	-	-25.9	-24.9	-20.0	-16.6	-16.5	-16.1	-16.0	-16.0	-16.0	-18.5
NAL4 – Banks Lodge	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	16.3	17.3	22.1	25.5	25.6	26.1	26.1	26.1	26.2	26.2
	Exceedence Level	-	-	-26.7	-25.7	-20.9	-17.5	-17.4	-16.9	-16.9	-16.9	-16.8	-19.4
NAL5 – 14 West Watten	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	18.6	19.5	24.4	27.8	27.9	28.3	28.4	28.4	28.5	28.5
	Exceedence Level	-	-	-24.4	-23.5	-18.6	-15.2	-15.1	-14.7	-14.6	-14.6	-14.5	-17.1
NAL6 - Newton	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	21.2	22.2	27.1	30.5	30.6	31.0	31.1	31.1	31.1	31.2
	Exceedence Level	-	-	-21.8	-20.8	-15.9	-12.5	-12.4	-12.0	-11.9	-11.9	-11.9	-14.4
NAL7 - Lanergill	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	16.8	17.8	22.6	26.0	26.1	26.6	26.6	26.7	26.7	26.7

NAL		Wind Speed (ms <sup>-1</sup> ) as standardised to 10 m height											
		1	2	3	4	5	6	7	8	9	10	11	12
NAL8 – Backlass Hill	Exceedence Level	-	-	-26.2	-25.2	-20.4	-17.0	-16.9	-16.4	-16.4	-16.3	-16.3	-18.9
	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	22.5	23.5	28.4	31.8	31.9	32.3	32.3	32.4	32.4	32.5
NAL9 – Leanmore Lodge	Exceedence Level	-	-	-20.5	-19.5	-14.6	-11.2	-11.1	-10.7	-10.7	-10.6	-10.6	-13.1
	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	24.9	25.9	30.8	34.2	34.3	34.7	34.8	34.8	34.8	34.9
NAL10 - Achnamoine	Exceedence Level	-	-	-18.1	-17.1	-12.2	-8.8	-8.7	-8.3	-8.2	-8.2	-8.2	-10.7
	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	42.1	42.0	41.8	41.7	41.7	42.3
	Predictions LA90	-	-	15.6	16.6	21.4	24.8	24.9	25.4	25.4	25.4	25.5	25.5
NAL11 – Knockglass House	Exceedence Level	-	-	-27.4	-26.4	-21.6	-18.2	-17.2	-16.6	-16.4	-16.3	-16.2	-16.8
	SSNL LA90	43.0	43.0	43.0	43.0	42.2	41.8	41.4	41.3	40.9	40.7	40.7	41.4
	Predictions LA90	-	-	15.9	16.9	21.8	25.2	25.3	25.7	25.8	25.8	25.8	25.9
NAL12 - Mybster	Exceedence Level	-	-	-27.1	-26.1	-20.4	-16.6	-16.1	-15.6	-15.1	-14.9	-14.9	-15.5
	SSNL LA90	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	45.6
	Predictions LA90	-	-	26.0	27.0	31.9	35.3	35.4	35.8	35.9	35.9	35.9	36.0
NAL12 - Mybster	Exceedence Level	-	-	-17.0	-16.0	-11.1	-7.7	-7.6	-7.2	-7.1	-7.1	-7.1	-9.6

## 14.7. Additional Mitigation

### Mitigation during Construction and Decommissioning

14.7.1. As detailed in Table 14.1 above, construction activities will be undertaken during typical working hours; 8 am to 7 pm Monday to Friday and 8 am to 1 pm on Saturdays. Nevertheless, a range of good practice measures would be detailed in the Construction Environmental Management Plan (CEMP) and employed to minimise noise impacts (CEMP to be agreed secured via condition and agreed post consent, outline CEMP included in Technical Appendix A5.1).

## Mitigation during Operation

- 14.7.2. The exact model of wind turbine to be used for the Proposed Development would be the result of a future tendering process. Achievement of the noise limits determined by this assessment would be a key determining factor in the final choice of wind turbines for the Proposed Development. Modern turbines have the ability to operate in a range of lower noise modes if required.

## 14.8. Residual Effects

### Residual Operational Effects

- 14.8.1. Predicted wind farm operational noise levels at all the NALs lie below the SSNL. **There would be no significant residual effects.**
- 14.8.2. At some locations, under some wind conditions and for a certain proportion of the time operational wind farm noise would be audible; however, it would be at an acceptable level in relation to the ETSU-R-97 guidelines and there would be no significant residual effects.

### Residual Cumulative Effects

- 14.8.3. Predicted cumulative wind farm operational noise levels lie below the TNL at all NALs, there would be **no significant residual effects** due to the Proposed Development.

## 14.9. Statement of Significance

- 14.9.1. The guidance contained within ETSU-R-97 and the IOA GPG was used to assess the likely operational noise impact of the Proposed Development. Predicted levels indicate that for dwellings neighbouring the Proposed Development the operational noise impact is not significant after the SSNL are adopted.
- 14.9.2. There are a range of wind turbine models that may be appropriate for the Proposed Development. If the Proposed Development receives consent, further data would be obtained from the supplier for the final choice of wind turbine model to demonstrate compliance with the operational noise limits derived in this report.

## 14.10. Statement of Competence

- 14.10.1. This Chapter was prepared by TNEI Services Ltd. TNEI is a specialist energy consultancy with an Acoustics team which has undertaken noise assessments for over five gigawatts (GW) of onshore wind farm developments. The assessment was carried out by Gemma Clark. Gemma has been undertaking operational noise assessments for wind farms for over 16 years and is an Associate Member of the Institute of Acoustics. The assessment has been reviewed and approved by James Mackay. James has been undertaking operational noise assessments for wind farms for over 17 years. James Mackay is a Full Member of the Institute of Acoustics and holds the Diploma in Acoustics and Noise Control.

## 14.11. Non-Technical Summary

- 14.11.1. A noise assessment was undertaken to determine the likely significant noise effects from the operational phase of the Proposed Development.

- 14.11.2. Construction noise activities will be undertaken during typical working hours and as such a detailed construction noise assessment was not required.
- 14.11.3. Background noise monitoring was previously undertaken at a number of properties proximate to the Proposed Development as part of the noise assessment work undertaken for Halsary Windfarm. Halsary is now an operational wind farm located immediately to the south west of the Proposed Development. Due to the number of existing operational wind farms within the area, additional noise monitoring was not undertaken due to the potential influence of operational wind turbine noise on the measured levels. Background noise data previously collected for Halsary Windfarm was used to set the Total ETSU-R-97 Noise Limits for the Proposed Development. A correction was applied to the data used from Halsary Windfarm to take account of wind shear and the difference in hub heights for the turbines at Halsary Windfarm and the Proposed Development.
- 14.11.4. The operational noise assessment was undertaken in three stages, which involved setting the Total ETSU-R-97 Noise Limits (which are limits for noise from all wind farms in the area) at the nearest noise sensitive receptors, predicting the likely effects (undertaking a cumulative noise assessment where required) and setting SSNL for the Proposed Development.
- 14.11.5. Predicted cumulative operational noise levels indicate that for noise sensitive receptors neighbouring the Proposed Development, cumulative wind turbine noise (which considers noise predictions from all nearby operational and consented wind farms and the Proposed Development) would meet the Total ETSU-R-97 Noise Limits at all Noise Assessment Locations.
- 14.11.6. The Total ETSU-R-97 Noise Limit is applicable to all operational and consented wind farms in the area so Site Specific Noise Limits (SSNL) have also been derived to control the specific noise from the Proposed Development. In accordance with the guidance in Institute of Acoustics (IOA) Good Practice Guidance (GPG), the SSNL have been derived with due regard to cumulative noise by accounting for the proportion of the Total ETSU-R-97 Noise Limit which is potentially being used by other nearby developments. The SSNL have been derived in accordance with the IOA GPG.
- 14.11.7. Predictions of wind turbine noise from the Proposed Development have been made in accordance with good practice using a candidate wind turbine, the Vestas V162, 6.8 MW with serrated trailing edge blades, a hub height of 139 m. Predicted operational noise levels from the Proposed Development indicate that for noise sensitive receptors neighbouring the Proposed Development, wind turbine noise from the Proposed Development would meet the SSNL at all Noise Assessment Locations (NAL) and are therefore deemed to be not significant. In order to meet the noise limits at one receptors, mode management would be required for one turbine at  $6 \text{ ms}^{-1}$  for certain wind directions based on the candidate turbine considered in this assessment.
- 14.11.8. The use of SSNL would ensure that the Proposed Development could operate concurrently with other operational wind farm developments in the area and would also ensure that the Proposed Development's individual contribution could be measured and enforced if required.
- 14.11.9. The wind turbine model was chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Development receive consent, the final choice of wind turbine would be subject to a competitive tendering process. The final choice of wind turbine would, however, have to meet the SSNL presented in the noise assessment.

# Chapter 15

## Socio-economics, Recreation and Tourism

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The area within the red line boundary where the Proposed Development will be located (application area).

## List of Abbreviations

Abbreviation	Description
AOD	Above Ordnance Datum
B&B	Bed and Breakfast
BEIS	Business, Energy and Industrial Strategy
BESS	Battery Energy Storage System
Capex	Construction expenditure
CCP	Climate Change Plan
CEMP	Construction Environmental Management Plan
Devex	Development expenditure
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GDHI	Gross Disposable Household Income
GVA	Gross Value Added
HIE	Highlands and Islands Enterprise
IEMA	Institute of Environmental Management and Assessment
LDP	Local Development Plan
LVIA	Landscape and Visual Impact Assessment
m	metres
MW	Megawatt
NPF4	National Policy Framework 4
Natural Power	Natural Power Consultants Limited
NOMIS	National Online Manpower Information System
NTS	Non-Technical Summary
NVQ	National Vocational Qualification
ONS	Office of National Statistics
Opex	Operational expenditure
SES	Scottish Energy Strategy
SOC	Standard Occupational Classification
THC	The Highland Council
THC area	The Highland Council area
VFR	Visiting Friends or Relatives

## 15.1. Introduction

- 15.1.1. This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Natural Power Consultants Limited (Natural Power) and assesses the potential socio-economic, tourism and recreation impacts and effects that could occur as a result of the proposed Watten Wind Farm (hereafter known as the 'Proposed Development').
- 15.1.2. As stated in Chapter 1: Introduction, the Proposed Development is located in the Scottish Highlands within The Highland Council (THC) area.
- 15.1.3. The Proposed Development will consist of up to seven wind turbines with tip heights of up to 220 metres (m) which will have a generating capacity of up to 47.6 megawatts (MW) subject to final wind turbine procurement. In addition, the Applicant proposes to provide a small area for car parking and a walking route within the Proposed Development Area as a result of feedback obtained during the pre-application consultation process with the community. It is expected that the provision of this facility would be secured by way of a condition which would require further consultation on the form and location.
- 15.1.4. There will be a further 20 MW of capacity associated with the proposed battery energy storage system (BESS). The total generating capacity of the Proposed Development will therefore be 67.6 MW. In addition, the Proposed Development is planned to have an operational period of 35 years.
- 15.1.5. This chapter outlines policies considered relevant to the potential socio-economic impacts of the Proposed Development and describes how the Proposed Development will contribute toward targets and objectives set out within relevant Scottish and local strategies.

## 15.2. Methodology

### Study Area

- 15.2.1. The socio-economic and tourism baseline considers the study areas of:
- THC area;
  - Scotland; and
  - The UK.
- 15.2.2. The quantifiable economic impacts reported in this document are inclusive, i.e. the reported impact for Scotland includes the impacts within the THC area.
- 15.2.3. The tourism and recreation assessment is based on assets which lie within 15 km of the Proposed Development as set out in the Scoping Report.

### Assessment Methodology

- 15.2.4. Where other EIAR chapters follow methodology widely recognised by statutory and governing bodies, there is no such recognised methodology for socio-economic assessments. This chapter takes the approach of highlighting how the Proposed Development supports UK and Scottish strategy and policy documents relating to socio-economics and identifies what benefits the Proposed Development could provide locally should it be granted consent.

- 15.2.5. As part of the scoping process for the Proposed Development, a Scoping Report was issued and a Scoping Opinion requested. The assessment carried out in this chapter has taken into account the scoping opinion in respect of socio-economics, tourism and recreation. In addition, this chapter assesses the economic baseline of the area, including the importance of the tourism sector.

- 15.2.6. Baseline conditions were established through desktop studies. The following sources of information were used in the completion of this chapter:
- Relevant economic development strategies and policies at UK and Scottish levels;
  - Official statistics including: National Online Manpower Information System (NOMIS), Office of National Statistics (ONS), Census 2011, Scottish Government, THC publications and VisitScotland; and
  - Economic impact assumptions drawn from RenewableUK publications on the economic benefits of onshore wind farms.

### Socio-economics

- 15.2.7. The methodology adopted will assess the following key stages:
- Existing economic environment (baseline) using official data on population, industrial structure, unemployment and economic activity levels, income and earnings;
  - The potential economic effects during the development and construction phase of the Proposed Development including direct employment, supplier effects and income effects;
  - The potential economic effects during the operational phase of the Proposed Development including direct employment, supplier effects and income effects;
  - The economic effects arising from infrastructure improvements and potential community benefits and shared ownership; and
  - Consider and report on mitigation and management measures which could be employed to minimise any negative impacts and maximise potential positive impacts.
- 15.2.8. This socio-economic assessment is grounded on a RenewableUK publication<sup>1</sup> on economic impact modelling utilising the most recent industry research, conducted by BiGGAR Economics. The report discusses the economic impacts of onshore wind farm development and has shown, through investigation of numerous case studies across the UK, how expenditure from the different phases of wind farm development (e.g. development, construction, operation and maintenance) is passed to the local, regional and national economy. As such, this provides a model which can be utilised to illustrate the potential quantifiable economic inputs that the Proposed Development can have for THC, Scotland and the UK. This research method has been deployed on numerous other socio-economic assessments of onshore wind farms across the UK and is considered an applicable and quantifiable approach.
- 15.2.9. The assessment calculates the socio-economic impact from the construction of seven turbines. The employment and resultant gross value added (GVA) impacts are based on the indicative maximum generation capacity of 47.6 MW. The potential 20 MW within the stored battery energy storage energy compound is seen as storage and therefore has not been assessed and would be additional to what is presented in this assessment.

### Tourism and Recreation

- 15.2.10. The potential effects of wind farm developments on the tourism and recreation sector is well-researched, and as such key studies have been included for reference, including:
- Economic impacts of wind farms on Scottish tourism: research findings (Scottish Government, 2008)<sup>2</sup>;

<sup>1</sup> RenewableUK. (2015) *Onshore Wind: Direct and Wider Economic Benefits*. [Online] Available from - <https://www.renewableuk.com/news/295907/Onshore-Wind-Direct-and-Wider-Economic-Benefits-Members-only.htm>. [Accessed: 14/07/2023]

<sup>2</sup> Scottish Government (2008) *Economic impacts of wind farms on Scottish tourism: report*. [Online] Available from - <https://www.gov.scot/publications/economic-impacts-wind-farms-scottish-tourism/> [Accessed: 14/07/2023]

- VisitScotland wind farm consumer research (2011)<sup>3</sup>;
- Wind farms and tourism trends in Scotland (BiGGAR Economics, 2017)<sup>4</sup>;
- Wind farms and tourism trends in Scotland: evidence from 44 wind farms (BiGGAR Economics, 2021)<sup>5</sup>; and
- Public attitudes tracker energy infrastructure and energy sources (Department for Business, Energy and Industrial Strategy (BEIS) 2021)<sup>6</sup>.

15.2.11. Tourist assets have been identified as detailed in Section 15.8 and the analysis focuses on whether the Proposed Development is likely to lead to change in behaviour, for example few tourists visiting the area.

15.2.12. Recreational assets, such as trails, have been identified as detailed in Section 15.7, and the potential reduction in recreational amenity has been assessed. There are a number of potential ways that the Proposed Development could affect trails, including through reduced amenity associated with landscape and visual impacts and through reduced access. Reduced access to amenity is particularly important in the context of areas that have limited access to recreational amenities, such as walking.

15.2.13. It is noted that in the recently adopted National Policy Framework 4 (NPF4), tourism is not included in the matters to be considered in respect of onshore wind farms under Policy 11: Energy.

### Assessment of Potential Effect Significance

15.2.14. The initial consideration of the sensitivity of an area's economy, or a tourism asset to an effect is assessed based on the criteria outlined in Table 15.1.

Table 15.1: Socio-economics, tourism and recreation sensitivity criteria

Sensitivity	Description
Very high	The asset has little or no capacity to absorb change without fundamentally altering its present character and/or is of very high tourism, recreational or socio-economic value, or of national importance. For example, it is a destination in its own right (for attractions), with a substantial proportion of visitors on a national level.
High	The asset has low capacity to absorb change without fundamentally altering its present character and/or is of high tourism, recreational or socio-economic value, or of importance to Scotland.
Medium	The asset has moderate capacity to absorb change without substantially altering its present character, has some tourism, recreational or socio-economic value and/or is of regional importance (e.g. Scotland). For example, it is a popular destination among current visitors (for attractions), with a significant contribution to the regional economy.

<sup>3</sup> VisitScotland (2011) *Wind Farm Consumer Research*. [Online] Available from - [https://archive2021.parliament.scot/S4\\_EconomyEnergyandTourismCommittee/General%20Documents/Visit\\_Scotland\\_and\\_Windfarm\\_report.pdf](https://archive2021.parliament.scot/S4_EconomyEnergyandTourismCommittee/General%20Documents/Visit_Scotland_and_Windfarm_report.pdf) [Accessed: 14/07/2023]

<sup>4</sup> BiGGAR Economics (2017) *Wind Farms & Tourism Trends in Scotland*. [Online] Available from - <https://biggareconomics.co.uk/wp-content/uploads/2020/01/Wind-farms-and-tourism-trends-in-Scotland.pdf> [Accessed: 14/07/2023]

Sensitivity	Description
Low	The asset is tolerant to change without detriment to its character, has low tourism, recreational and/or socio-economic value, or is of local importance. For example, it is an incidental destination for current visitors (for attractions).
Negligible	The asset is resistant to change and/or is of little tourism, recreational or socio-economic value. For example, an incidental destination with low numbers of current visitors (for attractions).

Source: Natural Power

15.2.15. The magnitude of the potential effect will be assessed based on criteria presented in Table 15.2.

Table 15.2: Socio-economics, recreation and tourism magnitude criteria

Magnitude	Description
High	Major loss/improvement to key elements/features of the baselines conditions such that post development character/composition of baseline condition will be fundamentally changed. For example, a major long-term alteration of socio-economic conditions, a major reduction/improvement of recreational assets, or a substantial change to tourism spend.
Medium	Loss/improvement to one or more key elements/features of the baseline conditions such that post development character/composition of the baseline condition will be noticeably changed. For example, a moderate alteration of socio-economic conditions, a moderate reduction/improvement in the recreational asset, or a moderate change to tourism spend.
Low	Changes arising from the alteration will be detectable but not material; the underlying composition of the baseline condition will be similar to the pre-development situation. For example, a small alteration of the socio-economic conditions, a small reduction/improvement in the recreational asset, or a small change in tourism spend.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

Source: Natural Power

15.2.16. The sensitivity of the asset and the magnitude of the predicted effects will be used as a guide, in addition to judgement to predict the significance of the likely effects. Moderate and major effects are assessed as significant in EIA terms. The significance criteria is outlined in Table 15.3.

<sup>5</sup> BiGGAR Economics (2021) *Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms*. [Online] Available from - <https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf> [Accessed: 14/07/2023]

<sup>6</sup> Business, Energy and Industrial Strategy Committee (2021) *BEIS Public Attitudes Tracker: Energy Infrastructure and Energy Sources*. [Online] Available from - [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1040725/BEIS\\_PAT\\_Autumn\\_2021\\_Energy\\_Infrastructure\\_and\\_Energy\\_Sources.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040725/BEIS_PAT_Autumn_2021_Energy_Infrastructure_and_Energy_Sources.pdf) [Accessed: 14/07/2023]

Table 15.3: Significance matrix

Sensitivity					
Magnitude	Very high	High	Medium	Low	Very Low
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Source: Natural Power

### 15.3. Consultation

- 15.3.1. The assessment carried out in this chapter has taken into account the Scoping Opinion regarding the socio-economics, tourism and recreation.
- 15.3.2. The responses contained in the Scoping Opinion and identification of where they have been addressed in this chapter are set out in Table 15.4.

Table 15.4: Consultation responses

Consultee	Issue	Response and how the issue is considered in the chapter
The Highland Council	Who is affected by development, identifying individual households, communities, tourist related business, recreational groups.	Socio-economic and Tourism baselines identified and described in section 15.6 & 15.7 respectively within this chapter.
	Economic information associated with the project, including potential number of jobs and economic activity associated with the procurement, construction, operation and decommissioning of the development.	In the absence of project specific information, statistics and calculations from a RenewableUK publication <sup>7</sup> on economic impact modelling utilising the most recent industry research, conducted by BiGGAR Economics, were used.
	Address potential impact on and mitigation for public access incorporating core paths, public rights of way, long distance routes, other paths and wider access rights across the Proposed Development Area.	Outline Access Management and Enhancement Plan detailed in Chapter 15: Socio-economics, Recreation and Tourism, in Section 15.6.
	Proposed site access follows a promoted line for the local Corbett as both the approach and	This matter will be addressed in the Access Management Plan

<sup>7</sup> RenewableUK. (2015) *Onshore Wind: Direct and Wider Economic Benefits*. [Online] Available from - <https://www.renewableuk.com/news/295907/Onshore-Wind-Direct-and-Wider-Economic-Benefits-Members-only.htm>. [Accessed: 14/07/2023]

<sup>8</sup> Secretary of State for Business, Energy and Industrial Strategy (2020) *The Energy White Paper: Powering our Net Zero Future*. [Online] Available from -

Consultee	Issue	Response and how the issue is considered in the chapter
	continuation of a traverse from Cluanie. Access should be accommodated as far as possible during any upgrade of that track and once completed, during and after construction of the scheme as a whole.	which will be the subject of a condition.

Source: Natural Power

### 15.4. Legislation, Policy and Guidance

- 15.4.1. All relevant national legislation, planning policies, guidelines, development plans and other material considerations are addressed in Chapter 2: Legal and Policy. A summary of those matters related to socio-economics, recreation and tourism, is included in the following text.
- 15.4.2. This assessment includes a review of existing economic development policies, referencing tourism strategies where applicable, at the UK, Scottish and local level, together with reference to the evidence base.

#### UK Renewable Energy advice

##### The UK Energy White Paper (December 2020)<sup>8</sup>

- 15.4.3. The White Paper sets out the approach to tackle climate change. It recognises the world-leading target the UK government have set whilst also acknowledging action to achieve this is necessary. The foreword states ‘*decisive global action and significant investment and innovation*’ is required to create economic and market growth as well as job creation.
- 15.4.4. It states that ‘*The UK should harness more of the economic benefit from the accelerated deployment of renewable technologies. This will help position the whole of the UK to reap economic benefits*’.

#### Scottish Renewable Energy and Climate Change Policy and Advice

##### The Climate Change Plan (February 2018)<sup>9</sup>

- 15.4.5. The Climate Change Plan states that ‘*By 2032, Scotland’s electricity system will supply a growing share of Scotland’s energy needs and by 2030, 50 % of all Scotland’s energy needs will come from renewables*’.
- 15.4.6. In addition, it states in Chapter 1 that the Scottish Government ‘*will also continue to pursue policies and goals within our own gift to secure this route to market, and to ensure that as wide a range of onshore and offshore technologies as possible are able to develop in the right places – securing as much economic and industrial benefit for Scotland as possible*’.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/945899/201216\\_BEIS\\_EWP\\_Command\\_Paper\\_Accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf) [Accessed: 14/07/2023]

<sup>9</sup> Scottish Government (2018) *Climate Change Plan: third report on proposal and policies 2018 – 2032*. [Online] Available from - <https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018/documents/> [Accessed: 14/07/2023]

15.4.7. In addition, it details that *'investment to enhance the competitiveness and productivity of Scotland's low carbon electricity generation and network sector will contribute to the Scottish Government's wider objectives of sustainable economic growth.'*

#### **Update to the Climate Change Plan 2018-2032: Securing a Green Recovery on a Path to Net Zero<sup>10</sup>**

15.4.8. In December 2020, the *'Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovery on the Path to Net Zero'* (Climate Change Plan (CCP) Update) (Scottish Government, 2020) was published. Building on the policy outcomes identified in the 2018 CCP, the CCP Update sets the Scottish Government's legislative commitment to reducing emissions by 75 % by 2030 (compared with 1990) and to net-zero by 2045 in the context of a post-COVID green recovery.

15.4.9. The CCP highlights key commitments which include, amongst others, to increase the number of good, green jobs and to enable people to access these jobs through training and reskilling. In addition, it recognises that the green recovery and transition to net zero presents considerable economic opportunities for Scotland by capitalising on its strengths including in energy.

#### **Scottish Energy Strategy (SES) 2017<sup>11</sup>**

15.4.10. The strategy sets out key targets for the energy system, by 2030, to be *'the equivalent of 50 % of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources'* and to have *'an increase by 30 % in the productivity of energy use across the Scottish economy'*.

15.4.11. The strategy places a *'sharp emphasis on the energy sector's economic role, benefits and potential'* via key areas such as developing necessary skills, boosting inclusive growth, stimulating investment and creating new business models.

15.4.12. Onshore wind is also recognised as a key opportunity. The SES sets out that *'Onshore wind is now amongst the lowest cost forms of power generation of any kind and is a vital component of the huge industrial opportunity that renewables create for Scotland. The sector supports an estimated 7,500 jobs in Scotland and generated more than £3 billion in turnover in 2015'*.

#### **Scottish Energy Strategy Position Statement<sup>12</sup>**

15.4.13. On 16th March 2021 the Scottish Government published its position statement in relation to the SES and the approach needed for a green economic recovery from the COVID-19 pandemic. The SES Position Statement provides an overview of the key priorities for the short to medium-term in ensuring a green economic recovery, whilst remaining aligned to the net zero ambitions.

15.4.14. The Strategy sets out that *'creating green jobs are at the heart of the Scottish Government's plans for a fair, resilient and green economic recovery.'*

15.4.15. In addition, Section 8 *'Support for Industries and Sectors across the Energy Landscape'* states *'the continued growth of Scotland's renewable energy industry is fundamental to enabling us to achieve our ambition of creating sustainable jobs as we transition to net zero.'*

#### **Draft Energy Strategy and Just Transition Plan (2023)<sup>13</sup>**

15.4.16. Updated Renewable energy is at the forefront of Scotland's energy strategy. The Draft Energy Strategy and Just Transition Plan sets out various targets to deliver the vision stating the *'Scotland will be a renewable powerhouse'* amongst other things.

15.4.17. In addition, renewable energy production will be significantly scaled up with continued investment into the net zero economy. There will be increased investment in green energy *'that delivers economic opportunities'* where *'workers will have the training, skills and opportunities to access the good, green jobs that come with this.'*

15.4.18. The £100 million Green Jobs Fund will provide capital across Scotland in the aim to support green jobs and industries across Scotland.

#### **Onshore Wind Policy Statement (2022)<sup>14</sup>**

15.4.19. The Onshore Wind Policy Statement was released in December 2022. It details the significant support to local economies, onshore wind already provides across Scotland through direct and indirect jobs and with onshore wind being deployed at a greater volume over the coming decade, there is opportunity to capitalise on established experience and expertise.

15.4.20. In addition, the Statement recognises the opportunity *'to create an established remanufacturing industry based on circular economy principles'* as well as having the potential *'to add significant investment into Scotland's economy'* along with the introduction of new skills and supporting direct and indirect jobs to meet the demand.

15.4.21. The Statement also highlights concerns from communities stating their worry over the potential negative effect the deployment of onshore wind can have on tourism. However, whilst there may be discrete impacts in some cases, current evidence suggests that this is not the general rule.

15.4.22. In most cases, renewable energy schemes have been known to boost tourism across Scotland by producing additional outdoor recreational activities and through investment into a range of project to benefit local communities.

#### **Programme for Scotland 2022-2023<sup>15</sup>**

15.4.23. Renewable energy development is regarded as one of the significant economic opportunities that will be a focus for Scotland in the year ahead along with the transition to a net zero economy.

15.4.24. The programme recognises Scotland's potential to become a global green energy powerhouse, for Europe and beyond.

<sup>10</sup>Scottish Government (2020) *Securing a green recovery on a path to new zero: climate change plan 2018 – 2032 – update*. [Online] Available from - [Executive Summary - Securing a green recovery on a path to net zero: climate change plan 2018–2032 - update - gov.scot \(www.gov.scot\)](https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2017/12/scottish-energy-strategy-future-energy-scotland-9781788515276/documents/00529523-pdf/00529523-pdf/govscot%3Adocument/00529523.pdf) [Accessed: 14/07/2023]

<sup>11</sup> Scottish Government (2017) *Scottish Energy Strategy: The future of energy in Scotland*. [Online] Available from - <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2017/12/scottish-energy-strategy-future-energy-scotland-9781788515276/documents/00529523-pdf/00529523-pdf/govscot%3Adocument/00529523.pdf> [Accessed: 14/07/2023]

<sup>12</sup> Scottish Government *Scotland's Energy Strategy Position Statement*. [Online] Available from - <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/03/scotlands-energy-strategy-position-statement/documents/scotlands-energy-strategy-position-statement/scotlands-energy-strategy-position-statement/govscot%3Adocument/scotlands-energy-strategy-position-statement.pdf> [Accessed: 14/07/2023]

<sup>13</sup> Scottish Government (2023) *Draft Energy Strategy and Just Transition Plan – delivering a fair and secure zero carbon energy system for Scotland*. [Online] Available from - <https://www.gov.scot/publications/draft-energy-strategy-transition-plan/> [Accessed: 14/07/2023]

<sup>14</sup> Scottish Government (2022) *Onshore Wind Policy Statement* [Online] Available from - <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/#:~:text=Sets%20out%20our%20ambition%20to,an%20onshore%20wind%20sector%20deal>. [Accessed: 14/07/2023]

<sup>15</sup> Scottish Government (2022-23) *A Stronger & More Resilient Scotland: The Programme for Government 2022-2023*. [Online] Available from - <https://www.gov.scot/publications/stronger-more-resilient-scotland-programme-government-2022-23/> [Accessed: 14/07/2023]



### Scotland's National Strategy for Economic Transformation<sup>16</sup>

- 15.4.25. The Strategy sets out the priorities for Scotland's economy as well as the actions needed to maximise the opportunities of the next decade to achieve the vision of a wellbeing economy.
- 15.4.26. The vision for Scotland by 2032 includes, amongst others, being recognised as an 'international benchmark for how an economy can transform itself, de-carbonise and rebuild natural capital whilst creating more well-paid and secure jobs and developing new markets based on renewable sources of energy and low carbon technology.'
- 15.4.27. Key industries and new market opportunities include:
- Renewable energy, with Scotland enjoying a quarter of Europe's wind potential and home to globally leading businesses in tidal energy as part of a wider energy industry with strengths in the company base, financial capital, infrastructure, knowledge and knowhow; and
  - The circular economy, where resources are kept in high-value use, creating new market, innovation and job opportunities that will be key to achieving our targets for net zero and nature.

### Scottish Planning Policy

#### National Planning Framework 4 (NPF4) 2022<sup>17</sup>

- 15.4.28. NPF4 was adopted by the Scottish Government in February 2023.
- 15.4.29. NPF4 details Scotland's opportunity, post COVID-19, to focus efforts on supporting good, green jobs for the future. In addition, there are targets to 'enable investment that supports the just transition to a net zero, nature-positive economy.'
- 15.4.30. Policy 19 discusses Green Energy and Scotland's role in reducing carbon emissions, contributing to a green, fair and resilient economic recovery. It highlights the importance of onshore wind and how it will play the 'greatest role in the coming years'. In addition, it details the importance of ensuring local development plans are considering 'an area's full potential for electricity and heat from renewable sources is achieved.'

### Highland Planning Policy

#### Highland Wide – Local Development Plan (LDP) 2012<sup>18</sup>

- 15.4.31. THC published in 2012 the LDP for THC area (excluding Cairngorms National Park, which has its own plan) for the next 20 years. It sets out strategic spatial priorities and policies for THC area and will secure land for specified uses to provide certainty for development.
- 15.4.32. The plan has a vision to create 'sustainable communities, balancing population growth, economic development and the safeguarding of the environment across the area and have built a fairer and healthier Highlands.' The plans consider, but not limited to, the economy, renewable energy and tourism:
- Ensuring that development of renewable energy resources are managed effectively with clear guidance on where renewable energy developments should and should not be located;

- Taking a lead in reducing the amount of greenhouse gases released into the air, adapted to the effects of climate change and limited the amount of non-renewable resources development uses; and
- Providing opportunities which encourage economic development and create new employment across the area focusing on the key sectors of life sciences, energy, tourism, food and drink, higher education, inward investment, financial and business services, creative industries, aquaculture and renewable energy, whilst at the same time improving the strategic infrastructure necessary to allow the economy to grow over the long term.

#### Caithness and Sutherland Local Development Plan (LDP) – Adopted 2018<sup>19</sup>

- 15.4.33. Included in the Vision Outcomes for Caithness and Sutherland in 2035 is 'A strong, diverse and sustainable economy characterised as being an internally renowned centre for renewable energy....'.
- 15.4.34. The Plan discusses the substantial renewable area resource the area has in regard to onshore wind. In addition, renewable energy generation investment in North Highland is delivering economic benefits for the area in addition to meeting Council and national climate change targets.

#### Highlands and Islands Enterprise 2019-2022 Strategy<sup>20</sup>

- 15.4.35. Highlands and Islands Enterprise (HIE) strategy breaks down the region into eight sections which have its own focus and ambitions. Caithness and Sutherland were characterised as:
- Declining population: 38,520;
  - Highest unemployment rate in region;
  - Plans underway to launch satellites into space;
  - Home to Scotland's first European Geopark; and
  - High value skills in nuclear power and decommissioning – a key asset.
- 15.4.36. Renewable energy and a low carbon economy was identified as a key regional opportunity. The HIE views themselves as well-placed to capitalise upon the UK and Scottish Governments' commitments to move to a lower carbon, decentralised and locally based energy system.
- 15.4.37. Tourism was a sector highlighted within the strategy, providing crucial economic and community growth 'providing up to 15 % of employment, well above the national average of 8 %'. HIE had a vision going forward for 'our region's businesses, communities and stakeholders will work together in collaboration around themes including marine and outdoor tourism to responsibly develop successful and sustainable tourism destinations, creating new products and offerings through investment in skills, infrastructure and partnerships'.

### Community Benefit

#### Scottish Government Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments 2019<sup>21</sup>

- 15.4.38. This guidance was updated in 2019 and the revised guidance places a greater focus on achieving a lasting legacy for local communities underpinned by a well-developed community action plan. The guidance notes that within the

<sup>16</sup> Scottish Government (2022) *Scotland's National Strategy for Economic Transformation*. [Online] Available from - <https://www.gov.scot/publications/scotlands-national-strategy-economic-transformation/pages/1/> [Accessed: 14/07/2023]

<sup>17</sup> Scottish Government (2022) *National Planning Framework 4* [Online] Available from - [National Planning Framework 4 - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/national-planning-framework-4/pages/1/) [Accessed: 14/07/2023]

<sup>18</sup> The Highland Council (2012) *Highland-wide Local Development Plan (HwLDP)* [Online] Available from - [https://www.highland.gov.uk/info/178/local\\_and\\_statutory\\_development\\_plans/199/highland-wide\\_local\\_development\\_plan](https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan) [Accessed: 14/07/2023]

<sup>19</sup> The Highland Council (2018) *Caithness and Sutherland Local Development Plan – Adopted*. [Online] Available from - [https://www.highland.gov.uk/download/downloads/id/19712/casplan\\_adopted.pdf](https://www.highland.gov.uk/download/downloads/id/19712/casplan_adopted.pdf) [Accessed: 14/07/2023]

<sup>20</sup> Highlands and Islands Enterprise (2019) *Highlands and Islands Enterprise 2019-2022 Strategy* [Online] Available from - <https://www.hie.co.uk/media/5006/strategyplusplanplus2019-2022-1.pdf> [Accessed: 14/07/2023]

<sup>21</sup> Scottish Government *Good Practice Principles for Community Benefits from Onshore Renewable Energy Developments (2019)*. [Online] Available from - <https://www.gov.scot/publications/scottish-government-good-practice-principles-community-benefits-onshore-renewable-energy-developments/> [Accessed: 14/07/2023]

last 12 months, 214 projects have been offered and £15,719,720 total community benefits were paid (2019 statistics). The guidance is supportive of renewable energy businesses that seek to offer communities a flexible package of benefits; such flexible packages of benefit should offer an element of additionality and go beyond the requirements of the planning process.

- 15.4.39. The package of benefits that a renewable energy business offers may vary in line with the priorities of community/communities involved, and the size and scope of the renewable energy project. However, community benefits should relate to the specific needs and aspirations of local people. The guidance advises that possession of a community action plan is key to delivering a community's aspirations and ambitions, and guidance is provided as to how this should be developed with a view to establishing a lasting legacy.
- 15.4.40. This guidance was updated in 2019 and provides guidance on the process of a renewable energy business making an offer, and a community accepting that offer. The aim of the review was to ensure that Scottish communities continue to benefit from local projects in a manner that is appropriate for the current and future context in which renewable energy projects are developed, and advises on how local communities, renewable energy companies and local authorities can work together to achieve this.

#### Scottish Government Shared Ownership of Onshore Renewable Energy Developments 2019<sup>22</sup>

- 15.4.41. The Applicant is offering shared ownership as standard practise in line with Scottish Government's guidance. This will involve a community group as a financial partner over the lifetime of a renewable energy project.
- 15.4.42. The opportunities tend to be offered to communities geographically adjacent to renewable developments however, the community may wish to extend the opportunity to a wider geographic area and these options can be explored. The guidance highlights Scottish Government's and thus, the Applicant's, commitment to supporting communities and allowing their voices to be heard in the planning and delivery of renewable energy projects.

## 15.5. Method of Assessment

### Socio-economic Baseline

- 15.5.1. This subsection summarises the baseline characteristics of the local area and compares them against a Scottish and national context in terms of population, industrial structure, critical strategic employers, unemployment and economic activity levels, income and earnings, and the relative economic importance of tourism. These are presented to demonstrate what impact the Proposed Development may have on the local area.
- 15.5.2. In order to provide a comparison, the following geographical areas were considered:
- Local: defined as THC area;
  - Regional area: Scotland; and
  - Great Britain: the national area, defined as England, Wales and Scotland. In some cases, due to data availability the UK (England, Wales, Scotland and Northern Ireland) was used.

<sup>22</sup> Scottish Government *Shared Ownership of Onshore Renewable Energy Developments (2019)* [Online] Available from - <https://www.gov.scot/publications/scottish-government-good-practice-principles-shared-ownership-onshore-renewable-energy-developments/> [Accessed: 14/07/2023]

<sup>23</sup> Office for National Statistics NOMIS – *Official Census and Labour Market Statistics*. [Online] [https://www.nomisweb.co.uk/reports/imp/la/1946157421/subreports/pop\\_time\\_series/report.aspx](https://www.nomisweb.co.uk/reports/imp/la/1946157421/subreports/pop_time_series/report.aspx) [Accessed: 14/07/2023]

### Population

- 15.5.3. Overall, THC area has experienced an increase in population between 2001 and 2020 with the biggest increase shown between 2001 and 2012 (11 %). The percentage change between 2012 and 2020 increased by 1.1 %. The population across Scotland and Great Britain experienced an increase in population between 2001 – 2020 of 7.4 % and 11.9 % respectively.
- 15.5.4. Table 15.5 outlines THC area and regional area and Great Britain overall population change in the years of 2001, 2012 and 2020.

Table 15.5: Population change: 2001, 2012 & 2020 at THC area, Scotland and Great Britain levels

	THC area (number of people)	Scotland (number of people)	Great Britain (number of people)
Population (2001)	208,900	5,064,200	57,424,200
Population (2012)	232,900	5,313,600	61,881,400
Population (2020)	235,400	5,466,000	65,185,700
% change			
2001 – 2012	11 %	4.9 %	7.7 %
2012 – 2020	1.1 %	2.9 %	5.3 %

Source: NOMIS – *Official Census and Labour Market Statistics*<sup>23</sup>, ONS *midyear population estimates*<sup>24</sup>

### Age Structure

- 15.5.5. The working age population for THC area has declined during the period of 2012 to 2020 along with a steady increase in retirement population from 2001 to 2020, which is likely to put additional pressure on services in the THC area.
- 15.5.6. In 2020, retirement age populations are approximately 4 % higher in the THC area than the Scottish average.
- 15.5.7. Table 15.6 shows the overall age structure for THC area, Scotland and Great Britain between the period of 2001 – 2020.

<sup>24</sup> National Records of Scotland (2022) *Mid-year Population Estimates for Scotland, mid-2021: Time series data*. [Online] Available from - <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.nrscotland.gov.uk%2Ffiles%2F%2Fstatistics%2Fpopulation-estimates%2Fmid-21%2Fmid-year-pop-est-21-time-series-data.xlsx&wdOrigin=BROWSELINK> [Accessed: 14/07/2023]

Table 15.6: Age structure between 2001-2020 at THC area, Scotland and Great Britain levels

Age Structure	THC area		Scotland		Great Britain	
	(number of people)	%	(number of people)	%	(number of people)	%
<b>2001</b>						
Children (0 – 15)	40,889	19.6	970,374	19	11,465,609	20
Working age (16 – 64)	133,200	63.8	3,286,645	64.9	36,809,800	64.1
Retirement age (65+)	34,790	16.7	807,181	16	9,148,769	16
<b>2012</b>						
Children (0 – 15)	40,888	17.6	914,626	17	11,601,404	19
Working age (16 – 64)	146,900	63.1	3,473,233	65.4	39,711,900	64.2
Retirement age (65+)	45,054	19.3	925,741	17	10,568,092	17
<b>2020</b>						
Children (0 – 15)	38,490	16.4	916,783	17	11,648,653	18
Working age (16 – 64)	142,900	60.7	3,493,137	63.9	40,665,300	62.4
Retirement age (65+)	54,001	22.9	1,056,080	19	12,871,771	20

Note: Percentages may not add up to 100% due to rounding.

Source: NOMIS and National Records of Scotland<sup>23</sup>. Statistics for children and retirement<sup>24</sup>

- 15.5.8. Working age populations in THC area<sup>25</sup> are expected to decrease to 135,944 in 2043. In contrast, retirement age populations are projected to increase to 64,033 in 2043.

## Industrial Structure

- 15.5.9. Comparable occupation figures at THC area, Scotland and Great Britain levels are presented in Table 15.7.

Table 15.7: Industrial Structure, 2021 – 2022

Standard Occupational Classification (SOC) 2010 Major Groups	THC area (%)	Scotland (%)	Great Britain (%)
SOC 2010 Major Group 1-3	41.1	48.3	51.4
1 Managers, Directors and Senior Officials	7.4	8.2	10.3
2 Professional Occupations	19.7	25.3	25.8
3 Associate Professional & Technical	14.0	14.8	15.0
SOC 2010 Major Group 4-5	20.6	18.5	18.7
4 Administrative & Secretarial	9.4	9.8	10.1
5 Skilled Trades Occupations	11.1	8.7	8.6
SOC 2010 Major Group 6-7	18.9	17.1	14.6
6 Caring, Leisure and Other Service Occupations	9.1	8.4	7.9
7 Sales and Customer Service Occupations	9.8	8.6	6.6
SOC 2010 Major Group 8-9	19.5	16.0	15.3
8 Process Plant & Machine Operatives	7.4	6.0	5.7
9 Elementary Occupations	12.1	10.0	9.6

Note: % are for those of 16+ and % is a proportion of all persons in employment

Source: ONS annual population survey<sup>26</sup>.

- 15.5.10. As can be seen from the information contained in Table 15.7, THC area has lower proportions of highly skilled populations, SOC major group 1 – 3 (41.1 %), in contrast to the Scotland (48.3 %) and Great Britain level (51.3 %). In addition, THC area has higher proportions of lower skilled populations in SOC major groups 4-5 (20.6 %), 6-7 (18.9 %) and 8-9 (19.5 %) in contrast to both Scotland and Great Britain levels.
- 15.5.11. Table 15.8 summarises the industry of employment across each spatial level.

<sup>25</sup> National Records of Scotland - Population Projects for Scottish Areas (2018-Based) [Online] Available from - <https://scotland.shinyapps.io/nrs-sub-national-population-projections/> [Accessed: 14/07/2023]

<sup>26</sup> NOMIS Official Census and Labour Market Statistics – Highland Labour Market Profile [Online] Available from - <https://www.nomisweb.co.uk/reports/lmp/la/1946157421/report.aspx> [Accessed: 14/07/2023]

Table 15.8: Industry of Employment at THC area, Scotland and Great Britain levels, 2021

Employment by industry	THC area (%)	Scotland (%)	Great Britain (%)
Mining and Quarrying	0.4	1.0	0.1
Manufacturing	5.5	7.1	7.6
Electricity, Gas, Steam and Air Conditioning Supply	1.1	0.7	0.4
Water Supply, Sewerage, Waste Management and Remediation Activities	1.8	0.8	0.7
Construction	7.3	6.1	4.9
Wholesale and Retail Trade, Repair of Motorcycles	15.6	14.4	14.4
Transportation and Storage	4.1	4.2	5.1
Accommodation and Food Service Activities	11.0	7.6	7.5
Information and Communication	2.1	3.1	4.5
Financial and Insurance Activities	0.7	3.1	3.6
Real Estate Activities	1.4	1.5	1.8
Professional Scientific and Technical Activities	4.6	6.5	8.9
Professional Scientific and Technical Activities	4.6	6.5	8.9
Administrative and Support Service Activities	5.5	8.0	8.9
Public Administration and Defence, Compulsory Social Security	5.5	6.6	4.6
Education	8.3	8.7	8.8
Human Health and Social Work Activities	17.4	15.9	13.7
Arts, Entertainment and Recreation	3.2	2.5	2.3

<sup>27</sup> No Qualifications = No formal qualifications held.

Other Qualifications = includes foreign qualifications and some professional qualifications.

NVQ 1 Equivalent = fewer than 5 GCSEs at grades A-C, foundation GNVQ, NVQ 1, intermediate 1 national qualification (Scotland) or equivalent.

NVQ 2 Equivalent = 5 or more GCSEs at grades A-C, intermediate GNVQ, NVQ 2, intermediate 2 national qualification (Scotland) or equivalent.

Employment by industry	THC area (%)	Scotland (%)	Great Britain (%)
Other Service Activities	1.8	1.8	1.9

Note: % is a proportion of total employee jobs excluding farm-based agriculture. Employee jobs excludes self – employed, government-supported trainees and HM Forces. Data excludes farm based agriculture

Source: ONS Business Register and Employment Survey: open access<sup>26</sup>.

15.5.12. A review of the industry of employment suggests THC area has a significantly higher proportion of construction, accommodation and food service activities and human health and social work activities in comparison to Scotland and Great Britain levels. In addition, there is a lower incidence of financial and insurance activities, professional scientific and technical activities and administrative and support service activities.

15.5.13. In terms of educational attainment levels, Table 15.9 shows THC area as having a higher proportion of residents with lower qualifications – National Vocational Qualification 2 (NVQ) and above, and NVQ1 and above – in contrast to Scotland and Great Britain levels. THC area has lower proportions (44.8%) of residents with higher qualifications in contrast to Scotland levels (50.0%). However, the local area shows lower proportions of residents with no qualifications in comparison to Scotland and Great Britain levels.

Table 15.9: Qualifications, 2021

Qualification <sup>27</sup>	THC area (%)	Scotland (%)	Great Britain (%)
NVQ4 and Above	44.8	50.0	43.6
NVQ3 and Above	62.3	64.8	61.5
NVQ2 and Above	83.8	79.6	78.1
NVQ1 and Above	91.2	86.4	87.5
Other Qualifications	#	5.8	5.9
No Qualifications	5.4	7.8	6.6

Note: # indicates sample size too small for reliable estimate. Numbers and % are for those of aged 16-64.

% is a proportion of resident population of area aged 16-64.

Source: ONS annual population survey<sup>28</sup>.

### Critical Strategic Local Employers

15.5.14. Data from 'Highlands and Islands Enterprise 2019 – 2022 Strategy'<sup>28</sup> describes the business base in the region as having 'a greater proportion of small and medium sized enterprises and a dominance of micro businesses, with the majority of employees working for an enterprise with fewer than 50 staff.'

15.5.15. The strategy also identifies tourism and the public sector as being the main employers. In recent decades, the region has diversified in particular with energy, life sciences, food and drink and creative industries which all offer a wider range of employment opportunities.

NVQ 3 Equivalent = 2 or more A levels, advanced GNVQ, NVQ 3, 2 or more higher or advanced higher national qualifications (Scotland) or equivalent.

<sup>28</sup> Highlands and Islands Enterprise 2019-2022 Strategy. [Online] Available from - <https://www.hie.co.uk/media/5006/strategyplusplanplus2019-2022-1.pdf> [Accessed: 14/07/2023]

15.5.16. In 2012 – 2013, according to ‘The Highland Council’s A Fairer Highland’<sup>29</sup>, the largest employer was THC with over 12,000 employees.

### Unemployment

15.5.17. Unemployment rate is an effective measure of economic performance and can allow for spatial comparisons to be made. Table 15.10 shows unemployment rates for 2021. The data shows the unemployment rate in THC area is lower than both Scotland and Great Britain levels.

Table 15.10: Unemployment Rates (2021 – 2022)

THC area (%)	Scotland (%)	Great Britain (%)
2.9	3.4	3.8

Source: ONS annual population survey<sup>26</sup>. Statistics are model based.

15.5.18. Employment levels in Scotland were severely impacted by the financial recession in 2008 with unemployment rates increasing by 67% between 2008 and 2011 (4.9% and 8.2% respectively). Similarly, the THC area’s unemployment rates increased from 3.4% to 5.3% during the same period however not as significantly. It has steadily fallen to reach an all-time low for the local area in 2019 at 2.8 % before increasing again around the time of the COVID-19 pandemic in 2020 at 3.1 % and increasing further to 3.5% in 2021.

15.5.19. Figure 15.1 illustrates the changes in unemployment rates across THC area, Scotland and Great Britain levels between 2004 – 2021.

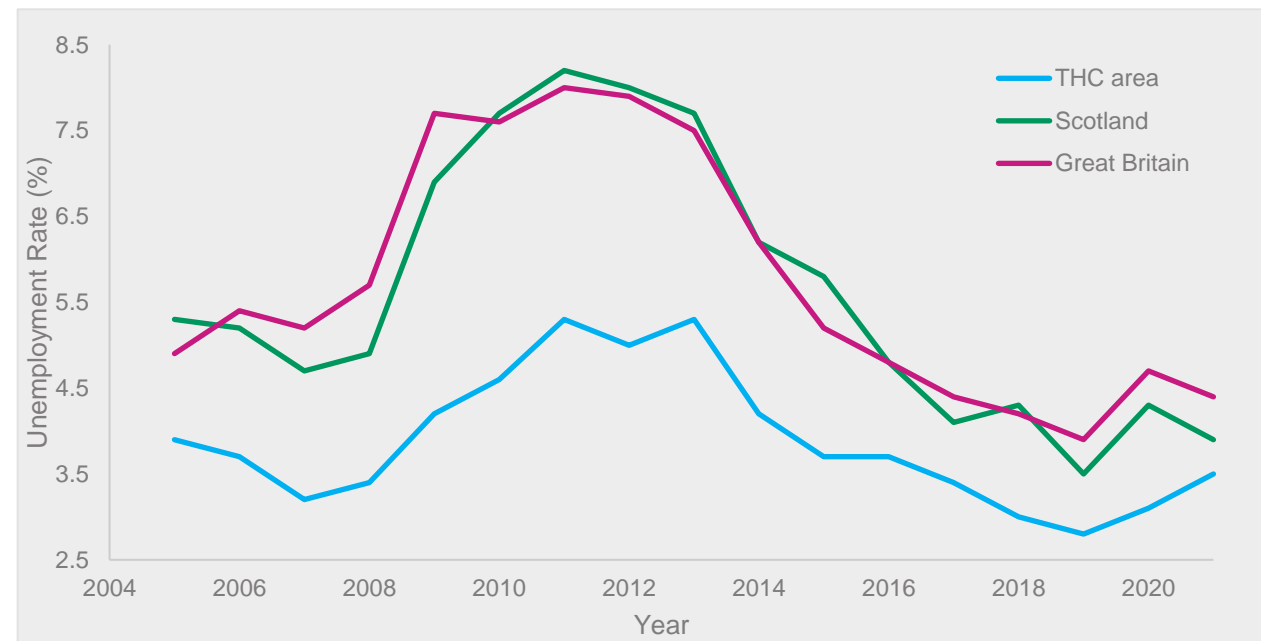


Figure 15.1: Unemployment Rate, 2005 – 2021

Source: ONS Annual Population Survey<sup>26</sup>

15.5.20. Rural areas typically exhibit an above average proportion of self-employed individuals. This is demonstrated in THC area (Table 15.11) where self-employed levels are higher (9.9%) than the Scotland average (7.7%). Overall, THC area’s economically active population (74.4%) is lower than Scotland (77.1%) and Great Britain (78.6%). In

addition, the proportion of retired people in THC area is particularly high (39.2%) compared to Scotland (14.9%) and Great Britain (13.7%) averages. Overall, THC area labour market appears to be marginally less dynamic than the Scotland and Great Britain average.

Table 15.11: Labour Market Profile

Jul 2021 – Jun 2022	THC area (%)	Scotland (%)	Great Britain (%)
Total economically Active (16-64)	74.4	77.1	78.6
In Employment	71.3	74.4	75.5
Employee	60.9	66.4	66.0
Self Employed	9.9	7.7	9.2
Unemployed	2.9	3.4	3.8
Total economically Inactive (16-64)	25.6	22.9	21.4
Retired	39.2	14.9	13.7
Student	#	23.9	27.1
Looking after family/home	#	16.8	19.7
Long-term sick	21.9	30.7	25.4
Other economically inactive	#	10.4	11.6

Note: # indicates sample size too small for reliable estimates. % is a proportion of those economically inactive, except total, which is a proportion of those aged 16 – 64

Source: ONS annual population survey<sup>26</sup>

### Economic Activity Levels

15.5.21. The economic activity rate is a useful measure of the labour market opportunities available in the area<sup>30</sup>. THC area has lower levels of economic activity relative to Scotland and Great Britain levels.

Table 15.12: Economic Activity Rate

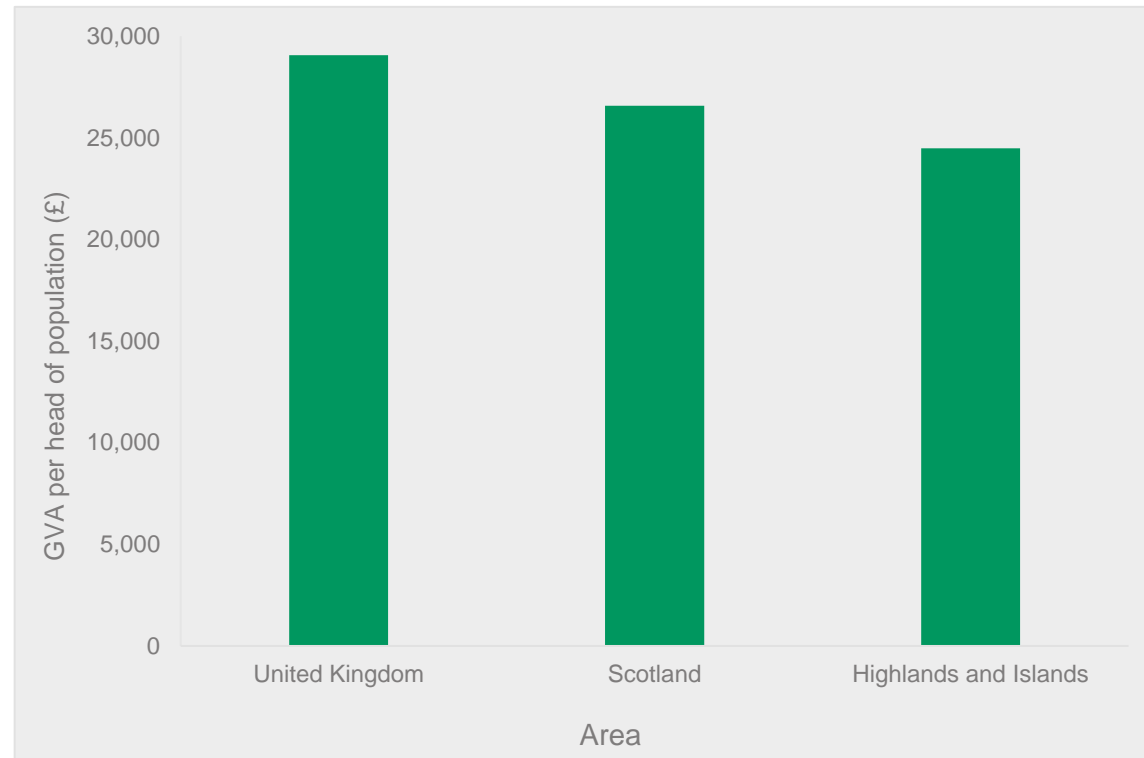
Jul 2021 – Jun 2022	THC area (%)	Scotland (%)	Great Britain (%)
Economically active (16 – 64)	74.4	77.1	78.6
Economically inactive (16 – 64)	25.6	22.9	21.4

Source: ONS Annual Population Survey

15.5.22. As shown in Figure 15.2, per capita output in 2020 (measured by GVA per head of population at current basic prices), for the Highlands and Islands was £24,487 (84% of national levels). Due to data availability, Highlands and Islands and United Kingdom GVA per head of population statistics were used for local and national levels respectively.

<sup>29</sup> The Highland Council Equality Plan: A Fairer Highland (2012- 2017) [Online] Available from - [https://www.highland.gov.uk/downloads/file/3531/equality\\_plan\\_2012-2017\\_-\\_a\\_fairer\\_highland](https://www.highland.gov.uk/downloads/file/3531/equality_plan_2012-2017_-_a_fairer_highland) [Accessed: 14/07/2023]

<sup>30</sup> The economic activity rate measures the percentage of the population, both in employment and unemployed that represents the labour supply regardless of their labour status. The figure represents the degree of success of the area in engaging people in the productive activity.



**Figure 15.2: GVA per Hear of Population (at current basic prices), 2020**

Source: *Regional Accounts 2020 (ONS)*<sup>31</sup>

15.5.23. In addition, the Gross Disposable Household Income (GDHI)<sup>32</sup> per head of population in 2020 for the Highlands and Islands was £19,826. In contrast to Scotland levels (£19,706) and Great Britain levels (£21,440). Further analysis indicates that the region of Caithness and Sutherland and Ross and Cromarty is fourth lowest out of six (£19,342) within the sub-regions of the Highlands and Islands.

### Tourism Employment

15.5.24. The level of tourism related employment in the THC area has increased from 2009 – 2017 (Table 15.13). In addition, the THC area has the third highest level of tourism jobs (2017) in Scotland after the City of Edinburgh and Glasgow City.

**Table 15.13: Tourism Employment, 2008 – 2017**

	Number of tourism jobs 2017	% change 2009 – 2012	% change 2012 – 2017	% change 2009 – 2017
THC area	16,000	0 %	22 %	22 %
Scotland	206,000	-5 %	13 %	8 %
Great Britain <sup>33</sup>	3,240,000	2.2 %	18 %	21%

Source: *VisitScotland using Scottish Government Growth Sector Statistics (October 2018)*<sup>34</sup>

### Predicted Spending on Accommodation and Local Business

- 15.5.25. Another impact of wind farms is the spending of workers when they visit wind farms and stay away from home. This will benefit accommodation, food and drink providers in the locality. This occurs throughout all stages of the wind farm development cycle.
- 15.5.26. RenewableUK<sup>35</sup> produced a report '*Onshore Wind: Direct & Wider Economic Impacts*' which detailed case study research on three projects using numbers of workers visiting an area, time spent in the area and levels of spending. This produced an estimation of the magnitude of economic impact to the local area. Based on this information, it was estimated that for every MW constructed, £7,500 is spent in the local area on accommodation and on food and drink. In relation to the Proposed Development, this would result in £357,000 (47.6 MW) being spent in the THC area.
- 15.5.27. An analysis of the nearest accommodation services was carried out to determine an example total indirect expenditure from accommodation used by construction using VisitScotland<sup>36</sup> (excluding Airbnb). Accommodation providers within 3.5 km were analysed (Bed and Breakfast (B&B) and self-catering cottage) and peak season rates per night were used. This produced a maximum average spend per night of £92.66 across June to August.

### Socio-economic Baseline Summary

- 15.5.28. THC area has experienced an increase in population between 2001 and 2020 with the biggest increase shown between 2001 and 2012. Working age populations have declined during the period of 2012 to 2020 in contrast to a steady increase in retirement populations.
- 15.5.29. In addition, working age and retirement populations are predicted to decrease and increase respectively in 2043.
- 15.5.30. THC area has lower proportions of highly skilled populations. In addition, there are lower incidence of financial and insurance activities, professional scientific and technical activities and higher proportion of construction, accommodation and food service activities and human health and social work activities in THC area.
- 15.5.31. THC area has higher proportion of residents with lower-level qualifications and lower proportion of higher level qualifications.

<sup>31</sup> Office for National Statistics *Regional gross value added (balanced) per head and income components (2023)* [Online] Available from - <https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalregionalgrossvalueaddedbalancedperheadandincomecomponents> [Accessed: 14/07/2023]

<sup>32</sup> Office for National Statistics *Regional gross disposable household income: all ITL level regions (2022)* [Online] Available from - <https://www.ons.gov.uk/economy/regionalaccounts/grossdisposablehouseholdincome/datasets/regionalgrossdisposablehouseholdincomegdhi> [Accessed: 14/07/2023]

<sup>33</sup> Stats Wales *Employee jobs in tourism-related industries by area and year* [Online] Available from - <https://statswales.gov.wales/Catalogue/Business-Economy-and-Labour-Market/People-and->

[Work/Employment/Jobs/Employees-Only/Business-Register-and-Employment-Survey-SIC2007/employeejobsintourismrelatedindustries-by-area-year](https://www.visitscotland.com/Work/Employment/Jobs/Employees-Only/Business-Register-and-Employment-Survey-SIC2007/employeejobsintourismrelatedindustries-by-area-year) [Accessed: 14/07/2023]

<sup>34</sup> VisitScotland *Insight Department: Tourism employment in Scotland (2018)* [Online] Available from - <https://www.visitscotland.org/research-insights/about-our-industry/tourism-employment> [Accessed: 14/07/2023]

<sup>35</sup> Renewable UK *Onshore Wind: Direct & Wider Economic Impacts (2012)* [Online] Available from - [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48359/5229-onshore-wind-direct--wider-economic-impacts.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48359/5229-onshore-wind-direct--wider-economic-impacts.pdf) [Accessed: 14/07/2023]

<sup>36</sup> Visit Scotland *Accommodation Search* [Online] Available from - <https://www.visitscotland.com/info/accommodation/search-results?prodtypes=acco&loc=The+Highlands&locpoly=131&locprox=0&stay=&endDate=&r1a=2&r1children=0&r1infants=0&r1c=0&avail=off> [Accessed: 14/07/2023]

- 15.5.32. Unemployment rates in THC area are slightly lower than the Scotland average.
- 15.5.33. Self-employed rates are higher in THC area along with retired populations and a lower economically active proportion of population.
- 15.5.34. Caithness and Sutherland (in which the Proposed Development is located) and Ross and Cromarty have the fourth lowest GDHI out of six overall across THC area.
- 15.5.35. Tourism employment is important for the local area with an increase occurring from 2009 – 2017. The percentage change between 2009 – 2017 was higher in THC area in comparison to the Scotland average. In addition, the THC area has the third highest level of tourism jobs in Scotland.
- 15.5.36. Predicted spending costs in the surrounding area of wind farm developments have the potential to generate £7,500 for every MW constructed. This results in £357,000 (47.6 MW) for the construction of the Proposed Development based on case study research.

## Tourism and Recreation Baseline

### Tourism Volume and Value

- 15.5.37. This section provides a tourism profile of THC area relative to Scotland in terms of visitor and tourist trends, tourism volume and value, visitor patterns, visitor accommodation occupancy rates and expenditure patterns, the most up-to-date sources of information have been used. Where necessary, figures and statistics for the Highlands and Islands have been used in place of THC area due to data availability.

### Profile of Tourism

- 15.5.38. The VisitScotland 'Insight Department: Highland Factsheet 2019'<sup>37</sup> provides an overall summary of tourism in the local area. Between 2017 and 2019, domestic day tourism spend equalled approximately £571 million per year on average.
- 15.5.39. The VisitScotland Highlands Visitor Survey 2015 & 2016<sup>38</sup> highlights the experience and behaviour of visitors to THC area. Scenery and landscape was identified a major attraction for visitors to THC area, more so than to almost any other part of Scotland. Visitors also praised the knowledge and service of accommodation staff and 8 out of 10 visitors thought the area was easy to travel around. Weaknesses included the availability of local produce and value for money of eating out, consistent with other Scottish regions.
- 15.5.40. The report noted the following key trends:
- The local area attracted 17 % of all overnight trips and 13 % of the total overnight tourism expenditure in Scotland;
  - The number of overnight visits was 30 % higher than in 2018 in THC area. Bed/nights and overnight spend also both increased by 23 %;
  - Scottish residents were the driver behind the strong regional performance in 2019. In addition, there was a big increase in overnight tourism from residents of England and Wales; and

<sup>37</sup> VisitScotland *Insight Department: Highland Factsheet (2019)* [Online] Available from - <https://www.visitscotland.org/research-insights/regions/highlands> [Accessed: 14/07/2023]

<sup>38</sup> VisitScotland *Scotland Visitor Survey 2015 & 2016 – The Highlands of Scotland* [Online] Available from - <https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-insights/scotland-visitor-survey-2015-2016.pdf> [Accessed: 14/07/2023]

<sup>39</sup> Venture North *Tourism for Caithness and Sutherland* [Online] Available from - <https://www.venture-north.co.uk/guides/wick->

- International travel to THC area declined in 2019 with number of trips dropping by 15 %.

- 15.5.41. The Proposed Development is situated on land approximately 3 km to the south-west of Watten. Watten is a small village in Caithness, close to Wick River and Loch Watten. Loch Watten is the largest body of water in Caithness<sup>39</sup>. Watten has a population of 714 according to the 2011 census<sup>40</sup>.

### Top Visitor Attractions

- 15.5.42. There are no top paid or free attractions within 15 km of the Proposed Development. According to Visit Scotland, all popular visitor attractions in THC area are located out with 15 km of the Proposed Development as shown in Table 15.14.

Table 15.14: Top free and paid visitor attractions in THC area

Top Sites (free of charge)	2019 Rank	2019 Number of visitors	Approximate distance from Proposed Development
Glencoe Visitor Centre	1	436,924	>15 km
Glenmore Forest Park	2	427,791	>15 km
Corrieshalloch Gorge	3	146,707	>15 km
Glen Affric	4	135,710	>15 km
Inverness Botanic Gardens	5	105,703	>15 km
Top Sites (Paid)	2019 Rank	2019 Number of visitors	Approximate distance from Proposed Development
Urquhart Castle	1	547,518	>15 km
Glenfinnan Monument	2	462,235	>15 km
Loch Ness by Jacobite	3	321,980	>15 km
Culloden Visitor Centre	4	209,011	>15 km
Dunvegan Castle & Gardens	5	176,534	>15 km

Source: *Insight Department: Highland Factsheet 2019*<sup>37</sup>

- 15.5.43. In addition, sites not included in the top visitor attraction category but considered popular within the area of Caithness East<sup>41</sup> include:

- Wick Heritage Museum (14.2 km to the east of Proposed Development);
- Castle Sinclair Girnigoe (15.8 km to the east of Proposed Development);
- Camster Cairns (8.3 km to the south of Proposed Development);

[east/watten#:~:text=Loch%20Watten%20is%20the%20largest,Trout%22%20after%20the%20local%20produce.](https://www.visitscotland.org/binaries/content/assets/dot-org/pdf/research-insights/scotland-visitor-survey-2015-2016.pdf) [Accessed: 14/07/2023]

<sup>40</sup> Athena Solutions, Watten Community Council *Watten Community Development Plan (2016)* [Online] Available from - <https://localenergy.scot/wp-content/uploads/2021/10/Watten-community-action-plan.pdf> [Accessed: 14/07/2023]

<sup>41</sup> Venture North *Tourism for Caithness and Sutherland Visitor Attractions* [Online] Available from - [https://www.venture-north.co.uk/plan/attractions?type\\_attraction=&area=1181](https://www.venture-north.co.uk/plan/attractions?type_attraction=&area=1181) [Accessed: 14/07/2023]

- Yarrows Archaeological Trail (11.5 km to the south east of Proposed Development);
- Clan Gunn Heritage Centre (17.5 km to the south of Proposed Development);
- Wick Harbour Authority (14.5 km east of the Proposed Development);
- Dunbeath Heritage Trust (21.5 km to the south of Proposed Development);
- North Lands Creative (15.3 km to the south of Proposed Development); and
- Lyth Arts Centre (12.4 km to the north east of Proposed Development).

15.5.44. In summary, Wick Heritage Museum, Camster Cairns, Yarrows Archaeological Trail, Wick Harbour Authority and Lyth Arts Centre are all located within 15 km of the Proposed Development. However, four out of five of these sites are beyond 10 km of the Proposed Development.

### Top Visitor Activities

15.5.45. Top visitor activities undertaken as part of a day trip in THC area include going out for a meal in a restaurant, café, hotel, pub (2.5 million) and sightseeing on foot (1.5 million). A lower number of visitors watched wildlife/bird watching (0.9 million) or visited a beach (0.7 million).

Table 15.15: Top visitor activities, 2016 – 2018

Activity	2016 – 2018 THC area rank	THC area 2016 – 2018 Annual Average Day Trips (millions)
Went for a meal in a restaurant, café, hotel, pub etc.	1	2.5
Sightseeing on foot	2	1.5
Long walk, hike or ramble (minimum of 2 miles/1 hour)	3	1.4
Visited friends for leisure	4	1.3
Went for a drink in a pub, club, hotel etc.	5	1.1
Short walk/stroll – up to 2 miles/1 hour	6	1.1
Visited family for leisure	7	1.1
Sightseeing by car	8	0.9
Watched wildlife, bird watching	9	0.9
Visited a beach	10	0.7

Source: Insight Department: Highland Factsheet 2019<sup>37</sup>

### Recreational Paths and Trails

15.5.46. Due to the higher susceptibility of receptors using promoted long-distance footpaths and cycle routes, recreational routes were identified in EIAR Chapter 6: Landscape and Visual Impact Assessment and Technical Appendix A6.7: Sequential Route Assessment within a radius of 15 km from the Proposed Development.

15.5.47. A total of 48 Core Paths were identified within 15 km from the Proposed Development of which 15 are included in the assessment due to their proximity to the Proposed Development and widespread theoretical visibility predicted.

15.5.48. The core paths cross a variety of landscapes including sweeping moorland, agricultural land, and the periphery of settlement. Views tend to be open with some screening occurring from landform, vegetation and buildings.

15.5.49. Table 15.16 Details the recreational routes identified and considered within the assessment of the Proposed Development.

Table 15.16: Recreational routes

Recreational Routes within 15 km of Proposed Development	Description
Core Path 8 – Loch More to Altnabreac	Located 11.3 km at its nearest point to the south west of the proposed turbines. From this footpath, extensive views across Loch More and the surrounding peatlands can be obtained including the distinctive profile of the Lone Mountains to the south.
Core Path 10 – Loch More to Dalnawillan	Located 13.4 km at its nearest point to the south west of the proposed turbines. From this footpath, extensive views across Loch More and the surrounding peatlands can be obtained including the distinctive profile of the Lone Mountains to the south.
Core Path 17 – Hill Orlig	Located 13.9 km at its nearest point to the north west of the proposed turbines. This Core Path accesses the small Hill of Orlig and transmitter mast. As a result of the slight increase of elevation, open and extensive views of the surrounding farmland can be experienced including distant views to the south across the peatlands of the Flow Country towards the Lone Mountains.
Core Path 60 – Ben Dorrery	Located 12.9 km at its nearest point to the north west of the proposed turbines, this Core Path accesses the hill of Ben Dorrery. Due to its elevation and the surrounding landscape being low-lying, extensive panoramic views of the Caithness landscape can be obtained, including the coastline and sea to the north and east across foreground farmland, and the peatlands forming the Flow Country to the south, backdropped by the lone mountains.
Core Path 61 - Causeymire	This Core Path utilises the access tracks between turbines within the Causeymire Wind Farm. Open views of the surrounding farmland to the north and peatlands to the south including distant views of the Lone Mountains can be obtained. Wind turbines and the supporting infrastructure form a key feature within views alongside neighbouring developments of Achlachan I, Bad a Cheo and Halsary.



Recreational Routes within 15 km of Proposed Development	Description
Core Path 64 – Achnarras Quarry	Achnarras Quarry is a nature reserve for fossils and is designated as a Special Site of Scientific Interest (SSSI).
Core Path 65 – The Old Quarry	The Old Quarry is located to the west of Spittal Museum and Community Centre. Views from the path are generally open with some screening occurring from landform and vegetation.
Core Path 70 – Dirlot Gorge Egress/Ingress	Located 6.5 km – 8.7 km at its nearest point to the south west of the proposed turbines, this Core Path accesses Dirlot Gorge.  Due to its elevation and the surrounding landscape being low-lying, extensive panoramic views can be obtained, including the peatlands forming the Flow Country to the south, backdropped by the lone mountains.
Core Path 105 – Achavanich and Munsary	Located 5.6 km at its nearest point to the south of the proposed turbines. Open view of the surrounding farmland and peatland can be obtained with forestry to the north along the ridgeline.
Core Path 126 – Blingrey Forest	Located 7.4 km at its nearest point to the south east of the proposed turbines, this track passes through Camster Forest but obtains open views at its western extent next to Camster Wind Farm.
Core Path 158 – Watten Roadside Link to Loch Watten Core Path 160 – Sports Pitch Core Path 161 – Watten to Camster Roadend Link Core Path 162 – Watten Riverside Link	These Core Paths are between 3.4 – 3.8 km at their nearest points and located in and around Watten. Wind turbines tend to be partially visible from the Core Paths in the mid-ground and influenced by screening from trees and woodland.
Core Path 177 – Wick to Ackergillshore by Roadside Footway	Located 13.6 km at its nearest point to the east of the proposed turbines.  Views from this Core Path tend to be open onto surrounding farmland and Wick Airport.

Source: EIA Technical Appendix A6.7: Sequential Route Assessment

15.5.50. The sensitivity is assessed as High for these core paths as they are being used for recreation and the users are appreciating the countryside views.

### UK Trips and Expenditure

15.5.51. The number of domestic tourist trips from Scotland and rest of Great Britain to THC area had a significant increase of 63% over the period of 2018 – 2019 (Table 15.17). In addition, total domestic overnight expenditure increased

by 35% over the same period. It is clear that THC area is more dependent on its Scottish domestic visitors in comparison to the rest of Great Britain as they make up more than half of the visitors (1,541,000) visiting during 2019.

Table 15.17: UK tourists to THC area by country of residence, 2019

Area	Visitors (annual average)			Domestic Tourism Expenditure (%)		
	THC area (000s)	Scotland (000s)	THC area % change (2018/19)	THC area (%)	Scotland (%)	THC area % change (2018/19)
Scotland	1,541	7,692	63 %	51 %	44 %	54 %
Rest of Great Britain <sup>42</sup>	906	6,119	21 %	49 %	56 %	21 %
Total (million)	2.4	13.8	45 %	£ 575	£3, 200	35 %

Source: VisitScotland Insight Department: Highland Factsheet 2019<sup>37</sup> and Insight Department: Key Facts on Tourism in Scotland 2019<sup>43</sup>

### Total Trips

15.5.52. The tourism profile of THC area is predominantly influenced by British residents to the regional area and in 2019, the number of overnight trips by British residents was at least 28 % higher than in any other year back to 2013<sup>37</sup>. In particular, residents of Scotland travelled much more to THC area in 2019 compared to previous years.

### Purpose of Travel

15.5.53. Table 15.18 details the purpose of both overseas and Great British trips to THC area. The majority of domestic and overseas tourists visit THC area for a holiday. In terms of UK trips, THC area have a proportionately greater number of holiday tourists than the Scottish average.

15.5.54. Compared to the Scottish average, there is a lower proportion of both overseas tourists and domestic visitors that are visiting friends or relatives. In addition, there are relatively few business trips for either domestic or overseas in THC area.

Table 15.18: Purpose of travel 2017 – 2019

	Overseas (%)		GB Trips (%)	
	THC area (2017 – 2019)	Scotland (2019)	THC area (2017 – 2019)	Scotland (2019)
Holiday	86	61	73	56
Visiting Friends or Relatives (VFR) <sup>44</sup>	11	25	17	29
Business	2	11	10	13
Other	1	3	1	2

Source: VisitScotland Highlands Factsheet (2019)<sup>37</sup> and Key Facts on Tourism in Scotland (2019)<sup>43</sup>

<sup>44</sup> VFR = Visiting Friends or Relatives

<sup>42</sup> Rest of Great Britain includes England and Wales

<sup>43</sup> VisitScotland Insight Department Key Facts on Tourism in Scotland (2019) [Online] Available from - <https://www.visitscotland.org/research-insights/about-our-industry/statistics> [Accessed: 14/07/2023]

## Accommodation

15.5.55. Using VisitScotland<sup>45</sup>, an accommodation search for THC area detailed 3,357 accommodation providers. A total of 30 providers were located within 15 km of the Proposed Development (Table 15.19). This search does not include Airbnb properties.

Table 15.19: Accommodation providers within 15 km of the Proposed Development

Accommodation	Type	Location	Number of bedrooms	Approx. distance from Proposed Development
Loneacre	Self-Catering	Watten	2	2.9 km NW
Auld Post Office	B&B	Watten	3	5.6 km NW
Loch Watten House	B&B	Watten	4	3.5 km NE
Ulbster Arms Hotel	Hotel	Halkirk	13	10 km NW
Church Court Cottage	Self-Catering	Halkirk	2	9.8 km NW
Dorrey View Cottage	Self-Catering	Halkirk	2	9.8 km NW
Stemster School House Apartment	Self-Catering	Halkirk	1	9.1 km N
The Clachan B&B	B&B	Wick	4	14 km E
Caithness View Lodges	Self-Catering	Wick	4	11 km NE
Howe Taft	Self-Catering	Wick	2	12 km NE
1 Thurdistoft Farm Cottage	Self-Catering	Thurso	2	14 km N
2 Thurdistoft Farm Cottage	Self-Catering	Thurso	2	14.3 km N
Braeside Retreats	Self-Catering	Thurso	2	14.9 km NW
Greenland House	B&B	Castletown	8	14.7 km N
The Castletown Hotel	Hotel	Castletown	28	15 km N
Aurora B&B	B&B	Murkle	2	15 km N

Accommodation	Type	Location	Number of bedrooms	Approx. distance from Proposed Development
Wick Lets	Serviced Apartments	Wick	2	14.7 km E
Corner Town House	Self-Catering	Wick	4	14.2 km E
The Queens Hotel	Hotel	Wick	8	13.9 km E
MacArthur House B&B	B&B	Wick	2	14.5 km E
Harbour House B&B	B&B	Wick	4	14.4 km E
Duncorann House	Self-Catering	Wick	4	14.2 km E
Mackays Hotel	Hotel	Wick	30	14 km E
Mackays Hotel Villa and Apartments	Services Apartments	Wick	5	14 km E
Norseman Hotel	Hotel	Wick	48	13.9 km E
Nethercliffe Hotel	Hotel	Wick	6	14 km E
The Lighthouse Keeper's Cottage	Self-Catering	Wick	3	15.8 km E
Ganscleet Croft	B&B	Thrumster	1	13 km SE
Secret Glamping at Mill Farm	Glamping	Thrumster	-	13 km SE
Bulchatton Cottage	Self-Catering	Lybster	2	15 km SE

Source: VisitScotland 'The Highlands' Accommodation Search

15.5.56. It is clear that the majority of accommodation providers (14) are in and around Wick situated between 11 – 15 km from the Proposed Development. In addition, there is a wider range of accommodation types including Hotels, Self-Catering and Guest Houses/B&Bs. It is also interesting to note the scale of bed spaces is limited with only 3 accommodation providers with 28 or more bedrooms, two of which are located in Wick. This suggests the local area (up to 15 km from the Proposed Development) may be seen as more of a day visit destination than an overnight visit location.

15.5.57. Table 15.20 shows the accommodation providers by location and type.

<sup>45</sup> VisitScotland Accommodation Search [Online] Available from - <https://www.visitscotland.com/info/accommodation/search->

[results?prodtypes=acco&loc=The+Highlands&locpoly=131&locprox=0&stay=&endDate=&r1a=2&r1children=0&r1infants=0&r1c=0&avail=off](https://www.visitscotland.com/info/accommodation/search-?prodtypes=acco&loc=The+Highlands&locpoly=131&locprox=0&stay=&endDate=&r1a=2&r1children=0&r1infants=0&r1c=0&avail=off) [Accessed: 14/07/2023]

Table 15.20: Accommodation providers by location and type

	Hotels	Guest House/B&Bs	Self-Catered	Camping and Caravan Sites	Total
Watten		2	1		3
Halkirk	1		3		4
Wick	4	3	7		14
Thurso			3		3
Castleton	1	1			2
Murkle		1			1
Thrumster		1		1	2
Lybster			1		1
Total	6	8	15	1	30

15.5.58. Self-Catered accommodation is most common (15) in contrast to the small number of hotels (6) and camping and caravan sites (1) in the surrounding area. This suggests the local area is a place for family holidays, activity holidays and short breaks.

15.5.59. In THC area, most domestic tourists chose to stay in a hotel or B&B/Guest House/Restaurant with Rooms (Table 15.21). This is similar to Scotland's average annual occupancy for hotels at 41% however much lower for occupancy of B&B/Guest Houses at 20 %.

Table 15.21: Accommodation used in 2015 &amp; 2016

	THC area	Scotland
Hotel	40 %	41 %
B&B/Guest House/Restaurant with Rooms	40 %	20 %
Self-Catering	20 %	22 %
Camping	13 %	6 %
Friends/Family	10 %	19 %

Source: Scotland Visitor Survey 2015 & 2016<sup>38</sup>

### Occupancy

15.5.60. As would be expected, occupancy rates in THC are highest during the main holiday season however hotel occupancy in autumn is higher than spring compared to the other accommodation providers. The highest occupancy across the whole year are hotels (70%) which is similar to the annual average for all of Scotland (71%) (Table 15.22).

15.5.61. Self-catering (55 %) and hostels (60%) in THC area have a higher occupancy average compared to Scotland.

Table 15.22: Occupancy in THC area , 2019

	Hotel (%)	Guest House (%)	Self-Catering (%)	Hostel (%)
Winter	45	9	34	39
Spring	69	38	54	61
Summer	86	76	74	76
Autumn	72	37	49	51
Average for region	70	44	55	60
Annual average for all of Scotland	71	50	48	41

Source: Visit Scotland Highlands Factsheet 2019<sup>37</sup>. To note: percentages may not add up due to rounding.

### Cultural Heritage Tourism

15.5.62. In terms of cultural heritage tourism, the Cultural Heritage Assessment (see Chapter 10 of this EIAR) identified three known non-designated heritage assets recorded on the Historic Environment Record within the Inner Study Area (ISA). In addition the assessment identified a further 14 features of potential cultural significance within the ISA. Of the 17 identified cultural heritage features, 11 are of Low importance.

15.5.63. Within 2 km of the proposed turbines, four scheduled monuments and 42 non-designated heritage assets are located. There are 13 scheduled monuments, one Category A listed building and one Category B listed building within 2-5 km. Within 5 km - 10 km of the proposed turbines, there are 36 scheduled monuments and within 10 km - 20 km there are 16 Category A listed buildings and nine scheduled monuments.

15.5.64. There are Inventory Gardens and Designed Landscapes, Conservation Area or Inventory Battlefields within the ISA or Outer Study Area (OSA). Similarly, there are no World Heritage Sites (WHS) in the ISA or OSA.

15.5.65. Five scheduled monuments (SMs), one Category A listed building (LB) and one non-designated heritage asset were assessed in Chapter 10.

15.5.66. The majority of the heritage assets identified are not classed as tourism attractions. There are no residual construction effects anticipated as a result of appropriate mitigation agreed with THC Historic Environment Team and similarly, residual operational effects of **minor, adverse significance** are anticipated upon four SMs which are not considered as residual effects.

15.5.67. Further details are disclosed in Chapter 10 of the EIAR.

### Tourism Baseline Summary

15.5.68. Across THC area, the tourism sector is heavily reliant on the domestic market in terms of visitor numbers and expenditure. The strong drive-in regional performance in 2019 was through domestic tourism with Scottish residents travelling much more to THC area compared to previous years.

15.5.69. Scottish tourists made up more than half of the visitors visiting during 2019 compared to the rest of Great Britain.

15.5.70. International travel to THC area declined in 2019 with the number of trips and bed/nights dropping by 15 % and 5 % respectively.

15.5.71. Total domestic overnight expenditure increased by 35 % over 2018 – 2019.

15.5.72. Majority of domestic and overseas tourists visit THC area for a holiday.

- 15.5.73. A total of 30 accommodation providers were located within 15 km of the Proposed Development with the majority of providers being self-catering. This was in contrast to the small number of hotels in the surrounding area.
- 15.5.74. Residual effects on cultural heritage assets identified have been assessed as Not Significant as a result of the Proposed Development therefore cultural heritage tourism is highly unlikely to experience a significant adverse effect from the Proposed Development.

## 15.6. Assessment of potential effects

### Development and Construction

- 15.6.1. This section assesses the potential economic effects from the Proposed Development, during the development and construction including direct employment, supplier effects and income effects (in terms of GVA impact).
- 15.6.2. The Proposed Development will also present job opportunities at a local, regional and UK level throughout the life cycle of the project; specific numbers are presented. For the purposes of this section, the terminology is consistent with the RenewableUK publication<sup>46</sup> e.g. for spatial area, local, regional and UK terms area used.
- 15.6.3. Should the Proposed Development be granted consent, employment opportunities will be available during the consent condition discharge stage and continue through to the construction phase, with opportunities for local contractors. Further positive supply chain impacts on local, regional and national levels are also expected.
- 15.6.4. Should the Proposed Development be granted consent it is expected that there will be employment opportunities for managing the satisfaction of conditions requirements with THC and commissioning of relevant preconstruction surveys.
- 15.6.5. The following method for sourcing the direct economic effects during the development and construction phase is grounded on RenewableUK research<sup>46</sup>, carried out by BiGGAR Economics, to discover the economic impacts of onshore wind developments.
- 15.6.6. Based on the research, the total cost of development per MW installed ranged from £11,000 to over £700,000. The weighted average cost was £150,216 per MW installed. For the basis of this assessment, it has been assumed the RenewableUK estimate is appropriate, as it was based on a larger sample of existing projects which equates to a total development expenditure ('devex') for the Proposed Development (47.6 MW) of £7,150,282 (£7.2 million).
- 15.6.7. The RenewableUK research estimated the average construction cost per MW to be around £1,318,875 (£1.32 million), however, this rate varies between ±15% depending on the precise nature of each development. Similarly, to cost of the development estimate, it has been assumed the RenewableUK estimate of £1.32 million per MW is appropriate which equates to a total construction expenditure ('capex') in the region of £62,776,450 (£62.8 million) for the 47.6 MW development.
- 15.6.8. The RenewableUK research has previously given indication for how these total expenditures would be apportioned geographically, finding that on average the majority, 98%, of devex spend is in the UK, including 13% spent in the local area and 59 % spent at a regional level. On average, 47% of capex was spent in the UK, 36 % at the regional level and 12 % at the local level. These figures can be extrapolated for the Proposed Development using the total devex (£7.2 million) and capex (£62.8 million) estimates for the Proposed Development.
- 15.6.9. Table 15.23 summarises the development and construction costs across each area.

Table 15.23: Development and construction costs

Spatial Area	% of Total Development Spend	£ Equivalent per annum (Development)	% of Total Construction Spend	£ Equivalent per annum (Construction)
Local	13 %	£929,537	12 %	£7,533,174
Regional**	59 %	£4,218,666	36 %	£22,599,522
UK*	98 %	£7,007,276	47 %	£29,504,932

\*the figures for UK include the Scottish values.

\*\* the figures for Scotland include the local values.

Note – Excludes non-UK devex (2 %) and non-UK capex (53 %).

- 15.6.10. The contract data from RenewableUK's case study research assessment has been combined with turnover per employee data and ratio of GVA to turnover for relevant industries (Table 15.24). These tables also show the breakdown of development and construction costs into each of the main components of the work, based on the case study data.

Table 15.24: GVA and employment ratios (Development Phase)

Indicator	Turnover per Employee (£)	GVA/Turnover
Project Development	£120,965	0.569
Legal and Financial	£87,041	0.777
Environmental Impact Assessment	£101,102	0.653
Development Total	£103,036	0.666

Source: RenewableUK/BiGGAR Economics Table 2. Data taken from ONS Annual Business Survey 2013, 2014<sup>46</sup>

- 15.6.11. Table 15.25 shows that the turbine contracts for manufacture, assembly and transport account for the majority of the value of the construction contracts, accounting for 64.4%. The balance of plant contracts account for 28.6% and the grid connections account for 7.1%. Therefore, the weighted average for construction shows there is one employee per £137, 942 in turnover and a GVA/Turnover rate of 0.432.

Table 15.25: GVA and employment ratios (Construction Phase)

Indicator	Turnover per Employee (£)	GVA/Turnover
Balance of Plant Contract	£150,194	0.458
Turbine Contract	£129,672	0.422
Grid Connections Contract	£163,802	0.419
Construction Total	£137,942	0.432

Source: RenewableUK/BiGGAR Economics Table 6. Data taken from ONS Annual Business Survey 2013, 2014

- 15.6.12. Applying the assumptions set out in Tables 15.24 and 15.25, GVA and employment ratios provides an estimate on the level of employment at the local, Scottish and UK level.
- 15.6.13. At the development phase, the level of employment at the regional level for the Proposed Development (47.6 MW) is estimated to be around 40.94 jobs, contributing £2.8 million in GVA (see Table 15.25). At the construction phase,

<sup>46</sup> RenewableUK *Onshore Wind: Direct & Wider Economic Impacts* (2012) [Online] Available from - [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48359/5229-onshore-wind-direct-wider-economic-impacts.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48359/5229-onshore-wind-direct-wider-economic-impacts.pdf) [Accessed: 14/07/2023]

the Proposed Development could sustain approximately 163.83 jobs, contributing £9.8 million in GVA (see Table 15.26).

**Table 15.26: Economic impact of the Proposed Development (Development Phase)**

Spatial Area	Jobs	GVA (£)	Turnover (£)
Local	9.02	£619,072	£929,538
Regional	40.94	£2,809,632	£4,218,667
UK	68.00	£4,666,846	£7,007,276

15.6.14. At the local level, the construction phase of the Proposed Development could sustain up to 9.02 jobs and contribute £619,072 in GVA (see Table 15.27). In the construction phase, the Proposed Development could sustain up to 54.61 jobs and contribute £3.3 million in GVA (see Table 15.27).

**Table 15.27: Economic impact of the Proposed Development (Construction Phase)**

Spatial Area	Jobs	GVA (£)	Turnover (£)
Local	54.61	£3,254,331	£7,533,174
Regional	163.83	£9,762,994	£22,599,522
UK	213.89	£12,746,131	£29,504,932

15.6.15. Although construction impacts are usually one-off in nature, they will be lasting up to 24 months and therefore are considered to have a meaningful benefit to the local economy. The forecasted scale of employment and GVA impact during the construction phase can be seen as having a positive effect on both the local and regional economies. It is also expected that during the construction phase there will be positive impacts on the local area's hospitality sector with construction site workers residing in accommodation locally to the Proposed Development, using local shopping and catering facilities etc.

15.6.16. The supply chain, or indirect impacts are also likely to benefit from the Proposed Development as construction activity typically has strong beneficial cascading effects with other sectors such as, building, manufacturing etc and therefore lead to job creation elsewhere in the local economy.

15.6.17. The temporary employment supported by the construction and development of the Proposed Development may be a noticeable change in THC area economy, but not in any of the other study areas. Therefore, the magnitude of this impact was assessed as **low** in the local area and **negligible** at regional and national levels.

15.6.18. On this basis, the effect of spending on construction and development contracts was assessed as **minor** (beneficial) for the local area and **negligible** (beneficial) at regional and national levels.

## Operations and Maintenance

15.6.19. This section analyses the potential economic effects during the operational and maintenance phase of the wind farm including direct employment, supplier effects and income effects (in terms of GVA impact). These effects will differ in their scale, duration and geographic coverage.

15.6.20. In the event of decommissioning, or replacement of the wind turbines, it is anticipated that the likelihood of socio-economic effects is similar to, or less than, that expected during construction. Decommissioning would be undertaken in line with best practice processes and methods at that time and will be managed through consultation with relevant consultees. It is expected that decommissioning would be the subject of a condition. An Outline CEMP has been included in Technical Appendix A5.1 of this EIAR.

15.6.21. The method presented for sourcing the direct economic effects during the operational phase is grounded on the same RenewableUK research as described above.

15.6.22. According to the research, the annual cost of operations and maintenance per MW installed ranges from £23,000 to £130,000 per annum. The operations and maintenance costs are affected by the size of development, land contracts and whether turbines are still under warranty.

15.6.23. Applying values calculated from RenewableUK research, the estimated weighted average operational expenditure ('opex') for onshore wind is £59,867 per MW installed per annum. Therefore, using this estimate, the total opex for the Proposed Development (47.6 MW) is approximately £2,849,669 (£2.8 million).

15.6.24. The RenewableUK research has previously given indication for how this total cost would be apportioned geographically. The vast majority, 87 %, of the operation and maintenance spend is within the UK, including 42 % spent in the local area and 58 % spent at a regional level.

15.6.25. Table 15.28 summarises the operation and maintenance costs across each spatial level based on the total opex, £2.8 million, calculated for the Proposed Development.

**Table 15.28: Operational and maintenance costs per annum**

Spatial Area	% of Spend	£ Equivalent per annum
Local*	42 %	£1,196,861
Regional*	58 %	£1,652,808
UK	87 %	£2,479,212

\* the figures for UK include region/nation and the figures for region/nation include local.

Note: Excludes non-UK operation related expenditure (13 %)

Source: BiGGAR Economics Case Studies<sup>46</sup>

15.6.26. The contract data from the case study assessment (i.e. turnover data) has been combined with turnover per employee data and ratio of GVA to turnover for relevant industries (Table 15.29). This table also shows the breakdown of operation and maintenance costs into each of the main components of work, based on the case study data.

Table 15.29: GVA and employment ratios

	Turnover per employee (£)	GVA/Turnover	% of Spend
Turbine Maintenance	£154,923	0.364	31 %
Site Maintenance	£109,844	0.440	6 %
Operational Management	£122,500	0.584	11 %
Land Agreements	£49,744	0.360	14 %
Habitat Management costs	£83,600	0.337	0 %
Non-domestic rates (business rates)	n/a	0.500	6 %
Community Benefit	£47,967	0.418	24 %
Other (Average)	£86,741	0.418	24 %
Operational and Maintenance Total	£121,935	0.430	100 %

Source: RenewableUK/BiGGAR Economics Table 9. Data taken from ONS Annual Business Inquiry 2010<sup>46</sup>

- 15.6.27. Applying the assumptions from RenewableUK, set out in Table 15.29, provides an estimate on the level of employment at the operational phase for local, regional and national levels.
- 15.6.28. This gives the level of employment at the regional level for the operational phase of the Proposed Development as approximately 13.55 jobs, contributing £710,707 in GVA. At the local level, the operational phase of the Proposed Development is expected to sustain approximately 9.82 jobs, contributing £514,650 in GVA (Table 15.30).

Table 15.30: Economic impact of the Proposed Development (Operational and Maintenance)

Spatial Area	Jobs	GVA (£)	Turnover (£)
Local	9.82	£514,650	£1,196,861
Regional	13.55	£710,707	£1,652,808
UK	20.33	£1,066,061	£2,479,212

- 15.6.29. The forecasted scale of employment and GVA impact during the operational phase can be seen as having a positive effect on both local and regional economies.
- 15.6.30. The magnitude of potential operational effects was assessed as **low** with respect to the local and regional economy as a whole.
- 15.6.31. In this way, the effect of expenditure on operations and maintenance contracts was assessed as **negligible** (beneficial) with respect to local economy and **negligible** (beneficial) with reference to the regional economy as a whole.

<sup>47</sup> Scottish Government (2008) *Economic impacts of wind farms on Scottish tourism: research findings*. [Online] Available from - <https://www.gov.scot/publications/economic-research-findings-economic-impacts-wind-farms-scottish-tourism/> [Accessed 14/07/2023]

## Tourism and Recreation

### Literature Review

- 15.6.32. A growing body of research regarding the opinions of tourists towards wind farms exists. Extracts from the key findings and the potential impact of the Proposed Development are summarised. Overall, this research tends to support the premise that wind farm development has not resulted in a serious negative economic impact on tourism and could even have wider positive impacts. While some of this research is dated it remains relevant and there has been no more recent research and perhaps more importantly no research to dispute this.

### Economic impacts of wind farms on Scottish tourism: research findings (Scottish Government, 2008)<sup>47</sup>

- 15.6.33. Research from Scottish Government has suggested that wind farms have a minor impact on visitor activity with evidence detailing 93-99 % of tourists that has seen a wind farm in the local area suggested that the experience would not have any effect on their decision to return to that area, or to Scotland as a whole. Furthermore, 48% of visitors were positive regarding the statement 'I like to see wind farms' with a further 24 % neutral, resulting in a minority of 28% of tourists preferring landscapes without wind farms.

### VisitScotland Wind Farm Consumer Research (2011)<sup>48</sup>

- 15.6.34. Key findings from this research found 83 % of Scotland respondents (80% of UK) stated their decision to holiday in the UK would not be affected by the presence of a wind farm. A further 80% of Scotland respondents (81% of UK) either disagreed, or neither agreed nor disagreed, that wind farms spoil the look of the Scottish countryside.
- 15.6.35. Overall, the research suggests that, at the current time, the overwhelming majority of consumers do not feel wind farms spoil the look of the countryside.

### Wind Farms and Tourism Trends in Scotland (BiGGAR Economics, 2017)<sup>49</sup>

- 15.6.36. In 2017, BiGGAR Economics undertook an analysis examining the relationship between wind farm developments and tourism. The study looked at wind farms constructed between 2009 and 2015 and tourism at the national, regional and local level during the same period.
- 15.6.37. Analysis found that during this time period, the number of wind farms increased across Scotland, and in almost all local authority areas, while employment in sustainable tourism also grew substantially. The analysis also found no correlation between tourism employment and the number of turbines at the national or local authority area.
- 15.6.38. In addition, no link was found between the development of a wind farm and tourism related employment. In 21 out of the 28 areas considered, employment in sustainable tourism grew. In 22 out of the areas, employment either grew faster or decreased less than the rate for the relevant local authority area as a whole.
- 15.6.39. Overall, the conclusion of this study found no relationship between the development of onshore wind farms and tourism employment at the level of Scottish economy, at the local authority level or in the areas immediately surrounding the wind farm development.

<sup>48</sup> VisitScotland (2011) *Wind Farm Consumer Research*. [Online] Available from - <https://ascogfarm.com/wp-content/uploads/2020/07/RES-CD-TOU-006.pdf> [Accessed 14/07/2023]

<sup>49</sup> BiGGAR Economics *Wind Farms and Tourism Trends in Scotland (2017)* [Online] Available from - [Microsoft Word – Wind Farms and Tourism Trends in Scotland Oct17.docx \(rwe.com\)](https://www.rwe.com/~/media/Files/2017/10/Wind_Farms_and_Tourism_Trends_in_Scotland_Oct17.docx) [Accessed: 14/07/2023]

### Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms (BiGGAR Economics, 2021)<sup>50</sup>

- 15.6.40. The most recent research on the economic impact of wind farms on tourism was published by BiGGAR Economics in 2021. The study was carried out to find empirical evidence of a relationship between the development of onshore wind farms and the tourism sector in Scotland.
- 15.6.41. The analysis of trends at the local authority area found no relationship between the growth in the number of wind turbines and the level of tourism employment. In addition, the analysis considered the possibility of more local effects, through examining tourism-related employment in the immediate vicinity of 16 wind farms. This analysis found that in the majority of cases, tourism-related employment in the vicinity of wind farms had outperformed the trend for Scotland as a whole and for the local authority area in which the wind farm was based.
- 15.6.42. Overall, from the analysis of 44 wind farm case studies in Scotland, the research has provided a substantial evidence base to determine that there was no relationship between wind farm development and trends in tourism employment at the level of the Scottish economy, across local authority areas nor in the locality of wind farm sites.

### Public Attitudes Tracker: Energy Infrastructure and Energy Sources (Department for Business, Energy & Industrial Strategy (BEIS), 2021)<sup>51</sup>

- 15.6.43. A national tracker survey outlined that support for renewable energy has been consistently high, with 87 % expressing support for the use of renewables, whilst opposition to renewables was very low at 1 %. And more specifically, the national tracker found that 90 % support onshore wind, with only 4 % opposing it.

### Local Attractions

- 15.6.44. According to the ranked free and paid visitor attractions by VisitScotland there are no top free or paid visitor attractions within 15 km of the Proposed Development. therefore, it is considered highly unlikely that the Proposed Development will lead to a change in visitor behaviour (negligible magnitude). Therefore, the effect has been assessed as **negligible**.
- 15.6.45. Sites that have not been included in the top visitor attraction category but still considered popular within the area of Caithness East are all out with 10 km from the Proposed Development apart from Camster Cairns which are located 8.3 km to the south of the Proposed Development. Therefore, it is considered highly unlikely that the Proposed Development will lead to a change in visitor behaviour (negligible magnitude) for the sites located out with 10 km from the Proposed Development. Therefore, the effect has been assessed as **negligible**.
- 15.6.46. The Camster Cairns<sup>52</sup> are two of the oldest stone monuments in Scotland. The monuments are a pair of Neolithic tombs – a long cairn and a round cairn - built more than 5,000 years ago. The cairns are sited on the windswept moor in the middle of Caithness 'Flow Country'. It is understood that this attraction does not have a substantial number of visitors and as such it is likely considered to be of mainly local importance (low sensitivity). It is also unlikely that the key features (such as local heritage) will be adversely affected and therefore the magnitude has been assessed as low. Therefore, the effect has been assessed as **negligible**.

<sup>50</sup> BiGGAR Economics. (2021) *Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms*. [Online] Available from - <https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf>. [Accessed: 14/07/2023]

<sup>51</sup> Department for Business, Energy & Industrial Strategy. (2021) *BEIS Public Attitudes Tracker: Energy Infrastructure and Energy Sources, Autumn 2021, UK* [Online] Available from –

### Accommodation

- 15.6.47. The VisitScotland search identified one accommodation provider within the local area of the Proposed Development (1-3 km). Loneacre (self-catering) is situated 2.9 km north-west of the Proposed Development. The accommodation provider is small offering two bedrooms which suggests mainly local economic importance (low sensitivity). The rural location, outdoor activities, quality of views and proximity to the towns of Thurso and Wick are considered to be key features. Therefore, the magnitude has been assessed as medium. Therefore, the effect has been assessed as **minor**.
- 15.6.48. Similarly, Loch Watten House (B&B) is located 3.5 km to the north-east of the Proposed Development. It is a small B&B with four rooms which suggests mainly local economic importance (low sensitivity). The rural location, proximity to Loch Watten and Scrabster or Gills Bay to Orkney ferry are considered to be key features. Therefore, the magnitude has been assessed as medium. Therefore, the effect has been assessed as **minor**.
- 15.6.49. The Auld Post Office (B&B) is located 5.6 km to the north-west of the Proposed Development. It is considered to be mainly of local economic importance (low sensitivity). The rural location, local walks around the coastline and proximity to the ferries to Orkney Islands are considered to be key features. Therefore, the magnitude has been assessed as medium. Therefore, the effect has been assessed as **minor**.
- 15.6.50. Three self-catering accommodation providers and a hotel are situated in Halkirk between 9.1 – 10 km north and north-west of the Proposed Development. The three self-catering accommodation providers are assessed as being of local economic importance (low sensitivity) and due to the substantial distance from the Proposed Development, impacts are unlikely (negligible magnitude). Therefore, the effect has been assessed as negligible. The Ulbster Arms Hotel situated 10 km north-west of the Proposed Development, is assessed as having local/regional importance (medium sensitivity) however due to the substantial distance from the Proposed Development, impacts are unlikely (negligible magnitude) and therefore, the effect has been assessed as **negligible**.
- 15.6.51. A large number of accommodation providers are situated in and around Wick between 11-15.8 km from the Proposed Development. This includes one of the largest accommodation providers in the VisitScotland search – Norseman Hotel – with 48 bedrooms located 13.9 km east of the Proposed Development. This is assessed as having local/regional economic importance (medium sensitivity) however due to the substantial distance from the Proposed Development, impacts are unlikely to be experienced (negligible magnitude). Therefore, the effect has been assessed as **negligible**.
- 15.6.52. Three self-catering accommodation providers are situated in Thurso, 14.0 km – 14.9 km north and north west of the Proposed Development and are likely to be of mainly local economic importance (low sensitivity). In addition, due to the substantial distance from the Proposed Development, impacts are unlikely to be experienced (negligible magnitude). Therefore, the effect has been assessed as **negligible**.
- 15.6.53. Two accommodation providers are situated in Castletown (hotel and B&B), 14.7 -15 km north of the Proposed Development. The hotel is considered to be of mainly local/regional economic importance (medium sensitivity) due to its larger scale and bedrooms it offers whereas the B&B is local economic importance (low sensitivity). However, due to the substantial distance for both accommodation providers from the Proposed Development, it is considered that impacts are unlikely to be experienced (negligible magnitude). Therefore, the effect for both accommodation providers has been assessed as **negligible**.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1040725/BEIS\\_PAT\\_Autumn\\_2021\\_Energy\\_Infrastructure\\_and\\_Energy\\_Sources.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1040725/BEIS_PAT_Autumn_2021_Energy_Infrastructure_and_Energy_Sources.pdf) [Accessed: 14/07/2023]

<sup>52</sup> Historic Environment Scotland *Grey Cairns of Camster* [Online] Available from - <https://www.historicenvironment.scot/visit-a-place/places/grey-cairns-of-camster/> [Accessed: 14/07/2023]

- 15.6.54. There is one B&B accommodation provider located in Murkle, 15 km north of the Proposed Development. The B&B is considered to be of mainly local economic importance (low sensitivity) and due to the substantial distance from the Proposed Development, impacts are unlikely to be experienced (negligible magnitude). Therefore, the effect has been assessed as **negligible**.
- 15.6.55. A further two accommodation providers (B&B and glamping) are located in Thrumster, 13 km south east of Proposed Development. These are both considered to be of mainly local economic importance (low sensitivity). In addition, due to the substantial distance from the Proposed Development, impacts are considered to be unlikely (negligible magnitude) therefore the effect has been assessed as **negligible**.
- 15.6.56. One self-catering accommodation provider is located in Lybster, 15 km south-east of the Proposed Development. It is considered to be of mainly local economic importance (low sensitivity). In addition, due to the substantial distance from the Proposed Development, impacts are considered to be unlikely (negligible magnitude) therefore the effect has been assessed as **negligible**.

### Recreational Paths and Trails

- 15.6.57. Recreational paths and trails have been identified within 15 km of the Proposed Development and the potential reduction in recreational amenity has been assessed. There are a number of potential ways that the Proposed Development could affect trails, including through reduced amenity associated with landscape and visual impacts and through reduced access. Reduced access to amenity is particularly important in the context of areas that have limited access to recreational amenities, such as walking. It is important to highlight that any construction noise will be temporary in nature as either the visitor will be moving through the landscape away from the Proposed Development, or the construction noise will be short-lived.

#### Construction and Operation

##### Core Path 8 – Loch More to Altnabreac

- 15.6.58. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.
- 15.6.59. This route is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate-minor adverse** not significant effect during construction/decommissioning, and operation and maintenance phases. This is due to being viewed beyond the existing cluster of turbines, some of which would screen the proposed turbines.

##### Core Path 10 – Loch More to Dalnawillan

- 15.6.60. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.
- 15.6.61. This route is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate-minor adverse** not significant effect during construction/decommissioning, and operation and maintenance phases. This is due to being viewed beyond the existing cluster of turbines, some of which would screen the proposed turbines.

- 15.6.62. **Core Path 17 – Hill Orlig** Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium-low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

- 15.6.63. This route is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate-minor adverse** not significant effect during construction/decommissioning, and operation and maintenance phases.

##### Core Path 60 – Ben Dorrery

- 15.6.64. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium-low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

- 15.6.65. This viewpoint is assessed as having a High sensitivity to change, combined with a Medium-low magnitude of change resulting in a **Moderate adverse significant effect** during construction/decommissioning, and operation and maintenance phases. The effect is considered to be significant as a consequence of the elevated views obtained and lack of screening where all 7 turbines would be visible in their entirety.

##### Core Path 61 - Causeymire

- 15.6.66. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

- 15.6.67. This viewpoint is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate adverse and not significant** effect during construction/decommissioning, and operation and maintenance phases. The effect is considered to not be significant as wind turbines and the supporting structure are key features of the view.

##### Core Path 64 – Achnarras Quarry

- 15.6.68. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

- 15.6.69. This route is assessed as having a Medium sensitivity to change, combined with a Medium magnitude of change resulting in a **Moderate adverse** significant effect. This is due to the proximity of the Proposed Development to the viewpoint, and extension of effect during hours of darkness by aviation lights.

##### Core Path 65 – The Old Quarry

- 15.6.70. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

- 15.6.71. This route is assessed as having a Medium sensitivity to change, combined with a Medium magnitude of change resulting in a **Moderate adverse** significant effect. This is due to the proximity of the Proposed Development to the viewpoint, and extension of effect during hours of darkness by aviation lights.



#### Core Path 70 – Dirlot Gorge Egress/Ingress

15.6.72. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

15.6.73. This route is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate-minor adverse** not significant effect during construction/decommissioning, and operation and maintenance phases. This is due to being viewed beyond the existing cluster of turbines, some of which would screen the proposed turbines.

#### Core Path 105 – Achavanich and Munsary

15.6.74. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

15.6.75. This route is assessed as having a Medium sensitivity to change, combined with a Medium magnitude of change resulting in a **Moderate adverse** significant effect. This is due to the proximity of the Proposed Development to the viewpoint, and extension of effect during hours of darkness by aviation lights.

#### Core Path 126 – Blingrey Forest

15.6.76. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

15.6.77. This viewpoint is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate adverse** and not significant effect during construction/decommissioning, and operation and maintenance phases. The effect is considered to not be significant as wind turbines and the supporting structure are key features of the view.

#### Core Path 158 – Watten Roadside Link to Loch Watten, Core Path 160 – Sports Pitch, Core Path 161 – Watten to Camster Roadend Link, Core Path 162 – Watten Riverside Link

15.6.78. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Medium, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

15.6.79. These Core Paths are assessed as having a High sensitivity to change, combined with a Medium magnitude of change resulting in a **Moderate adverse** significant effect during construction/decommissioning, and operation and maintenance phases. This is due to the proximity of the Proposed Development to the viewpoint, and extension of effect during hours of darkness by aviation lights.

#### Core Path 177 – Wick to Ackergillshore by Roadside Footway

15.6.80. Magnitude of change during construction/decommissioning, and operation and maintenance phases is assessed as Low, short-term during construction and decommissioning phases, and long-term during operation and maintenance. This would be reversible following decommissioning where no components of the Proposed Development would be visible.

15.6.81. This viewpoint is assessed as having a High sensitivity to change, combined with a Low magnitude of change resulting in a **Moderate-minor adverse** not significant effect during construction/decommissioning, and operation and maintenance phases.

### Outline Access Management and Enhancement Plan

15.6.82. During construction (as would be for the decommissioning phase) it is proposed that an Access Management and Enhancement Plan (AMEP) will be prepared to indicate the restrictions for users and any proposed mitigation (through means of alternative routes and enhancement opportunities). Final details will be confirmed post-consent through an appropriate planning condition, however areas expected to be covered would include:

- Setting out overall objectives;
- Fully establishing the current context of access and use of the forests across the range of users;
- Acknowledge the boundaries of different responsibilities in relation to the AMEP, including in respect of health and safety legislation;
- Summarise potential impacts from construction and operation;
- Set out a range of agreed mitigation measures in relation to identified impacts;
- Present a number of agreed enhancement measures;
- Confirm how details for the mitigation and enhancement measures will be communicated to the public and other stakeholders; and
- Explain how the implementation and success of the AMEP will be measured and reviewed.

15.6.83. During construction and decommissioning, as is the case with ongoing forestry operations, health and safety requirements will make it necessary to manage the use of core paths and permissive paths where they come within close proximity to infrastructure. It is likely that temporary closure orders will be required and arranged through consultation with the LPA's. Where possible temporary alternative routes will be provided. Prior to any temporary closures, notices will be posted in publicly available documents e.g. local media and the routes will be clearly marked with warning signs to discourage the public from entering the construction area. The aim is to have temporary closure orders in place for as little time as possible without compromising the health and safety of members of the public.

15.6.84. During the operation of the wind farm, it is envisioned that there would be no restrictions placed on the movement of the public using the existing Right to Roam across open land, other than in exceptional circumstances e.g. turbine component replacement.

15.6.85. To conclude, during the construction phase effects are not beyond those that are already in place or that will result from future forestry operations and are considered temporary in nature. Following the mitigation in the form of appropriately worded conditions addressing access management and enhancement plan, low/negligible effects are expected during the operational phase on surrounding core paths and permissive paths.

15.6.86. There are no core paths within the Proposed Development Area. Therefore, it is considered that the effect on core paths and permissive routes is **not significant**.

### Tourism and Recreation Impact Summary

15.6.87. There are not expected to be any significant effects on tourism or recreation assets in the surrounding area (within 15 km of the Proposed Development). For both accommodation and local attraction assessments, the effect was assessed to be either **minor** or **negligible**.

- 15.6.88. The majority of Core Paths situated within 10 km of the Proposed Development will receive a **minor** or **negligible** and therefore not significant effect and there are no core paths located within the Proposed Development Area.
- 15.6.89. Achavanich and Munsary Core Path and Spittal Core Path 61 is expected to receive **Major** adverse and significant effects during construction and operation due to the proximity to the Proposed Development and views of turbines from the track. In addition, two further Core Paths linking to the River Thurso to the minor road network are expected to receive a **Moderate** and significant effect due to proximity to Proposed Development. It is important to highlight that there are no Core Paths situated within the Proposed Development Area and instead are located out with 2.5 km from the site. The assessment does not consider that these effects from the Proposed Development are sufficiently adverse enough to deter a significant number of visitors away from these particular assets and as such, the Proposed Development is not likely to have any detrimental significant impacts on visitor numbers or the visitor economy.
- 15.6.90. Any potential negative impacts on tourism are likely going to be far outweighed by the wider positive benefits for the local area and Scotland as a whole in terms of employment opportunities, enhanced access and investment into the area.

## 15.7. Do-nothing Scenario

- 15.7.1. In the absence of the Proposed Development, it is likely that the land would continue under the same land use. The primary land use within the Proposed Development Area is sheep and cattle grazing with commercial forestry in the centre and west of the Proposed Development.
- 15.7.2. The potential economic benefits generated during the development, construction, operation and maintenance will not be delivered resulting in the loss of a total 74 jobs and approximately £4.4 million GVA at a local level and 219 jobs and £13.3 million GVA in Scotland as a whole.
- 15.7.3. In addition, the enhanced access from the creation of trails and paths will be lost potentially impacting on the local activities within the surrounding area including walking, wildlife interests, sports and country pursuits. Furthermore, the loss of enhanced access could result in a reduced footfall within the local area from the loss of routes and paths available to visitors and tourists, potentially impacting on the tourism economy in which THC relies on.

## 15.8. Mitigation and Potential Benefits

### Environmental benefits Provided by the Proposed Development

- 15.8.1. The Proposed Development has the generating capacity of up to 47.6 MW of renewable electricity, subject to final wind turbine procurement. Based on 6.8 MW wind turbines, the Proposed Development would produce sufficient electrical energy to satisfy the average annual requirements of approximately 35,422 homes<sup>53</sup>.

### Mitigation and Potential Community Benefits

- 15.8.2. This section considers the mitigation and potential community benefits which could be employed to minimise any negative impacts and maximise potential positive impacts.
- 15.8.3. The assessment reveals no adverse significant residual socio-economic impacts from the Proposed Development. Instead, the analysis shows that there will be substantial employment related benefits associated with the construction of the Proposed Development.

- 15.8.4. In terms of tourism, as highlighted in the BiGGAR Report, wind development has not resulted in a serious negative economic impact on tourism, with even wider positive impacts being seen.
- 15.8.5. The community benefit fund will be based on £5,000 per MW of wind installed. The Applicant will undertake a community consultation exercise should the proposed development be consented to ensure the appropriate management, distribution and access to the fund is well considered.

## 15.9. Residual Effects

- 15.9.1. As a result of the enhancement and mitigation measures, the residual effect on the recreational trails will be **negligible**.
- 15.9.2. The effect during the construction phase will be temporary in nature as either the visitor will be moving through the landscape away from the Proposed Development and construction noise will be short lived.
- 15.9.3. In addition, the effect during the operational phase of the Proposed Development will also be **negligible**. The improved access will allow more people to access outdoor recreation and encourage new types of walkers to the area. The scale of this increased amenity is not known; however, it is assumed that this will be equivalent to any potentially decreased amenity from current walkers due to the addition of the Proposed Development to the character of the surrounding Core Paths. The residual effect has therefore been assessed as **negligible**.

## 15.10. Cumulative effects

- 15.10.1. Wind farms which are currently operational, under construction or in the application stage, within an xx km radius of the Proposed Development Area are shown on Figure xx. It is not expected that any of those wind farms, within 5 km of the site would be under construction at the same as the Proposed Development.
- 15.10.2. There are no specific construction projects that would give rise to employment and additionality effects with the Proposed Development.
- 15.10.3. Chapter 12 Traffic and Transportation has assessed the potential for cumulative effects on local roads and concludes that this would not lead to any further environmental effects in transportation terms provided that measures are included in the Construction Traffic Management Plan (CTMP) which would manage abnormal loads and days of high density of traffic movements.
- 15.10.4. Cumulative operational effects on employment are not expected due to low numbers of operational staff involved. Cumulative effects on the tourism economy are considered unlikely in the context of the published studies set out in section 15.6.

## 15.11. Statement of Competence

- 15.11.1. As a company, Natural Power has provided independent, expert advice to the renewable energy industry for over 3,500 projects since 1995.
- 15.11.2. The company comprises a team of experts to provide unrivalled renewable energy expertise and services with experience at every phase of the project lifecycle. In addition, the company is accredited by the Institute of Environmental Management and Assessment (IEMA) as well as many staff being IEMA members and holding qualifications at various levels.

<sup>53</sup> RenewableUK *Wind Energy Statistics Explained* [Online] Available from - <https://www.renewableuk.com/page/UKWEDEXplained/Statistics-Explained.htm> [Accessed: 14/07/2023]  
Calculation: 47.6 MW x 0.3184 x 8,760 hours / 3.748 MWh = 35, 422 homes

15.11.3. The company offers expertise in multiple fields including project management, planning permitting and environment and due diligence amongst others.

be consented to ensure the appropriate management, distribution and access to the fund and shared ownership is well considered.

## 15.12. Summary and Conclusions

### Socio-economic

- 15.12.1. In terms of development and construction impact, of the £69.9 million wind farm development and construction values, there is potential for £8.5 million to benefit the local economy and £26.8 million to benefit the regional economy. Applying industry assumptions provides an estimate on the level of development and construction employment at the regional for the Proposed Development as 204.8 jobs contributing £12.6 million in GVA. At the local level, the development construction phase of the Proposed Development could sustain up to 63.6 jobs and contribute £3.9 million in GVA.
- 15.12.2. The operation and maintenance phase is also expected to generate economic impacts. Applying the data from the RenewableUK research to the Proposed Development (47.6 MW), an estimate of the total opex equals approximately £2.8 million. Of this, £1.2 million could benefit the local economy and £1.7 million could be injected into the regional economy on an annual basis. Applying the industry assumptions gives the level of operational employment at the regional level for the Proposed Development as 13.6 jobs, contributing £710,707 GVA per annum. At the local level, the operation and maintenance phase of the Proposed Development is expected to sustain 9.8 jobs, contributing £513,650 in GVA per annum.
- 15.12.3. These direct economic benefits should be set against the socio-economic conditions in THC area, and particularly the region of Caithness and Sutherland and Ross and Cromarty which is fourth lowest GDHI out of six within the sub-regions of the Highlands and Islands. In addition, the levels of economically inactive populations are higher in THC (25.6 %) in comparison to the Scottish average (22.9 %). Retired populations are also expected to increase along with a decrease in working age populations in 2043.
- 15.12.4. Within the context of EIA legislation, none of the economic impacts considered are significant.
- 15.12.5. In addition to the economic opportunities from the development, construction and operation phases, there are also a variety of wider economic impacts which are excluded from the assessment itself. The wider impacts which should also be noted as having positive effects on the regional and national economies include:
- Supporting local policy objectives: the Proposed Development can play an important role in supporting regional and national policy objectives. It will promote renewable technologies which is a main target in THC area LDP along with supporting the path to Net Zero which is a key ambition in many of the Scottish Government strategies.
  - Local supply chain opportunities: the research carried out by RenewableUK which estimated that the expenditure of workers who visit the local area benefit the accommodation and food service sector to the value of around £7,500 per MW constructed. The wider 'knock-on' effects can in turn support the supply chain of other activities such as the spending habits of retail operations and accommodation providers;
  - Income effects: the economic analysis has focused on the GVA impact of generated employment as this is the 'real' impact on the economy. However, it is worth noting that new employment will generate additional wages and salaries, much of which will be spent in the UK; and
  - Community benefits: The Applicant is offering to provide a small area for car parking and a walking route within the Proposed Development. In addition, the Applicant is offering to provide a community benefit fund and shared ownership which will involve a community consultation exercise should the Proposed Development

### Tourism and Recreation

- 15.12.6. In terms of tourism effects, the literature review indicates that wind farms have a minor impact on visitor activity. Studies from 2017 on wind farms and tourism trends (BiGGAR Economics) determined that whilst the number of wind farms increased across almost all local authority areas, employment in sustainable tourism also grew substantially. The study found no correlation between tourism employment and the number of turbines at the national or local authority area.
- 15.12.7. More recent research published in 2021 on the economic impact of the wind farms on tourism (BiGGAR Economics) analysed trends at the local authority area and found no relationship between growth in the number of turbines and the level of tourism employment. In addition, the analysis found that tourism related employment in the vicinity of wind farms had outperformed the trend for Scotland as a whole and for the local authority area in which the wind farm was based.
- 15.12.8. A national tracker survey published in 2021 also outlined that support for renewable energy had been consistently high with 87% expressing support for the use of renewables with the opposition being very low at 1 %.
- 15.12.9. The tourism baseline indicates that across THC area, the tourism sector is heavily reliant on the domestic market in terms of visitor numbers and expenditure with Scottish residents travelling more to THC area in 2019 compared to previous years.
- 15.12.10. The assessment has considered the impact on baseline conditions of tourism and recreational assets arising from the Proposed Development. The findings conclude that the likelihood for potential negative impacts of the Proposed Development on tourism and recreational assets is considered to be low. There are no top paid or free tourism attractions within 15 km of the Proposed Development
- 15.12.11. Several of the Core Paths in Achavanich and Munsary and Spittal have been assessed as having a **major** or **moderate** effect during both construction and operation however these effects will only be short lived as the visitor will be moving through the landscape away from the Proposed Development and construction noise is temporary in nature. The assessment therefore does not consider that these effects are sufficiently adverse enough to deter a significant number of visitors away from these assets. It is important to highlight that these core paths are not within the Proposed Development Area and are situated out with 5 km from the site. Therefore, the Proposed Development is not likely to have any detrimental significant impacts on visitor numbers or visitor economy.
- 15.12.12. Any potential negative impacts on tourism are likely going to be far outweighed by the wider positive benefits for the local area and Scotland as a whole in terms of employment opportunities, enhanced access and investment into the area.

## 15.13. Non-Technical Summary

### Socio-economic

- 15.13.1. In terms of development and construction impact, of the £69.9 million wind farm development and construction values, there is potential for £8.5 million to benefit the local economy and £26.8 million to benefit the regional economy. Applying industry assumptions provides an estimate on the level of development and construction employment at the regional for the Proposed Development as 204.8 jobs contributing £12.6 million in Gross Value

Added (GVA). At the local level, the development construction phase of the Proposed Development could sustain up to 63.6 jobs and contribute £3.9 million in GVA.

- 15.13.2. The operation and maintenance phase is also expected to generate beneficial economic impacts. Applying the data from the RenewableUK research to the Proposed Development (47.6 MW), an estimate of the total operations and maintenance phase equals approximately £2.8 million. Of this, £1.2 million could benefit the local economy and £1.7 million could be injected into the regional economy on an annual basis. Applying the industry assumptions gives the level of operational employment at the regional level for the Proposed Development as 13.6 jobs, contributing £710,707 GVA per annum. At the local level, the operation and maintenance phase of the Proposed Development is expected to sustain 9.8 jobs, contributing £513,650 in GVA per annum.
- 15.13.3. These direct economic benefits should be set against the socio-economic conditions in The Highland Council (THC) area, and particularly the region of Caithness and Sutherland and Ross and Cromarty which is fourth lowest Gross Disposable Household Income (GDHI) out of six within the sub-regions of the Highlands and Islands. In addition, the levels of economically inactive populations are higher in THC (25.6 %) in comparison to the Scottish average (22.9%). Retired populations are also expected to increase along with a decrease in working age populations in 2043.
- 15.13.4. Within the context of Environmental Impact Assessment (EIA) legislation, none of the economic impacts considered are significant.
- 15.13.5. In addition to the economic opportunities from the development, construction and operation phases, there are also a variety of wider economic impacts which are excluded from the assessment itself. The wider impacts which should also be noted as having positive effects on the regional and national economies include:
- Supporting local policy objectives: the Proposed Development can play an important role in supporting regional and national policy objectives. It will promote renewable technologies which is a main target in THC area Local Development Plan (LDP) along with supporting the path to Net Zero which is a key ambition in many of the Scottish Government strategies.
  - Local supply chain opportunities: the research carried out by RenewableUK which estimated that the expenditure of workers who visit the local area benefit the accommodation and food service sector to the value of around £7,500 per MW constructed. The wider 'knock-on' effects can in turn support the supply chain of other activities such as the spending habits of retail operations and accommodation providers;
  - Income effects: the economic analysis has focused on the GVA impact of generated employment as this is the 'real' impact on the economy. However, it is worth noting that new employment will generate additional wages and salaries, much of which will be spent in the UK; and
  - Community benefits: The Applicant is offering to provide a small area for car parking and a walking route within the Proposed Development. In addition, the Applicant is offering to provide a community benefit fund and shared ownership which will involve a community consultation exercise should the Proposed Development be consented to ensure the appropriate management, distribution and access to the fund and shared ownership is well considered.

## Tourism and Recreation

- 15.13.6. In terms of tourism effects, the literature review indicates that wind farms have a minor impact on visitor activity. Studies from 2017 on wind farms and tourism trends (BiGGAR Economics) determined that whilst the number of wind farms increased across almost all local authority areas, employment in sustainable tourism also grew substantially. The study found no correlation between tourism employment and the number of turbines at the national or local authority area.

- 15.13.7. More recent research published in 2021 on the economic impact of the wind farms on tourism (BiGGAR Economics) analysed trends at the local authority area and found no relationship between growth in the number of turbines and the level of tourism employment. In addition, the analysis found that tourism related employment in the vicinity of wind farms had outperformed the trend for Scotland as a whole and for the local authority area in which the wind farm was based.
- 15.13.8. A national tracker survey published in 2021 also outlined that support for renewable energy had been consistently high with 87% expressing support for the use of renewables with the opposition being very low at 1%.
- 15.13.9. The tourism baseline indicates that across THC area, the tourism sector is heavily reliant on the domestic market in terms of visitor numbers and expenditure with Scottish residents travelling more to THC area in 2019 compared to previous years.
- 15.13.10. The assessment has considered the impact on baseline conditions of tourism and recreational assets arising from the Proposed Development. The findings conclude that the likelihood for potential negative impacts of the Proposed Development on tourism and recreational assets is considered to be low. There are no top paid or free tourism attractions within 15 km of the Proposed Development
- 15.13.11. Several of the Core Paths in Achavanich and Munsary and Spittal have been assessed as having a **major** or **moderate** effect during both construction and operation however these effects will only be short lived as the visitor will be moving through the landscape away from the Proposed Development and construction noise is temporary in nature. The assessment therefore does not consider that these effects are sufficiently adverse enough to deter a significant number of visitors away from these assets. It is important to highlight that these core paths are not within the Proposed Development Area and are situated out with 5 km from the site. Therefore, the Proposed Development is not likely to have any detrimental significant impacts on visitor numbers or visitor economy.
- 15.13.12. Any potential negative impacts on tourism are likely going to be far outweighed by the wider positive benefits for the local area and Scotland as a whole in terms of employment opportunities, enhanced access and investment into the area.

# Chapter 16

## Other Matters

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## Glossary

Term	Definition
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from the Proposed Development.
Environmental Impact Assessment Regulations	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Environment Impact Assessment Report	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (EIA Regulations).
The 'Applicant'	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The development area within the red line boundary where the Proposed Development will be located (the Site).

## List of Abbreviations

Abbreviation	Description
BESS	Battery Energy Storage System
BMS	Battery Management System
CBA	Carbon Balance Assessment
CEMP	Construction Environmental Management Plan
CIA	Climate Impact Assessment
CO <sub>2</sub>	Carbon Dioxide
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regs	Environmental Impact Assessment Regulations 2017
FOI	Freedom of Information
GHG	Greenhouse Gases
GW	Gigawatt
LPA	Local Planning Authority
Natural Power	Natural Power Consultants Limited
NTS	Non-Technical Summary
PPS18	Planning Policy Statement 18
PWS	Private Water Supply
SEPA	Scottish Environment Protection Agency
THC	The Highland Council

## 16.1. Introduction

16.1.1. This chapter has been prepared by Natural Power Consultants Limited (Natural Power) and summarises the potential effects of the Proposed Development in respect of Shadow Flicker, Climate and Carbon Balance, and Utilities.

Effects within this section have been scoped out as follows:

- Ice Throw; and
- Lightning.

16.1.2. Ice Throw and Lighting were proposed to be scoped out within the Scoping Report (submitted May 14<sup>th</sup>, 2022). Ice throw was scoped out due to the Scottish Governments Onshore Wind Farm Advice Sheet<sup>1</sup> stating that danger to human or animal life from falling parts or ice is rare. Similarly, Lighting as stated in the Scottish Governments Windfarm Advice Sheet<sup>2</sup>, that the danger to human or animal life from lightning strike via a turbine is rare since lightning is directed down the turbine to the earth; the turbine itself being earthed. Consideration has been given when risk of lightning is high that the maintenance of the turbines would not be undertaken during these times. Planning Context and Policy Requirements

16.1.3. Table 16.1 summarises planning guidance and policy relevant to potential effects from wind farm development on Shadow Flicker, Climate and Carbon Balance and Utilities.

**Table 16.1: UK and Scottish planning guidance, policy and legislation relating to shadow flicker, utilities and public access**

Document	Policy Text
Planning and Environment Policy Group – Best practice Guidance to Planning Policy Statement 18 (PPS18) ‘Renewable Energy’ (2009)	1.3.77 ‘Careful site selection, design and planning, and good use of relevant software, can help avoid the possibility of shadow flicker in the first instance. It is recommended that shadow flicker at neighbouring offices and dwellings within 500 m should not exceed 30 hours per year or 30 minutes per day.’
Scottish Government – Onshore wind turbines: planning advice (2014)	‘Shadow Flicker: developers should provide calculations to quantify the effect. In most cases however, where separation is provided between wind turbines and nearby dwellings (as a general rule, 10 rotor diameters), ‘shadow flicker’ should not be a problem. However, there is scope to vary layout/reduce the height of turbines in extreme cases.’
UK Government: Guidance on Renewable and low carbon energy (2015)	‘Individual turbines can be controlled to avoid shadow flicker at a specific property or group of properties on sunny days, for specific times of the day and on specific days of the year. Where the possibility of shadow flicker exists, mitigation can be secured through the use of conditions. Although problems caused by shadow flicker are rare, where proposals for wind turbines could give rise to shadow flicker, applicants should provide an analysis which quantifies the impact.’
The Highland Council (THC): Onshore Wind	‘Wind energy schemes should always be designed to avoid causing shadow flicker, blade glint, glare and light effects to any regularly occupied buildings not associated with the development. Where this cannot be achieved, the Council

Document	Policy Text
Energy Supplementary Guidance	<i>will expect wind energy developments to be located a minimum distance of 11 times the blade diameter of the turbine(s) from any regularly occupied buildings not associated with the development. Within a distance less than 11 times the blade diameter, a shadow flicker assessment will be required. The Council may support a scheme that relies on mitigation, where it is deemed to be effective. In such instances turbine shutdown systems will be the required mitigation. The increase in distance from the widely accepted 10 times rotor diameter to 11 is to account for the northern latitudes of Highland.’</i>

Source: Natural Power

## 16.2. Consultation

16.2.1. Consultation regarding other matters undertaken during the course of the EIA is recorded in Table 16.2.

**Table 16.2: Consultee scoping responses relating to other matters**

Consultee	Comments/issues raised/recommendations	Addressed responses/outcomes
The Highland Council	<p>‘Given the reported separation distance from any nearby residential properties, it is accepted that a shadow flicker assessment is not required to be undertaken.’</p> <p>Subsequently Shadow Flicker was scoped in by THC in a pre-application meeting on the 14<sup>th</sup> of September 2022 following from this initial response on 28<sup>th</sup> July.</p> <p>Assessments to determine the impact of Ice throw and lightning were scoped out through further consultation following the formal scoping response.</p>	<p>Shadow Flicker has been assessed and further details can be found in Section 16.3 of this Chapter. Also see Technical Appendix A16.1: Shadow Flicker Assessment.</p>
	<p>Issues such as dust, air borne pollution and / or vapours, noise, light, shadow-flicker can then be highlighted. Consideration must also be given to the potential health and safety risks associated with lightning strikes and ice throw given the proximity of recreational routes through the Proposed Development.</p> <p>Subsequently lightning strikes and ice throw were scoped out of the EIA.</p>	<p>Dust, air borne pollution and / or vapours, noise, light will be considered in a full Construction Environmental Management Plan (CEMP) as a condition attached to the deemed planning permission . An Outline CEMP has been included in Technical Appendix A5.1. The methodology and results of the shadow flicker assessment can be found in Technical Appendix A16.1: Shadow Flicker Assessment. An Outline Access Management and</p>

<sup>1</sup> Scottish Government. (2014) Onshore wind turbines: planning advice [Online] Available from - <https://www.gov.scot/publications/onshore-wind-turbines-planning-advice/>. [Accessed: 10/08/2023]

Consultee	Comments/issues raised/recommendations	Addressed responses/outcomes
		Enhancement Plan has been included in Chapter 15: Socioeconomics, Recreation and Tourism, Section 15.6.
	<p><i>'Depending on the proximity of the working area and access route to any houses etc applicant may require to submit a scheme for the suppression of dust during construction.</i></p> <p><i>Particular attention should be paid to construction traffic movements and routing.'</i></p>	An Outline CEMP has been included in Technical Appendix A5.1 and would be subject to a condition attached to the deemed planning permission forthcoming with respect to a full CEMP.

Source: The Scottish Government Energy Consents Unit (2022) Scoping Opinion on Behalf of the Scottish Ministers Under the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Watten Wind Farm Scoping Opinion. Ref: 1293898

### 16.3. Shadow Flicker

- 16.3.1. Shadow Flicker is the effect caused when blades of a wind turbine cast shadows over the neighbouring properties as they turn, through constrained openings such as windows. Shadow flicker can only occur within buildings and is not to be confused with shadow casting. The magnitude of the shadow flicker depends on several environmental conditions coinciding at a given time, including the position and height of the sun, wind speed, wind direction, cloud cover, position of the turbine relative to a sensitive receptor, and the position of any windows together with intervening line-of-sight screening (e.g., trees or buildings).
- 16.3.2. There is no standard for the assessment of shadow flicker in Scotland and there are no guidelines with which to quantify what exposure levels would represent a significant versus not significant effect. In the absence of specific guidelines, the assessment considered the 'Best Practice Guidance for PPS18 'Renewable Energy' (Department of Environment Northern Ireland, 2009)<sup>3</sup> from Northern Ireland, which states: 'It is recommended that shadow flicker at neighbouring offices and dwellings...should not exceed 30 hours per year or 30 minutes per day'.
- 16.3.3. A shadow flicker assessment has been undertaken for the Proposed Development analysing five receptor locations situated in the vicinity of Proposed Development. A reference point for all settlements within the range of 1.6 km of the Proposed Development where provided. Five receptor locations were identified within that range to represent a worst case scenario for the identified settlements. The WindFarmer software package was used for this assessment. First the worst-case scenario for shadow flicker was calculated at these locations, using a 'bare-earth' model that does not take into account screening effects from vegetation and buildings. Next, meteorological data was applied to the worst-case results to give a more realistic assessment of shadow flicker at the chosen receptors. Receptors were chosen to represent the worst-case scenario for settlements closest to the Proposed Development.
- 16.3.4. Full details of the methodology, and the results of the assessment, can be found in Technical Appendix A16.1. In summary the methodological approach implemented the worst-case scenario. Shadow flicker was assessed by the maximum number of theoretical hours that shadow flicker could occur. Worst case assumptions were also used e.g., the turbines are always rotating, and the sun can be represented as a single point. Of the five receptors,

R1-R3 had the potential to exceed the maximum allowance of 30 minutes/day and 30 hours/year. That being said, in a real case scenario receptor one and three were unlikely to exceed the threshold.

- 16.3.5. It is important to note that not all properties within a study area will experience shadow flicker. In order for it to occur, the weather must be sunny, and the blades must also be rotating. The effect is also reduced if the turbine rotors are perpendicular to the location experiencing flicker, so will be dependent upon wind direction because turbines turn to face into the wind when operating. Vegetation such as trees or hedgerows or intervening buildings, and the topography of the land itself, will also have a screening effect. Finally, the absence of windows facing the direction of relevant turbines, and the nature of use of any affected rooms, may mitigate any impacts.
- 16.3.6. The 'worst-case assessment' results showed that receptor 2 (R2) could theoretically exceed the 30 minutes per day and 30 hours per year of shadow flicker. Additionally, R1-3 also met the threshold of 30 minutes per day. That being said, R1 and R3 did not exceed the hours/year threshold. It should be noted here that these results do not account for factors such as any screening from vegetation, orientation of windows at the receptor, or the function of rooms theoretically affected by shadow flicker. Taking these into account will further reduce the hours of shadow flicker experienced at these receptors. The property adjacent to the receptor has been analysed in the Residential Visual Amenity Assessment (Technical Appendix A6.8), which has provided the following additional contextual detail.
- 16.3.7. Receptor two is adjacent to a property named Leanmore, north of the Proposed Development. Turbines contributing to shadow flicker at this receptor location are T1, T2 and T5.
- 16.3.8. Prior to commissioning of the Proposed Development, a shadow flicker protocol to reduce effects to below 30 minutes a day and/or 30 hours per annum for any relevant properties existing or with planning permission at the time of consent will be agreed by means of a deemed planning permission condition with the local planning authority (LPA). In the event of a substantiated complaint to the LPA from owners of the aforementioned properties, this protocol would be enacted. Suggestions of mitigation include screening planting, installation of blinds within affected residents' homes or a control programme whereby turbines would shut down automatically when Shadow Flicker occurs. With this measure in place, no significant shadow flicker effects would arise from the Proposed Development.

### 16.4. Climate and Carbon Balance

- 16.4.1. A wind farm has the potential to make savings on greenhouse gas (GHG) emissions compared to electricity generation which involves the burning of fossil fuels. The carbon balance assessment (Volume 3: Technical Appendix A9.6) has considered the current electricity generation mix and assesses the level of Carbon Dioxide (CO<sub>2</sub>) savings that could potentially be saved depending on the source of electricity generation the wind farm is displacing at any given time. An assessment has been undertaken in accordance with Scottish Government recommended methodology<sup>4</sup>.
- 16.4.2. Where peat or carbon-rich soils are present, Scottish Environment Protection Agency (SEPA) requires applications for onshore wind farms to include a systematic assessment of the likely effects to these features. This requirement aligns with EIA Directive 2014/52/EU (as transposed into domestic legislation) which sets out that direct and indirect effects of development projects on climate (Article 3) and climatic factors (Annex IV) are considered.

<sup>3</sup> Department of Environment, Northern Ireland. (2009) Best practice Guidance to Planning Policy Statement 18 Renewable Energy [Online] Available from - [https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy\\_0.pdf](https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/Best%20Practice%20Guidance%20to%20PPS%2018%20-%20Renewable%20Energy_0.pdf) ) [Accessed: 10/08/2023]

<sup>4</sup> The Scottish Government. (2008) Calculating carbon savings from wind farms on Scottish peat lands: a new approach [Online] Available from - <https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/pages/13/> [Accessed: 10/08/2023]



16.4.3. Accordingly, a Climate Impact Assessment (CIA) has been undertaken in accordance with Schedule IV of the EIA Regulations<sup>5</sup> which transposes the EIA Directive into Scottish law and states that:

*'(4) A description of the factors specified in Article 3(1) likely to be significantly affected by the project, including climate (for example greenhouse gas emissions, impacts relevant to adaptation).*

*(5) A description of the likely significant effects of the project on the environment resulting from, inter alia ...*

*(f) The impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change.'*

16.4.4. The assessment has also considered relevant Scottish policy on climate change and adaptation and has considered the climate change targets of THC as set out in the Council Plan (2017-2022) document.

16.4.5. The CIA approach has considered the likely magnitude of GHG emissions of the Proposed Development in comparison to the baseline scenario with no development (where no emissions are produced as no construction takes place).

### Carbon Balance

16.4.6. Current best practice recommends that the Environmental Impact Assessment Report (EIAR) includes a carbon balance assessment (CBA) which assesses effects with reference to the magnitude of emissions released by the development and the period of time it takes to payback for those carbon emissions, the context of those emissions (e.g., national, regional and local emissions reduction targets) and professional judgement. The assessment is based on the proposed information regarding the scale and nature of the Proposed Development. Where data is unavailable, worst-case reasonable assumptions will be used.

16.4.7. A CBA employs the Scottish Government's Carbon Calculator Tool<sup>6</sup> and quantifies the CO<sub>2</sub> emission savings over the life of the Proposed Development against the release of CO<sub>2</sub> from other energy generation methods as a result of implementing the project. It also reports on the time it takes to pay back any carbon debt and the potential effects of the Proposed Development on climate change in terms of carbon savings produced.

16.4.8. A CBA has been produced to give an indication of the Proposed Development's impact on the existing peat on site and to assess the potential effects in terms of carbon CO<sub>2</sub> emissions against the total potential carbon savings attributed to the Proposed Development. The assessment has quantified the gains over the life of the project against the release of CO<sub>2</sub> during construction, including loss of peat bog and construction of roads/tracks and other infrastructure. The latest version of the Carbon Calculator<sup>6</sup> that is available before the application is submitted has been used. It is not expected for there to be any requirement for the CBA to be amended post submission following any further update of the Carbon Calculator that may occur.

16.4.9. The output from the carbon balance assessment indicates that, based on the best estimate values determined from the information currently available, that the Proposed Development would pay back the carbon emissions associated with its construction, operation, and subsequent decommissioning in 1.4 years.

16.4.10. For further information see Technical Appendix A9.6:Carbon Calculator Assessment, which details the methodology, input parameters and outputs.

<sup>5</sup> The Scottish Government (2017) Schedule 4 – Information for inclusion in environmental statements [Online] Available from: <https://www.legislation.gov.uk/ukxi/2017/571/schedule/4/made> [Accessed 10/08/2023]

<sup>6</sup> Carbon Calculator Tool v1.7.0 [Online] Available from: <https://informatics.sepa.org.uk/CarbonCalculator/> [Accessed 10/08/2023]

## 16.5. Utilities – Electricity, Water & Gas

### Overhead Electricity Network

16.5.1. There is one overhead electricity line to a derelict property called Shielton that currently crosses the proposed hardstandings of Turbine 3 this has not been mapped and would be relocated or routed underground prior to construction.

16.5.2. There are no other overhead electricity lines within proximity of the Proposed Development.

16.5.3. Turbines have been positioned in a way that has aimed to mitigate impact to a nearby overhead line. Access routes being utilised for the Proposed Development will have appropriate warning signs for overhead lines. Therefore, considering the location of the electricity lines in relation to proposed infrastructure, with appropriate mitigation during the construction phase (and similar for the decommissioning phase), the potential effect of the Proposed Development on overhead electricity lines is considered not significant.

### Water Supply

16.5.4. Chapter 9: Hydrology, Geology and Hydrogeology presents the relevant hydrological assessment relating to water supply.

### Private Water Supplies (PWS)

16.5.5. Increased sediment erosion as a result of wind farm construction and decommissioning can have impacts on the quality, quantity, and continuity of water supply to the properties.

16.5.6. THC provided information on PWS within 5 km of the Proposed Development and letters were issued to all identified properties so that further assessment could be undertaken to identify any potential effects on private water supplies and appropriate mitigation.

16.5.7. Non-statutory consultation has been undertaken with local residents and landowners in relation to private water supplies as part of a private water supply risk assessment where the Proposed Development is considered to have potential for impact on such identified supplies.

16.5.8. THC PWS map shows properties which have registered PWS (<10 m<sup>3</sup> per day abstraction rate). The database does not show the location of the source of the supply, nor does it provide an exhaustive list of all private water supplies in the area as those that are not registered will not be shown. The PWS properties have been identified within 5 km of the Proposed Development are shown in Table 16.3.

16.5.9. No abstractions of water supplies are proposed.

Table 16.3: Registered private water supplies (within hydrology study area)

PWS Name	Location (Easting, Northing)	Source Type	Supply Type	Approximate distance from Proposed Development (m)
Achingale Mill	324055, 953483	Not specified	Domestic	2,680
Lower Toftingall	317721, 954004	Not specified	Domestic	2,970

Source: THC Open Map Data: Private Water Supplies (2022)<sup>7</sup>

<sup>7</sup> Highland Council Open Map Data (2022) [Online] Available from - [https://map-highland.opendata.arcgis.com/datasets/ded172bbade24650bb2c1baec5e0d318\\_0/explore?location=58.465661%2C-3.322056%2C13.00](https://map-highland.opendata.arcgis.com/datasets/ded172bbade24650bb2c1baec5e0d318_0/explore?location=58.465661%2C-3.322056%2C13.00) [Accessed: 02/03/2023]

- 16.5.10. Please see detail in Chapter 9: Hydrology, Geology and Hydrogeology which concluded due to the embedded design buffer distances and the implementation of a CEMP, the potential for all effects was not significant in terms of the EIA Regulations in relation to hydrology, geology and hydrogeology.

### Public Water Supplies

- 16.5.11. Scottish Water were consulted in relation to public water supply assets. The freedom of information (FOI) request outcome indicated that Scottish Water have no mapped Drinking Water Protected Areas within or within the vicinity of the Proposed Development. Furthermore, no Scottish Water Assets are recorded to be within the area of the Proposed Development and have also been confirmed via the Asset Plan Providers. There should therefore be no significant adverse effect upon the public water supply, as noted in Chapter 9.

### Buried Infrastructure and Underground Assets Including Gas

- 16.5.12. There is an SSE underground cable that runs parallel to the red line boundary in the south, north of Turbine 3 and Turbine 7. An underground cable servitude corridor has been applied to the cable to buffer it which can be seen on Figure 4.1: Constraints to Site Design of the EIAR for location of the power lines. The proposed new access tracks will cross over this cable route in two places: west of Turbine 7 and north west of Turbine 3.

### Gas

- 16.5.13. No gas infrastructure has been identified within the Proposed Development Area, and therefore it is not considered further in this chapter.

## 16.6. Battery Fire Risk

- 16.6.1. The proposed Battery Energy Storage System (BESS) would be expected to utilise a modern lithium-ion cell chemistry and surrounding systems. There is very limited risk of fires starting or spreading through what is called 'thermal runaway' with the latest generation of lithium-ion battery energy storage systems, which benefit from a layered protection strategy. Firstly, the internal condition of individual battery cells, stacks and racks are monitored and managed by a battery management system (BMS), which detects and mitigates for signs of potential overheating and developing fire risk. In the event of any early warning signs being detected, individual cell stacks can be easily deactivated and replaced as part of regular maintenance. Fire and gas detection and suppression systems also monitor for early signs and then seek to dispel any fires within battery housing. The modular design nature of most BESS (as illustrated on Figure 5.12: Indicative Battery Energy Storage System Compound) also reduces the risk of fire spreading between battery housings by incorporating adequate internal spacing. Finally, in the specific forested context of the Proposed Development, an external buffer of 10 m from the very edge of the battery storage hardstanding area to any trees mitigates the risk of any uncontrolled fire spreading,
- 16.6.2. As of 2023<sup>8</sup>, the Applicant will provide up to 2 gigawatts (GW) of battery storage. This is being developed in the UK, with a pipeline of over 10 GW globally being developed by 2035. The Applicant is not aware of fires within any UK battery storage sites, and the risks are evidently low enough (with application of appropriate systems and design mitigations) not to dissuade from substantial growth and planning approvals.

- 16.6.3. It is therefore concluded that fire risks from the proposed battery energy storage are low. However, the final design details of any battery energy storage, including fire monitoring and suppression systems, can be approved by the local authority via a deemed planning permission condition.

## 16.7. Population and Human Health

- 16.7.1. The assessment of potential health effects will be covered under individual aspect chapters of the EIAR. Chapters 14: Noise, 15: Socioeconomics, Recreation and Tourism, 16: Other Matters (this chapter) and associated Technical Appendix A16.1: Shadow Flicker Assessment present the relevant assessments.

## 16.8. Major Accidents and Disasters

- 16.8.1. The Proposed Development is not located in an area with a history of natural disasters such as extreme weather events, and 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<sup>9</sup> and the Health and Safety at Work etc. Act 1974<sup>10</sup>.
- 16.8.2. An Outline CEMP plan has been included in Technical Appendix A5.1 and it is anticipated a full CEMP would be agreed as a condition attached to a deemed planning permission forthcoming.

## 16.9. Non-Technical Summary

- 16.9.1. In relation to shadow flicker, modelling has shown one receptor location to be potentially in exceedance of the recommended limits, however a scheme to satisfactorily alleviate the incidence of shadow flicker at any affected premises lawfully in existence at the date of this permission will be agreed with the LPA prior to commissioning.
- 16.9.2. In relation to climate and carbon balance, a carbon balance assessment was conducted. A carbon balance assessment assesses the amount of time a Proposed Development would take to payback the emissions its development generates. In this case, it was found that it would take 1.4 years for the Proposed Development to pay back the carbon emissions generated from its construction, operation and decommission.
- 16.9.3. It is predicted that effects on utilities from the Proposed Development would be not significant.
- 16.9.4. Due to the safety features of modern wind turbines and battery energy storage systems, the results of detailed assessments into, shadow flicker, climate and carbon balance, utilities, and planning conditions to mitigate the potential effects, it is concluded that the Proposed Development would not present a significant safety risk to the public.

<sup>8</sup> EDF renewables (2023). Battery Storage [Online] Available from - <https://www.edf-re.uk/what-we-do/battery-storage/> [Accessed 02/03/2023]

<sup>9</sup> Construction (Design and Management) Regulations 2015. Available from - <https://www.legislation.gov.uk/uksi/2015/51/contents/made> [Accessed: 02/03/2023]

<sup>10</sup> Health and Safety at Work etc. Act 1974. Available from - <https://www.legislation.gov.uk/ukpga/1974/37/contents> [Accessed 02/03/2023]

# Chapter 17

## Residual Effects and Mitigation

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## Glossary

Term	Definition
Baseline	The existing conditions that prevail against which the effects of the Proposed Development are compared.
Construction Environmental Management Plan (CEMP)	A plan prepared by a contractor before the start of construction work, detailing 'environmental aspects' that may be affected by the construction work and management methods to prevent any such effects. The CEMP would include methods and site management practices to be applied to prevent generation of nuisance dust, accidental pollution events and a range of other potential sources of accidental damage to the environment, and response and reporting procedures to minimise the damage in the event of a pollution incident.
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of drawing together by the developer, in a systematic way, a description of the development and information relating to the likely significant environmental effects arising from a Proposed Development.
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Environmental Impact Assessment Regulations	The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Groundwater	Water located beneath the ground surface in soil pore spaces and in the fractures of rock formations.
Habitat	The area or environment where a species naturally occurs.
Ice throw	Under certain conditions, ice may form on turbine blades. If the turbine is operational and the ice becomes detached while the blades are rotating, it may be projected away from the turbine.
Infrastructure	This is used to describe all parts of Watten Wind Farm that require construction activities, both temporary and permanent, including turbines, hard standings, borrow pits and tracks (where new or widened).
Landscape	An area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors.
Landscape Character	A distinct, recognisable and consistent pattern of elements in the landscape that makes the landscape different from another, rather than better or worse.
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for potential negative effects of a development.
Peat	A largely organic substrate formed of partially decomposed plant material.
Planning and Renewable Energy Statement	A document outlining the policy and legislation relevant to the proposed development and demonstrating the accordance or otherwise of the development with this policy and legislation.

Term	Definition
Private water supply	Any water supply which is not provided by a water company and is not connected to mains supply. Most private water supplies are situated in more remote, rural parts of the country and may just serve one property or several properties through a network of pipes.
Protected Species	Animals or plants protected by legislation.
Scoping	The process of identifying the issues to be addressed by an Environmental Impact Assessment.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that response.
Shadow flicker	The effect caused when turbine blades cast shadows over neighbouring properties as they turn, through constrained openings such as windows.
Significance	A measure of the importance of the environmental effect, defined by significance criteria specific to the environmental topic.
Synergistic Effect	The result of individual effects from different topic areas assessed in combination.
The Applicant	The Applicant is 'EDF Energy Renewables Limited' and will be referred to as the 'Applicant'.
The Proposed Development	The proposed Watten Wind Farm development.
The Proposed Development Area	The development area within the red line boundary where the Proposed Development will be located (application area).
Topography	The physical features of a geographical area.
Visual Amenity	The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of the activities of the people loving, working, recreating, visiting or travelling through an area.
Visual Effects	Effects on specific views and on the general visual amenity experienced by people.

## List of Abbreviations

Abbreviation	Description
AIL	Abnormal Indivisible Load
AMP	Access Management Plan
BDPP	Bird Disturbance Protection Plan
BEMP	Biodiversity Enhancement Plan
BESS	Battery Energy Storage System
CAA	Civil Aviation Authority
CaSPlan	Caithness and Sutherland Local Development Plan
CEMP	Construction and Environmental Management Plan
CHVP	Cultural Heritage Viewpoint
CO <sub>2</sub>	Carbon dioxide
dB	Decibel
EnvCoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA Regs	Environmental Impact Assessment Regulations 2017
FoI	Freedom of Information
FSA	Forestry Study Area
GHG	Greenhouse Gas
GPG	Good Practice Guide
GWDTE	Groundwater Dependent Terrestrial Ecosystems
HES	Historic Environment Scotland
HGV	Heavy Goods Vehicles
HMP	Habitat Management Plan
IOA	Institute of Acoustics
IOF	Important Ornithological Feature
ISA	Inner Study Area
JRC	Joint Radio Company
LCT	Landscape Character Type
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
MW	Megawatt
NAL	Noise Assessment Locations
Natural Power	Natural Power Consultants Limited
NVC	National Vegetation Classification
OBEMP	Outline Biodiversity Enhancement Management Plan

Abbreviation	Description
ONS	Office for National Statistics
OS	Ordnance Survey
PHLRA	Peat Hazard Landslide Risk Assessment
PMP	Peat Management Plan
PWS	Private Water Supply
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SLA	Special Landscape Area
SNH	Scottish Natural Heritage
SPA	Special Protected Area
SPP	Species Protection Plan
SSNL	Site Specific Noise Levels
SSSI	Sites of Special Scientific Interest
SuDS	Sustainable Drainage System
THC	The Highland Council
TMP	Traffic Management Plan
WLA	Wild Land Area

## 17.1. INTRODUCTION

17.1.1. This chapter presents: a summary of the topics scoped into and included in the Environmental Impact Assessment (EIA) for Watten Wind Farm (the Proposed Development). All chapters note the consultees that were consulted/responded during the EIA process. The Environmental Impact Assessment Report (EIAR) details where these responses have been addressed, if applicable; the results of the EIA assessments where these are potentially significant; any mitigation proposed; and any residual effects. Synergistic effects are potential effects which may be caused through a combination of effects from different topics, and these are assessed in Table 17.1.

17.1.2. The EIAR includes five introductory chapters:

- Introduction (Chapter 1);
- Legal and Policy Context (Chapter 2);
- Approach to EIA (Chapter 3);
- Site Selection and Design Evolution (Chapter 4); and
- Project Description (Chapter 5).

17.1.3. Assessments are provided in the following chapters:

- Landscape and Visual (Chapter 6);
- Ecology (Chapter 7);
- Ornithology (Chapter 8);
- Hydrology, Geology and Hydrogeology (Chapter 9);
- Cultural Heritage (Chapter 10);
- Forestry (Chapter 11);
- Traffic and Transport (Chapter 12);
- Aviation and Telecommunication (Chapter 13);
- Noise (Chapter 14);
- Socioeconomics, Recreation and Tourism (Chapter 15); and
- Other Matters (Chapter 16).

## 17.2. SUMMARY OF ASSESSMENT

### Introductory

#### Legal and Policy Context (Chapter 2)

17.2.1. Chapter 2 of the EIAR identifies policy and legislative frameworks relating to renewable energy development and specifically onshore wind in a Scottish, UK, and international context. It does not assess the Proposed Development against these policies and legislation (which is the purpose of the Planning and Renewable Energy Statement), instead describing the context in which the Proposed Development is put forward.

17.2.2. Chapter 2 demonstrates that from international through to regional policy and legislation, there is broad support for the development of renewable energy, and a recognition of the speed and scale with which renewable energy development needs to be realised in order to avert the worst impacts of climate change.

17.2.3. Local policy and legislation in particular recognises the need to balance renewable energy development with potential impacts of large scale onshore wind. However, even here there is acceptance of the need for rapid deployment of green energy at scale to enable a myriad of goals, from de-carbonising industry and the transport network to improving air and water quality in areas where the environmental impact of historic industrial land uses has had a detrimental impact upon these assets.

17.2.4. The relevant planning policy and legislative provisions are also identified and considered in greater detail within the Planning and Renewable Energy Statement, which provides a detailed assessment and justification of the Proposed Development against relevant policy direction and legislation.

### Approach to EIA (Chapter 3)

17.2.5. Chapter 3 describes the EIA process followed, in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, to produce this EIAR, and the approach taken to identify and evaluate the impacts and associated potential effects of the Proposed Development.

17.2.6. While the chapter describes the general EIA methodology taken throughout this EIAR, methodologies for specific disciplines can be found in their related chapters (Volume 1) and Technical Appendices (Volume 3).

17.2.7. The process described in Chapter 3 is as follows:

- **Baselines** established through desk-based assessments, consultation with statutory and non-statutory consultees, field surveys and monitoring;
- **Scoping** report prepared to identify the likely significant environmental effects of the Proposed Development, and agreement sought with consultees on scope of the EIA;
- The prediction and evaluation of **impacts and effects** through examination of potential changes to the baseline environment that could result from the construction, operation and decommissioning of the Proposed Development;
- Consideration of the **cumulative impacts** and effects of wind farm sites within the vicinity of the Proposed Development. The cumulative criteria for each discipline are outlined in their relevant chapters and Technical Appendices; and
- Identification of **mitigation** for significant effects and monitoring of this to ensure its continued effectiveness.

### Site Selection and Design Evolution (Chapter 4)

17.2.8. Chapter 4 outlines the site selection process and design evolution of the Proposed Development.

17.2.9. The Applicant has a portfolio of sites across Scotland which have been investigated over time for wind energy potential. The feasibility studies allow the assessment of individual sites for potential to accommodate a range of development solutions and the outcomes result in some sites that are not progressed beyond the feasibility stage whilst others progress to in-depth assessment and application. Sites receiving the necessary consents are then progressed to construction and operation. Desk-based feasibility studies and site visits to the area of the Proposed Development were undertaken at an early stage. Results indicated that this site would be a technically and environmentally appropriate location to develop a wind farm.

17.2.10. A Scoping Report was submitted to the Scottish Government in May 2022 by Natural Power on behalf of the Applicant. At that time, it was envisaged the wind farm would comprise of up to eight wind turbines, up to 220 m in blade tip height.

- 17.2.11. Formal scoping, consultation, meetings and discussions took place with The Highland Council, SEPA, NatureScot and other consultees to agree the survey methodologies and opportunities to share information to inform the EIA process. The outcomes of these meetings and discussions coupled with public exhibitions and engagement have played an important role in shaping both the Watten Wind Farm design, and the scope and content of the EIAR. The formal scoping opinion and consultee responses received are included in Technical Appendix A1.
- 17.2.12. Chapter 4 sets out the extent and scale of how the Proposed Development was refined over the course of the design process including turbines being reduced in number, and multiple iterations of the Proposed Development Area. The design evolved largely to address perceived landscape, hydrological and ornithological issues (particularly impacts on peat) but also to reduce the overall impacts of the Proposed Development to an acceptable level, whilst optimising the economic production of green energy. Chapter 4 concludes that a focused and cohesive design has been produced capable of making a significant contribution to the Scottish Government's onshore wind energy targets.
- 17.2.13. Decisions on turbine size and number required consideration of various commercial and technical constraints, including forestry, wind resource and the separation between turbines needed to limit turbulence effects, as well as turbine availability and likely earliest economic deliverability. These considerations and on-site factors such as topography, ground conditions, existing infrastructure, ecological sensitivities, proximity to dwellings, rights of way, and archaeological features have all affected the size and the location of the turbines and other infrastructure proposed for Watten Wind Farm.

### Project Description (Chapter 5)

- 17.2.14. Chapter 5 outlines the details of the proposal, including specifications of turbines, access tracks and electrical infrastructure. It also describes the general construction methodology, timescales and typical construction equipment likely to be used for Watten Wind Farm. Operation and decommissioning phases are also detailed.
- 17.1.1 Construction would be over approximately 12 months and will require temporary construction compounds consisting of portable accommodation buildings, vehicle parking and storage areas for both machinery and construction materials.
- 17.1.2 The construction methods detailed in this section will ultimately be detailed in the Construction Environmental Management Plan (CEMP), built on best practice methodologies developed at other wind farms, and comply with all Health and Safety requirements for construction operations. An Outline CEMP can be found in Volume 3, Technical Appendix A5.1.

### Landscape, and Visual Impact Assessment (Chapter 6)

- 17.2.15. Chapter 6 of the EIAR assesses the likely effects of the Proposed Development on landscape, and visual resources in a defined study area. The Landscape and Visual Impact Assessment (LVIA) takes account of the effects of the Proposed Development inside and outside of the Proposed Development Area, as the proposal may affect the landscape character and visual amenity of locations at some distance beyond the Proposed Development Area. A study area of 45 km offset from the outer most turbines of the Proposed Development has been applied for the purposes of the LVIA. The LVIA incorporates a Residential Visual Amenity Assessment (RVAA) see Technical Appendix A6.9 and considers effects from Aviation Lighting see section 6.3 of Chapter 6: LVIA. All assessment methodologies are fully described in Technical Appendix A6.1.
- 17.2.16. Methodologies for all elements of the LVIA, viewpoints to be used for the visual and aviation lighting assessments, and wind farms to be included in the cumulative assessment, were agreed in consultation with The Highland Council and NatureScot.

- 17.2.17. Baseline conditions were established through desk-based study, site-based investigations and surveys. Baseline conditions for individual effects include operational wind farms in the 45 km study area. The cumulative assessment examines three scenarios:
- **Scenario 1:** The existing scenario of operational wind farms and those under construction is assessed in the LVIA;
  - **Scenario 2:** considers the addition of the Proposed Development in the context of operational wind farms, those under construction and additionally those developments currently consented. This represents the likely future scenario; and
  - **Scenario 3:** the addition of the Proposed Development in the context of operational, under construction, consented and undetermined applications i.e., a less certain future scenario.
- 17.2.18. Several operational wind farms are located within the South and East sub-unit of this LCT, this includes Achlachan I, Causeymire, Bad a Cheo, Halsary forming a large cluster to the west of the Proposed Development (Group 1), and Camster, and Bilbster, Burn of Whilk (Group 2).
- 17.2.19. Chapter 6 assesses that significant effects affecting a variety of landscape and visual receptors would occur within a localised area out to 15 km. This would occur within the context of the nearby Group 1 operational, consented and application developments. There would be direct impacts on landscape character principally as a result of the introduction of seven turbines and supporting infrastructure. This would affect semi-improved farmland and forestry and no sensitive landscape features.
- 17.2.20. One Wild Land Area (WLA) is assessed as receiving a significant effect, this is based on the extent of theoretical visibility within the WLA rather than affecting the wild attributes of the designation. Similarly, one regional landscape designation, the Flow Country and Berriedale Coast Special Landscape Area is also predicted to receive a significant effect based on the extent of visibility of the Proposed Development seen beyond the boundaries of the designation but would have limited effect on the special qualities of the SLA.
- 17.2.21. Several visual receptors would perceive significant effects as a result of views of the Proposed Development. These would include 24 residential properties/groups within 3 km of the Proposed Development Area, three roads, four Core Paths and four settlements as demonstrated by eight of the twenty viewpoints representing views from significant visual receptors.

### Ecology (Chapter 7)

- 17.2.22. Chapter 7 outlines baseline information, identifies potential impacts of the proposal on the ecology of the area, assesses the significance of those impacts, describes mitigation measures to avoid, reduce, remedy or compensate for those impacts, and assesses the significance of the residual effects based on the magnitude of the impact and the sensitivity of the receptor. This chapter also discusses the ongoing management and monitoring measures that may be required.
- 17.2.23. There are two designated sites within the Proposed Development Area; Caithness and Sutherland Peatlands SAC and Shielton Peatlands SSSI.
- 17.2.24. Although the Proposed Development Area encompasses a discrete area that forms part of the Caithness and Sutherland SAC and Shielton Peatlands Site of Special Scientific Interest (SSSI) due to oversail, the construction footprint of the Proposed Development does not overlap with these areas, and as a consequence no works would be undertaken in the SAC or SSSI. Construction work would comply with a CEMP which will take cognisance of the environmental sensitivities of the site and its immediate surrounds and would be monitored by a suitably experienced Environmental Clerk of Works (EnvCoW). The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with SEPA best practice guidance.

With this embedded mitigation in place, water pollution impacts and associated likely significant effects associated with the Proposed Development are considered unlikely. Furthermore, the Burn of Acharole separates the Proposed Development hydrologically from the Caithness and Sutherland Peatlands SAC and Shielton Peatlands SSSI. No potential effects on qualifying habitats of the SAC or SSSI are therefore anticipated and are scoped out of the assessment.

- 17.2.25. Bat activity is assessed as part of the EIA and guidelines for clearance from forest edge to turbine blades will be followed. It is considered unlikely that the Proposed Development will have any significant effects on the integrity of bat populations within the Proposed Development Area during the construction and decommissioning phases of the development. The magnitude of impacts for bat collision risk were assessed to be minor adverse through the operational phase of the development. In addition to embedded mitigation (i.e., maintenance of a 50 m buffer from turbine blade tip to feature height and feathering whilst idling), proposals for riparian planting within the Proposed Development Area included as part of biodiversity enhancements detailed in the Outline Biodiversity Enhancement Management Plan (OBEMP) (Technical Appendix A7.6) would create and improve bat foraging habitat and corridors. The mitigation measures will therefore reduce the effects of the Proposed Development from minor adverse to not significant. Cumulative impacts assessed for bats resulted in a predicted low spatial and long term temporal magnitude of impact.
- 17.2.26. The main areas of vegetation interest were largely avoided during the design evolution of the development. However there will be some direct and indirect habitat loss to blanket bog and wet modified bog during the construction phase of the development. In addition to the embedded mitigation, the implementation of an OBEMP, which includes bog and upland habitat restoration, the residual effects are predicted to be minor adverse and therefore not significant.
- 17.2.27. The 'footprint' of the Proposed Development has a direct impact on forestry habitat, and the soils beneath, however only parts of turbine 5 and turbine 6 including hard standings and parts of tracks are within forestry which will be felled using a key holing approach therefore effects on forestry are predicted to be not significant. Through the OBEMP, the applicant proposes a suite of measures including peatland restoration and raptor and wader enhancement, grassland enhancement for waders and riparian planting to mitigate for any impact and create new opportunities to improve ecosystem resilience within the site boundary and will result in significant biodiversity net gain.

### Ornithology (Chapter 8)

- 17.2.28. The assessment in Chapter 8 considers the various potential impacts arising from the construction, operation and decommissioning of the Proposed Development, and evaluates the significance of these impacts on the identified key species of interest in the context of their conservation value, sensitivity to wind farm development and the scale of the potential effects.
- 17.2.29. The Proposed Development is not located within any statutory conservation designations for ornithological interest.
- 17.2.30. Potentially significant effects on birds were avoided during the design phase of the development. The vantage point surveys recorded flight lines from a total of 18 target species.
- 17.2.31. Following survey, the species considered to be important ornithological features (IOFs) in the context of the Proposed Development, and following guidance, were then assessed for disturbance/displacement and collision risk and included for a number of reasons (not all relevant to every species): designated species listed under Caithness and Sutherlands Peatlands SPA, Annex 1, Schedule 1, BoCC Red list. The following species were assessed; Hen harrier, Merlin, Osprey, Red-throated diver, Curlew, Lapwing, and Herring gull.
- 17.2.32. For all IOFs taken forward into the assessment, the predicted residual effects during the construction, operation and decommissioning phases of the Proposed Development (alone or cumulatively) are considered to be no more than Moderate/Minor adverse (for 'High' sensitive species) and Minor adverse (for 'Medium' or Medium/High' for

sensitive species) and therefore not significant in the context of the EIA Regulations. In the longer-term with the implementation of the Habitat Management Plan (HMP), effects are likely to further reduce and may result in a positive net gain for IOFs (and other species present within and around the Proposed Development).

### Hydrology, Geology and Hydrogeology (Chapter 9)

- 17.2.33. Chapter 9 of the EIAR assesses potential impacts on surface water hydrology, geology and hydrogeology, including peat deposits, terrestrial and aquatic habitats, and protected species, and resultant potential for significant effects.
- 17.2.34. The study area can be seen in Figure 9.1 Proposed Development Area and Study Areas.
- 17.2.35. Desk based assessment and site surveys were undertaken to help establish the baseline. These included walkover surveys where hydrologists inspected proposed watercourse crossings and other hydrological features, and Phase 1 and Phase 2 peat probing to confirm presence and depth of peat on site.
- 17.2.36. Measures to mitigate impacts on hydrological receptors are fully described in Table 17.1.
- 17.2.37. The Proposed Development is located within the wider surface water catchment of the Wick River and within the sub-catchment of the Upper Wick River. Potential risk of increased flooding downstream will be mitigated through design of supporting drainage and watercourse crossing upgrades, and implementation of good management practices, including sustainable drainage systems (SuDS). In addition, certain measures under consideration for the Outline Biodiversity Enhancement Management Plan (OBEMP) (peatland restoration and riparian planting) could provide natural flood management benefits.
- 17.2.38. There are three designated sites within the Proposed Development Area: Shielton Peatlands SSSI, Caithness Sutherland Peatlands Ramsar and Caithness and Sutherland SAC however none of these sites are hydrologically connected to the Proposed Development Area as they are separated by the Burn of Acharole.
- 17.2.39. The Highland Council (THC) Environmental Health Department was contacted for details of any private drinking water abstractions not authorised by SEPA within 5 km of the Proposed Development Area via a FOI request. A response from THC confirmed the Private Water Supply (PWS) sources and properties located within 5 km of the Proposed Development Area, which were two domestic supplied, one at Achingale Mill via a groundwater borehole and the other at Lower Toftingall via a groundwater spring. Achingale Mill is currently not habitable and unoccupied. It is located downstream from the Proposed Development Area in the Wick River catchment, however, PWS located >250 m from the Proposed Development, the borehole is not at risk from the Proposed Development. Lower Toftingall is located in a separate catchment upstream to the Proposed Development and is therefore considered hydrologically disconnected to the Proposed Development Area.
- 17.2.40. A number of additional properties within the drainage pathways of the Proposed Development Area were also identified during the desktop study, which although not listed by THC, may utilise an unregistered PWS. Nine properties were contacted by letter questionnaires to confirm if the property was supplied by a PWS and to gather information on details of the source and supply. Of the nine questionnaires sent, responses were received for four properties, all of which confirmed their property was supplied by Scottish Water Mains. No additional PWS were identified, and no further assessment was considered necessary.



- 17.2.41. The soils present across the Proposed Development Area are primarily organic peatland soils (dystrophic blanket peat<sup>1</sup>) with an area of mineral drift soils in the south-east.
- 17.2.42. The SNH Carbon and Peatland Map 2016 maps Class 1, 3 and 5 peatland as present across the majority of the Proposed Development Area, with smaller pockets of Class 4, as shown in Figure 7.2. Results of peat depth probing and coring are detailed in Technical Appendix A9.4: Phase 1 and 2 Peat Depth and Coring Survey Report. Combining the results from the Phase 1 and Phase 2 depth surveys shows the majority of the peat Study Area (70.05 %) has a peat depth of  $\leq 1.0$  m or no peat (see also Figures 9.9 and 9.10). Areas where peat depth is less than 0.5 m is more appropriately considered, or referred to as, organo-mineral soils or peaty soils. Some areas of deeper peat were recorded within the peat Study Area as shown on Figure 9.9 and Figure 9.10. A maximum depth of 5.6 m was recorded near the western Proposed Development Area boundary. Measures to reduce impact on peat include implementation of the recommendations detailed in the draft Peat Management Plan (PMP) (Technical Appendix A9.5) and Peat Hazard Landslide Risk Assessment (PHLRA) (Technical Appendix A9.7) designing floating track sections and peat restoration areas have been included as part of the OBEMP.
- 17.2.43. The assessed potential Ground Water Dependent Terrestrial Ecosystems (GWDTE) National Vegetation Classifications (NVCs) sub-communities are considered reliant upon surface water or are ombrotrophic in nature across the entirety of the Proposed Development Area and therefore assessed to be generally of low groundwater dependency. Where habitat was assessed conservatively as moderate groundwater dependency near T2 location, the gentle topography and organic peat soil deposits present reduce the likelihood of the habitat being groundwater dependent.
- 17.2.44. Chapter 9 and associated Technical Appendices outline mitigation that would be included in a detailed CEMP secured via planning condition, to be implemented during the construction phase to protect peat and the surface and groundwater environment.
- 17.2.45. Following the successful design and implementation of mitigation measures the magnitude of impact of construction effects on all identified receptors are predicted to be not significant. The assessment of predicted operational effects has determined that the magnitude of impact of effects on all receptors to be of no significance.
- 17.2.46. Potential effects during the decommissioning phase are predicted to be less than those identified in the construction phase and are therefore predicted to be not significant.
- 17.2.47. Cumulative effects are predicted to be negligible during construction, operational and decommissioning phases following successful implementation of mitigation measures.
- 17.2.50. The Study Areas were agreed with consultees and are categorised as an inner study area (ISA) and outer study area (OSA). The ISA is the Proposed Development Area, and the OSA is based on the level of importance assigned to the asset (see Table 10.5) to ensure that all potential significant effects are recognised:
- Up to 2 km from proposed turbines: Category C Listed Buildings, and non-designated heritage assets;
  - Up to 5 km from proposed turbines: Conservation Areas and Category B Listed Buildings;
  - Up to 10 km from proposed turbines: Scheduled Monuments; and
  - Up to 20 km from proposed turbines: Category A Listed Buildings, Inventory Gardens and Designed Landscapes, and Inventory Battlefields.
- 17.2.51. All known heritage assets onsite have been avoided through design and will not be directly physically impacted by the Proposed Development infrastructure.
- 17.2.52. Buffer zones of 30 m have been included around known heritage assets in Management Units B & C in the OBEMP and detail is included in the OBEMP report that no tree planting or wader scrapes will be undertaken in these areas. No indirect (physical) impacts are anticipated. No heritage assets located in the ISA are in proximity to the Proposed Development infrastructure such that accidental damage is considered likely.
- 17.2.53. The assessment of archaeological potential has identified that any remains may be of up to Medium importance. If significant remains are present and discovered during construction phase groundworks, preservation in situ will be implemented where possible (such as in Management Unit B: Grassland Enhancement for Waders, any wader scrapes that expose significant archaeological remains could be ceased and backfilled). Archaeological remains are unlikely therefore to be fully removed and as such this may result in a construction-phase physical impact of up to moderate magnitude. Without mitigation, therefore, a physical impact upon archaeological remains discovered during construction-phase could result in an effect of up to Minor Adverse Significance which is Not Significant.
- 17.2.54. In respect of the setting of heritage assets, residual operational effects of Minor Adverse Significance which are Not Significant are predicted upon four Scheduled Monuments: SM90056/PiC297 Grey Cairns of Camster (only if/when intervening plantation is harvested) (CHVP10, Volume 2, Figure 10.12), SM13632 Carn A' Chladha, broch (CHVP3, Volume 3, Figure 10.5 & CHVP4, Volume 3, Figure 10.6), SM13634 Bail A' Chairn, broch (CHVP5, Volume 3, Figure 10.7 & CHVP6, Volume 3, Figure 10.8), and SM721 Scouthal Burn, Chapel and The Clow (CHVP8, Volume 3, Figure 10.10). Operational effects of Negligible Significance are not of material consideration and therefore not considered residual effects.
- 17.2.55. Operational effects on heritage assets were assessed to be either Minor adverse or Negligible therefore not significant, however, these impacts are fully reversed upon decommissioning.
- 17.2.56. Decommissioning effects have been scoped out of the assessment as the decommissioning phase will not create new physical impacts on top of those created by construction. Decommissioning will also return the setting of the historic assets to their baseline conditions.
- 17.2.57. Cumulative impact assessment considering other consented and submitted applications for wind farms has identified No Significant Effects.
- 17.2.58. A programme of mitigation shall be agreed with Historic Environment Scotland and THC Historic Environment Team to offset any potential direct effects on unknown heritage assets which may exist within the ISA, to include potential impacts upon or beneath peat. Following agreement of these works No Residual Effects are anticipated upon potential heritage assets within the ISA.

### Cultural Heritage (Chapter 10)

- 17.2.48. Chapter 10 of the EIAR assesses the effects of the Proposed Development on the historic environment. It does so by identifying historic assets that could be impacted by the Proposed Development, assesses their importance, and the potential impact the Proposed Development could have on them, assesses cumulative impacts, describes mitigation for potential adverse effects, and describes any potential resultant residual effects.
- 17.2.49. Heritage assets to be scoped into the assessment, the scope of the assessment and methodologies for the Chapter and its associated Technical Appendices were agreed through consultation with THC and Historic Environment Scotland (HES). Full details can be found in Chapter 10 and Technical Appendix A10.1: Cultural Heritage Baseline & Settings Assessment.

<sup>1</sup> Scottish Government, National Soil Map of Scotland: Generalised Soil Type. Available Online at: [https://map.environment.gov.scot/Soil\\_maps/](https://map.environment.gov.scot/Soil_maps/) [Accessed 15/08/2023]

### Forestry (Chapter 11)

- 17.2.59. Chapter 11 of the EIAR considers the potential implications of the Proposed Development on the woodland resource within the site boundary and its long-term management.
- 17.2.60. The Forestry Study Area (FSA) extends to approximately 141.30 ha of privately owned and managed woodlands. The forests are comprised largely of commercial conifers with areas of mixed broadleaves and open ground planted in the late 1990s. The crops are in the mid rotation phase and there are no current felling or replanting programmes.
- 17.2.61. Two of the proposed wind turbines and associated infrastructure, as shown on Figure 1.2: Site Layout, are located partially within existing commercial forestry plantations. SEPA requested a key holing felling approach must be used wherever possible to reduce the area of forest directly impacted by the Proposed Development (rather than coupe felling). A key holing approach to felling has been included for the works associated with the Proposed Development. The total felling required for the Proposed Development is estimated to be 11.24 ha (which represents 7.96% of the study area). **As a result of the onsite replanting and compensatory planting there would be a net increase in the stocked area of woodland of 3.84 ha.** As such there will be no requirement for offsite compensatory planting.
- 17.2.62. There is no Ancient Woodland within the Proposed Development Area therefore there will be no Ancient Woodland lost as a result of the Proposed Development.

### Traffic and Transport (Chapter 12)

- 17.2.63. Chapter 12 of the EIAR examines any potential effects that would arise on road infrastructure and its use. Baseline conditions were established through consultation and use of available traffic survey data, and potential traffic impacts have been identified and assessed, and where relevant, mitigation measures identified.
- 17.2.64. The assessment considered a worst-case scenario and assumes all stone would need to be imported onto site and all foundation concrete would need to be brought to site in ready mix lorries.
- 12.1.1 Several roads have been identified as being potential construction material and Abnormal Indivisible Load (AIL) road routes. These are as follows; A9 between Latheron and Georgemas, A9 south of Latheron (AIL's only), A882 from Wick to Georgemas, B870 from Watten to Mybster. The Site Entrance is located directly onto the A9 via the existing Halsary Wind Farm entrance. A variety of routes will be used by construction traffic depending on the point of origin.
- 17.2.65. For the AIL deliveries there are two preferred routes from the Port of Nigg and Scrabster Harbour being identified. Port of Wick was deemed unsuitable for AIL deliveries.
- 17.2.66. The route from the Port of Nigg for AILs would be as follows: From the Port of Nigg, exit onto the B9175 joining the A9. Loads would then head northbound on the A9 towards Latheron and then westbound onto the A9 towards the existing Halsary Wind farm site entrance.
- 12.1.2 The route from Scrabster: for AILs would be as follows: Loads would exit the harbour onto the A9, continuing south towards the existing Halsary Windfarm site entrance.
- 17.2.67. The traffic impacts associated with the abnormal load deliveries were also assessed. An AIL Route Survey Report including swept path analysis at particular pinch points has been prepared demonstrating the viability of the proposed abnormal load route (see Technical Appendix A12.1).

- 17.2.68. Traffic management interventions for delivery of the AILs have been included in Technical Appendix A12.1 and an outline Traffic Management Plan (TMP) for Heavy Goods Vehicles (HGVs) (see Technical Appendix A12.2) were prepared.
- 17.2.69. In relation to potential cumulative impacts, these would be dependent on whether other developments are constructed concurrently. If the construction of the Proposed Development coincided with another, using the same transport routes, then communication with the other developers will take place with the aim to mitigate effects to a non-significant level. This will be delivered through the construction TMP.
- 17.2.70. The assessment concludes that, with the incorporation of suitable mitigation measures secured through a construction TMP, there will be no significant traffic effects associated with the Proposed Development.

### Telecommunication (Chapter 13)

- 17.2.71. Chapter 13 of the EIAR examines any potential effects that would arise on telecommunication and its use. Baseline conditions were established through consultation and use of available data, impacts have been identified and assessed, and where relevant, mitigation measures identified.
- 17.2.72. One telecommunication link crosses the Proposed Development Area.
- 17.2.73. The Joint Radio Company (JRC) provided an initial objection to the Proposed Development as one communications link crosses the Proposed Development Area. One wind turbine is currently located within the exclusion zone associated with this communications link, as defined by the JRC. Consultation with the JRC to understand their position and to identify a way forward is ongoing. Mitigation will be required.

### Aviation (Chapter 13)

- 17.2.74. Chapter 13 of the EIAR also examines any potential effects that would arise on aviation interests. The aviation assessment includes: a desktop study where relevant aviation policy and legislation documents were reviewed and considered; identification of aviation bodies and consultation with such bodies; assessment of the potential impacts of the proposed development on all aspects of aviation, and identification of any potential mitigation measures that may need to be employed.
- 17.2.75. A worst case scenario has been assessed with regards to an aviation lighting scheme, in which all turbines will be fitted with lights.
- 17.2.76. The Proposed Development would currently infringe the Minimum Sector Altitude associated with aviation operations at Wick: John O'Groats Airport, which is located approximately 14.5 km east of the nearest wind turbine. Due to the overall altitude of the Proposed Development, the Minimum Obstacle Clearance Altitude will not be maintained in the Proposed Development's/airspace's current design. Consultation with Wick John O'Groats Airport is ongoing to identify whether a change to the Minimum Sector Altitude airspace is achievable to accommodate the Proposed Development. Crane operations will be considered within this change.

### Noise (Chapter 14)

- 17.2.77. This chapter assesses the potential noise effects that would occur as a result of Watten Wind Farm, assuming a worst-case scenario in relation to turbine choice.
- 17.2.78. Construction noise activities will be undertaken during typical working hours and as such a detailed construction noise assessment was not required.

- 17.2.79. Background noise monitoring was previously undertaken at a number of properties proximate to the Proposed Development as part of the noise assessment work undertaken for Halsary Windfarm. Halsary is now an operational wind farm located immediately to the south-west of the Proposed Development. Due to the number of existing operational wind farms within the area, additional noise monitoring was not undertaken due to the potential influence of operational wind turbine noise on the measured levels. Background noise data previously collected for Halsary Windfarm was used to set the Total ETSU-R-97 Noise Limits for the Proposed Development. A correction was applied to the data used from Halsary Windfarm to take account of wind shear and the difference in hub heights for the turbines at Halsary Windfarm and the Proposed Development.
- 17.2.80. The operational noise assessment was undertaken in three stages, which involved setting the Total ETSU-R-97 Noise Limits (which are limits for noise from all wind farms in the area) at the nearest noise sensitive receptors, predicting the likely effects (undertaking a cumulative noise assessment where required) and setting Site Specific Noise Limits (SSNL) for the Proposed Development.
- 17.2.81. Predicted cumulative operational noise levels indicate that for noise sensitive receptors neighbouring the Proposed Development, cumulative wind turbine noise (which considers noise predictions from all nearby operational and consented wind farms and the Proposed Development) would meet the Total ETSU-R-97 Noise Limits at all Noise Assessment Locations.
- 17.2.82. The Total ETSU-R-97 Noise Limit is applicable to all operational and consented wind farms in the area so SSNL have also been derived to control the specific noise from the Proposed Development. In accordance with the guidance in Institute of Acoustics (IOA) Good Practice Guidance (GPG), the SSNL have been derived with due regard to cumulative noise by accounting for the proportion of the Total ETSU-R-97 Noise Limit which is potentially being used by other nearby developments. The SSNL have been derived in accordance with the IOA GPG.
- 17.2.83. Predictions of wind turbine noise from the Proposed Development have been made in accordance with good practice using a candidate wind turbine, the Vestas V162, 6.8 Megawatt (MW) with serrated trailing edge blades, a hub height of 139 m. Predicted operational noise levels from the Proposed Development indicate that for noise sensitive receptors neighbouring the Proposed Development, wind turbine noise from the Proposed Development would meet the SSNL at all Noise Assessment Locations (NAL) and are therefore deemed to be not significant. In order to meet the noise limits at one receptor, mode management would be required for one turbine at 6 ms<sup>-1</sup> for certain wind directions based on the candidate turbine considered in this assessment.
- 17.2.84. The use of SSNL would ensure that the Proposed Development could operate concurrently with other operational wind farm developments in the area and would also ensure that the Proposed Development's individual contribution could be measured and enforced if required.
- 17.2.85. The wind turbine model was chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Development receive consent, the final choice of wind turbine would be subject to a competitive tendering process. The final choice of wind turbine would, however, have to meet the SSNL presented in the noise assessment.

### Socioeconomics, Recreation and Tourism (Chapter 15)

- 17.2.86. Chapter 15 of the EIAR assesses the potential effects on socioeconomics, recreation and tourism as a result of the Proposed Development at local, Scottish, and UK levels. The baseline was informed by publicly available Office for National Statistics (ONS) data.
- 17.2.87. Regarding tourism, there is potential for effects on local tourism focussed businesses relating to restricted access during the construction phase. However, it is predicted that these would be mitigated through the Access Management Plan (AMP), to be agreed with the LPA and landowners prior to construction, and through

communication with recreational users through relevant channels. Current research, referenced in the chapter, shows that there is no evidence to suggest wind farms have a negative economic impact on tourism. The Proposed Development is likely to improve public access to the site, which could help increase the tourism benefits to the area.

- 17.2.88. In terms of direct economic benefits, Chapter 15 demonstrates that the Proposed Development could sustain 54 jobs at a local level and 163 at a Scottish level during the construction phase, and nine jobs at a local level and 13 at a Scottish level during the operational phase. There is also likely to be indirect economic benefit from the Proposed Development due to the multiplier effect, where local workers and suppliers not directly linked to the Proposed Development derive income from it, which is then spent in the local economy.
- 17.2.89. In terms of community benefits, the Proposed Development is creating a community benefit fund worth £5,000 per MW per year, giving £238,000 per year over the proposed 35-year lifespan of the Proposed Development. In addition, the Proposed Development is offering shared ownership which will involve a community consultation exercise should the Proposed Development be consented to ensure the appropriate management, distribution and access to the fund and shared ownership is well considered.
- 17.2.90. Overall, the chapter concludes that the Proposed Development will have little impact on tourism in the local area and will have a positive socioeconomic benefit over the course of its lifespan at local, Scottish, and UK levels.

### Other Matters (Chapter 16)

- 17.2.91. Chapter 16 of the EIAR examines the following aspects of the Proposed Development in terms of health and public safety:
- Shadow Flicker;
  - Climate and Carbon Balance;
  - Utilities – Electricity, Water and Gas; and
  - Battery Fire Risk.
- 17.2.92. A preliminary shadow flicker assessment was undertaken to evaluate the potential effects of shadow flicker on surrounding properties due to the Proposed Development. This predicted that in a worst-case scenario, one of the five receptor locations modelled would exceed the commonly accepted shadow flicker limit of 30 hours per year. Commitments specific to the Proposed Development include verifying receptors through an on-site assessment, and the installation of shadow modules/sunshine sensors to mitigate the effects of shadow flicker. The full report can be found in Technical Appendix A16.1. It is expected that a planning condition limiting shadow flicker to below 30 minutes a day and/or 30 hours per annum for any properties existing or with planning permission at the time of consent will form part of the consent for the Proposed Development. This condition will result in effects of shadow flicker being not significant.
- 17.2.93. A wind farm has the potential to make savings on greenhouse gas (GHG) emissions compared to electricity generation which involves the burning of fossil fuels. The carbon balance assessment (Volume 3: Technical Appendix A9.6) has considered the current electricity generation mix and assesses the level of CO<sub>2</sub> savings that could potentially be saved depending on the source of electricity generation the wind farm is displacing at any

given time. An assessment has been undertaken in accordance with Scottish Government recommended methodology<sup>2</sup>.

17.2.94. No significant effects are anticipated for utilities – electricity, water and gas as a result of the Proposed Development.

17.2.95. The proposed Battery Energy Storage System (BESS) would be expected to utilise a modern lithium-ion cell chemistry and surrounding systems. There is very limited risk of fires starting or spreading through what is called ‘thermal runaway’ with the latest generation of lithium-ion battery energy storage systems, which benefit from a layered protection strategy. In the specific forested context of the Proposed Development, an external buffer of 10 m from the very edge of the battery storage hardstanding area to any trees mitigates the risk of any uncontrolled fire spreading, it is therefore concluded that fire risks from the proposed battery energy storage are low. However, the final design details of any battery energy storage, including fire monitoring and suppression systems, can be approved by the local authority via a deemed planning permission condition.

17.2.96. During the construction and decommissioning phase, the construction site would be managed according to all relevant health and safety regulations and CEMP. Measures to manage public access would also be put in place where required via an AMP.

17.2.97. During the operational phase, public safety would be ensured as the use of wind turbines and components would be conforming to either BS EN IEC 61400-1:2019<sup>3</sup> or IEC 16400. These turbines contain sensors that detect instabilities and unsafe operation and shut down under these circumstances. Therefore, no safety risks are expected as a result of public access to the vicinity of the proposed wind farm.

### 17.3. RESIDUAL EFFECTS, MITIGATION AND ENHANCEMENT

17.3.1. Table 17.1 summarises the mitigation measures incorporated into the design of the proposed wind farm, and those proposed for the construction, operation and decommissioning phases of the Proposed Development and contains a schedule of environmental enhancement.

Table 17.1: Summary of residual effects, mitigation and enhancement for Watten Wind Farm

EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
LVIA	Design evolution	<ul style="list-style-type: none"> <li>Design aimed to avoid overly complex or visually confusing layout and minimise overall impact when viewed from local settlements.</li> <li>Key design consideration was relationship between Proposed Development and existing, operational wind farms in the surrounding area. Design also aimed to reduce potential cumulative effects between Proposed Development and relevant consented, in-planning and pre-application wind farms.</li> <li>To reduce the Landscape and Visual effects of the Proposed Development, the following changes were made throughout the design evolution process:                             <ul style="list-style-type: none"> <li>Overall reduction number of turbines from eight (scoping layout) to seven (design freeze).</li> <li>A proposed aviation lighting scheme that fulfils the requirements of the CAA while reducing light pollution from the Proposed Development as far as possible.</li> </ul> </li> </ul>		<p>Significant effects could occur within a localised area out to 15 km affecting a variety of landscape and visual receptors:</p> <ul style="list-style-type: none"> <li>Causeymire – Knockfin Flows WLA;</li> <li>Flow Country and Berriedale Coast SLA;</li> <li>The Sweeping Moorland and Flows LCT</li> <li>Farmed Lowland Plain LCT (indirect effects);</li> <li>twenty-four residential properties/groups within 3 km of the Proposed Development Area;</li> <li>three roads;</li> <li>four Core Paths; and</li> <li>four settlements.</li> </ul>

<sup>2</sup> The Scottish Government. (2008) *Calculating carbon savings from wind farms on Scottish peat lands: a new approach* [Online] Available from - <https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/pages/13/> [Accessed 03/02/2023]

<sup>3</sup> BS EN IEC 61400-1:2019 Wind energy generation systems - Design requirements - Available from - <https://shop.bsigroup.com/products/wind-energy-generation-systems-design-requirements/standard> [Accessed 30/05/2023]

EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
Ecology	Design evolution	<ul style="list-style-type: none"> <li>A minimum distance of 50 m has been maintained between the Proposed Development and watercourses as far as practically possible, with a few exceptions (see Chapter 10 and associated Technical Appendices) in these instances where the 50 m watercourse buffer has not been maintained deeper peat was avoided. Any new watercourse crossings will be constructed, where possible, to be sympathetic to existing natural geomorphological conditions and to allow the safe passage of wildlife.</li> <li>The layout of the Proposed Development has avoided impacts to sensitive habitats where possible (e.g., the areas of soil with the highest peat content). Where avoidance has not been possible, the infrastructure will be constructed in such a way as to maintain the integrity and connectivity of the hydrology of hydrologically sensitive habitats such as the construction of some floating road sections. Access tracks have been designed in keeping with good practice.</li> <li>There will be a 50 m buffer distance between turbines and habitat features such as forest edges, to minimise effects of foraging bats.</li> </ul>		Not significant
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Pre-construction surveys for protected species.</li> <li>Where possible an allowance of 50 m micro-siting of infrastructure will be considered to ensure construction does not impact on the most sensitive habitats and any other identified ecological constraints and will be completed in consultation with the EnvCoW.</li> <li>Any land degraded by construction and not required for the operation of the Proposed Development, such as temporary crane hard standings, would be restored as soon as possible after construction is completed.</li> <li>Site activities have the potential to cause pollution through dust, siltation, leaks and spillages associated with plant and materials during the construction and operational phases mitigated through the CEMP.</li> <li>Pollution incidents may occur during construction as well as within the operational phase during maintenance works, mitigated via CEMP.</li> <li>Accidental or incidental injury and mortality of protected species during construction, mitigated via SPP and CEMP.</li> <li>Loss of habitat compensated via biodiversity net gain included in the OBEMP.</li> <li>Direct and indirect loss of blanket bog and wet modified bog habitat mitigated through the OBEMP via restoration of bog and upland habitat.</li> </ul>	<p>Implementation of the SPP secured via planning condition.</p> <p>CEMP secured via planning condition.</p> <p>Presence of EnvCoW on site secured via planning condition.</p> <p>BEMP secured via planning condition.</p>	Minor adverse. Not significant
	Operation	<ul style="list-style-type: none"> <li>Potential bat collisions for high collision risk bat species. In addition to embedded mitigation (i.e., maintenance of a 50 m buffer from turbine blade tip to feature height and feathering whilst idling), proposals for riparian planting within the Proposed Development Area included as part of biodiversity enhancements detailed in the OBEMP would create and enhance bat foraging and commuting habitat along watercourses within the Proposed Development Area.</li> <li>There will be little on-site activity during the operational phase, any routine maintenance works will take place during the day where practicable to minimise the potential for disturbance to protected species within the Proposed Development in accordance with the BEMP.</li> </ul>	BEMP secured via planning condition.	Minor adverse. Not significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Good practice measures as described in the construction stage will be followed, including specific guidance for the restoration and decommissioning of wind farms. New guidance available at the</li> </ul>	Complete decommissioning in line with specific up to date guidance and secured via condition..	Not significant.

EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
		decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.		
Ornithology	Design evolution	<ul style="list-style-type: none"> <li>The layout has been designed to minimise the potential for any negative effects associated with the Proposed Development, as well as potentially providing positive effects in the longer term.</li> <li>Various measures will be proposed to provide compliance with legislation, and to follow good practice guidance and consultation recommendations with regard to breeding birds.</li> <li>Where experience of developing projects of this nature has shown that embedded mitigation is sufficient to prevent significant adverse effects on Important Ornithological Features (IOFs), this has been built into the assessment.</li> </ul>		Not significant.
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Prior to the start of construction, contractors will be made aware of the ornithological sensitivities within the area of the Proposed Development (particularly with regard to the potential presence of Schedule 1 breeding species) during toolbox talks as part of the CEMP.</li> <li>Legal compliance regarding breeding birds will be adhered to including good practice via timing of works and pre-construction surveys will be necessary to reduce the possibility of illegal damage, destruction or disturbance to occupied bird nests during the construction phase.</li> <li>Felling of trees, and construction of turbine bases, access tracks and other structures will lead to direct habitat loss, mitigated via CEMP and enhanced via biodiversity net gain in the BEMP.</li> <li>Disturbance and displacement - potential impacts of associated noise and visual disturbance could lead to the temporary displacement or disruption of breeding and foraging birds. The potential impacts associated with construction activities are only likely to occur for as long as the construction phase continues. They are thus short-term and can be readily mitigated by avoiding sensitive areas (through the implementation of appropriately defined buffer zones), and by timing construction activities to avoid periods where sensitive species are present (if and where possible) such as the breeding season.</li> <li>A Bird Disturbance Protection Plan (BDPP) will detail embedded mitigation measures required prior to and during construction for protected bird species potentially breeding at the Proposed Development site, particularly in the vicinity of historic nests or suitable nesting habitat.</li> </ul>	<p>BEMP and BDPP secured via planning condition.</p> <p>Presence of EnvCoW on site secured via planning condition.</p>	Moderate/Minor. Adverse. Beneficial. Not Significant.
	Operation	<ul style="list-style-type: none"> <li>The operation of turbines and associated human activities for maintenance purposes also has the potential to cause disturbance and displace birds from the development. Disturbance impacts during the operational phase may be less than during the construction phase, as species may become habituated to turbines and disturbance due to human activities will be considerably reduced.</li> <li>Collision risk.</li> <li>With the exception of the operation of the wind turbines and general maintenance of the turbines, there will be little on-site activity during the operational phase and therefore levels of disturbance will be considerably reduced relative to the construction period.</li> </ul>	BEMP and BDPP secured via planning condition.	Moderate/Minor. Adverse. Beneficial. Not Significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Good practice measures as described in the construction stage will be followed, including specific guidance for the restoration and decommissioning of wind farms. New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.</li> </ul>	Complete decommissioning in line with specific up to date guidance and secured via condition.	Moderate/Minor. Adverse. Not Significant.
Hydrology, Geology and Hydrogeology	Design evolution	<ul style="list-style-type: none"> <li>All mapped watercourses marked as a constraint were given a 50 m buffer applied where possible to protect them from disturbance and potential effects on water quality during construction and operation.</li> <li>Phase 1 and Phase 2 peat surveys were completed, and areas of deep peat avoided where practical.</li> </ul>		

EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
		<ul style="list-style-type: none"> <li>Some access tracks were floated where possible to minimise impact on peat resource.</li> <li>GWDTE were also identified and avoided where possible.</li> </ul>		
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Risk of chemical pollution, erosion and sedimentation, flood risk and reduced water quality for surface watercourses mitigated by adherence to the CEMP, maintaining 50 m watercourse buffer, SUDs and appropriate water course crossing design.</li> <li>Risk of chemical pollution, changes to flow, reduced water quality and quantity of groundwater units mitigated by adherence to the CEMP, maintaining 50 m watercourse buffers and SUDs.</li> <li>Risk of changes to flow, loss of peat, loss of peat stability and peat compaction for peatlands mitigated by implementation of the recommendations detailed in the PMP and PHLRA and adherence to the, CEMP and through implementation of the BEMP.</li> </ul>	<p>Maintain 50 m watercourse buffer where possible.</p> <p>CEMP secured by planning condition.</p> <p>SUDs secured by planning condition.</p> <p>Implementation of the PMP &amp; PHLRA and secured via condition.</p> <p>Natural flood management in the form of peat restoration and riparian planting contained in BEMP, to be secured by planning condition.</p>	Moderate/Minor. Not significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Good practice measures as described in the construction stage will be followed, including specific guidance for the restoration and decommissioning of wind farms. New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.</li> </ul>	Complete decommissioning in line with specific up to date guidance and secured via condition.	Not significant.
Cultural Heritage	Design evolution	<ul style="list-style-type: none"> <li>Reduce effects on heritage assets from the Proposed Development, no infrastructure is predicted to impact heritage assets within the Proposed Development Area as appropriate distances from receptors have been achieved.</li> <li>Overall reduction number of turbines from eight (scoping layout) to seven (design freeze).</li> </ul>		
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Physical impact on archaeological remains mitigated via an appropriate level of survey, excavation, recording, analysis and publication of the results, in accordance with a written scheme of investigation. It is proposed that mitigation focuses on any groundworks within areas of peat, and also monitors the excavations for wader scrapes in OBEMP Management Unit B. It is proposed a 30 m buffer is applied to heritage assets within BEMP areas.</li> <li>Fencing off assets to protect them from accidental damage.</li> <li>Pre-commencement and post felling surveys to locate and identify archaeological assets.</li> </ul>	A written scheme of investigation (WSI) which will be submitted to THC and HES for approval and secured via condition.	Unknown, potentially Major adverse. Significant.
Forestry	Design evolution	<ul style="list-style-type: none"> <li>Through the design evolution process a key holing approach to felling was requested by SEPA and adopted by the Applicant as the best approach to reduce the impacts on forestry as a result of the Proposed Development.</li> </ul>		
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Forest felling agreed with private landowners and managed via CEMP.</li> </ul>	CEMP secured via planning condition.	
	Operation	<ul style="list-style-type: none"> <li>The operational phase will not require any tree felling works unless either maintenance, wind resource, environmental, or health and safety requires the areas immediately around the turbine bases (already cleared of trees) to be cleared of any natural re-growth.</li> <li>Compensatory planting will be undertaken, as required, resulting in no net forestry loss.</li> </ul>	Re-growth clearance to be agreed with landowner and secured via condition.	
	Decommissioning	<ul style="list-style-type: none"> <li>Decommissioning may require the immediate areas around the turbines to be clear of vegetation.</li> </ul>	Complete decommissioning in line with specific up to date guidance and secured via condition.	Not significant.

EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
Traffic and Transport	Design evolution	<ul style="list-style-type: none"> <li>Through the design evolution process a transport route has been investigated and assessed to minimise negative effects associated with the Proposed Development.</li> </ul>		
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Forest felling vehicle movements mitigated in the construction TMP &amp; CEMP.</li> <li>There will be increased traffic flows and slow moving vehicles on the highway links utilised by vehicles associated with the Proposed Development, mitigated via construction TMP. Measures include:                             <ul style="list-style-type: none"> <li>Scheduling AIL and HGV deliveries to avoid peak times;</li> <li>Temporary signage to direct drivers to the Proposed Development and advise of routes not permitted;</li> <li>Temporary signage to warn other road users and pedestrians;</li> <li>Scheduling construction activities, with focus on concrete and AIL deliveries to reduce deliveries whilst key activities are occurring;</li> <li>Reduced speed limits;</li> <li>Trial run for AIL movements including convoys, holding points and specific laybys; and</li> <li>Consultation with highway authorities and police to coordinate AIL deliveries, including local community via media outlets and individuals.</li> <li>If the need was identified cumulative construction TMPs for the Proposed Development and other relevant cumulative developments would be agreed through discussion between the developers and other relevant parties (including the roads authorities).</li> </ul> </li> </ul>	<p>CEMP secured via planning condition.</p> <p>Construction TMP (AIL &amp; HGV) secured via a planning condition.</p>	Not significant.
	Operation	<ul style="list-style-type: none"> <li>With the exception of the operation of the wind turbines and general maintenance of the turbines, there will be little on-site activity during the operational phase and therefore traffic volumes will be considerably reduced relative to the construction period.</li> </ul>		Not significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Decommissioning would be managed in accordance with a decommissioning plan to be agreed with relevant authorities at the time.</li> </ul>	Complete decommissioning in line with specific up to date guidance and secured via condition.	
Telecommunication	Operation	<ul style="list-style-type: none"> <li>One wind turbine is currently located within the exclusion zone associated with a telecommunications link, defined by the JRC. Consultation is ongoing with the JRC to understand their position and to identify a way forward. Mitigation will be required.</li> </ul>	Agreement needed between the Applicant and JRC on how to mitigate impacts on the telecommunication link to accommodate the Proposed Development	Negligible
Aviation	Operation	<ul style="list-style-type: none"> <li>Aviation lighting scheme.</li> <li>The Proposed Development would currently infringe the Minimum Sector Altitude associated with aviation operations at Wick John O'Groats Airport, located approximately 14.5 km east of the nearest wind turbine. Therefore, Minimum Obstacle Clearance Altitude will not be maintained in the Proposed Development's/airspace's current design, due to the overall altitude of the Proposed Development. Consultation with Wick John O'Groats Airport is ongoing to identify whether an airspace change is achievable to accommodate the Proposed Development. Crane operations will be considered within this change</li> </ul>	<p>Aviation lighting scheme to be secured via condition.</p> <p>Agreement needed between the Applicant and Wick John O'Groats Airport regarding a strategy to identify whether a change to the Minimum Sector Altitude airspace is achievable to accommodate the Proposed Development</p>	Negligible
Noise	Design evolution	<ul style="list-style-type: none"> <li>The layout of the proposed wind farm, turbine sizes and the turbines proposed has reduced the impacts of noise on potential residential receptors.</li> </ul>		



EIAR Chapter	Phase	Considerations for Mitigation/Enhancement	Commitment securing mechanisms for Mitigation/Enhancement	Residual Effects
	Pre-construction and construction	<ul style="list-style-type: none"> <li>Noise associated with the construction of the proposed development.</li> <li>The locations adopted for the noise assessment are representative of neighbouring noise sensitive receptors to the proposed development Properties within proximity will experience sound levels associated with construction that are no greater than existing ambient sound levels.</li> </ul>	<p>CEMP secured via planning condition.</p> <p>Construction works to be undertaken during typical working hours (08:00-19:00 Monday to Friday and 08:00-13:00 Saturday.)</p>	Not significant.
	Operation	<ul style="list-style-type: none"> <li>Operational cumulative noise level predictions determined compliance with the requirements of ETSU-R-97. Mitigation to specific turbines (dependent on final chosen turbine model) may be needed to achieve proposed noise limits at all neighbouring noise sensitive receptors.</li> </ul>	<p>Compliance with relevant guidance - ETSU-R-97.</p> <p>Compliance with agreed noise limits secured via condition.</p>	Not significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Anticipated noise levels will be similar to those generated through construction.</li> </ul>	<p>Complete decommissioning in line with specific up to date guidance and secured via condition.</p> <p>Decommissioning works to be undertaken during typical working hours. (08:00-19:00 Monday to Friday and 08:00-13:00 Saturday.)</p>	Not significant.
Socioeconomics, Recreation and Tourism	Pre-construction and construction	<ul style="list-style-type: none"> <li>Pre-construction checks would be completed to confirm all baseline data was still correct nearer the time of construction.</li> <li>For health and safety some public access through the site will be closed during various phases of the construction. This will be managed by an AMP.</li> <li>Access Management Plan (AMP) will maximise the availability and viability of recreational infrastructure within the site boundary to reduce impacts on tourism and tourism related businesses.</li> </ul>	AMP agreed with LPA and landowners prior to construction, and through communication with recreational users through relevant channels.	Not significant.
	Operation	<ul style="list-style-type: none"> <li>As part of the AMP the Applicant aims to offer enhancement measures in the form of improving recreational infrastructure within and local to the Proposed Development.</li> </ul>	AMP secured via planning condition.	Not significant.
	Decommissioning	<ul style="list-style-type: none"> <li>Decommissioning would be managed in accordance with a decommissioning plan to be agreed with relevant authorities at the time.</li> </ul>	Complete decommissioning in line with specific up to date guidance and agreed with LPA.	Not significant.
Other Matters	Pre-construction and construction	<ul style="list-style-type: none"> <li>Scheme to alleviate shadow flicker at any affected premises lawfully in existence at the date of this permission to within the guidance thresholds to be agreed with the LPAs prior to commissioning.</li> <li>Lightning protection equipment fitted to project turbines.</li> <li>TMP developed in collaboration with relevant highways authorities to mitigate significant effects on air quality.</li> <li>Construction Management Plan to mitigate traffic risks to site workers and general public.</li> <li>Clearly marked diversions for public access where required to protect public from construction related risks.</li> </ul>	<p>Shadow Flicker mitigation secured through planning condition.</p> <p>TMP and construction management plan secured through planning condition.</p>	

Source: Natural Powe

## 17.4. SYNERGISTIC EFFECTS

- 17.4.1. An assessment of synergistic effects ensures that the assessments provided in the EIAR for each topic are not considered in isolation. This assessment considers the potential synergistic effect of related residual effects during construction, operation, and decommissioning of the Proposed Development. A synergistic effect during decommissioning is considered to be of similar or less significance than that created during construction and therefore they are discussed together below.

### Construction and Decommissioning

- 17.4.2. During the construction and decommissioning phases, potential adverse synergistic effects are limited to the Proposed Development Area where there will be heavy plant operations, earth works, forestry operations and vehicle movements. These could result in potential synergistic effects upon physical and biological receptors including where there are overlaps between residential visual amenity, ecology, hydrology, geology and hydrogeology. These effects would be temporary in nature, will be managed through a CEMP and TMP, and in isolation have been assessed in the EIAR as not significant. These potential effects will also be monitored by an EnvCoW and enforced through planning condition(s). Given the limited number and extent of receptors, the limited effects predicted and their temporary nature, the synergistic effects during construction and decommissioning phases are considered not significant.

### Operation

- 17.4.3. Potential synergistic effects during the operational phase are limited to areas which are within or close to the Proposed Development Area where there may be a combination of potential visual, noise and shadow flicker effects. These effects then need to be considered and balanced against the ongoing socio-economic and wider environmental benefits which will arise from the project over this extended period. In terms of impacts on human health and population it is considered that the overall balance of effects remains positive and acceptable.
- 17.4.4. The inclusion of biodiversity enhancement management will restore areas of modified and damaged bog habitats within the Proposed Development Area. Restoration will focus on ditch blocking to rewet drained areas of peatland and restore areas of eroding peat, thus having a positive synergistic effect in this regard.

## 17.5. SUMMARY

- 17.5.1. This chapter of the EIAR summarises the potential effects of the Proposed Development as well as potential synergistic effects which consider such effects in combination. Following the implementation of mitigation primarily in the form of embedded mitigation in the siting and design of the proposal, potential significant adverse effects are restricted to isolated landscape and visual effects upon limited receptors within close proximity of the Proposed Development. As noted in Table 17.1; these are effects which are commonly associated with wind farms and in this regard need to be balanced against the benefits.
- 17.5.2. A OBEMP will be developed and agreed to restore areas of riparian habitats and overgrazed grassland within the Proposed Development Area and the Proposed Development will provide socioeconomic benefits through continuing employment opportunities it has already provided at the planning stage through the lifetime of the project following consent. In addition, the Proposed Development will contribute towards meeting national renewable energy targets and reducing carbon dioxide emissions to help reach the national carbon net zero target.