

## Chapter 7: Ecology

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## Chapter 7: Ecology

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## 7 Ecology

### 7.1 Executive Summary

- 7.1.1 This chapter considers the potential effects on important ecological features (IEFs) associated with the construction and operation (and decommissioning) of the Proposed Development.
- 7.1.2 The assessment is based on comprehensive baseline data, comprising specifically of targeted field surveys of legally protected and notable ecological features of conservation concern (i.e. IEFs) identified during desk study and consultation feedback. It draws on pre-existing information, where appropriate, from other studies, survey data sources and is based on standard Environmental Impact Assessment (EIA) guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) and NatureScot.
- 7.1.3 A suite of baseline ecology field surveys has been undertaken to inform the impact assessment, including for habitats and vegetation, badger, otter, pine marten, red squirrel, water vole, bats and fisheries.
- 7.1.4 The Site does not overlap with any designated sites of nature conservation interest although there are several in the wider surrounding area. The closest is the Upper Nithsdale Woods Special Area of Conservation (and component Chanlockfoot Site of Special Scientific Interest) which are located 4.85 km to the north-east of the Site. These designated sites have static qualifying ecological features (woodland habitats) and no effects on these are anticipated due to lack of pathways between the Site and these (and any other) designated sites with qualifying ecological interest.
- 7.1.5 Baseline surveys have established that habitats within the Site predominantly comprise stands of coniferous plantation (principally Sitka spruce) at various stages of growth. There are a number of areas of clear-fell within the confines of the plantation. There is open mainly grassland habitats on the periphery of the Site, with only limited and isolated peatland habitat which has been subject to degradation, mainly from artificial ditch creation. Some watercourses flow through the Site, most notably the Appin Burn. The access route largely follows an existing forestry track, fringed with coniferous plantation, and some limited open habitat (grassland). Field surveys confirmed the presence of badger (but no setts), otter (including potential holt sites and resting places), pine marten (but no den sites) and water vole (possible burrow). Common pipistrelle, soprano pipistrelle, brown long-eared, noctule, Leisler's and Myotis bat species were recorded during the bat activity surveys.
- 7.1.6 The assessment identifies which of the IEFs identified through the desk study and field surveys require further consideration and receive a full impact assessment. The assessment covers the Proposed Development on its own as well as cumulatively with other relevant projects. Embedded mitigation and good practice measures, including (but not restricted to) sensitive scheme design (including avoidance of peatland and minimising the number of watercourse crossings), pollution prevention controls, sediment management, sensitive construction techniques with regards to works near water, fish and water quality monitoring (pre-, during and post-construction; as part the Construction Environmental Management Plan (CEMP)), pre-construction protected species surveys, the presence of an Ecological Clerk of Works (ECow) and licencing requirements (where applicable) would be implemented during construction and have been taken into account when undertaking the assessment, as is standard practice.
- 7.1.7 For all IEFs scoped in for detailed assessment, following the application of the embedded mitigation, no significant adverse direct and/or indirect effects are anticipated as a result of the Proposed Development, either alone or when considered cumulatively with other relevant developments.
- 7.1.8 Accordingly, no additional mitigation is required. However, precautionary additional mitigation to reduce any unnecessary collision risk to foraging and commuting bats would be adopted. During the operational phase of the Proposed Development, additional mitigation in the form of pitching the blades out of the wind ('feathering') to reduce rotation speeds below 2 revolutions per minute (rpm) while idling, would be implemented.
- 7.1.9 Enhancement measures including habitat restoration (of carbon-rich soils through re-wetting), and habitat creation and enhancement measures to be implemented under the Outline Nature Enhancement Management Plan (ONEMP), are predicted to provide net beneficial effects associated with the Proposed Development, benefitting many IEFs in the long-term, and will leave biodiversity in a demonstrably better state than in the absence of the Proposed Development, consistent with Policy 3 of the National Planning Framework 4 (NPF4).

## 7.2 Introduction

- 7.2.1 This chapter of the Environmental Impact Assessment (EIA) Report assesses the potential for significant effects upon ecological features in relation to the construction, operation and decommissioning of the Proposed Development.
- 7.2.2 The assessment is based upon comprehensive baseline data, compiled through ecological field surveys, desk study and consultation with nature conservation bodies. The assessment has been written in reference to guidelines authored by the Chartered Institute of Ecology and Environment Management (CIEEM, 2018).
- 7.2.3 The chapter is supported by the following Technical Appendices presented in **Volume 4 and Volume 5 (Confidential Technical Appendices)**:
- Technical Appendix 7.1: Habitats and Vegetation;
  - Technical Appendix 7.2: Protected Terrestrial Mammals;
  - Technical Appendix 7.3: Bats;
  - Technical Appendix 7.4: Fisheries;
  - Technical Appendix 7.5: Confidential Protected Terrestrial Mammals<sup>1</sup>; and
  - Technical Appendix 7.6: Outline Nature Enhancement Management Plan.
- 7.2.4 The chapter is also supported by the following figures, which are available in **Volume 2**:
- Figure 7.1: Ecological Statutory Designated Sites;
  - Figure 7.2a: Habitat and Botanical Desk Study Records (Ancient Woodland Inventory 'AWI' area);
  - Figure 7.2b: Habitat and Botanical Desk Study Records (Botanical Species);
  - Figures 7.3a: Extended Phase 1 Habitat Survey Plan (the Site);
  - Figures 7.3b: Extended Phase 1 Habitat Survey Plan (the Access Route);
  - Figures 7.4: National Vegetation Classification (NVC) Survey Plan;
  - Figures 7.5: Protected Terrestrial Mammal Survey Plan;
  - Confidential Figure 7.6: Terrestrial Mammal Desk Study Records (Sensitive);
  - Confidential Figure 7.7: Terrestrial Mammal Field Survey Results (Sensitive);
  - Figure 7.8 - Bat Activity Survey Plan;
  - Figure 7.9 - Potential Roost Features Plan;
  - Figure 7.10: Fisheries Habitat Survey Plan; and
  - Confidential Figure 7.11: Bat Desk Study Records (Sensitive).
- 7.2.5 In the interest of concision, information contained in other chapters and appendices is not repeated herein unless beneficial for understanding.
- 7.2.6 Only common species names are referred to within the main body of this chapter. A summary of the species referred to herein and in associated **Technical Appendices 7.1 to 7.4**, is provided within the relevant Technical Appendix and includes common names, scientific (Latin) names and relevant conservation status.
- 7.2.7 Ornithological features are assessed in **Chapter 8**.
- 7.2.8 The following terminology is referred to in the chapter:
- The Proposed Development: the physical infrastructure of the proposed wind farm project, as set out in **Chapter 4**, and which in this chapter is typically used in reference to proposed turbines (unless otherwise stated);
  - The Site: the application red line boundary in which the Proposed Development would be located, as shown on **Figure 4.1** and on relevant figures associated with this chapter. This does not include the Access Route, which is treated separately;

<sup>1</sup> Technical Appendix 7.5: Confidential Protected Terrestrial Mammals includes sensitive information, e.g. the locations of specially protected species, and will be provided to NatureScot, the Scottish Government Energy Consents Unit and Dumfries and Galloway Council only.

- Access Route: the track connecting the Site to the public highway to the south-west of the Site (**Figure 4.1**) which is to be up-graded as part of the Proposed Development; and
- Study Area(s): these are survey specific areas that generally cover the Proposed Development and an appropriate surrounding buffer, as illustrated on **Figures 7.1 to 7.7**.

### 7.3 Legislation, Policy and Guidelines

7.3.1 Legislation, policy and guidance of specific relevance to ecology, and taken into account in the assessment presented within this chapter, are outlined below.

#### Legislation

7.3.2 The following legislation of relevance to this chapter have been considered:

- The Conservation of Habitats and Species Regulations 2017, (as amended) and the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (collectively 'the Habitats Regulations');
- The Nature Conservation (Scotland) Act 2004;
- The Protection of Badgers Act 1992 (as amended in Scotland);
- The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- The Wildlife and Countryside Act 1981 (as amended in Scotland); and
- The Wildlife and Natural Environment (Scotland) Act 2011.

#### Planning Policy

7.3.3 The following planning policy of relevance to this chapter have been considered:

- Scottish Government (2022a) The Scottish Biodiversity Strategy to 2045<sup>2</sup>;
- Scottish Government (2022b) Onshore Wind Policy Statement<sup>3</sup>;
- Scottish Government (2023) National Planning Framework (NPF) 4;
- Dumfries and Galloway Local Development Plan (LDP); and
- Dumfries and Galloway Local Biodiversity Action Plan.

#### Guidance

7.3.4 The following best practice guidelines, guidance and associated sources have informed the baseline studies and subsequent assessment presented within this chapter:

- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, 2016).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (Collins, 2023).
- Bat Surveys: Good Practice Guidelines 2nd edition (Hundt, 2012).
- Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (NatureScot, 2021).
- Land Use Planning System Guidance Note 4: Planning Guidance on On-shore Windfarm Developments (Scottish Environment Protection Agency, 2017a).
- Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Groundwater Abstractions and Groundwater Dependant Terrestrial Ecosystems (Scottish Environmental Protection Agency, 2017b).
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018 v1.3).
- Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines (Marine Scotland Science, 2021).
- Pre-application guidance for onshore wind farms (NatureScot, 2024j).
- Good Practice During Wind Farm Construction (NatureScot, 2024k).

<sup>2</sup> <https://www.gov.scot/publications/scottish-biodiversity-strategy-2045/>

<sup>3</sup> <https://www.gov.scot/publications/onshore-wind-policy-statement-2022/>

- Scottish Biodiversity List (SBL) (NatureScot, 2020).
- Standing Advice for Planning Consultations:
- Protected Species: Badger (NatureScot, 2024a);
- Protected Species: Otter (NatureScot, 2024b);
- Protected Species: Pine Marten (NatureScot, 2024c);
- Protected Species: Red Squirrel (NatureScot, 2024d);
- Protected Species: Water Vole (NatureScot, 2024e);
- Protected Species: Bats (NatureScot, 2024g);
- Protected Species: Freshwater Pearl Mussel (NatureScot, 2024i); and
- Guidance followed with respect to survey methodologies is detailed in **Technical Appendices 7.1 to 7.4**.

## 7.4 Consultation

- 7.4.1 Formal consultation took place via the submission of an EIA Scoping Report submitted in March 2022; a Scoping Opinion was received in June 2022.
- 7.4.2 Additionally, informal consultation with NatureScot was undertaken during the baseline survey period to agree the scope of data gathering methods.
- 7.4.3 It should be noted that the design of the Proposed Development has evolved since the Scoping Report was submitted and the number of proposed turbines is now fewer than that for which opinion was originally sought. Further details of these changes are described in the “Limitations to Assessment” section below.
- 7.4.4 A summary of the relevant responses obtained through consultation is presented in **Table 7.1**.

**Table 7.1 – Consultation**

Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
NatureScot (June 2022)	Scoping Opinion	Advised that any works should take account of protected species that may be present within the Proposed Development area with reference to appropriate survey guidance.	Noted.
Fisheries Management Scotland (FMS) (June 2022)	Scoping Opinion	Nith District Salmon Fisheries (NDSFB) stated that the associated drainage works and watercourse crossings involved with road construction in upland habitats can prove detrimental to salmonid and other species of fish and the aquatic environment generally and that they require more detailed surveys of the aquatic environment and its species to provide accurate data to inform the assessment.	<p>A 50 m buffer from watercourses has been incorporated from the initial design stage to avoid watercourses and watercourse crossings where possible. Where it was not feasible to maintain buffers, details of encroachments are provided in <b>Technical Appendix 6.1</b>.</p> <p>The six new watercourse crossings required (see <b>Chapter 6</b>) will be sensitively designed to allow the continued free movement of water and wildlife therein.</p> <p>It is considered that embedded mitigation and good practice to be implemented during construction and operation will prevent significant impacts on aquatic interests of local watercourses, including those downstream. A Fish Monitoring Plan (FMP) (extended to freshwater pearl mussel), including pre-, during- and post-construction fish monitoring will be produced and included within the Outline Construction Environmental Management Plan (CEMP) (see</p>

Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
			<b>Technical Appendix 4.1 and Section 7.9).</b>
Fisheries - Nith District Salmon Fisheries (NDSFB) (June 2022)	Scoping Opinion	<p>Object to the proposal relating to Appin wind farm on the grounds that there is insufficient commitment within the scoping report to gather information on the species.</p> <p>State that walkover surveys do not provide factual information on species population densities and distribution or the species that fish rely on for their survival.</p> <p>NDSFB hold some archive electrofishing data for watercourses located in or within the potential zone of influence of the Proposed Development and can confirm that salmonid species of fish are present.</p> <p>State that electrofishing surveys are the only way to provides actual data which can be measured and compared with future surveys. They would require a full suite of aquatic surveys be carried out before construction takes place and repeated annually, to include fish, aquatic macro invertebrates and invasive species to inform the assessment.</p> <p>State that an appropriate "fish monitoring plan" is required.</p>	<p>As above.</p> <p>As above.</p>
Fisheries- Nith Catchment Fisheries Trust (NCFT) (June 2022)		<p>Agree with the terms of the NDSFB response and support that response.</p> <p>Consider that it would be appropriate to conduct fresh water pearl mussel surveys in the watercourses which could potentially be impacted.</p> <p>Require detailed aquatic monitoring plans to be agreed prior to the development.</p>	<p>Noted.</p> <p>A freshwater pearl mussel survey has not been carried out, however a habitat suitability survey for freshwater pearl mussel has been undertaken of the watercourses within the Site (see <b>Technical Appendix 7.4</b>). A FMP, including pre-, during- and post-construction fish (and freshwater pearl mussel) monitoring, will be produced with input from the relevant consultees (see <b>Section 7.9</b>). This FMP would form part of the CEMP if the Proposed Development is consented (see <b>Technical Appendix 4.1</b>). See the <b>Appin Wind Farm Conditions Section 36 Consent and Deemed Planning Permission</b> document for further details.</p> <p>Noted.</p>
Tynron Community Council (June 2022)	Scoping Opinion	<p>Agree with the range of desk study sources and ecology surveys considered to inform the design and assessment of the Proposed Development.</p> <p>Dissagree with the statement that baseline information gathering has not identified the Site as being sufficiently important to lead to the potential for significant effects on the following protected species:</p> <ul style="list-style-type: none"> <li>– Wildcat;</li> <li>– Water vole;</li> <li>– Red squirrel;</li> <li>– Badger;</li> <li>– Invertebrates; or</li> <li>– Amphibians and reptiles.</li> </ul> <p>Requires supporting evidence to be detailed.</p>	<p>Noted.</p> <p>Supporting evidence produced from field surveys and desk study for the species mentioned is detailed within this assessment.</p>



Consultee and Date	Scoping / Other Consultation	Consultation Response	Applicant Response
		State that they do not agree that the full range of likely effects to be assessed within the EIA Report has been adequately identified and is proportionate to the nature of the Proposed Development.	The IEFs relevant to the Proposed Development are considered in <b>Section 7.11</b> , with further assessment of those IEFs where adverse effects are possible addressed in <b>Section 7.12</b> .
		Highlights the requirement for the impacts of lighting on bats does not appear to be considered.	The impacts of lighting on bats have been considered in this assessment. See <b>Section 7.9</b> below.
		Express preference for local eco-tourism businesses to be consulted with regards to both ecology and ornithology.	Effects with regards to socio-economic considerations are addressed in the Socio-Economic Benefits Report which accompanies the application for consent. Impacts on tourism are addressed in <b>Chapter 2: EIA Methodology</b> .
		Disagrees with the scoping out of potential for indirect effects upon the ecological qualifying interests of any statutorily designated site for nature conservation located greater than 2 km from the Site due to the implementation of embedded mitigation and good practice. Concerned regarding the potential for habitat fragmentation, disruption, destruction and potential changes in hydrology that could impact designated sites further than 2 km from the Proposed Development.	The IEFs (including statutory sites with ecological qualifying interests) relevant to the Proposed Development are considered in <b>Section 7.11</b> , with further assessment of those IEFs where adverse effects are possible addressed in <b>Section 7.12</b> .
		Disagree with the scope of cumulative assessment, arguing that a greater weight must be given to the proposed Appin Wind Farm proposal because of its height, number of turbines and longevity.	Potential effects of the Proposed Development on IEFs are considered (alone) in <b>Section 7.12</b> , and cumulatively within <b>Section 7.15</b> . The assessment is based on the whole Proposed Development (including specification).
NatureScot (October 2020)	Informal survey scoping	Noted that habitat surveys planned should be adequate at Phase 1 level for the Proposed Development.	Noted. The findings of the habitat surveys are detailed in <b>Technical Appendix 7.1: Habitats and Vegetation</b> .

## 7.5 Assessment Methodology and Significance Criteria

### Scope of Assessment

- 7.5.1 The assessment presented within this chapter has been undertaken in accordance with CIEEM guidelines (CIEEM, 2018) and considers the following potential impacts upon designated sites and ecological features associated with construction, operation and decommissioning of the Proposed Development:
- habitat loss/deterioration - direct and indirect loss and deterioration of habitats;
  - mortality/injury - direct or indirect loss of life or injury; and
  - disturbance/displacement of species - disturbance and displacement of faunal species; loss, damage or disturbance to their breeding and/or resting places.
- 7.5.2 Potential effects on ecological features are considered as a result of the Proposed Development alone and cumulatively with other developments which are the subject of a valid planning application (including those subject to appeal, but with relevant publicly available documentation), operational, under construction and consented wind farm developments with design information in the public domain.
- 7.5.3 CIEEM guidelines (2018) stipulate that it is not necessary to carry out a detailed assessment of impacts upon ecological features that are sufficiently widespread, unthreatened and resilient to impacts of the Proposed Development. As such, the assessment presented within this chapter considers effects upon designated sites and ecological features which are considered 'important' on the basis of baseline information, relevant guidance, literature, professional judgement of the authors and, where

relevant, opinions of statutory advisory bodies provided through consultations in relation to the Proposed Development and, where relevant, other wind farm developments.

- 7.5.4 Where ecological features are not considered so important as to warrant a detailed assessment, or where it is clear they would not be significantly affected by the Proposed Development on the basis of baseline information, these are 'scoped out' of the assessment (as agreed through the scoping report and opinion, see **Table 7.1** or as detailed in **Section 7.11**). Mitigation measures for impacts on such features may, however, still be outlined as appropriate to reduce and/or avoid any potentially adverse effects or to ensure legislative compliance. Where relevant, these ecological features may also be discussed qualitatively within the EIA Report and given consideration in site-wide recommendations for habitat enhancement.
- 7.5.5 The assessment is based on the Proposed Development described in **Chapter 4**.
- 7.5.6 Following the principle of proportionate EIA, design evolution and embedded mitigation are considered at the outset of the assessment, including standard best practice and construction management measures included within the Outline CEMP, see **Technical Appendix 4.1**. Ecological features are 'scoped in' to the assessment where there is still considered to be the potential for significant effects on the identified feature arising from the Proposed Development after the application of embedded mitigation measures.
- 7.5.7 The scope of the assessment has been informed by consultation responses summarised in **Table 7.1**.

#### **Study Area**

- 7.5.8 Study areas, within which baseline information in relation to ecological features has been obtained, comprise the Proposed Development and areas out to as far as 10 km from the Site and Access Route boundaries for specific species.
- 7.5.9 Some small changes to the Site and Access Route boundaries have occurred since initial surveys were undertaken. However, these are considered of no limitation to the assessment due to their modest nature. See **Technical Appendix 7.1** and the "Limitations to Assessment" section below for a summary of these changes.
- 7.5.10 The Study Areas used have appropriately covered the Proposed Development infrastructure, as well as adjacent habitats, as required.
- 7.5.11 The locations of statutory designated sites for nature conservation with ecological qualifying interests have also been identified within 10 km of the Site and Access Route (**Figure 7.1**).
- 7.5.12 Full details of study areas adopted for desk study and field surveys are provided in **Technical Appendices 7.1 to 7.5** and illustrated on **Figures 7.1 to 7.7**.

#### **Desk Study**

- 7.5.13 A desk study review of existing ecological information was undertaken to:
- identify the location of designated sites for nature conservation cited for ecological interest, within 10 km of the Site boundary for statutory sites, and 2 km from the Site and Access Route boundaries for non-statutory sites;
  - identify existing records of protected and/or notable species and habitats within 2 km of the Site and Access Route;
  - identify any factor or features that may influence the potential for impacts on ecological features as a result of the Proposed Development;
  - inform the requirement for further detailed survey; and
  - provide context for assessment.
- 7.5.14 Some minor changes to the Site and Access Route boundaries have occurred since the desk study was undertaken, however, these are considered of no limitation to the assessment due to their modest nature and the locations of the changes making little difference to the overall footprint of the Proposed Development (the footprint being what determines the reach of the desk study Search Area). See **Technical Appendix 7.1** and the "Limitations to Assessment" section below for a summary of these changes.
- 7.5.15 The following key sources were consulted:
- Freshwater pearl mussel information web page (JNCC, 2022);
  - South West Scotland Environmental Information Centre (SWSEIC);
  - NatureScot Open Data Geoportal;
  - NatureScot Sitelink;

- Saving Scotland's Red Squirrels website;
- SEPA River Basin Management Plan (SEPA, 2021);
- Scotland's Environment Map (Scottish Government);
- UK Habitats Directive Article 17 Report (JNCC, 2019);
- River Nith Catchment Fishery Management Plan 2014-2018 (Nith District Salmon Fishery Board and Nith Catchment Fishery Trust, 2014); and
- River Nith Catchment Fishery Management Plan 2023-2028 (Nith District Salmon Fishery Board and Nith Catchment Fishery Trust, 2023).

7.5.16 Additional peer-reviewed literature and industry guidance are referred to where relevant.

7.5.17 Details and results of the desk study undertaken are provided in **Technical Appendices 7.1 to 7.5**.

#### Field Surveys

7.5.18 Detailed knowledge of habitats and vegetation and the presence or likely presence of protected and notable faunal species on or surrounding the Site and Access Route have been derived from field surveys.

7.5.19 The following field surveys have been completed:

- Extended Phase 1 Habitat Survey;
- National Vegetation Classification (NVC) survey;
- Terrestrial mammal surveys;
- Bat habitat suitability appraisal;
- Bat activity surveys - ground level automated monitoring;
- Preliminary bat roost assessment; and
- Fish habitat survey.

7.5.20 **Table 7.2** provides a summary of field survey methodologies followed. Full details are provided in **Technical Appendices 7.1 to 7.5**.

**Table 7.2 – Field survey methodologies**

Ecological Feature	Survey Type	Methodology
Habitats and Vegetation	<ul style="list-style-type: none"> <li>– Extended Phase 1 Habitat Survey</li> <li>– National Vegetation Classification (NVC) Survey</li> </ul>	<ul style="list-style-type: none"> <li>– An extended Phase 1 Habitat Survey and an NVC Survey were carried out on the 30<sup>th</sup> July and the 2<sup>nd</sup> and 3<sup>rd</sup> August 2021. A habitat validation survey was undertaken on the 8<sup>th</sup> October 2024. The Study Area for these habitat surveys was the Site and out to 100 m (where accessible).</li> <li>– An extended Phase 1 Habitat Survey of the proposed Access Route was undertaken on 18<sup>th</sup> August 2022. The Study Area for the Access Route surveys was the access route itself and out to 20 m either side.</li> <li>– Minor changes to the Route Access have occurred since these surveys were undertaken, however, these are considered of no limitation to the assessment. See <b>Technical Appendix 7.1</b> and the the "Limitations to Assessment" section below for a summary of these changes.</li> <li>– The Phase 1 surveys were undertaken in accordance with the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010), extended to include the additional recording of specific features indicating the presence, or likely presence, of protected or notable species. The NVC surveys followed the guiding principles detailed in the National Vegetation Classification: Users' handbook (Rodwell, 2006).</li> <li>– Full details are provided in <b>Technical Appendix 7.1</b>.</li> </ul>
Terrestrial mammals	<ul style="list-style-type: none"> <li>– Terrestrial mammals surveys</li> <li>– Extended Phase 1 Habitat Survey</li> </ul>	<ul style="list-style-type: none"> <li>– Protected terrestrial mammal surveys were carried out from 24<sup>th</sup> May to 26<sup>th</sup> May 2021 and 7<sup>th</sup> and 8<sup>th</sup> September 2021.</li> <li>– In addition, an extended Phase 1 Habitat Survey was carried out as detailed above, where signs of terrestrial mammals were searched for. The Site was further subject to an updated habitat 'validation' survey on the 8<sup>th</sup> October 2024..</li> <li>– An extended Phase 1 Habitat Survey was conducted at the proposed Access Route on the 18<sup>th</sup> August 2022, and this included recording any evidence of protected terrestrial mammals.</li> <li>– An update survey of the Site for terrestrial mammals was undertaken on the April 29<sup>th</sup> and 30<sup>th</sup> 2025.</li> </ul>

Ecological Feature	Survey Type	Methodology
		<ul style="list-style-type: none"> <li>All surveys were undertaken in conditions conducive to the survey of terrestrial mammals, including normal flow conditions of watercourses with the Study Areas, and not undertaken immediately after periods of heavy rain.</li> <li>Target species for survey were badger, otter, pine marten, red squirrel and water vole. The study area comprised all suitable habitats for the target species within the Site and Access Route and out to at least 50 m for red squirrel and water vole, 100 m for badger, 200 m for otter, 250 m for pine marten, where access allowed.</li> <li>Surveys have been undertaken in accordance with NatureScot guidance (NatureScot, 2024a- 2024e, 2024g, 2024i, 2024j, 2024k) and industry standard guidance, as detailed in <b>Appendix 7.2</b>.</li> <li>Full details are provided in <b>Appendix 7.2</b>.</li> </ul>
Bats	<ul style="list-style-type: none"> <li>Bat Habitat Appraisal</li> <li>Preliminary Roost Assessment</li> <li>Bat Activity Survey</li> </ul>	<p><u>Habitat Suitability Appraisal (HSA)</u></p> <ul style="list-style-type: none"> <li>Habitats present within the Site and Access Route were appraised for their potential to support bats in terms of both foraging and commuting opportunities in accordance with Bat Conservation Trust guidance (Collins, 2016; applicable at the time of survey). However, the HSA has utilised baseline data in relation to current BCT guidance (Collins, 2023) in appraising habitats within the Site and Access Route relative to foraging and commuting opportunities applicable to bats. Likewise, HSA has been utilised in informing the Habitat Risk component of the Initial Risk Assessment (Table 3a; NatureScot, 2021) relative to wind turbines included within the Proposed Development.</li> </ul> <p><u>Preliminary Roost Assessment</u></p> <ul style="list-style-type: none"> <li>Structures and trees within the Site and Access Route (and within 281 m of the proposed turbine locations<sup>4</sup>) with the potential to support maternity roosts and significant hibernation or swarming sites were identified via ground truthing, undertaken during extended Phase 1 Habitat Surveys of the Site and the proposed Access Route and protected mammal surveys which took place in 2021, 2022 and 2024 (in accordance within NatureScot, 2021).</li> <li>Potential Roost Features (PRFs) recorded were later appraised relative to updated BCT guidance (Collins, 2023), following PRA assessments being superseded by Ground Level Tree Assessments (GLTA) relative to trees and PRA relative to structures. Results were factored into the Habitat Risk component of the Initial Risk Assessment (Table 3a; NatureScot, 2021) relative to wind turbines included within the Proposed Development.</li> </ul> <p><u>Bat Activity Survey</u></p> <ul style="list-style-type: none"> <li>Bat activity surveys in 2021, comprising of 14 ground-level static surveys, were undertaken during spring (May), summer (July - early August) and autumn (late September to early October) activity periods, in accordance with NatureScot guidance (2021).</li> <li>Further bat activity surveys in 2024, comprising a ground-level static survey, were undertaken during the autumn (September) activity period by FDM Ecology Ltd, in accordance with NatureScot guidance (2021). In total of nine MSs (MS4-MS6, M8-MS14) were deployed within the Site at previously used locations, in accordance with NatureScot guidance (2021).</li> <li>Monitoring stations were located at or within relative proximity to proposed turbine locations at the time of survey.</li> <li>Bat activity levels for high collision risk species (i.e., <i>Pipistrellus</i> and <i>Nyctalus</i> species) was assessed using similar principles as the Ecobat assessment tool.</li> <li>Full details are provided in <b>Appendix 8.4</b>.</li> </ul>
Fish	<ul style="list-style-type: none"> <li>Fish Habitat Survey (FHS)</li> </ul>	<ul style="list-style-type: none"> <li>A FHS was completed on all watercourses within the Site (including a 100 m Site buffer, where accessible) on 28<sup>th</sup> and 29<sup>th</sup> of October 2021, to identify any areas of critical fish habitat (i.e. spawning, nursery areas, juvenile and adult holding areas, juvenile lamprey habitat and freshwater pearl mussel habitat).</li> <li>Full details are provided in Technical <b>Appendix 8.5</b>.</li> </ul>

#### Field Survey Personnel

- 7.5.21 All field surveys were completed by experienced, reputable and professional ecologists, fully conversant in established ecology survey methodologies for proposed wind developments.
- 7.5.22 Details of field surveyors are provided in **Technical Appendices 7.1 to 7.4**.

<sup>4</sup> NatureScot (2021) guidance states that key features that could support maternity roosts and significant hibernation and/or swarming sites should be identified within 200 m plus rotor radius of the boundary (281 m in the case of the Proposed Development). Therefore, a 281 m buffer 'Turbine Constraints Buffer' has been used as a cut off point for the consideration of nearby potential roosting features.

### Other Species

- 7.5.23 As per NatureScot guidance (2024j), there are some species that, with standard mitigation applied, are unlikely to experience significant effects as a result of the development of onshore wind farms (e.g. invertebrates and amphibians), and as such, do not require surveys to inform an EIA.
- 7.5.24 On this basis, baseline surveys for invertebrates, reptiles and amphibians have not been undertaken to inform the design and assessment of the Proposed Development. Mitigation measures to avoid or otherwise reduce adverse effects and ensure legislative compliance (where applicable) have however been outlined.

### **Assessment of Potential Effect Significance**

- 7.5.25 The assessment has been undertaken in accordance with CIEEM guidelines (2018) and includes the following stages:
- determination and evaluation of important ecological features;
  - identification and characterisation of impacts;
  - assessment of the significance of effects prior to mitigation measures;
  - outline of mitigating measures to avoid and reduce significant impacts;
  - assessment of the significance of any residual effects after the application such measures; and
  - identification of appropriate compensation measures to offset significant residual effects.

### Criteria for Assessing the Sensitivity of Ecological Features

- 7.5.26 Relevant European, national and local guidance from governments and specialist organisations has been referred to, to determine the sensitivity (or importance) of ecological features. Reference has also been made to NatureScot guidance on key ecological features when considering the development of onshore wind farms in Scotland (NatureScot, 2022).
- 7.5.27 In addition, sensitivity has also been determined using professional judgement and taking account of the results of baseline field and desk study findings and the functional role of features within the context of the geographical area.
- 7.5.28 It should be noted that sensitivity, or importance, does not necessarily relate to the level of legal protection that a feature receives, and ecological features may be important for a variety of reasons, such as their connectivity to a designated site, rarity, or the geographical location of species relative to their known range.
- 7.5.29 For the purposes of this assessment, the sensitivity or importance of an ecological feature is considered in the context of a defined geographical area, ranging from International to Local, as detailed in **Table 7.3**.

**Table 7.3 – Sensitivity / geographic scale of ecological feature of importance**

<b>Sensitivity / Geographical Scale of Importance</b>	<b>Definition</b>
High – International / National	<p>An internationally or nationally designated site (i.e., SAC, Ramsar site or candidate site (e.g., cSAC) and/or SSSI).</p> <p>Large areas of priority habitat listed under Annex 1 of the Habitats Directive, and smaller areas of such a habitat that are essential to maintain the viability of that ecological resource. Or significant extents of a priority habitat identified in the SBL, or smaller areas which are essential to maintain the viability of that ecological resource.</p> <p>A regularly occurring, nationally or regionally significant population of any internationally or nationally important species, listed under Annex 2 or Annex 4 of the Habitats Directive, or Schedule 1 or Schedule 5 of the Wildlife and Countryside Act, or an SBL priority species.</p>
Medium - Regional	<p>Viable areas of key semi-natural habitat identified in the UKBAP.</p> <p>A regularly occurring, locally significant population of any nationally important species listed on the SBL, and species listed under Schedule 5 of the Wildlife and Countryside Act or Annex 2 or Annex 4 of the Habitats Directive.</p> <p>Sites which exceed the local authority-level designations but fall short of SSSI selection guidelines, including extensive areas of semi-natural woodland.</p>
Low – Local	Other species of local conservation value. Areas of habitat or species considered to appreciably enrich the ecological resource within the local context (e.g., species-rich flushes or hedgerows).

Sensitivity / Geographical Scale of Importance	Definition
	All other species and habitats that are widespread and common and which are not present in locally, regionally or nationally important numbers, or habitats which are considered to be of poor ecological value.
Very Low - Site	Areas of habitat or species considered of value up to the site only level. Note, these features are not considered in this assessment.

#### Criteria for Assessing the Magnitude of Impacts

- 7.5.30 Once identified, potential impacts are described making reference to the following characteristics as appropriate:
- beneficial or adverse;
  - extent;
  - magnitude;
  - duration;
  - timing;
  - frequency; and
  - reversibility.
- 7.5.31 The assessment only makes reference to those characteristics relevant to understanding the nature of an impact and determining the significance of the resulting effect. For the purposes of this assessment the temporal nature of potential effects are described as follows:
- negligible: of inconsequential duration;
  - short-term: for 1-5 years;
  - medium-term: for 5-10 years;
  - long-term: for 10-50 years; and
  - permanent: >50 years.
- 7.5.32 The criteria used to determine the magnitude of impacts are set out in **Table 7.4**.

**Table 7.4 – Impact magnitude**

Magnitude	Definition
Very High	The impact (either on its own or cumulatively with other proposals) may result in the permanent total or almost complete loss of a designated site and/or species/habitat status or productivity. Or alternatively notable gains in the designated site and/or species/habitat status or productivity.
High	The impact (either on its own or cumulatively with other proposals) may adversely, or beneficially, affect the conservation status of a designated site and/or species population, in terms of the coherence of its ecological structure and function (integrity), across its whole area, that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest.
Medium	The impact (either on its own or cumulatively with other proposals) would not adversely, or beneficially, affect the conservation status of a designated site and/or species in the long-term, but some element of the functioning might be affected, and impacts could potentially affect its ability to sustain some part of itself in the short to medium-term.
Low	Neither the above or below applies, but some observable adverse, or beneficial, impact is evident on a short-term basis or affects the extent of a habitat/species abundance in the local area.
Negligible	A very slight (indiscernible) reduction, or increase, in a habitat/species status or productivity and/or no observable effect.

#### Criteria for Assessing Effect Significance

- 7.5.33 For the purposes of assessment, significant effects are identified as those which encompass 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).
- 7.5.34 Such effects are identified by considering the sensitivity of a receptor, the magnitude of the impact and applying professional judgement based on best available evidence, to identify whether the integrity of a receptor will be affected.
- 7.5.35 The term 'integrity' is used here to refer to the maintenance of the conservation status of a population of a species or habitat at a specific location or geographical scale.
- 7.5.36 For the purposes of this assessment, significant effects are primarily expressed with reference to an appropriate geographical scale.



- 7.5.37 In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect has been assumed as a precautionary approach. Where uncertainty exists, this is acknowledged.
- 7.5.38 Where the assessment proposes measures to mitigate potentially significant adverse effects on important ecological features, a further assessment of residual effects, taking into account such measures, has been undertaken.
- 7.5.39 CIEEM guidelines (2018) do not recommend the sole use of a matrix table as commonly set out in EIA Report chapters to determine 'significant' and 'non-significant' effects. For the purposes of the assessment presented in this chapter, **Table 7.5** sets out adapted CIEEM terminology and equivalent in the context of the EIA Regulations.
- 7.5.40 For the purpose of this assessment '**Major**' and '**Moderate**' effects alone (or **Major/Moderate** effects) are considered significant in the context of the EIA Regulations.

**Table 7.5 – Effect (EIA Significance)**

Sensitivity	Impact Magnitude				
	Very High	High	Medium	Low	Negligible
High	Major	Major/Moderate	Moderate/Minor	Minor	Negligible
Medium	Major/Moderate	Moderate	Minor	Minor/Negligible	Negligible
Low	Moderate/Minor	Minor	Minor	Minor/Negligible	Negligible

- 7.5.41 CIEEM guidelines (2018) note that *"A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects have been lawfully permitted following EIA procedures."*

#### **Approach to Mitigation in the Assessment**

- 7.5.42 A mitigation hierarchy has been proposed to avoid, mitigate and compensate for potential adverse effects on ecological features as a result of the Proposed Development:

- 'avoidance' is used where a potential impact has been avoided from occurring e.g., through changes in Proposed Development design;
- 'mitigation' is used to refer to measures to reduce a specific adverse effect *in situ*;
- 'compensation' describes measures taken to offset residual effects, i.e., where mitigation in situ is not possible or sufficient; and
- 'enhancement' is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

#### **Assessment of Residual Effect Significance**

- 7.5.43 Where the ecological assessment proposes measures to mitigate adverse effects on ecological features, a further assessment of residual effects, taking into account any mitigation recommended, will be undertaken.

#### **Cumulative Assessment**

- 7.5.44 Potentially significant cumulative effects can result from individually insignificant but collectively significant, or interacting, effects taking place over a period of time or concentrated in a location.
- 7.5.45 For aquatic features, potential cumulative effects are likely to be significant only for other developments located relatively close (i.e., within 2 km) and within the same hydrological sub-catchments.
- 7.5.46 Potentially significant cumulative effects are only likely where other developments are located within the regular range of more mobile species (e.g., bats). Cumulative effects have therefore been assessed with reference to NatureScot guidance (2021), for a study area within 10 km of the Site and Access Route.
- 7.5.47 The cumulative assessment includes consideration of:
- existing wind farm developments, either operational or under construction;
  - approved wind farm developments, awaiting implementation; and
  - wind farm applications in planning, within the planning process with a valid planning application and sufficient information (including design information) in the public domain to allow a meaningful assessment.
- 7.5.48 No major non-wind developments are considered in the assessment given no such development was identified by NatureScot during scoping (see consultation points in **Table 7.1**) as requiring consideration.

- 7.5.49 Those developments which have been withdrawn and/or refused are not considered, unless an appeal is currently in progress and information is available.
- 7.5.50 Whilst single or small-scale wind turbine developments (three turbines or less) may contribute to cumulative effects, these have been scoped out of assessment, in line with NatureScot guidance (SNH, 2012), as applications for such developments do not generally consider the potential for impacts upon ecological features in sufficient detail so as to enable meaningful assessment, and information is often not readily available for small-scale developments.

#### **Enhancement Opportunities**

- 7.5.51 As a fundamental aspect of the Proposed Development, habitat enhancement opportunities on-site are investigated. Policy 3 of NPF4 advises that developments should contribute to the enhancement of biodiversity, and this could include restoring degraded habitats and strengthening nature networks and connections between them. Enhancement measures to be investigated and adopted are accordingly provided in the ONEMP (**Technical Appendix 7.6**).

#### **Limitations to Assessment**

- 7.5.52 Some minor changes to the Site and Access Route boundaries have occurred since the desk study was undertaken. However, these are considered of no limitation to the assessment due to their modest nature and the locations of the changes making little difference to the overall footprint of the Site and Access Route (the footprint being what determines the reach of the desk study Search Area).
- 7.5.53 The Access Route deviates modestly from the original layout surveyed. However, the habitats along the route not formally subject to an extended Phase 1 Habitat Survey was predominantly commercial forestry and thus of limited ecological value. Where any parts of the Access Route were not accessed, this is shown in Figure 7.3b denoted by asterisks (\*). A1.2.2 and B5/B1 habitats were mapped following a review of aerial maps and from adjacent mapped habitats. Accordingly, all parts of the Study Areas associated with the Site and the Access Route are considered to have been appropriately considered.
- 7.5.54 For further limitations and discussion in full see **Technical Appendices 7.1 to 7.5**.

## **7.6 Current Baseline Conditions**

### **Desk Study**

- 7.6.1 This section provides a summary of baseline ecological conditions in relation to:

- Designated sites of nature conservation with ecological interests;
- Habitats and vegetation;
- Protected and notable species;
  - Terrestrial mammals;
  - Bats; and
  - Fisheries.

- 7.6.2 Full details are provided within **Technical Appendices 7.1 to 7.5**.

#### Designated Sites for Nature Conservation

- 7.6.3 This section should be read with reference to **Figure 7.1**. Statutory and non-statutory sites designated for ornithological features are addressed separately in **Chapter 8: Ornithology**.

#### *Statutory Designated Sites for Nature Conservation*

- 7.6.4 **Table 7.6** provides a summary of statutory designated sites for nature conservation with ecological qualifying interests located within 10 km of the Proposed Development.
- 7.6.5 In review of the NatureScot Sitelink website, the Site and Access Route does not form a part of any internationally or nationally designated site for nature conservation with ecological qualifying interests.
- 7.6.6 Upper Nithsdale Woods Special Area of Conservation (SAC), Chanlockfoot SSSI and Stenhouse Wood Site of Special Scientific Interest (SSSI) are co-located and overlap somewhat in their extents.
- 7.6.7 The distances provided in **Table 7.6** are from the Site boundary to the designated site boundary at their nearest points.



**Table 7.6 – Statutory ecological designated sites**

Designated Site	Distance at closest point and orientation from Site boundary	Qualifying Features
Upper Nithsdale Woods Special Area of Conservation (SAC)	4.85 km north-east	– Mixed woodland on base-rich soils associated with rocky slopes.
Chanlockfoot SSSI	4.85 km north-east	– Upland mixed ash woodland.
Stenhouse Wood Site of Special Scientific Interest (SSSI)	5.02 km east	– Upland mixed ash woodland.
Tynron Juniper Wood SAC	8.13 km east	– Juniper on heaths or calcareous grasslands.
Tynron Juniper Wood SSSI	8.13 km east	– Juniper scrub.

*Non-statutory Designated Sites for Nature Conservation*

- 7.6.8 Consultation with South West Scotland Environmental Information Centre (SWSEIC) indicated that the Site does not form part of any non-statutory designated site for nature conservation and no such sites are located within the Search Area.
- 7.6.9 A review of NatureScot's Open Data Geoportal identified that with the Site is within the Transitional Zone of the Galloway and Southern Ayrshire Biosphere Reserve, which is recognised as an internationally world class environment for people and nature. The Biosphere Reserve covers a large area (9,000 km<sup>2</sup>) of south-west Scotland's land and sea.
- 7.6.10 A review of the Saving Scotland's Red Squirrels website identifies the Site to be on the periphery of the Nith Valley Priority Areas for Red Squirrel Conservation (PARC). PARCs are landscapes where grey squirrel control networks are present, which aim to provide coordinated and sustained protection of the resident red squirrels. The Site also lies within a Scottish Forestry designated priority area for grey squirrel control, which itself spatial overlaps with the PARC.

Priority Habitats and Ancient Woodland

- 7.6.11 Ten areas of woodland on the ancient woodland inventory were identified within the Search Area by SWSEIC, as shown on **Figure 7.2a**. Two of these are within the Site, however, from mapping, aerial photos and Site surveys, it appears these woodlands have been, at least partially, converted to commercial forestry. They could still be classified as PAWS (plantations on Ancient Woodland Sites) and as such, they are likely to retain a ground flora seedbank which could help in restoration to broad-leaved woodland.

**Field Surveys**

Habitats and Vegetation

- 7.6.12 The consideration of existing records is limited to those reported since (and including) 2010, to ensure that the most up to date (and thus relevant to the Proposed Development) records are considered.
- 7.6.13 Three 'notable' plant records were returned by the SWSEIC. These comprised of spotted cat's-ear (a nationally rare species but not listed on the IUCN red list of threatened species), field scabious (a species on the Dumfriesshire Rare Plant Register, DRPR) and juniper (a SBL and LBAP species, and on the DRPR). There was also one fungi record returned by the SWSEIC: purple moor-grass rust, which is an SBL species.
- 7.6.14 No records of invasive non-native plant species were returned from the SWSEIC.
- 7.6.15 A summary of habitats recorded within the Site and the proposed Access Route is summarised below and in **Tables 7.3a** and **7.3b** and **7.4**.
- 7.6.16 Habitats are discussed with reference to both the extended Phase 1 Habitat Survey and NVC survey results.

*The Site*

- 7.6.17 The Site features a diverse range of habitats, primarily shaped by its forestry operations, natural watercourses, and upland landscape. Broad-leaved semi-natural woodland is limited in extent and primarily follows the Appin Burn and parts of the Shinnel Water, with species like ash, willow, birch, rowan, and sessile oak. Broad-leaved woodland plantations appear in scattered patches, ranging from recently planted areas still in tubes to mature blocks with limited understorey. The most dominant woodland habitat is the coniferous plantation, largely composed of Sitka spruce with some larch, exhibiting various growth stages.

- 7.6.18 Large sections of the Site also include clear-felled areas, where vegetation has shifted to grasses and herbaceous species such as foxglove and rosebay willowherb, especially on drier ground. Surrounding hilltops and much of the remaining open land consist of unimproved acid grassland with a mix of grass species and herbs suited to dry, well-drained soils, with wetter patches transitioning into tufted hair-grass dominated grasslands. There are also acid flushes and notable stands of great woodrush in some locations.
- 7.6.19 Neutral grasslands are less widespread, with unimproved types found near streams and in abandoned fields, and improved neutral grasslands confined to enclosed, intensively grazed fields. Marshy grassland is common in wetter, lower-lying areas and plantation gullies, often dominated by rushes and occasionally supporting a richer mix of wetland plants, including rare purple moor-grass communities near blanket bog zones.
- 7.6.20 Other minor habitats include bracken mosaics, a small blanket bog area suffering from drying effects due to adjacent forestry, and open standing water in the form of two ponds. The Appin Burn and Shinnel Water, both typical upland streams, represent the area's dystrophic running water habitats.
- 7.6.21 Two ponds were recorded within the Site, although not within the proposed land-take of the Proposed Development infrastructure footprint.
- 7.6.22 The habitat validation survey in 2024 confirmed that habitat conditions remain largely consistent with those recorded in 2021, with the exception of two additional areas of clear-fell resulting from recent forestry activity.
- 7.6.23 A summary of habitat types and approximate areas within the Site is provided in **Table 7.7**.
- 7.6.24 NVC communities identified through the NVC survey present on-site are summarised in **Table 7.8** along with corresponding Habitats Directive (92/43/EEC) Annex 1 Habitat types, SBL priority habitat type, Priority Peatland Status and potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs) status<sup>5</sup> in accordance with SEPA guidance (2017b) and NatureScot NVC / EUNIS / Annex 1 correspondence tables (2017). NVC communities inconsequential in extent (i.e. very localised) are not included in **Table 7.8**.
- 7.6.25 For the purpose of this assessment, potential for impacts on GWDTEs are not discussed in detail herein, and are discussed separately in **Chapter 6**.
- 7.6.26 The survey identified one instance of a priority peatland community within the Site where its condition indicates blanket bog where any impacts from the Proposed Development would likely be of possible national interest. This was an area of M20 blanket bog, located in a thin strip along the northern boundary of the Site at Peat Rig. This habitat lies 770 m north of the Proposed Development infrastructure at its nearest point.

**Table 7.7 –Summary of baseline habitats including approximate area and relative percentage coverage within the Site**

Phase 1 Habitat Type	Extent (ha)	Relative Cover (%)
A1.1.1-Broadleaved woodland-semi-natural	5.16	0.55
A1.1.2-Broadleaved woodland-plantation	21.25	2.26
A1.2.2-Coniferous woodland-plantation	544.14	57.77
A4/B2.1-Recently felled woodland/Neutral grassland-unimproved	27.80	2.95
A4-Recently felled woodland	77.61	8.24
B1.1/B2.1/C1/B5-Acid grassland-unimproved/Neutral grassland-unimproved/Bracken/Marshy grassland	4.22	0.45
B1.1-Acid grassland-unimproved	196.32	20.84
B2.1/B5/C1-Neutral grassland-unimproved/Marshy grassland/Bracken	15.23	1.62
B2.1/B5-Neutral grassland-unimproved/Marshy grassland	16.78	1.78
B2.1-Neutral grassland-unimproved	1.32	0.14
B2.2/B5-Neutral grassland-semi-improved/Marshy grassland	0.78	0.08
B5/C1-Marshy grassland/Bracken	4.54	0.48
B5-Marshy grassland	4.23	0.45
E1.6.1-Blanket bog	0.64	0.07

<sup>5</sup> Assessments of GWDTE are based on botanical assessment and are therefore only indicative. As such, these require further hydrological assessment to confirm their status GWDTEs. For the purpose of this assessment, potential for impacts on GWDTEs are not discussed in detail herein, and are discussed separately in **Chapter 6**.

Phase 1 Habitat Type	Extent (ha)	Relative Cover (%)
J3.3-Built up Area	0.13	0.01
Track	21.82	2.32
<b>Total</b>	<b>941.97</b>	<b>100</b>

**Table 7.8 – Summary of the recorded plant communities within the Site with relevant conservation designations and/or potential groundwater dependence**

Phase 1 Habitat	NVC Community	Annex 1 Habitat	Scottish Biodiversity List	Potential Groundwater Dependence**
E1.6.1 Blanket bog	M20 – <i>Eriophorum vaginatum</i> blanket mire: no sub-community assigned	H7130 Blanket bog	Blanket Bog	3
B5 Marshy grassland	M23a – <i>Juncus effusus</i> – <i>Galium palustre</i> rush pasture, <i>Juncus acutiflorus</i> sub-community	-	Upland flushes, fens and swamps	1
	M25a <i>Molinia Caerulea</i> - <i>Potentilla erecta</i> mire, <i>Erica tetralix</i> sub-community	-	-	2
B2.1 Unimproved neutral grassland	MG1 - <i>Arrhenatherum elatius</i> grassland	-	-	3
B2.2 improved grassland	MG6 – <i>Lolium perenne</i> – <i>Cynosurus cristatus</i> grassland: <i>Anthoxanthum odoratum</i> sub-community	-	-	3
B2.1 Unimproved neutral grassland	MG9 – <i>Holcus lanatus</i> – <i>Deschampsia cespitosa</i> grassland: no sub-community assigned	-	-	2
B1.1 Unimproved acid grassland	U4a – <i>Festuca ovina</i> – <i>Agrostis capillaris</i> – <i>Galium saxatile</i> grassland: typical sub-community	-	-	3
B1.1 Unimproved acid grassland	U5a <i>Nardus stricta</i> - <i>Galium saxatile</i> grassland, species poor sub-community	-	<i>Nardus stricta</i> - <i>Galium saxatile</i> grassland	3 (2 in very localised damper areas)
B1.1 Unimproved acid grassland	U16 <i>Luzula sylvatica</i> - <i>Vaccinium myrtillus</i> tall-herb community	-	-	3
C1 Bracken	U20 <i>Pteridium aquilinum</i> – <i>Galium saxatile</i> community.	-	-	3
C3.1 Tall ruderal	OV27 <i>Epilobium angustifolium</i> community	-	-	3
A1.1.1 Broadleaved semi-natural woodland	W1 <i>Salix cinerea</i> - <i>Galium palustre</i> scrub	-	Wet woodland	2
A1.1.1 Broadleaved semi-natural woodland	W9 <i>Fraxinus excelsior</i> – <i>Sorbus aucuparia</i> – <i>Mercurialis perennis</i> woodland	-	Upland mixed ashwoods	3

\*\* As listed in Appendix 4 of SEPA (2017b) LUPS Guidance Note 31. The categorisation of groundwater dependent terrestrial ecosystems is preliminary and is based on vegetation communities present. Confirmed categorisation is based on subsequent formal hydrological assessment.

#### The Access Route

- 7.6.27 An extended Phase 1 Habitat Survey of the proposed Access Route was undertaken on 18<sup>th</sup> August 2022.
- 7.6.28 A summary of habitat types and approximate areas is provided in **Table 7.9**.
- 7.6.29 The habitats along the proposed Access Route consist of a diverse mix of woodland, grassland, wetland, and disturbed land types. Small patches of semi-natural broad-leaved woodland occur along the track, mostly made up of mature sycamore trees with some rowan and willow, while planted broad-leaved woodland areas are primarily located to the west.
- 7.6.30 Coniferous woodland is also present in two forms and makes up the majority of the Access Route Area, approximately 74%. A limited area of semi-natural Scots pine occurs near Cairn Hill, comprising a small stand of old trees with acid grassland beneath. In contrast, conifer plantations dominate much of the route, primarily made up of Sitka spruce and other conifers at varying stages of maturity. These dense stands have minimal ground flora due to their heavy shade. A mixed plantation also exists, mainly composed of sycamore and larch. Along many track edges, dense scrub has developed, especially through Sitka spruce regeneration, alongside some natural willow scrub.
- 7.6.31 Several clear-felled areas are present along the proposed Access Route, characterised by stumps, brash, and developing vegetation such as regenerating Sitka spruce, marshy grassland, and early successional grasslands. Unimproved acid and neutral grasslands occur mainly in these clear-felled or recently planted areas, supporting various grasses and herbs. These often form mosaics with marshy

grassland, which is widespread along the track and dominated by soft rush and other wetland plants. There are also some patches of purple moor-grass.

- 7.6.32 Bracken is common, forming mosaics with various grassland types, while tall ruderal vegetation such as rosebay willowherb appears in disturbed areas. A small patch of dry heath was noted near Ramsleugh Burn, featuring heather, bilberry, and associated mosses. A single pond was recorded adjacent to the Access Route and several dystrophic hill streams exist in the area. Additionally, human-modified features like a small quarry and stone dykes are found along the proposed Access Route.

**Table 7.9 –Summary of overarching habitats including approximate area and relative percentage coverage within the proposed Access Route Area**

Overarching habitat	Relevant Phase 1 codes within mosaic	Total habitat extent within the Access Route Area (ha)	Relative Cover within the Access Route Area (%)
Broadleaved woodland	B5/A1.1.2	0.66	0.36
Clear-fell	A4/A2/B1.1/C1	18.04	9.84
Coniferous plantation	A1.2.1/B1.1/A2/B5/C1A1.2.2/B2.1/C3.1	135.73	74.03
Grassland (Acid grassland/ Marshy grassland)	B1.1/B5/A2/C1	17.28	9.43
Other (e.g. scrub or bracken)	B1.1/B5/A2	11.63	6.34
<b>Grand Total</b>		<b>183.35</b>	<b>100.00</b>

#### Terrestrial Mammals (excluding bats)

- 7.6.33 Baseline terrestrial mammal conditions are summarised in **Table 7.5**. Full details are provided in **Technical Appendix 7.2**, **Figure 7.5** and **Confidential Figure 7.7**, with desk study results provided in **Confidential Figure 7.6**.
- 7.6.34 Mammal species (excluding bats) returned from the Search Area comprised red squirrel (44 records between 2013 and 2020). There were 19 records of otter, but these were all historic and all greater than 30 years old. There were also three records of the invasive species grey squirrel (2013 to 2021) (see **Confidential Figure 7.6**).

**Table 7.10 – Summary of terrestrial mammal survey results**

Terrestrial Mammal Species	Summary of Survey Results
Badger	No badger setts were located during the various field surveys, however latrines and snuffle activity (i.e. foraging signs) were recorded within the Site during the updated habitat validation survey in October 2024. No evidence of badger was recorded during update surveys in April 2025. Habitats within the Site, and directly adjacent are considered suitable for badger. Suitable habitats include woodlands, watercourse banksides, moorland and farmland, as such habitats provide opportunities for foraging, commuting and sett creation.
Otter	Watercourses within the Study Area were typically considered to provide highly suitable foraging and commuting opportunities for otter, with suitable habitat for holt creation also likely to be present within woodland and bankside habitats within and adjacent to the Site. Otter presence was confirmed within and adjacent to the Site with live sightings, tracks and spraints recorded. Potential holts and resting places (locations confidential) were also recorded within the Site. Further evidence of otter (spraints, prints, feeding remains and a further potential holt site) was recorded during update surveys in April 2025.
Pine marten	A possible pine marten scat was recorded by a rowan tree situated along an on-site plantation access track during the September 2021 mammal survey (grid reference: NX 74591 97610). No evidence of pine marten was recorded during update surveys in April 2025. Woodlands within and adjacent to the Site are considered to be suitable habitats for foraging, commuting, resting and breeding pine marten.
Water vole	No evidence of water vole was recorded within the Study Area, with watercourses in the Site largely considered to be unsuitable for the species. However, during the updated habitat validation survey in October 2024, a possible water vole burrow was identified within the Site beside a pool of still water associated with White Burn (grid reference: NX73088 98351; see <b>Figure 7.5</b> ). No conclusive evidence of water vole presence was identified at the burrow entrance; however, it was considered that the burrow had potential to belong to the species as feeding remains of rushes (bitten at a 45-degree angle) were identified adjacent. It is therefore considered possible for this to belong to water vole. No evidence of water vole was recorded during update surveys in April 2025.

- 7.6.35 No evidence or sightings of red squirrel were recorded within the Site. The Site is considered potentially suitable to support red squirrel.
- 7.6.36 Additional signs of mammal species were recorded on-site during the various surveys. This included roe deer, fox, field vole, hedgehog and brown hare.
- 7.6.37 No evidence of any other protected and/or notable terrestrial mammal species was recorded during surveys.

### Bats

- 7.6.38 Full details of bat survey results are provided in **Technical Appendix 7.3, Figures 7.8 and 7.9**, with desk study results provided in **Confidential Figure 7.11**.
- 7.6.39 A total of 18 recent bat records were returned by SWSEIC within the Search Area, accounting for a minimum of six confirmed species overall (i.e., common pipistrelle, soprano pipistrelle, noctule, Leisler's, Natterer's, and Whiskered/Brandt's bats), in addition to unidentified records relating to the *Pipistrellus* and *Myotis* genus.
- 7.6.40 In review of the UK Habitats Directive Article 17 Report 'Habitats Directive Report 2019: Species Conservation Status Assessments 2019' based on Mathews *et al.* (2018), the Site is located within the known UK distribution range for the following species:
- common pipistrelle;
  - soprano pipistrelle;
  - Daubenton's;
  - Natterer's;
  - whiskered;
  - noctule;
  - Liesler's; and
  - brown long-eared bat.
- 7.6.41 Consequently, the presence of pre-existing and recent records, in addition to the recorded distribution ranges, would suggest these species could be present within the local area.

### *Bat Habitat Suitability Appraisal*

- 7.6.42 Habitats present within the Site include open, edge and closed habitat types, which could support a different species guilds present within the local landscape, although suitability is noted to be variable across the Site.
- 7.6.43 The Site is dominated by closed habitat types, predominantly comprised of coniferous plantation woodland, with localised areas of broad-leaved plantation and semi-natural woodland. Woodland habitats also form the bulk of edge habitat niches present on-Site, relative to woodland edges. The majority of closed habitat (i.e., commercial coniferous plantation) is unlikely to form a substantial foraging resource given both its structural composition, species assemblage and land practice management. Likewise, roosting opportunities are likely limited given the age and commercial status of on-site plantation, with no PRF features reported in association during baseline surveys on-site.
- 7.6.44 Open habitats present are variable distributed and predominantly found in association with southern and western-north-western margins. Much open habitat present is relatively expansive and exposed and subsequently are likely of reduced ecological values (although areas found in association with woodland edge, i.e., edge habitats, are likely more suitable and accessible). As such, open habitats represent a variable foraging resource relative to local bat assemblages.
- 7.6.45 Several riparian features, which include brooks and streams, are also distributed throughout the Site, which represent areas of increased foraging value. Multiple streams are also present across the southern boundary of the Site..
- 7.6.46 Overall, the Site is unlikely to support large numbers of bats due to its elevation, exposure and commercial practices, although the continuous cover of sheltered plantation woodland (both locally and on-site) is of some value as a habitat resource.
- 7.6.47 As such, the wind farm development area is most representative of **Low suitability** habitat descriptions outlined in Table 4.1 of BCT guidance (Collins, 2023) and subsequently considered to be of **Low habitat risk** relative to the Proposed Development (4. Assessment of Potential Risk to Bats), as outlined in Table 3a of NatureScot Guidance (2021).
- 7.6.48 The proposed Access Route is notable for being predominating comprised of sheltered edge habitats, and/or areas of closed woodland. As such, most habitats are comprised of coniferous woodland variants (typically considered to be sub-optimal relative to broader woodland habitats), there is increased potential for foraging, commuting and roosting, with the Access Route representing an ecologically valuable area relative to the wider Site.
- 7.6.49 As such, the Access Route is most representative of **Moderate suitability** habitat descriptions outlined in Table 4.1 of BCT guidance (Collins, 2023), being continuous and well connected, but dominated by sub-optimal habitat types.



*Preliminary Roost Assessment*

- 7.6.50 No PRF features were recorded within the 281 m Turbine Constraints Buffer (200 m plus rotor radius of the Proposed Development turbines).
- 7.6.51 Additionally, the nearest confirmed roost record returned by SWSEIC is located approximately 1.4 km from the nearest Turbine Constraints Buffer and considered to fall outside the zone of impact of the proposed turbines.
- 7.6.52 However, some areas of edge and/or closed habitat (e.g., coniferous plantation) do fall within constraint buffers, although such habitats are typically considered suboptimal for roosting bats, and no PRF features were recorded in association with these areas.
- 7.6.53 Additionally, a single PRF feature was recorded within the site boundary of the proposed Access Route.

*Bat Activity Survey*

- 7.6.54 Bats were detected on 38 nights over the course of the initial survey effort, which covered May (spring), July – early August (summer) and late September - October (autumn) 2023 recording periods. A minimum of six species were recorded, of which common pipistrelle, soprano pipistrelle, noctule and Leisler's bats are attributed as high collision risk (HCR) species.
- 7.6.55 Over the courses of the 2021 survey, a total of 5,125 bat passes were recorded over a period of 521 suitable nights across all MS locations combined.
- 7.6.56 Soprano pipistrelle was noted to be most abundantly recorded species, with a total of 3,095 passes recorded (i.e., 60.4% of total bat calls recorded) over the duration of the survey effort.
- 7.6.57 Likewise, soprano pipistrelle was noted to be the most frequently recorded species over the survey effort, registering across 223 cumulative nights (i.e., 42.8% of sampled nights).
- 7.6.58 Bats were recorded on 51.25% of cumulative survey nights (i.e., suitable nights of bat recordings at each MS location combined).
- 7.6.59 MS10 was noted to have recorded the most bat passes (i.e., 839 passes), as well as the highest percentage of passes for cumulative recordings (16.4%) total number of passes for MSs combined).
- 7.6.60 However, MS3 featured the highest frequency of bat passes relative to the number of nights sampled over the survey effort (i.e., 69.05% of recorded nights).
- 7.6.61 Cumulatively, the summer recording period accounted for the highest number of recorded bat passes (5029 passes), accounting for 98.1% of total recorded passes across the survey effort.
- 7.6.62 Likewise, the summer recording period accounted for the highest number of bat passes relative to the number of suitable nights sampled over the survey effort (i.e., 58.4% of nights sampled).
- 7.6.63 As detailed within **Technical Appendix 7.3**, the Proposed Development has been assessed as having an 'Initial Site Risk' of **2**, representing a **Low** Site Risk:
  - The Proposed Development 'Habitat Risk' is classified as **Low**.
  - The Proposed Development 'Project Size' is classified as being **Medium**.

Fisheries

- 7.6.64 This section should be read with reference to **Technical Appendix 7.4** and **Figure 7.10**.
- 7.6.65 Following review of returned SWSEIC records, no fish species records were identified within the Search Area.
- 7.6.66 The European Water Framework Directive (WFD) requires that surface waterbodies in member states are classified according to ecological status. SEPA's River Basin Management Plan website confirms there is a single classified waterbody within the Search Area. Watercourse W1 is the Shinnel Water, which is classified as currently having good overall ecological status and high access for fish migration. All 17 remaining watercourses covered within the Search Area tribute into the Shinnel Water. There were no physical instream barriers between the Shinnel Water and the remaining watercourses within the Search Area, however, many lie on gradients > 10 % and as such have limited suitability for fish fauna.
- 7.6.67 The grid reference locations and site photographs for the 17 water courses are detailed within Annexes 2 and 3 of **Technical Appendix 7.3**.
- 7.6.68 A review of the River Nith Catchment Fishery Management Plans (FMPs) revealed that the Nith Catchment supports the following species: Atlantic salmon, sea trout, brown trout, grayling, pike, eel, lamprey (brook, river and sea), minnow, stone loach, stickleback, tench, perch, bream and roach. The catchment is not stated to include freshwater pearl mussel.

- 7.6.69 All Scottish salmon rivers are assigned a Conservation Categorisation grading by the Scottish Government (2003). Gradings range from 1 to 3. Grade 1 denotes a river that has sustainable populations of fish and has a harvestable surplus. Grade 3 means that the river does not have a sustainable population and that the taking of salmon is not permitted. As detailed in the FMPs, the River Nith (and catchment) has been assigned a Grade 3 status for a number of years which means that all salmon must be released. Given current catch returns, it is unlikely that this grading will change in the near future.
- 7.6.70 As detailed in the FMPs, following The Conservation of Salmon (Collection of Statistics) Scotland Regulations 2006, the Nith District Salmon Fishery Board issues a request to all salmon fishing proprietors for them to submit their annual catch data.

*Fish Habitat Survey*

- 7.6.71 The Shinnel Water (W1) and its associated tributaries (W2–W10) form a network that ultimately feeds into the River Nith. Shinnel Water itself is classified by SEPA as having good ecological status and high accessibility for migratory fish, although downstream barriers limit fish movement. It flows through moorland and some forested areas on a shallow gradient, offering some suitable habitat for juvenile fish. In contrast, tributaries W2–W10 occur on steeper gradients that generally exceed what is passable for migratory fish, thus limiting their ecological value for fish populations. While some of these tributaries contain substrates such as pebbles and gravel that could support fry and parr, their steepness reduces habitat suitability. Others, particularly W4, W5, W9, and W10, feature peaty conditions and sparse water during dry periods, offering minimal habitat for fish.
- 7.6.72 Watercourses W11–W14 are tributaries of the Appin Burn. W11, located in the upper Appin Burn, has a moderate gradient and contains mostly cobble substrate with limited gravel, providing marginally suitable habitat for juvenile salmonids. The remaining tributaries (W12–W14) are minor, with steep gradients and narrow channels, resulting in rapid flow conditions and limited suitability for fish. Vegetation encroachment and gradient challenges further reduce their ecological potential for supporting aquatic fauna.
- 7.6.73 The lower Appin Burn tributaries (W15–W17), including the Magmalla Burn, are steep and also offer negligible suitability for fish habitat. However, the main channel of the lower Appin Burn (W18) has a more favourable gradient and substrate composition. It includes diverse flow conditions and substrate types like cobbles, gravel, and sand, making it a viable habitat for non-migratory fish and potentially for migratory species, despite the presence of a downstream waterfall that could impede passage.
- 7.6.74 The watercourses surveyed were considered suboptimal for freshwater pearl mussel, and freshwater pearl mussel is not predicted to be present within the watercourses.

## 7.7 Implications of Climate Change for Existing Conditions

- 7.7.1 A summary of the relevant climate change projections using the UK Climate Change Projections 2018 (UKCP18) is:
- temperatures are projected to increase, particularly in summer;
  - winter rainfall is projected to increase and summer rainfall is most likely to decrease;
  - heavy rain days (rainfall greater than 25mm) are projected to increase, particularly in winter;
  - near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant effects of winds; however, the increase in wind speeds is projected to be modest; and
  - an increase in frequency of winter storms over the UK.
- 7.7.2 The impact of climate change on protected and notable species will vary depending on factors such as the availability of suitable habitat and the extent to which such habitats might be lost, and the adaptability of a species to cope with change.
- 7.7.3 Impacts are likely to be felt at a population scale, across a species' range. For example, there may be species for which Scotland currently lies outside their usual breeding range and which may colonise if this range shifts north. Alternatively, non-breeding species may winter further north than currently, leading to a shift in wintering range and a local population decline.
- 7.7.4 Increased summer and winter temperatures and higher average precipitation rates in summer and winter, predicted by climate change, are likely to result in an extended growing/breeding season with earlier in the year vegetation growth and breeding activity of key species. Increased rainfall is likely to result in greater vegetation growth, although for some botanical species it may have adverse effects (through water-logging). Higher rates of juvenile mortality for key species may be expected as a result of higher rates of rainfall. The bat activity season is likely to be extended by the higher seasonal temperatures, but conversely higher rates of rainfall are likely to adversely affect foraging activity.

- 7.7.5 The opposing potential effects of climatic change on ecology features makes predicting future likely outcomes difficult. However, the potential effects on ecological features detailed in this chapter are not predicted to substantively change in relation to climate change over the next 50 years.
- 7.7.6 In terms of the impact assessment for the Proposed Development, the potential impacts of climate change are noted but would not be expected to have more than a minor impact on the ecological features identified during baseline data gathering.

## 7.8 Future Baseline in the Absence of the Proposed Development

- 7.8.1 In the absence of the Proposed Development, the habitats within the Site would be expected to remain under the existing regime, with large areas of the plantation forestry on Site continuing to be managed through thinning, rotational felling and replanting in accordance with existing management plans. Thus, there are parts of the Site that are currently forested that would be thinned or clear-felled, and parts of the Site that were recently felled or replanted during the baseline period which would develop over time into mature forestry. Any protected and notable species using the Site would, therefore, be required to adapt to these localised changes in habitat, irrespective of the Proposed Development.
- 7.8.2 The Proposed Development is not subject to any other development pressures or management which would affect the habitats or ecological species in such a way that the present baseline conditions presented here would become substantively different.
- 7.8.3 Whilst short-term and small-scale variability in populations and distributions may occur, and revisions to conservation statuses and designations are possible, such changes would be unlikely to qualitatively alter the conclusion of the assessment presented in this chapter and have been accounted for through the application of a precautionary approach and appropriate mitigation.
- 7.8.4 For certain species, population trends could result in changes to their status. Where regional population trends are known, this is referenced in the impact assessments.
- 7.8.5 It should be acknowledged that even where local populations remain similar to baseline conditions in future, a species' overall conservation status could still change, i.e., becoming more or less favourable. Additionally, new protected sites could be designated in future that have connectivity with the Site. However, where such changes can be anticipated, these changes would be unlikely to qualitatively alter the conclusions of the impact assessment.
- 7.8.6 The use of a precautionary approach in this impact assessment and the application of standard embedded mitigation and good practice measures (as detailed herein) allows for small changes in ecological populations, without altering the conclusions of the assessment.

## 7.9 Embedded Mitigation

- 7.9.1 Embedded mitigation is built into the Proposed Development to minimise the potential for any adverse impacts associated with the Proposed Development, to ensure adherence to good practice guidance and compliance with the Wildlife and Countryside Act 1981; with such measures being followed irrespective of the impact assessment's conclusions.
- 7.9.2 Where embedded mitigation measures are sufficient to prevent significant adverse effects on ecological features, this has been taken into consideration in the assessment, in order to produce an EIA which is proportionate to the risks posed by the Proposed Development.

### Design Considerations

- 7.9.3 The following design considerations have been incorporated to avoid and minimise adverse effects upon ecological features:
- The Proposed Development infrastructure has been designed to minimise the requirement for land-take and the number of watercourse crossings, reducing the loss of moorland habitats and potentially sensitive fish habitats.
  - New watercourse crossings were reduced as far as practicable by using existing tracks where possible and minimising the number of crossings during initial design iterations. The Proposed Development will use 48 existing crossings and proposes six new crossings; this includes crossing small watercourses not shown on the OS mapping but mapped in the field and watercourses shown on OS mapping data. A 50 m buffer from watercourses has been incorporated from an early design stage to avoid watercourses and watercourse crossings. All of these new crossings will be sensitively designed to allow the continued movement of water and wildlife. Details and photographs of all watercourse crossings (existing and proposed) are provided in **Technical Appendix 6.1** with the locations shown on **Figure 6.2**.
  - The layout of on-site access tracks has been designed to be as limited in length as possible and, where available, the access tracks have followed existing tracks to minimise land take.



- The layout of the Proposed Development has adopted a minimum 50 m<sup>6</sup> 'stand-off' distance from bat habitat features and turbine blade tips in accordance with NatureScot guidance (2021). A distance of 96 m between the turbines and woodland edge, and 55 m between turbines and watercourses, has been achieved, in accordance with NatureScot guidance (2021).
  - A minimum 30 m buffer between turbine locations, track and infrastructure, and 100 m buffer between borrow pit locations, and any potential otter holt locations has been included in accordance with current good practice mitigation outlined in NatureScot guidance (2020).
- 7.9.4 Good Practice Measures Full details of construction phase mitigation measures for the Proposed Development will be contained within a CEMP, and an OCEMP has been prepared which provides the structure for the CEMP (see **Technical Appendix 4.1**). The final CEMP will include all good practice construction measures, pollution prevention controls, dust suppression and prevention measures, sediment management and sensitive techniques with regards to construction in/near watercourses, to be implemented over the course of the construction of the Proposed Development in line with current industry and statutory guidance. The CEMP will include information on water quality monitoring during the construction phase of the Proposed Development.
- 7.9.5 Measures will be put in place to manage temporary lighting where it is used during the construction phase through the CEMP and will be informed by current guidance provided within *Bats and Lighting in the UK: Bats and the Built Environment Series* (BCT, 2018). Such measures will control light spill beyond working areas, and these along with the planned working hours, will suitably control lighting impacts. The CEMP will include details regarding temporary lighting management during the construction phase. The requirement for lighting during the operational phase is anticipated to be very minor and impacts on wildlife using the area to be negligible as a result.
- 7.9.6 Safe methods for on-site concrete batching and vehicle washing will be included in the CEMP, to consider both airborne and waterborne paths of impact.
- 7.9.7 Pollution management best practices for re-fuelling, bunding and storing fuel, oil or hazardous substances, careful storage of chemical, fuel and oil, as well as spillage incident protocols, will be included in the CEMP. Re-fuelling will only take place at a distance of more than 50 m from watercourses. Appropriate bunding will also be used around re-fuelling and chemical storage areas, preventing any fuel or chemical leaks from contaminating the capping layer stone or being washed into the receiving water environment. The protocols to be adopted in the event of a fuel spillage or similar incident within the compound area will be contained in the CEMP and will include the requirement for all on-site vehicles to carry spill kits.
- 7.9.8 Good practice measures to protect retained habitats during the construction works will also be implemented, including the sensitive demarcation of working areas, to be overseen by an Ecological Clerk of Work (ECoW).
- 7.9.9 The CEMP will include Species and Habitat Protection Plan (HSPP) detailing good practice measures for construction works within Annex 1, SBL or potential GWDTE habitats. SHPPs will detail measures required to manage construction works within these sensitive habitats and include habitat reinstatement measures.
- 7.9.10 To minimise damage or alteration in pH from leaching of cement or other alkaline building materials into sensitive wet acidic habitats (blanket bog, valley mire and acid grassland), where groundwater is encountered in the excavation for the turbine bases, the excavation will be lined with an impermeable membrane to prevent seepage of cementitious material into the sub-soil.
- 7.9.11 Good practice pollution prevention measures during works are discussed further in **Appendix 4.1**. Measures to prevent hydrological impacts are set out, which will prevent impacts such as contamination to the rivers and streams within the Site and Access Route as well as downstream rivers and designated sites to which they connect.
- 7.9.12 Good practice measures to prevent harm to faunal species will also include SPPs (see Pre-construction Surveys, below) and the careful storage of potentially dangerous substances or materials within construction compounds. Excavations will either be temporarily covered outside working hours or, if excavations are left open, boards will be positioned so that any animal can escape. On-site speed limits will also be adhered to.
- 7.9.13 Good practice habitat reinstatement measures will also be adopted and implemented in areas subject to disturbance during construction works, as soon as it is practical to do so. Further details of habitat reinstatement measures to be implemented will be provided within the CEMP, and details on habitat enhancement measures are provided within the Outline Nature Enhancement Management Plan (ONEMP) (see **Technical Appendix 7.6**).

<sup>6</sup> Micrositing will take these required buffers into account.

- 7.9.14 An FMP (extended to freshwater pearl mussel) will also be implemented to record pre-, during and post- construction fish populations in watercourses on and adjoining the Site and Access Route (as per the Standard Onshore Wind Farm Conditions).

- 7.9.15 Measures to protect fish during construction of watercourse crossings will be included in the CEMP.

#### **Pre-construction Surveys**

- 7.9.16 There is potential for a change in the distribution of protected terrestrial mammal species within the Site and Access Route between the completion of baseline surveys presented in this chapter and the commencement of construction activities for the Proposed Development. Pre-construction surveys for protected terrestrial mammals including badger, otter, pine marten, red squirrel and water vole will be undertaken within a defined period prior to the commencement of construction works and as set out within the OCEMP (**Appendix 4.1**).

- 7.9.17 This will cover all areas within 250 m of the Proposed Development and associated working areas, following guidance applicable at the time of survey.

- 7.9.18 The results of the pre-construction surveys will inform the need for further mitigation (if required) in respect of sensitive working practices, SPPs and/or the requirement to consult with NatureScot in relation to any protected species licensing.

#### **Ecological Clerk of Works (ECoW)**

- 7.9.19 A suitably qualified ECoW will be employed for the duration of the construction and reinstatement periods, to ensure ecological interests are safeguarded, although this may not necessarily be a full-time role throughout. The role of the ECoW related to ecological work will include the following tasks:
- provide briefings and information to all staff on-site, so staff are aware of the ecological sensitivities within the Site and Access Route and the legal implications of not complying with agreed working practices;
  - agree and monitor measures designed to minimise damage to retained habitats;
  - undertake pre-construction surveys and advise on ecological issues and working restrictions where required;
  - complete site-supervision works as required, in relation to sensitive habitats and protected species;
  - report to Dumfries and Galloway Council any material breaches of the CEMP (if encountered); and
  - oversee restoration of working areas following construction.

#### **Operational Period Embedded Mitigation**

- 7.9.20 Direct effects for sensitive ecological features are not anticipated to occur during the operational period of the Proposed Development with good practice measures in place, including pollution prevention controls and operational vehicles keeping to defined access tracks. There will be an on-site speed limit of 15 mph, to reduce the risk of direct collision between wildlife and vehicular traffic.
- 7.9.21 During the operation of the Proposed Development, maintenance visits will be infrequent and unlikely to result in disturbance to ecological features.

#### **Outline Nature Enhancement Management Plan (ONEMP)**

- 7.9.22 The ONEMP (see **Technical Appendix 7.6**) includes restoration measures of the most sensitive habitats within the Site and Access Route and subsequent monitoring which will measure the effectiveness of restoration works, with restoration works adaptable in response to monitoring outcomes. Restoration works will benefit ecological species (such as terrestrial mammals, foraging/commuting bats, fish and plants) present in, and close to, the Site and Access Route. Such enhancement measures will accord to the applicable NatureScot guidance, at the time of consent (if the Proposed Development is consented). The ONEMP will be finalised into a NEMP post-consent.

- 7.9.23 The ONEMP accords with NPF4 with regards to biodiversity enhancement (Policy 3), peatland restoration (Policy 5) and woodland enhancement (through riparian native tree planting; Policy 6).

- 7.9.24 **Decommissioning, restoration and aftercare strategy**

- 7.9.25 At the point of decommissioning, a Decommissioning, restoration and aftercare strategy will be developed through consultation with Dumfries and Galloway Council, NatureScot and other relevant consultees in line with relevant legislation and guidance at that point in time. The DEMP will detail those measures to be adopted to ensure the protection of key ecological features during decommissioning. A suitably qualified ECoW will be employed for the duration of decommissioning, to ensure ecological interests are safeguarded, although this may not necessarily be a full-time role throughout. These measures will typically mirror the measures adhered to in the CEMP and will include pollution prevention protocols and pre-decommissioning surveys.

## 7.10 Micrositing

- 7.10.1 Turbine micrositing may lead to the movement of turbine locations by up to 100m within the Site boundary. In the event that this should be required, consideration and protection measures for any ecologically sensitive buffers (e.g. 'stand off' distances of 50 m for bat habitat features) will be given.

## 7.11 Features Brought Forward for Assessment

- 7.11.1 The results of the desk study and field surveys were used to inform the identification of IEFs to be brought forward for assessment. Features which are unlikely to be affected, or which are considered sufficiently widespread, unthreatened or resilient to impacts from the Proposed Development, and hence would remain viable and sustainable, have not been subject to a detailed assessment and have been 'scoped-out'.
- 7.11.2 Mitigation measures for 'scoped out' features, are however outlined as appropriate where required to ensure legislative compliance.
- 7.11.3 A summary of identified IEFs is provided in **Table 7.11** which details whether each feature is scoped in or out of the assessment. The level of importance assigned to each feature is based upon baseline survey results and professional judgement. Only IEFs identified during baseline information gathering are considered in **Table 7.11**.

**Table 7.11 – Summary of sensitive/important ecological feature sensitivity**

IEF	Sensitivity	Scoped In or Out?	Justification
Upper Nithsdale Woods Special Area of Conservation (SAC), Chanlockfoot SSSI, Stenhouse Wood Site of Special Scientific Interest (SSSI), Tynron Juniper Wood SAC, Tynron Juniper Wood SSSI	High / International (SAC) / International (SSSI)	Out	<ul style="list-style-type: none"> <li>These designated sites are all located over 4.85 km from the Site and Access Route and are designated for the presence of static habitat and plant interests.</li> <li>As assessed during the Fish Habitat Survey (<b>Technical Appendix 7.4</b>), the watercourses within the Site all drain into the Appin Burn and Shinnel Water, which are located downstream to the east of the Proposed Development. Although the Site is hydrologically connected to Upper Nithsdale SAC and Stenhouse Wood SSSI, on account of spatial separation, embedded mitigation and sensitively located and designed infrastructure, no effects upon the ecological qualifying features of these designated sites are anticipated.</li> <li>A review of OS maps identifies that a ridge, comprising a series of peaks is located to the north-eastern part of the Site, therefore separating the location of the Proposed Development from the northern pocket of Upper Nithsdale SAC and Chanlockfoot SSSI. As such, there is no evidence of hydrological connectivity between the Site and these designates sites, and no prospect of hydrological flow from one to the other. On account of spatial separation, embedded mitigation and sensitively located and designed infrastructure, no effects upon the ecological qualifying features of these designated sites are anticipated.</li> <li>Proposed Development design and evolution has limited the number of watercourse crossings, and all new crossings will be sensitively designed to allow the continued, uninterrupted flow of water and wildlife therein (see <b>Chapter 6</b> for further information). Furthermore, a minimum 50 m buffer around all mapped watercourses has been adopted and works within 50 m of watercourses will be limited to vehicular access along existing tracks.</li> <li>Embedded mitigation and good practice measures, including (but not restricted to) drainage management, pollution prevention controls, sediment management and sensitive techniques with regards to construction near water, water quality monitoring (pre, during and post-construction), pre-construction surveys and the presence of an ECoW, will be implemented during construction (to be secured via the CEMP, see <b>Chapter 3</b>). These measures would protect the habitats present within the Site and Access Route (including watercourses). However, as noted above, the watercourses on-site are not hydrologically linked to these sites, so effects on them through hydrological pathways are not anticipated.</li> </ul>

IEF	Sensitivity	Scoped In or Out?	Justification
			<ul style="list-style-type: none"> <li>Effects on these sites are therefore <b>scoped out</b> of detailed assessment.</li> </ul>
Transitional Zone of the Galloway and Southern Ayrshire Biosphere Reserve	High / National	Out	<ul style="list-style-type: none"> <li>Part of the Proposed Development is located within the Transitional Zone of the Galloway and Southern Ayrshire Biosphere Reserve. Biosphere reserve designations help to promote the integrated and sustainable management of an area; these reserves are not designated for specific ecological features.</li> <li>Embedded mitigation and good practice measures will be implemented under the CEMP, including (but not restricted to) pollution and siltation protection measures, water quality monitoring (pre, during and post-construction), pre-construction survey and the presence of an ECoW during construction.</li> <li>On account of embedded mitigation and sensitively located and designed infrastructure, no effect upon this Biosphere Reserve is anticipated.</li> <li>Effects on this site are therefore <b>scoped out</b> of detailed assessment.</li> </ul>
Nith Valley Priority Areas for Red Squirrel Conservation (PARC)	High / National	Out	<ul style="list-style-type: none"> <li>The Site lies on the periphery of the Nith Valley PARC. The Site also lies within a Scottish Forestry designated priority area for grey squirrel control, which itself has spatial overlap with the PARC. PARC designations are areas where grey squirrel control networks are present, which aim to provide coordinated and sustained protection of the resident red squirrels; these areas are not designated for specific ecological features.</li> <li>Embedded mitigation and good practice measures will be implemented under the CEMP, including (but not restricted to) pollution and siltation protection measures, water quality monitoring (pre, during and post-construction), pre-construction survey and the presence of an ECoW during construction.</li> <li>Measures to monitor/control grey squirrel populations to protect red squirrel are detailed within the ONEMP.</li> <li>Effects on this site are therefore <b>scoped out</b> of detailed assessment.</li> </ul>
Ancient Woodland	Medium / Regional	Out	<ul style="list-style-type: none"> <li>Two areas of ancient woodland (likely of plantation origin), as listed on Scotland's Environment Map (ancient woodland inventory), are present within the Site. These areas of woodland overlap with a small area in the north east of the Site. The area of woodland closest to the infrastructure is located approximately 0.7 km north.</li> <li>The 0.7 km distance between the area of long-established woodland (likely of plantation origin) and Proposed Development infrastructure thus exceeds the documented suggested buffer from the boundary of the woodland to avoid root damage, which is 15 m (as detailed in Government Guidance (Ancient woodland, ancient trees and veteran trees: advice for making planning decisions; 2022)).</li> <li>Embedded mitigation, including pollution prevention control, would be undertaken, in accordance with the CEMP.</li> <li>Effects upon ancient woodland are therefore <b>scoped out</b> of detailed assessment.</li> </ul>
Annex 1, SBL or potential GWDTE habitats	High / National (priority peatland) Medium / Regional (other listed habitats)	In – Construction phase only	<ul style="list-style-type: none"> <li>The Annex 1, SBL or potential GWDTE habitats identified as being affected by the Proposed Development are: <ul style="list-style-type: none"> <li>B5 Marshy grassland/ M23a – <i>Juncus effusus</i> – <i>Galium palustre</i> rush pasture, <i>Juncus acutiflorus</i> sub-community, and</li> <li>B1.1 Unimproved acid grassland/ U5a <i>Nardus stricta</i> - <i>Galium saxatile</i> grassland, species poor sub-community</li> </ul> </li> <li>For the purpose of this assessment, potential for impacts on GWDTEs are not discussed in detail herein, and are discussed separately in <b>Chapter 6</b>.</li> </ul>

IEF	Sensitivity	Scoped In or Out?	Justification
			<ul style="list-style-type: none"> <li>Habitat loss as a result of the Proposed Development has been minimised through a sensitive and iterative design process, however direct land-take resulting in the loss of some Annex 1/GWDTE/SBL habitat types will be unavoidable. Additionally, very minor temporary habitat losses of conifer plantation are also anticipated to occur during the construction phase of the Proposed Development. <b>Conifer is not a notable habitat and is therefore this loss is scoped out of detailed assessment.</b></li> <li>The potential for indirect effects on adjoining/nearby habitats through local changes to hydrology is also considered within the assessment.</li> <li>On account of embedded mitigation, including (but not restricted to), the implementation of good practice construction measures, pollution prevention controls, sediment management and sensitive techniques with regards to construction near water (to be secured via the CEMP), and similar measures to be implemented during operation, there is no route to impacts from dust, pollution and run-off to habitats likely to lead to significant adverse effects upon these habitats.</li> <li><b>As such, indirect effects with the exception of potential drying effects to hydrologically dependant habitats (i.e. blanket and modified bog, wet dwarf shrub heath and flush) are scoped out of detailed assessment.</b></li> <li>Direct effects on habitats are not anticipated to occur during the operational phase, due to the implementation of embedded mitigation, including (but not restricted to) pollution prevention controls and operational vehicles keeping to defined access tracks.</li> <li><b>Such direct effects during operation are therefore scoped out of detailed assessment.</b></li> <li><b>As such, effects upon Annex 1, SBL or potential GWDTE habitats through habitat loss only during the construction stage is scoped in to detailed assessment.</b></li> <li><b>Habitats within the Site which are Annex 1, SBL or potential GWDTE habitats, but not subject to direct or indirect effects of the Proposed Development by virtue of distance from the Proposed Development (this includes a single 0.64ha area of blanket bog) are scoped out of detailed assessment.</b></li> </ul>
All other habitats and vegetation	Low / Local	Out	<ul style="list-style-type: none"> <li>Habitats and vegetation communities which are not listed in Annex 1 (of the Habitats Directive) or the SBL, or which are considered of low groundwater dependency, are <b>scoped out</b> of detailed assessment.</li> </ul>
Terrestrial mammals (Badger, Otter, Pine marten, Red squirrel, Water vole)	Low / Local	Out	<ul style="list-style-type: none"> <li>These features are considered to be generally common and widespread (with some not sensitive to wind farm developments; see NatureScot, 2024j) and/or were recorded very infrequently or in numbers of very low importance during the baseline studies, in that the potential for significant adverse effects from the Proposed Development on these species at a population level is considered inconsequential.</li> <li>Furthermore, embedded mitigation, including (but not restricted to), the implementation of good practice construction measures, pollution prevention controls, sediment management, sensitive techniques with regards to construction near water, pre-construction surveys, SPPs (where required), the presence of an ECoW and licencing requirements (where applicable), (to be secured via the CEMP), are considered appropriate to avoid any potentially significant adverse effects upon badger, otter, pine marten, red squirrel, and water vole.</li> <li>On consideration of the desk study and field survey results, the extent and nature of the Proposed Development, and embedded mitigation (as detailed above), there is no route to impacts likely to lead to significant adverse effects upon these features.</li> </ul>



IEF	Sensitivity	Scoped In or Out?	Justification
			<ul style="list-style-type: none"> <li>As such, effects on these terrestrial mammals are <b>scoped out</b> of detailed assessment.</li> </ul>
Bats - roosting	Low / Local	Out	<ul style="list-style-type: none"> <li>All bat species are protected under the Conservation (Natural Habitats &amp;c.) Regulations 1994 (as amended), the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act 2004 (as amended). They are also SBL priority species.</li> <li>No trees or structures with the potential to support maternity roosts and/or significant swarming or hibernation roosts were identified within 200 m plus rotor radius of the Proposed Development turbines (a 281 m "Turbine Constraints Buffer").</li> <li>A single PRF feature in a mature tree was recorded in direct association with the proposed Access Route (see <b>Figure 7.9</b>). However, it is unlikely that this tree will require removal and will be subject to the appropriate buffers and protections during the construction and operational phases. Should it require removal, the tree will undergo the appropriate level of survey prior to removal to ensure legislative compliance.</li> <li>Therefore effects on roosting bats are <b>scoped out</b> of detailed assessment.</li> </ul>
Bats - foraging/commuting	Low / Local	In - Construction and Operational phases	<ul style="list-style-type: none"> <li>The Stage 2 overall risk assessment concludes that there is a Low/Medium likelihood of the Proposed Development resulting in significant impact on bat species populations. <i>Myotis</i> species and brown long-eared bat are not considered further given they are not HCR species (see <b>Technical Appendix 7.3</b>).</li> <li>The nature of potential impacts on foraging and commuting bats relate to the construction phase (loss of foraging habitat) and the operational phase (loss of foraging habitat; death or physical injury via collision or barotrauma; and, displacement of individuals or populations from the area).</li> <li>As such, effects on commuting and foraging bats are <b>scoped in</b> to detailed assessment.</li> </ul>
Fisheries	Low / Local	Out	<ul style="list-style-type: none"> <li>The watercourses through the Site were of limited value for fish fauna and not suitable for freshwater pearl mussel, principally due to these watercourses being minor, on moderate to steep slopes and/ or characteristic of peaty headwaters</li> <li>The following measures, are considered appropriate to avoid any potentially significant adverse effects upon fish populations: <ul style="list-style-type: none"> <li>A minimum 50 m buffer has been included around all mapped watercourses for the Proposed Development infrastructure.</li> <li>New watercourse crossings were reduced as far as practicable by using existing tracks where possible and minimising the number of crossings during initial design iterations. The Proposed Development will use 48 existing crossings and proposes six new crossings.</li> <li>All new vehicular watercourse crossings will be sensitively designed to allow the continued uninterrupted movement of waterflow, and any potential wildlife present therein. Fish monitoring, prior to, and over the course of, the construction phase of the Proposed Development (as detailed in the OCEMP, <b>Technical Appendix 4.1</b>).</li> <li>Embedded mitigation and good practice measures, including (but not restricted to), pollution prevention controls, sediment management and sensitive techniques with regards to construction near water, water quality monitoring (pre, during and post-construction) and the presence of an ECoW will be implemented during construction (to be secured via the CEMP, see <b>Technical Appendix 4.1</b>).</li> <li>An FMP (extended to freshwater pearl mussel), including provision for pre, during- and post-construction fish monitoring, will be produced.</li> </ul> </li> </ul>

IEF	Sensitivity	Scoped In or Out?	Justification
			<p>Measures to protect aquatic features including fish will be included in the CEMP.</p> <ul style="list-style-type: none"> <li>– Considering these measures, there is no route to impacts likely to lead to significant adverse effects upon fisheries.</li> <li>– As such effects on fish fauna, and freshwater pearl mussel are <b>scoped out</b> of detailed assessment.</li> </ul>

## 7.12 Assessment of Effects

7.12.1 This section identifies the potential effects in relation to habitats (Annex 1, SBL or potential GWDTE habitats) and bats (foraging/commuting) as a result of the Proposed Development alone.

7.12.2 The Proposed Development has been assessed for an operational life of 50 years.

### Construction

7.12.3 Potential construction phase impacts on ecological features associated with the Proposed Development are considered to relate to:

- direct land take (habitat loss) to accommodate the Proposed Development;
- indirect habitat loss to account for potential changes in habitat vegetation structure (and hydrological linkage) due to drying effects as a result of construction works;
- temporary disturbance and land take for laydown areas and construction compounds;
- disturbance to, fragmentation or severance of connecting habitat or potential bat commuting routes within, and adjacent to, the Proposed Development; and
- disturbance and pollution (indirect effects such as noise and vibration, dust, pollution from surface water run-off) resulting from site clearance and construction, plant and vehicles movements, and site workers' activities.

7.12.4 Potential effects are assessed on the assumption that embedded mitigation measures, as detailed in **Section 7.9** and within the Outline CEMP (**Technical Appendix 4.1**) are implemented.

### Habitats and Vegetation

#### Habitat Loss

##### *The Site*

7.12.5 There are two main ways by which habitats and vegetation may be affected by habitat loss as a result of the construction phase of the Proposed Development:

- direct loss – the loss of habitats and vegetation under the footprint of the Proposed Development; and
- indirect loss – calculated for Annex 1, SBL and/or potential GWDTE habitats which are located within 10 m of direct habitat loss areas, to account for potential changes in habitat vegetation structure due to drying effects as a result of construction works.

7.12.6 For the purposes of assessment, a precautionary approach has been taken which assumes that direct habitat loss and indirect loss of Annex 1, SBL and/or potential GWDTE habitats represents a permanent, irreversible adverse effect. In practice, some areas indirectly affected may be able to be restored i.e., during habitat reinstatement following construction in accordance with the OCEMP (**Technical Appendix 4.1**). Consideration is also given to those habitats temporarily affected, although it is considered that these will be reinstated.

7.12.7 **Table 7.12** details the estimated direct and indirect permanent and temporary habitat losses as a result of the construction of the Proposed Development on Annex 1, SBL and/or potential GWDTE habitats. These habitats involve:

- B5 Marshy grassland/ M23a – *Juncus effusus* – *Galium palustre* rush pasture, *Juncus acutiflorus* sub-community (SBL habitat and GWDTW Level 1), and
- B1.1 Unimproved acid grassland/ U5a *Nardus stricta* - *Galium saxatile* grassland, species poor sub-community (SBL habitat and GWDTW Level 2 and 3).

7.12.8 Many areas of the Site comprise a mix of habitats which are too complex to separate into defined habitat types. As such, habitats have been grouped into the following categories; marshy grassland, and un-improved acid grassland. The habitat type categories comprise both habitat mosaic and pristine examples of these habitats recorded within the Site.

- 7.12.9 Temporary loss relates to temporary habitat removal required for the temporary construction compounds; which will be fully reinstated back to those respective habitats after the construction phase. The permanent habitat loss relates to all other infrastructure associated with the Proposed Development. As a precautionary measure borrow pits are included as permanent land take.
- 7.12.10 Total permanent direct land take for the Proposed Development will be up to 28.25 ha of which 18.09 ha are accounted for in **Table 7.12**. Total temporary direct land take for the Proposed Development will be approximately 1 ha of coniferous woodland plantation.
- 7.12.11 Other habitats are not Annex 1, SBL and/or potential GWDTE habitats so have been scoped out of this assessment. Potential indirect losses of protected and notable habitats within 10 m of the Proposed Development are of a lesser extent as compared to direct losses (**Table 7.12**) and are less certain to take place.

**Table 7.12 – Summary of habitat losses on scoped in habitats**

Habitat Type Category	Relevant Phase 1 and NVC code	Total Area Within Site (ha)	Habitat Losses (ha)			Relative Coverage Lost (%)
			Direct	Indirect (out to 10 m)	Total (Direct plus indirect out to 10 m)	
Marshy grassland	B5/M23a	4.23	0.00	0.00	0.00	0.00 (direct) 0.00 (indirect) 0.00 (total)
Unimproved acid grassland	B1.1/U5a	196.32	18.00	12.77	30.77	63.71 (direct) 51.28 (indirect) 15.67 (total)
Grassland mosaic <sup>7</sup>	B5/M23a B1.1/U5a	37.78	0.09	0.13	0.22	0.31 (direct) 0.52 (indirect) 0.58 (total)

#### *The Access Route*

- 7.12.12 Total permanent direct land take for the Access Route will be up to 11.56 ha. Of this, only 5.31 ha (approximately 46%) are composed of habitats which are not conifer plantation or clear-fell. Only 0.71 ha is comprised of notable habitats (approximately 6%). These figures are displayed in **Table 7.13**.

**Table 7.13 –Summary of overarching habitats including approximate area and relative percentage coverage within the proposed Access Route Area**

Overarching habitat	Relevant Phase 1 codes within mosaic	Total habitat extent within the Access Route Area (ha)	Extent of habitat loss within the Access Route Area (ha)	Relative Cover within the Access Route Area (%)
Broadleaved woodland	B5/A1.1.2	0.66	0.00	0.36
Clear-fell	A4/A2/B1.1/C1	18.04	0.84	9.84
Coniferous plantation	A1.2.1/B1.1/A2/B5/C1A1.2.2/B2.1/C3.1	135.73	5.41	74.03
Grassland (Acid grassland/ Marshy grassland)	B1.1/B5/A2/C1	17.28	0.71	9.43
Other (e.g. scrub or bracken)	A2/C1D1/J1.5/J2.1	11.63	4.60	6.34
<b>Grand Total</b>		<b>183.35</b>	<b>11.56</b>	<b>100.00</b>

#### *Habitats Summary*

- 7.12.13 The permanent direct and indirect loss of notable habitats (marshy grassland and un-improved acid grassland) for both the Site and Access Route, are therefore predicted to be no more than **Low** magnitude, resulting in an effect of **Minor** significance, which is considered **Not Significant** in the context of the EIA Regulations.
- 7.12.14 For the purpose of this assessment, potential for impacts on GWDTEs are not discussed in detail herein, and are discussed separately in **Chapter 6**.

#### Bats (foraging/commuting)

- 7.12.15 The construction of the Proposed Development would result in the permanent and temporary loss of habitats which are typically of low foraging and commuting value to bats. The Proposed Development therefore has the potential to result in the loss of, or damage to, commuting or foraging habitat and

<sup>7</sup> Mosaic habitat that includes either or both un-improved acid grassland (B1.1/U5a) or marshy grassland (B5/M23a). Often includes these two habitats in combination with other habitats, such as bracken (C1/U20).



displacement of individuals or populations from the area (see NatureScot, 2021). Baseline activity surveys recorded activity of common and soprano pipistrelle, *Nyctalus* species, *Myotis* species and brown long-eared bat on-site, with the majority of activity relating to soprano pipistrelle and *Myotis* species. Baseline surveys have also demonstrated an Overall Risk Assessment of “**Low/Medium Site Risk**”, for high collision risk species recorded (common and soprano pipistrelle).

- 7.12.16 Overall, the Proposed Development is appraised as having **Low** suitability and the Access Route most representative of **Moderate** suitability for bats (in accordance with Collins, 2023).
- 7.12.17 The baseline surveys revealed activity of common pipistrelle, soprano pipistrelle and noctule on-site within the established emergence time for these species. Therefore, it is likely there are roosts for these species in the local area. However, no potential maternity or hibernation/swarming sites were identified within the 281 m Turbine Constraints Buffer (200 m plus rotor radius of the Proposed Development turbines).
- 7.12.18 Noise, lighting and dust generation during the construction period could potentially result in disturbance and reduced foraging opportunities for bats, particularly if night-time work is undertaken. Ecologically sensitive lighting will be implemented where any lighting might be needed, and night-time working will be kept to a minimum during the construction phase.
- 7.12.19 Given the largely suboptimal foraging/commuting habitat for bats on-site and the adoption of embedded mitigation (bat buffers from key bat features, ecologically sensitive lighting, and dust suppression and prevention measures) impacts of bat displacement/disturbance during construction are predicted to be of no more than a short-term, Low magnitude, resulting in an effect of **Minor adverse** significance, which is considered **Not Significant** in the context of the EIA Regulations.

#### Operation

- 7.12.20 Operational effects are defined as effects occurring during the operation of the Proposed Development. Operational effects generally relate to disturbance of adjacent habitats or species, on either a temporary or permanent basis. Some effects may reduce with habituation or remain for the lifetime of the Proposed Development.
- 7.12.21 During the operational phase, with the application of good practice measures relating to wind farm operation and maintenance activities, it is considered that potential adverse impacts are restricted to the risk of collision mortality for common and soprano pipistrelle bats. Direct adverse effects for other sensitive ecological features (such as habitat loss and disturbance) are not anticipated to occur during the operational period.
- 7.12.22 Potential for impacts on surface water, groundwater, peat and GWDTEs are discussed separately in in **Chapter 6: Geology, Hydrology and Peat**.

#### Bats (foraging/commuting)

- 7.12.23 Operational turbines can affect bats in a number of ways, although the main concerns to species populations relates to collision mortality, barotrauma (i.e. injury caused by a change in air pressure) and other injuries resulting from collision with, or flying in very close proximity to moving turbines (NatureScot, 2021).
- 7.12.24 The risk of operational mortality to bats is generally acknowledged to be lowest at locations with low bat activity. Additionally, the availability of suitable foraging habitats within 1.5 km of proposed turbine locations, such as watercourses, waterbodies and woodland, is suggested to have a protective effect on bat species, with bats more likely to use these high value foraging habitats (and other suitable linear features) than be attracted to the turbines (Mathews *et al.*, 2016).
- 7.12.25 The assessment of potential effects upon bats resulting from the operation of the Proposed Development's turbines has been based on the two-stage methodology set out in NatureScot guidance (2021). Full details are presented in **Technical Appendix 7.3**.
- 7.12.26 In accordance with NatureScot guidance (2021) a Stage 1 'Initial Site Risk Assessment' of the potential risk level of the Proposed Development has been undertaken based on a consideration of the Site's habitats and development-related features. This concludes that the Site is assessed as having an overall 'Site Risk' of 2, which represents a Low Site Risk.
- 7.12.27 Stage 2 'Overall Risk Assessment' of the two-stage process detailed within NatureScot guidance (2021) has then subsequently been completed to provide an overall assessment of risk to bat species, by considering the conclusions of Stage 1 in relation to relative levels of bat activity tool and considering the vulnerability of species recorded, at the population level.
- 7.12.28 In accordance with NatureScot guidance (2021), Stage 2 has been carried out separately for all HCR species recorded during baseline bat activity surveys, and which includes the following species:
- soprano pipistrelle;
  - common pipistrelle; and

- *Nyctalus* species (Noctule and Leisler's bats).

- 7.12.29 The calculated Stage 2 'Overall Risk Assessment' per species, both temporally and spatially is presented in **Technical Appendix 7.3**.
- 7.12.30 The Stage 2 overall risk assessment concludes that there is a **Low/Medium** likelihood of the Proposed Development resulting in significant impact on bat species populations.
- 7.12.31 No maternity roosts and/or significant swarming or hibernation roosts for any bat species were confirmed within the Site and Access Route, and no potential for these to be present was identified.
- 7.12.32 NatureScot guidance (2021) advises that to reduce potential impacts upon bats resulting from operational wind turbine development, a 50 m 'stand-off' distance should be maintained around bat habitat features, into which no part of the turbine intrudes. The guidance provides a formula for calculating this 'stand-off' distance.
- 7.12.33 The layout of the Proposed Development has adopted a minimum a 50 m 'stand-off' (from blade tip) distance between all proposed turbine locations and bat habitat features (including woodland, watercourses and waterbodies) to reduce potential impacts on bats in accordance with NatureScot guidance (2021).
- 7.12.34 Based on activity levels recorded and subsequent analysis as outlined, mortality or injury levels for bat species are considered to be low. The Proposed Development is not considered to represent a site of concern for bat collision risk following the approach set out in the bats and wind farm guidance (NatureScot, 2021). It is, however, acknowledged that low risk sites can still result in bat casualties, but for which embedded 'stand-off' distances from habitat features in accordance with NatureScot guidance (2021) is considered adequate mitigation to avoid potentially significant operational mortality risks to bat populations at most low-risk locations.
- 7.12.35 A 50 m buffer between the blade tip and bat habitat features (including watercourses and waterbodies) will ensure appropriate mitigation requirements for all bat species in accordance with NatureScot guidance (2021) are implemented as part of the Proposed Development. With these measures in place, impacts of bat collision risk mortality are subsequently considered to be of no more than a permanent, **Low** magnitude, resulting in an effect of **Minor adverse** significance which is considered **Not Significant** in the context of the EIA Regulations.
- 7.12.36 Given the overall low suitability of the habitats which would be lost as a result of the Proposed Development, and the presence of woodland, watercourses and open water in the wider area which offer higher suitability habitat, loss and damage to bat foraging or commuting habitat as a result of the Proposed Development is considered to be inconsequential at a population level and are subsequently considered to represent permanent, **Negligible** magnitude impacts, resulting in an effect of **Negligible adverse** significance, which is considered **Not Significant** in the context of the EIA Regulations.
- 7.12.37 Based on the lack of trees/structures considered suitable to support maternity roosts and/or significant swarming or hibernation roosts within the 281 m Turbine Constraints Buffer (200 m plus rotor radius of the Proposed Development turbines), activity levels recorded and subsequent analysis as outlined, displacement levels are likely to be low and are subsequently considered to represent permanent, **Negligible** magnitude impacts, resulting in an effect of **Negligible adverse** significance which is considered **Not Significant** in the context of the EIA Regulations.

#### **Decommissioning**

- 7.12.38 Decommissioning phase impacts are considered to result in no greater scope and significance of effects upon ecological features than those which would occur during the construction phase, albeit occurring over a shorter timescale.
- 7.12.39 The future presence of ecological features at the time of decommissioning (50 years) is unknown and cannot be reasonably assumed with any certainty.
- 7.12.40 As such, decommissioning phase effects upon ecological features are not considered further within this assessment. However, providing the implementation of good practice measures, are included (and presented in a DEMP at the point of decommissioning), it is unlikely that significant effects upon important ecological features would occur.

### **7.13 Additional Mitigation and Enhancement**

#### **Mitigation**

- 7.13.1 Embedded mitigation and good practice measures are detailed in **Section 7.9**, as well as in the OCEMP (see **Appendix 4.1**).
- 7.13.2 Although no significant effects on foraging/commuting bats are predicted, good practice measures will be adopted to reduce unnecessary risk to foraging and commuting bats. During the operational phase of the Proposed Development, additional mitigation in the form of pitching the blades out of the wind

(“feathering”) to reduce rotation speeds below 2 revolutions per minute (rpm) while idling, as detailed in NatureScot guidance (2021) would be implemented. The reduction in speed resulting from feathering compared with normal idling can reduce bat fatality rates by up to 50 % (NatureScot guidance, 2021). Feathering would therefore be implemented using automated Supervisory Control and Data Acquisition (SCADA) data for the lifetime of the Proposed Development.

#### Enhancement

- 7.13.3 An ONEMP for the Proposed Development has been provided as **Technical Appendix 7.6** and **Figure 7.12** and details outline habitat enhancement principles to be implemented as part of the Proposed Development.
- 7.13.4 The detailed NEMP would be agreed in consultation with NatureScot and Dumfries and Galloway Council and implemented as approved in accordance with a suitably worded condition. In summary, measures are to include:
- ditch blocking to improve and enhance the carbon rich soils in open habitats on Site;
  - enhance fisheries and other aquatic wildlife habitats on Site through riparian tree planting;
  - improve invertebrate habitat opportunities through pond creation and retention of dead wood;
  - improve roosting and foraging opportunities for bats through broad-leaved planting and the deployment of bird and bat boxes, and
  - improve the quality and condition of the woodland habitat on Site.
- 7.13.5 Enhancement measures, provided as part of the ONEMP, would remain in place throughout the operational phase, subject to periodic review in accordance with any emerging best practice management advice. It is envisaged that proposed enhancement measures would start to provide benefits after a period of around five to ten years.

#### Summary

- 7.13.6 Mitigation measures, together with habitat creation and enhancement measures to be implemented under the ONEMP, are expected to provide net beneficial effects associated with the Proposed Development longer term and will leave biodiversity in a demonstrably better state than in the absence of the Proposed Development, consistent with Policy 3 of the NPF4.

## 7.14 Cumulative Assessment

- 7.14.1 This section considers the potential effects of the Proposed Development upon IEFs in combination with other wind farm developments in accordance with NatureScot guidance (2021; and SNH, 2012) with respect to the appropriate approach to assessing cumulative effects. The assessment considers operational, consented (including under construction) and in application wind farms for bats (foraging/commuting) and habitat loss only and within 10 km of the Proposed Development (distance from a central point on-site).
- 7.14.2 Relevant projects included in the cumulative assessment are wind farm projects only, excluding those with three or fewer turbines, as agreed through Scoping (**Table 7.1**).
- 7.14.3 Where necessary, further relevant information was sought from project EIA Reports/ Environmental Statements, which were searched for using the website of the Scottish Government’s Energy Consents Unit (ECU)<sup>8</sup> or using the Dumfries and Galloway Council planning portal<sup>9</sup>.
- 7.14.4 The projects identified for inclusion in the cumulative assessment are listed in **Table 7.14**. Information was found for the majority of projects.

**Table 7.14 – Projects Included in the Cumulative Impact Assessment**

Wind Farm	No. of Turbines	Project Stage	Year of Planning Submission	Distance from the Site	Relevant Data Available?
Euchanhead	21	In Planning	2020	0.5 km	Yes
Lorg	10	In Planning	2022	1.6 km	Yes
Sanguhar II	44	Consented	2019	1.9 km	Yes
Manquhill	8	Consented	2023	3.4 km	Limited
Cornharrow	7	Consented	2022	3.5 km	Limited
Wether Hill	14	Operational	2005	3.5 km	Yes
Whiteside Hill	10	Operational	2006	5.8 km	No
Cloud Hill	11	In Planning	2023	6.2 km	Yes

<sup>8</sup> Available from: <https://www.energyconsents.scot/ApplicationSearch.aspx> (Accessed 30 April 2025)

<sup>9</sup> Available from: <https://eaccess.dumgal.gov.uk/online-applications/search.do?action=simple&searchType=Application> (Accessed 30 April 2025)

Wind Farm	No. of Turbines	Project Stage	Year of Planning Submission	Distance from the Site	Relevant Data Available?
Troston Loch	14	Consented	2020	6.9 km	Yes
Afton	27	Operational	2004	7.7 km	No
Windy Rig	12	Operational	2017	7.8 km	Yes
Sanquhar	9	Operational	2013	8.2 km	Limited
Twentyshilling Hill	9	Operational	2018	8.3 km	Yes
Windy Standard I	36	Operational	2002	8.4 km	No
Rowancraig	6	In Planning	2024	8.7 km	Yes
Windy Standard I (Repower)	8	In Planning	2022	8.8 km	Yes
Margree	9	Consented	2019	8.8 km	Yes
Hare Hill	39	Operational	1994	9.4 km	Yes
Hare Hill Extension	35	Operational	2007	9.7 km	Yes
Divot Hill	9	Consented	2023	9.9 km	Yes
Glenshimmeroch (variation)	10	In Planning	2025	10.0 km	Yes

### Construction

- 7.14.5 Cumulative construction related effects are considered in relation to bats and habitat loss (notable habitats) because these were the IEFs scoped in for detailed assessment.
- 7.14.6 Construction cumulative effects are considered for those other wind farms (that may have construction phases which coincide with that of the Proposed Development) within 5 km of the Proposed Development (Sanquhar II 1.9 km away, Manquhill 3.4 km away and Cornharrow 3.5 km away).
- 7.14.7 The potential for construction related adverse cumulative effects on foraging/commuting bats are considered highly unlikely to occur in recognition of the implementation of the 50 m buffer between the blade tip and bat habitat features (including woodland, watercourses and waterbodies), which is a key component in the design of the Proposed Development. Furthermore, no potential bat roost features were identified within 200 m plus rotor radius of the proposed turbines. Adverse effects on bats during construction are considered unlikely such that the Proposed Development is not anticipated to contribute to cumulative effects. Both the assessments for the Sanquhar II Wind Farm and Cornharrow Wind Farm found either no significant effects or negative impacts of a low magnitude on bats during the construction phase. Furthermore, cumulative impacts of all wind farms being developed at once are not anticipated to have a significant effect on bats due to the spatial separation between the Proposed Development and the other wind farm projects, such that it is likely to be different populations located in proximity to the Site compared to those populations in proximity to the other wind farm projects.
- 7.14.8 Sanquhar II Wind Farm reports modest losses of bog habitat (7.3%) habitat leading to an impact of moderate significance and no significant effect is predicted for Cornharrow Wind Farm with relation to habitat losses. Relevant information was not available for Manquhill Wind Farm. Sanquhar II Wind Farm will aim to improve the condition of the upland habitat mire complex.
- 7.14.9 Habitat mitigation measures detailed above for the Proposed Development, and enhancement measures proposed under the ONEMP (see **Technical Appendix 7.6**) would restore notable habitats (carbon-rich soils) on-site, and result in the increase in the extent of better-quality carbon-rich soils on-site.
- 7.14.10 It is predicted that cumulative adverse effects upon all scoped in IEFs during the construction phase will be Not Significant in the context of the EIA Regulations.

### Operation

- 7.14.11 Cumulative operational effects are considered in relation to bats (foraging/commuting) only (given this was the only IEF scoped into the assessment at the operational phase), with wind farms within 10 km of the Proposed Development.
- 7.14.12 Bat collision impacts have been minimised through the sensitive and considered design of the Proposed Development and by the implementation of standard good practice measures regarding buffer distances of turbines from bat habitat features (including woodland, watercourses and waterbodies woodland) to minimise the potential for impacts on commuting and foraging bats and therefore the likelihood of cumulative impacts. Further precautionary mitigation in the form of pitching the blades out of the wind (feathering) to reduce rotation speeds below 2 rpm while idling, as detailed in NatureScot (2021) would be implemented.
- 7.14.13 A review of publicly available information for available information for the consented wind farms found that Sanquhar II Wind Farm, and the in-planning Eucharhead Wind Farm and Lorg Wind Farm (within 5 km of the Site) has confirmed that good practice measures regarding buffer distances of turbines from suitable foraging and commuting habitats (such as woodland edge and watercourses) are proposed for these schemes. To further minimise effects on foraging/commuting bats the Eucharhead Wind Farm and Lorg Wind Farm also commit to implementing feathering (and curtailment in the case of Eucharhead) of operational turbines. Information in this regard was not available for Manquhill, Cornharrow and Wether Hill Wind Farms.

- 7.14.14 The implementation at other wind farm sites of these measures (which would also be implemented for the Proposed Development) to minimise impacts on commuting and foraging bats, further minimises the likelihood of cumulative impacts. Cumulative impacts on bats (foraging/commuting) are predicted to be no more than a long-term, **Low** magnitude, resulting in an effect of **Minor/Negligible adverse** significance, which is considered **Not Significant** in the context of the EIA Regulations.

## 7.15 Residual Effects

- 7.15.1 No additional mitigation is proposed at the construction stage. Therefore, residual effects on scoped in IEFs at the construction phase, as a result of the Proposed Development, both alone and cumulatively with other wind farm developments, are **Not Significant** and mirror the assessment conclusions in **Section 7.12**.

### Operation

#### Bats (foraging/commuting)

- 7.15.2 With the adoption of the mitigation measures (feathering of operational turbines), it is anticipated that a long-term, Negligible magnitude of impact would result in a long-term effect of **Negligible** significance on foraging/commuting bats, with respect to collision mortality, on-site, which is considered **Not Significant** in the context of the EIA Regulations.

- 7.15.3 In terms of loss/ damage to foraging/commuting habitat and displacement, feathering of operational turbines is not considered to result in any appreciative change in the assessment conclusions in **Section 7.12**.

### Decommissioning

- 7.15.4 No additional mitigation is proposed at the decommissioning stage. Therefore, residual effects on scoped in IEFs at the decommissioning phase, as a result of the Proposed Development, both alone and cumulatively with other wind farm developments, are **Not Significant** and mirror the assessment conclusions in **Section 7.12**.

## 7.16 Monitoring

- 7.16.1 Monitoring would be undertaken during construction in accordance with the CEMP (see the OCEMP in **Technical Appendix 4.1**) in relation to pollution prevention measures and also fish and water quality monitoring.
- 7.16.2 The fish (and water quality) monitoring plan would also be established and incorporated into the CEMP. The aim of the monitoring plan would be to review and, where necessary, update baseline conditions prior to construction works commencing and to continue throughout the construction and operational phases<sup>10</sup> to confirm that the mitigation measures with respect to fish populations, water quality, sedimentation and maintenance of potential fish passages are performing.
- 7.16.3 The ONEMP (see **Technical Appendix 7.6**) includes summary information on monitoring protocols to be undertaken during the operational phase of the Proposed Development, which would be finalised in a NEMP if the Proposed Development is consented. The monitoring protocols would include details of checks of the habitat mitigation (carbon-rich soils compensation) and habitat enhancement measures, and details of response and remediation measures in the event mitigation/enhancement measures are found not to be performing. This will also include identifying evidence of deer grazing and whether deer management as undertaken on the Site is appropriate for enhancing biodiversity, or whether changes to the deer control are required (for example, increased culling). Any alterations required to deer management would be discussed with the landowner.

## 7.17 Summary of Effects

- 7.17.1 Please summarise your chapter including baseline, mitigation and residual effects.

**Table 6.15 – Consultation**

Predicted Effects	Significance	Committed Additional Mitigation	Significance of Residual Effect
Construction and Decommissioning Phases: Habitat loss  – Annex 1, SBL or potential GWDTE habitatsmarshy	Not significant	Not required; standard, embedded mitigation applied	Not significant

<sup>10</sup> The monitoring plan would remain in place for 12 months after construction only.



Predicted Effects	Significance	Committed Additional Mitigation	Significance of Residual Effect
grassland and un-improved acid grassland			
Construction and Decommissioning Phases: Habitat loss, disturbance and displacement  Bats - foraging/commuting	Not significant	Not required; standard, embedded mitigation applied  Ecologically sensitive buffers implemented (e.g. 'stand off' distances of 50 m for bat habitat features)	Not significant
Operational Phase: Collision mortality, injury and barotrauma  Bats - foraging/commuting	Not significant	Not required; standard, embedded mitigation applied.  Feathering of blades to reduce rotation speeds below 2 rpm while idling.	Not significant

## 7.18 References

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