Document history

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Issue	Date	Revision Details
A	03/03/2022	First draft for client issue
B	25/03/2022	Second draft issued for legal review
C	17/11/2022	Released

Chapter 7

Ecology

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Glossary

Term	Definition
Baseline	The existing conditions that prevail against which the effects of the proposed development are compared.
Ecological Impact Assessment (EcIA)	Ecological Impact Assessment is a process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems.
Environmental Impact Assessment Report (EIAR)	A document reporting the findings of the EIA and produced in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 Regulation 5.
Habitat	The area or environment where a species naturally occurs.
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for potential negative effects of a development.
Original Development Area	The area based on the 9-turbine layout and was included in the Scoping Report, which comprised an Alternative Access Route (See Figure 1.3, Volume 3a)
Proposed Development	The proposed Scawd Law Wind Farm development
Proposed Development Area	The development area within the red line site boundary (application area) as shown in Volume 3a Figure 1.2: Site Layout
Proposed Access	The access routing for Scawd Law Wind Farm – leaves the public road (B709) to the west of the Proposed Development Area and approaches (included as part of the Proposed Development Area) (Figure 1.2, Volume 3a)
Protected Species	Animals or plants protected by European and/or domestic legislation.
Scottish Biodiversity List (SBL)	A list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.
Site of Special Scientific Interest (SSSI)	Sites of Special Scientific Interest are protected areas that represent the UK's most important wildlife and/or geological sites.
Special Area of Conservation Area (SAC)	Special Areas of Conservation (SACs) are protected areas in the UK.

List of Abbreviations

List and describe your abbreviations here.

Abbreviation	Description
AA	Appropriate Appraisal
AOD	Above Ordnance Datum (of height)
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CMS	Construction Method Statement
DEFRA	Department of Environment, Farming and Rural Affairs
EC	European Commission
EcIA	Ecological Impact Assessment
ECoW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPS	European Protected Species
FCS	Forestry Commission Scotland, now known as Forestry and Land Scotland (FLS)
FLS	Forestry and Land Scotland, formerly known as Forestry Commission Scotland (FCS)
FMMP	Fish and Macro-invertebrate Monitoring Programme
GIS	Geographical Information Systems
GMBRC	Glasgow Museums Biological Record Centre
GWDTE	Ground Water Dependent Terrestrial Ecosystem
Habs Regs	The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations)
HMP	Habitat Management Plan
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
LBAP	Local Biodiversity Action Plan
LBS	Local Biodiversity Site
LSE	Likely Significant Effect

Abbreviation	Description
Natural Power	Natural Power Consultants Limited, the lead EIA Co-Ordinator
NHZ	Natural Heritage Zone
NNR	National Nature Reserve
NVC	National Vegetation Classification
PAN	Planning Advice Note
RWE	RWE Renewables UK Developments Ltd, the Applicant
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SEPA	Scottish Environmental Protection Agency
SNH	Scottish Natural Heritage, now known as NatureScot
SPP	Species Protection Plan
SR	Scottish Renewables
SSSI	Site of Special Scientific Interest
SWT	Scottish Wildlife Trust
TWIC	The Wildlife Information Centre
UNESCO	United Nations Educational Scientific and Cultural Organisation
WCA	Wildlife and Countryside Act (1981)
WHS	World Heritage Site

7.1 STATEMENT OF COMPETENCE

7.1.1 The author of this chapter has over 20 years of experience in the Ecology and Conservation sector and has been working as an Environmental Consultant in the renewable sector for over 12 years. During this time, he has been involved with the production of scoping reports, technical baseline reports, operational monitoring reports and assisting with Ecological Impact Assessment (EcIA) technical appendices, as well as client and consultee liaison. The author was assisted by a Senior Environmental Consultant who has been working as a consultant in renewable and non-renewable development sectors for over 12 years, and an Associate Technical Director with 10 years of experience in EcIA and EIAR compilation.

7.1.2 Suitably qualified and experienced surveyors collected all data.

7.2 INTRODUCTION

7.2.1 This ecological chapter of the EIAR has been prepared by Natural Power Consultants (Natural Power) on behalf of Fred. Olsen Renewables Limited (FORL (the “Applicant”)) in respect of the proposed Scawd Law Wind Farm (hereafter referred to as the ‘Proposed Development’). The Proposed Development comprises up to 8 wind turbines and associated infrastructure on land in the Moorfoot Hills, north-east of Innerleithen in the Scottish Borders (“the Proposed Development Area”).

7.2.2 The scoping process for the Proposed Development was conducted after the baseline ecological surveys were carried out. In line with the principles of proportionate Environmental Impact Assessment (EIA), embedded mitigation is considered at the outset of the assessment. Important Ecological Feature (IEF) status has only been assigned 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. Therefore, requirement for further assessment is ‘scoped out’ for some features in this EcIA chapter, where appropriate, with justification given (see Table 7.21).

7.2.3 An overview of the baseline ecological conditions relating to the habitats and (non-avian) fauna present within the Proposed Development Area and immediate surrounding environment is provided in this chapter. Baseline ecological conditions have been established through combining the results of a desk-based review and ecological field surveys, conducted in 2019 and 2021, to obtain relevant ecological data. These were undertaken to ascertain the status of habitats and protected species occurring within the Proposed Development Area and immediate surrounding environment. The identified habitats and species comprising the ecological baseline are described, evaluated and assessed using recognised criteria, in accordance with industry guidelines (SNH, 2013[1] & CIEEM, 2018[2]) (see Paragraphs 7.3.1 to 7.3.4). This chapter establishes the ecological baseline and identifies IEFs based on the potential for ecological effects and impacts associated with the Proposed Development after the application of embedded mitigation. The potential for ecological impacts as a result of the Proposed Development during the construction, operational and decommissioning phases have been identified and assessed, with particular attention paid to habitats and species of high vulnerability, conservation concern and those afforded a high level of legal protection. These impacts are then assessed in terms of their significance to each IEF. Where potentially adverse ecological impacts have been identified and/or predicted for an IEF, appropriate mitigation to avoid or reduce the effects of such impacts are proposed. For IEFs for which greater than negligible residual effects are predicted after the application of this mitigation, cumulative impacts with other nearby developments have also been considered within this EcIA.

7.2.4 Several elements of this chapter relating to the identification and assessment of ecological features make reference to and are supported by the findings of the ornithological and hydrological assessments, reported in Chapter 8: Ornithology and Chapter 9: Hydrology, Geology and Hydrogeology.

[1] SNH, (2013). A handbook on environmental impact assessment. Guidance for Competent Authorities, Consultees and others in involved in the Environmental Impact Assessment Process in Scotland. Natural Heritage Management. 4th Edition.

[2] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management, Winchester.

7.2.5 The baseline studies referenced in this chapter are supported by the following Technical Appendices (Volume 4) and supporting figures (Volume 3a) which provide detailed information regarding the ecological field survey methods and field data:

- Appendix 7.1: Ecology Appendix
- Confidential Appendix 7.2: Ecology Confidential Appendix
- Figure 7.1: Ecology Survey Areas 2019 & 2021
- Figure 7.2: Bat Detector Locations 2019
- Figure 7.3: Bat Roost Assessment Results 2019 & 2021
- Figure 7.4: Bat Detector Results 2019
- Figure 7.5: Phase 1 Survey Results 2019 & 2021
- Figure 7.6: National Vegetation Classification (NVC) Survey Results 2019 & 2021
- Figure 7.7: Protected Mammal Survey Results 2019 & 2021
- Figure 7.8: Fish Habitat Survey Results 2019

7.2.6 An outline Habitat Management Plan (HMP) is presented in Section 7.7 Paragraph 7.7.63 and is supported by the following figure (volume 3a):

- Figure 7.9: Proposed Outline Habitat Management Plan

All Latin names for species recorded at the Proposed Development are given in Appendix 7.1.

Terminology

7.2.7 The public bodies NatureScot and Forestry and Land Scotland (FLS) recently changed their names from Scottish Natural Heritage (SNH) and Forestry Commission Scotland (FCS) respectively. SNH officially changed to NatureScot in August 2020 and FCS officially changed to FLS in April 2019. References to documents published by these bodies are referred to using the name at the time that the relevant document was written, meaning that some document references within this chapter use the former names of these bodies (SNH or FCS).

7.3 LEGISLATION, POLICY AND GUIDANCE

7.3.1 The following framework of international, national and local legislation and planning policy guidance, which exists to protect habitats and specific species, has been considered as part of the assessment. Ecological baseline surveys have been conducted following recognised guidelines and the EcIA takes account of the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (CIEEM, 2018)[2]

Legislation

- EU Exit: The Habitats Regulations in Scotland[3];
- Water Environment and Water Services (Scotland) Act 2003;
- Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive);
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) (the Habitats Regulations), which transposes the Habitats Directive into law in Scotland; and
- The Conservation of Habitats and Species Regulations 2017 (as amended), relating to reserved matters in Scotland including the granting of consent under section 36 of the Electricity Act (together, "the Habitats Regulations");
- Wildlife and Countryside Act 1981 (as amended);
- The Nature Conservation (Scotland) Act 2004;
- The Wildlife and Natural Environment (Scotland) Act 2011; and
- Protection of Badgers Act 1992 (as amended).

National Policy Guidance

7.3.2 The following policies are relevant to this Chapter in a national and local context:

- Scottish Borders Local Development Plan;
- SPP 2014
- UK Post 2010 UK biodiversity framework;
- The Scottish Biodiversity Strategy comprising:
  - Scotland's Biodiversity: It's in Your Hands (Scottish Executive, 2004); and
  - The 2020 Challenge for Scotland's Biodiversity);
- Planning Advice Note 60: Planning for Natural Heritage (Scottish Government, 2000); and
- Nature Conservation: Implementation in Scotland of the Habitats and Birds Directives: Scottish Executive Circular 6/1995 as amended (June 2000). The Scottish Borders Local Biodiversity Action Plan 2018-2028 (Scottish Borders Council, 2018) which has been designed to set out regional targets for biodiversity and sustainability at a local scale.
- NPF4 is currently in draft and is considered further in Chapter 2. As it is currently in draft and subject to consultation it is not considered in this chapter.

Other Guidance

7.3.3 Particular attention has also been given to the guidance documents listed below, that are applicable to assessing the effects of wind farm developments on ecology. Note that some documents published by NatureScot still refer to their former name of Scottish Natural Heritage (SNH). Reference has also been made to guidance documents throughout this Chapter where relevant:

- Averis *et al*. (2004). An Illustrators Guide to British Upland Vegetation[4];
- Bang, P. and Dahlstrøm, P. (2001). Animal Tracks and Signs[5];
- Chanin, P. (2003b). Monitoring the Otter[6];
- CIEEM (2018) Guidelines for EcIA in the United Kingdom and Ireland[7];
- Collins (2016). Bat Surveys for Professional Ecologists[8];
- Cresswell *et al*. (2012). UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation[9];

[3] Scottish Government. (2020). EU Exit: The Habitats Regulations in Scotland.

[4] Averis, A. et al. (2004). An Illustrated Guide to British Upland Vegetation. Joint Nature Conservation Committee. Peterborough.

[5] Bang, P. and Dahlstrøm, P. (2001). Animal Tracks and Signs. Oxford University Press, Oxford

[6] Chanin, P. (2003b). Monitoring the Otter Lutra lutra. Conserving Natura 2000 Rivers: Monitoring Series No. 10. English Nature, Peterborough

[7] CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester. Version 1.1 – Updated September 2019.

[8] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good practice Guidelines (3rd edition). The Bat Conservation Trust, London.

[9] Cresswell et al. (2012). UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation

- Dean *et al.* (2016). The Water Vole Mitigation Handbook[10];
- Environment Agency manual Restoration of Riverine Salmon Habitats[11];
- Gurnell *et al*. (2009). Practical Techniques for Surveying and Monitoring Squirrels[12];
- Harris *et al*. (1989). Surveying Badgers[13];
- Harris *et al*. (2008). Mammals of the British Isles[14];
- Hunt (2012). Bat Surveys: Good Practice Guidelines[15];
- JNCC (2010). Phase 1 Habitat survey[16];
- NatureScot (2021) Bats and onshore wind turbines - survey, assessment and mitigation[17];
- Neal & Cheeseman (1996). Badgers[18];
- Rodwell (2006). NVC survey[19];
- Sargeant G. & Morris P., (2003). How to Find and Identify Mammals[20];
- Scottish Executive (2001) European Protected Species, Development Sites and the Planning System: Interim guidance for local authorities on licensing arrangements;
- Scottish Environment Protection Agency (SEPA) (2014) Land Use Planning System SEPA Guidance Note 4: Planning Guidance on Windfarm Developments[21];
- SNH (2012) Assessing the cumulative impact of onshore wind energy developments[22];
- SNH (2016) General pre-application/scoping advice document[23];
- SNH (2019, updated 2021) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation[24];
- Scottish Renewables (SR), SNH, SEPA, FCS (2013) Good Practice during Wind Farm Construction[25]; and
- Strachan et al. (2011) The Water Vole Conservation Handbook[26].

7.4 METHOD OF ASSESSMENT

Desk Study

7.4.1 A desk-based review was undertaken in 2020 and 2021 to collate relevant public domain survey data, scientific publications, and to obtain historical records of protected and relevant species from within the Proposed Development Area and surrounding environment. This provided background information on the habitats and species potentially present, and to provide context to the ecological baseline survey results. Combined with the results of the ecological field surveys, this information has been utilised to provide a comprehensive ecological baseline on which to base the EcIA.

Statutory, National and Locally Designated Sites of Nature Conservation

7.4.2 A web-based search employing the online tools NatureScot Sitelink[27] and the Defra MAGIC Map application[28] was undertaken to identify and provide information on statutory designated sites of nature conservation, located within 10 km of the Proposed Development for the Scawd Law Ecology Scoping Report. This was updated in January 2021 to include a buffer of the Proposed Access. Sites designated solely for ornithological interests and of relevance to the Proposed Development are considered separately in Chapter 8: Ornithology.

Protected Species and Habitats

7.4.3 In January 2021 requests for existing records of target non-avian species within 5 km of the Proposed Development, extended to 10 km for bat species, were made to The Wildlife Information Centre (TWIC).

Field Surveys

7.4.4 An overview of the field surveys which were carried out between June 2019 and August 2021, used to inform this EcIA chapter, is provided in Table 7.1 below. The table provides summary information of the dates, methodologies and survey extents of the field surveys. Further details of survey extents can be found in Figure 7.1.

7.4.5 Detailed information including dates and methodologies for the surveys can be found in Appendix 7.1.

Table 7.1: Summary of field surveys undertaken within the Proposed Development Area

Survey	Method/Guidance followed	Date	Survey Area
Phase 1 Habitat survey	JNCC (2010)[16]	August 2019 and May, October 2021	300 m buffer of Proposed Development Area
National Vegetation Classification (NVC) survey	Rodwell (2006)[19] Averis *et al.* (2004)[4]	August 2019 and May, October 2021	300 m buffer of Proposed Development Area
Bat activity survey – static detectors	Hundt (2012)[15]; SNH (2019)[24] and NatureScot (2021)[17]	June to September 2019 inclusive	Proposed Development Area

[10] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016). The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

[11] Environment Agency manual Restoration of Riverine Salmon Habitats – A Guidance Manual. 2003 Version. Environment Agency, Bristol.

[12] Gurnell, J., Lurz, P., McDonald, R., Pepper, H. (2009). Practical Techniques for Surveying and Monitoring Squirrels. Forestry Commission Scotland, Edinburgh

[13] Harris S. Cresswell P & Jefferies D., (1989). Surveying Badgers. The Mammal Society, London.

[14] Harris, S. & Yalden, D.W. (eds). (2008). Mammals of the British Isles: Handbook, 4th Edition. The Mammal Society, Southampton.

[15] Hunt (2012). Bat Surveys: Good Practice Guidelines, 2nd edition. BCT, London.

[16] JNCC (2010). Handbook for Phase 1 Habitat survey: a technique for environmental audit. JNCC, Peterborough.

[17] NatureScot (Scottish Natural Heritage), Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) (2021). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

[18] Neal, E. and Cheeseman, C. (1996). Badgers. T & A D Poyser, London, p271 pp.

[19] Rodwell J. S. (2006). National Vegetation Classification: Users' handbook. JNCC, Peterborough.

[20] Sargeant G. & Morris P., (2003). How to Find and Identify Mammals. The Mammal Society, London.

[21] SEPA (2014). Land Use Planning System (LUPS), SEPA Guidance Note 4. Planning guidance on on-shore windfarm developments. Version 7. LUPS-GU4.

[22] SNH (2012). Assessing the cumulative impact of onshore wind energy developments. SNH, Scotland.

[23] SNH (2016). General pre-application/scoping advice document, SNH, Scotland.

[24] SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd., the University of Exeter, and Bat Conservation Trust (BCT) (2019). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

[25] Scottish Renewables, SNH, SEPA, Forestry Commission Scotland (2013). Good practice during windfarm construction. 2nd edition.

[26] Strachan, R., Moorhouse, T. & Gelling, M. (2011). The Water Vole Conservation Handbook. Third Edition, Wildlife Conservation Research Unit, University of Oxford, Abingdon.

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

[28] https://magic.defra.gov.uk/MagicMap.aspx

Survey	Method/Guidance followed	Date	Survey Area
Bat roost survey	Hundt (2012)[15]; and Collins (2016)[8]	July 2019 and May 2021	200 m buffer of Proposed Development Area
Otter and water vole survey	Sargeant & Morris (2003)[20]; Chanin (2003b)[6]; Dean *et al.* (2016)[10] and Bang & Dahlstrøm (2001)[5]	July 2019 and May 2021	250 m buffer of Proposed Development Area
Red squirrel	Gurnell *et al*.(2009)[12]; Sargeant & Morris (2003)[20]; and Bang & Dahlstrøm (2001)[5]	July 2019 and May 2021	100 m buffer of Proposed Development Area
Badger	Harris *et al.* (1989)[13]; Neal and Cheeseman (1996)[18]; Sargeant & Morris (2003)[20]; and Bang & Dahlstrøm (2001)[5]	July 2019 and May 2021	150 m buffer of Proposed Development Area
Pine marten	Sargent & Morris (2003)[20]	July 2019	150 m buffer of Proposed Development Area
Fish habitat survey	Scottish Fisheries Coordination Centre[11]	July 2019	Main watercourses within Proposed Development Area

Source: Natural Power

Survey Limitations

7.4.6 The following survey limitations were experienced:

- Static detectors were deployed twice during the summer and once in the autumn: June (Survey 1), July (Survey 2) and September (Survey 3), for 14 nights each deployment. The early summer survey (3-16 June) was conducted due to no spring survey and only 10 bat detectors were deployed for the survey due to detector availability. This is not considered to be a limitation to assessment as the activity peak for bats is considered to be autumn and this period was assessed.
- During the bat activity survey sub-optimal weather conditions (as defined in SNH (2019)[24] (temperature >8 ˚C; wind <5 m/s)) were recorded on several days (see Appendix 7.1 for full details of weather conditions during bat surveys). However, the Proposed Development Area is located in an upland environment, where inclement weather is common. It is therefore considered that the weather conditions encountered during the survey were representative of the general weather conditions in this habitat. Details of the sub-optimal weather conditions are outlined below:
  - In early summer (June) the minimum overnight temperature was below 8 ˚C on nine nights[29] and the median wind speed was above 5 m/s on two nights. The closest substantial settlement is Innerleithen, where the minimum and maximum temperatures in May are 8.1 ˚C and 14.5 ˚C[30]. The Proposed Development is at a higher altitude and more exposed than Innerleithen and is therefore likely to have a lower average temperature. This means that the weather conditions experienced during the survey were likely to be representative of the general conditions at the Proposed Development;
  - In summer (July) only a single night recorded the median wind speed above 5 m/s; and
  - In autumn (mid-August to September) there were four out of a total of 14 nights of survey during which the weather was sub-optimal: the average overnight temperature was below 8 ˚C on four nights and the median wind speed was recorded above 5 m/s during a single night only.
- Ecology surveys have not been conducted at the 27 Pinch Points along the proposed abnormal delivery route (as described in Vol x TA 9.x) , therefore pre-construction surveys will be undertaken for protected species and habitats at these locations if necessary. However, a desk-based assessment of all Pinch Points is provided in detail in Appendix 7.1.

Approach to Impact Assessment

7.4.7 This section presents the approach taken to the EcIA within this chapter and provides an overview of how the potential for impact has been determined and the method by which the significance of effect has been ascertained. The approach to the EcIA adopted within this assessment follows the CIEEM guidelines[2], and in line with these guidelines professional judgement has been applied where appropriate. The criteria used and the underlying rationale are described further within the following sections.

Determining Important Ecological Features (IEFs)

7.4.8 In accordance with CIEEM guidelines[2], the importance of an ecological feature is determined based upon its respective elements relating to biodiversity and ecosystem services with a geographical frame and reference as detailed in Table 7.2.

Table 7.2: Geographical context relating to the evaluation of an IEF

Level of value	Example of IEF
International	An internationally designated site (e.g. Special Area of Conservation (SAC)), or site meeting criteria for international designations such as a World Heritage Site (WHS) or United Nations Educational Scientific and Cultural Organisation (UNESCO) Biosphere Reserve.
	Species populations/habitat areas present with sufficient conservation importance to meet criteria for SAC selection.
National	A nationally designated site such as a Site of Special Scientific Interest (SSSI), or a National Nature Reserve (NNR), or sites meeting the criteria for national designation (such as the JNCC guidelines), or sites that have not been designated but that do meet the criteria for national designation (as outlined in JNCC guidelines[31]).
	Species populations/habitat areas present with sufficient conservation importance to meet criteria for SSSI selection[32].
Regional	Species populations/habitat areas at present falling short of SSSI selection criteria but with sufficient conservation importance to likely meet criteria for selection as a local site e.g. important in the context of NatureScot Natural Heritage Zone (NHZ) populations/habitat extents.
	Sites designated as local nature reserves such as Scottish Wildlife Trust (SWT) Reserves or Local Biodiversity Sites (LBS).

[29] Weather data collected from http://www.bordersweather.co.uk/

[30] Climate-Data.org. URL: https://en.climate-data.org/europe/united-kingdom/scotland/innerleithen-10677/

[31] https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/

[32] https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/

Level of value	Example of IEF
Local	Areas of semi-natural ancient woodland smaller than 0.25 ha.
	Areas of habitat or species populations considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows or evidence of regular otter activity.
Negligible	Usually widespread and common habitats and species. Features falling below Local importance are not normally considered in detail in the assessment process.

Source: CIEEM, 2018[2]

7.4.9 The Proposed Development Area is located within NHZ 20 (Border Hills) and so this is the Region against which impacts are assessed. NHZ 20 comprises smooth and rounded mountain ranges, hill slopes and summits vegetated by montane, moorland and grassland habitats[33].

7.4.10 Attributing geographical value to a feature is generally straightforward in the case of designated sites, as the designations themselves are normally indicative of level of value. For example, a SAC designated under the Habitats Directive is explicitly of European (International) importance. However occasionally a formally identified level of value may not be appropriate in the specific context of the Proposed Development following site specific survey work. Where this is the case professional judgement has been applied and rationale for decreasing or increasing the geographical level of value of a feature is given. An example of this might be bats, all of which are of international importance due to their protection under Annex IV of the Habitats Directive. However, if only very few foraging/commuting records of common and widespread bat species were made at a site, attributing international importance to the population present at the Proposed Development would be disproportionate, and the importance would be reduced accordingly (noting that this does not change the protection level from a legislative standpoint). For non-designated features, the use of guidelines such as the national guidelines for the selection of SSSIs can be helpful in providing a context for determining a feature's importance and level of value.

7.4.11 It should be acknowledged that some features, including certain legally protected species such as badger, may be of insufficient ecological and/or nature conservation importance at a given Proposed Development to warrant impact assessment within the EcIA, as there are unlikely to be significant effects to their population arising from the Proposed Development. However, due to the protected status of these features, they are considered in the EcIA within the context of legal and policy implications.

7.4.12 Part of the process of attributing importance to a species involves defining the population to be valued and requires professional judgment to identify an ecologically coherent population against which effects on integrity[34] can be assessed (see Paragraphs 7.4.20 – 7.4.22). For example, for wide-ranging species such as otter, it may be more appropriate to consider the otter population in a whole catchment, whereas for more localised species, such as water vole, importance may be attributed to groups of related colonies which function as a meta-population.

7.4.13 In line with the principles of proportionate EIA, embedded mitigation is considered at the outset of the assessment. IEF status has only been assigned where there is still considered to be the potential for significant effects to integrity of the feature at the assigned value level arising from the Proposed Development, after the application of embedded measures.

Valuing bats

7.4.14 For the purposes of this assessment and of assigning value to bats, the guidance set out by SNH[24] and NatureScot[17] has also been followed. Table 2 in this guidance identifies the population vulnerability of bat species based on the collision risk posed for individual bat species by wind turbines as determined by behavioural characteristics, and by bat population sensitivity based upon species rarity (adapted from Wray *et al.* (2010)[35]). Table 7.4 summarises the risk of turbine impact to bat species and the sensitivity of bat populations.

Table 7.3: Level of potential vulnerability of populations of Scottish species[36]

	Low collision risk	Medium collision risk	High collision risk
Common species	n/a	n/a	Common pipistrelle Soprano pipistrelle
Rare species	Brown long-eared bat Daubenton's bat Natterer's bat	n/a	n/a
Rarest species	Whiskered bat Brandt's bat	n/a	Nathusius' pipistrelle Noctule bat Leisler's bat

Source: NatureScot[36]

7.4.15 The guidance provided by Wray *et al.*[35] includes a framework for identifying the importance of bats in the landscapes through the evaluation of bat roosts and habitats. Applying this framework, bat roosts can be valued according to species rarity and roost status.

Characterising Potential Effects on Features

7.4.16 The criteria used in this assessment for describing the overall magnitude of a potential effect are summarised in Table 7.4.

7.4.17 The assessment also considers whether the effect is positive or negative, short-term (for example only during construction) or long-term (throughout the lifetime of the Proposed Development), reversible or permanent.

Table 7.4: Criteria used to determine the magnitude of ecological effect

magnitude of effect	Description of impact
Very highly negative	Total or almost complete loss of an ecological feature resulting in a permanent adverse impact on the integrity of the feature. The conservation status of the feature would be permanently affected.
Highly negative	Result in large-scale, permanent changes in an ecological feature, likely to change its ecological integrity. These impacts are therefore likely to result in overall changes in the conservation status of an ecological feature.
Moderately negative	Includes moderate-scale long-term changes in an ecological feature, or larger-scale temporary changes; however, the integrity of the ecological feature is not likely to be affected. This may result in temporary changes in the conservation status of the ecological feature, but these are reversible and unlikely to be permanent.
Low negative	Includes impacts that are small in magnitude, with small- scale temporary changes, and where integrity of the ecological feature is not affected. These effects are unlikely to result in overall changes in the conservation status of an ecological feature.

[33] SNH. (2002). Natural Heritage Zones: A National Assessment of Scotland's Landscapes. SNH, Edinburgh.

[34] Note that integrity in this context refers to ecological integrity of a habitat type or population of a species at a defined value level, i.e. the maintenance of the conservation status of a population of a species at a specific location or geographic scale. This should not be confused with the specific term 'Site Integrity' used in Appropriate Assessment for Natura 2000 sites.

[35] Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. (2010) Valuing Bats in Ecological Impact Assessment. IEEM In-Practice p. 23-25.

[36] Only those species which are known to occur in Scotland are included. BCT (2019). Find out more about Bats in Scotland. Available at: https://cdn.bats.org.uk/pdf/Scottish-bats-2019.pdf?mtime=20190412121246&focal=none

magnitude of effect	Description of impact
Negligible	No perceptible change in the ecological feature.
Positive	The changes in the ecological feature are considered to be beneficial to its ecological integrity or nature conservation status.

Source: CIEEM, 2018[2]

7.4.18 When identifying the magnitude of effect, it is essential to consider the likelihood that a change/activity will occur as predicted, with a degree of confidence in the impact assessment (in relation to the impact on ecological structure and function). Where possible, the degree of confidence should be predicted quantitatively. However, where this is not possible, a more qualitative approach is taken; particularly where the confidence level can only be based on expert judgement.

Habitat Loss Calculations

7.4.19 The construction of the Proposed Development would result in some permanent habitat loss to the infrastructure footprint (e.g. access tracks, turbine bases, crane hardstandings, and substation), habitat loss calculations are used to quantify the extent of this loss. Some construction areas will be reinstated following construction (for example the construction compound and the borrow pit) and therefore only represent a temporary loss; as such these areas are not included in calculations. Percentage habitat loss is based on the total area of each Phase 1 habitat type within the Proposed Development Area.

7.4.20 Habitat loss calculations are provided for all Phase 1 habitats (see Table 7.8) and are included in the impact assessment. The methods used and detailed results are provided in Appendix 7.1.

Determining Significance of Ecological Effects

7.4.21 The CIEEM guidelines[2] use only two categories to classify effects: “significant” or “not significant”. A significant effect is defined in ecological terms as an effect on the integrity or conservation status of a defined site, habitat or species. The significance of an effect is determined by considering the value level of the feature and the magnitude of the effect and applying professional judgement as to whether the integrity/conservation status of the feature will be affected at the given value level. This concept can be applied to both designated and undesignated sites and to defined populations.

7.4.22 In this assessment, an effect that threatens the integrity of a feature is considered to be significant in terms of the EIA Regulations. Effects assessed as not significant should be considered as not significant in terms of the EIA Regulations. It should be noted that, alongside the criteria provided, professional judgement is applied in determining the significance of a potential effect.

7.4.23 Where appropriate, mitigation and/or compensation measures, including the design process, are identified in order to avoid and reduce potentially significant effects. It is good practice to propose mitigation measures to reduce negative effects that are not significant. The level of significance of residual effects on features after the effects of mitigation have been considered can then be determined. Monitoring requirements can also be identified.,.

Trends and Predicted Future Baseline

7.4.24 In the absence of development, it is assumed that the habitat use at the Proposed Development would remain the same for the foreseeable future. Current habitat use within the Proposed Development Area is for sheep grazing and grouse shooting and as such areas of modified bog habitats have historically been drained to improve their quality for these purposes. In the absence of the Proposed Development this is likely to continue, leading to further modification impacts of drying and degradation of the bog habitat over the medium to long term.

7.4.25 It is more difficult to predict changes that that may occur in the longer-term (i.e. over 35 years), especially in the wake of climate change, which is predicted to cause range shifts in some species. In addition, climate change may alter habitat types by impacting on the composition and health of the plant communities present, thereby affecting the suitability of the Proposed Development Area for some of the species which currently occupy the site. Baseline surveys carried out for the Proposed Development represent a snapshot of the ecology community present at the time and cannot be extrapolated to predict future population trends in the event of climate change, or a future change in land use at the site.

7.5 CONSULTATION

7.5.1 The Scoping Report was submitted by the Applicant and considered by a range of consultees in July 2020. Those responses considered relevant to this chapter are summarised in Table 7.5.

Table 7.5: Summary of consultation responses to the Scoping Report

Consultee	Date	Issues raised and recommendations	Scoping response addressed
NatureScot	Aug 2020	The habitat and species surveys carried out seem comprehensive.	Noted.
		Potential impacts on the qualifying interests of the River Tweed Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI) and the Moorfoot Hills SAC/SSSI can be addressed by appropriate mitigation measures.	Discussed in the Embedded Mitigation Section 7.7, Paragraphs 7.7.4 – 7.7.24.
		Noted that the northern boundary of Proposed Development matches with that of the Moorfoot Hills SAC/SSSI. The SAC qualifying interests are blanket bog and European dry heath with blanket bog as one of the interests of the SSSI. Concern is that the topography of this area may mean that there is hydrological connectivity between the blanket bog on the wind farm site and that of the SAC/SSSI.	Assessment of impacts on the Moorfoot Hills SAC/SSSI are discussed in Section 7.7 below. Hydrological connectivity is addressed in Chapter 9 Hydrology, Geology & Hydrogeology.
		Noted that the Proposed Development could have connectivity with the River Tweed SAC/SSSI due to drainage and water flow off the site through several watercourses reaching the River Tweed.	Assessment of impacts on the River Tweed SAC are discussed in Section 7.12, Paragraphs 7.12.4.
		The EIA report should offer an outline Habitat Management Plan (HMP) that sets out broad measures to achieve positive management and enhancement of habitats within the development site to benefit biodiversity and not just mitigate impacts.	An outline HMP is provided in the EIAR.
Scottish Borders Council (SBC)	Sep 2020	Largely satisfied with the submitted Scoping report with a comprehensive set of surveys conducted for protected species including otter, water vole, badger, pine marten and red squirrel. Satisfied with pine marten and water	No records of pine marten and water vole were found during the baseline surveys and were therefore proposed to be scoped out of the EcIA.

Consultee	Date	Issues raised and recommendations	Scoping response addressed
		vole being scoped out of further assessment under the EIAR.	
		There could be hydrological connectivity with blanket bog habitat within Moorfoot Hills SAC, < 1km from site.	Hydrological connectivity is addressed in Chapter 9 Hydrology, Geology & Hydrogeology.
		There is potential connectivity with the River Tweed SAC due to direct drainage to the River Tweed. Potential impacts may arise during construction, operation and decommissioning through sediment run-off and pollution. Impacts may be addressed through wind farm design and good practice construction methods.	Assessment of impacts on the River Tweed SAC are discussed in Section 7.11, Paragraphs 7.11.1. – 7.11.4.
		The scoping report suggests that further bat surveys may be carried out to cover the spring period. Consideration should also be given to survey in the early Autumn period (September), unpublished monitoring data from Scottish Power Renewables suggests most activity occurred between mid-August to mid-September at their sites. This may coincide with post-breeding populations or migration of bats.	Surveys were conducted in summer (June-mid-August) and autumn (mid-August-October) as per guidance[24]. The spring survey was not undertaken in the required period (April-May) however, an early summer survey was carried out from the 3 - 16 June. Whilst there is known to be a peak of activity in spring, the biggest peak of bat activity in the year is known to occur between August and September. This is well documented in studies[37] [38], and although in the UK, studies have tended to be more species-specific in the US where there has been considerably more research on the impacts of bats and wind farms, there is significant information in relation to focussing on an autumn-centric approach, and this is equally applicable to UK species. It is considered the delay to the spring survey is not a limitation to assessment and that a survey conducted in early summer will also provide a representation of how the site is used by bats. Therefore, it is not considered that an additional spring survey is necessary. Results are presented in Section 7 Paragraphs 7.6.25 – 7.6.40.
		Satisfied with pine marten and water vole being scoped out of further assessment under the EcIA.	Not assessed further in the EIA.
		A fish habitat assessment has been carried out but no fish surveys. Fish surveys may be required to inform an HRA.	Results of the fish habitat assessment are presented in Section 7.6, Paragraphs 7.6.49 – 7.6.54. Fish are assessed in Section 7.7, Paragraphs 7.7.16 – 7.7.17.
		No mention is given to reptiles, amphibia or invertebrates. Suitable habitats for reptiles is found in the site. Reasonable Avoidance Measures should be adopted to mitigate impacts on e.g. adder, common lizards and amphibia. There are records of a northern brown argus colony (SBL priority species) within the site at the lower part of Gateshopeknowe Burn. Their species-rich grassland habitat must be safeguarded from the development and there are opportunities to enhance this habitat under an HMP.	Reptiles, amphibia and invertebrates, including northern brown argus, are assessed within Section 7.7, Table 7.21. The area along the Gatehopeknow Burn was initially surveyed as a potential access route. The southern access is unlikely to be required for anything other than 4x4 access i.e. access for site investigations or pre-construction.
		Areas of blanket bog are found within the site, turbines T4, T5 and T12 are in areas of blanket bog or wet modified bog although it is said none of the turbines is located on peat.	The proposed turbine layout has changed since the scoping report. After scoping re-assessment of the NVC results indicate only wet modified bog present on site. Five of the turbines are located within modified bog. Habitat Loss Calculations are provided in Section 7.7, Table 7.8.
		The Council adopts a no-net loss of biodiversity policy, losses of biodiversity are required to be compensated for and that biodiversity enhancements provided. Compensation and enhancement should be secured through a HMP in accordance with good practice	Proposals for an outline HMP have been considered as part of this assessment. See Section 7. Paragraph 7.6.63.
Royal Society for the Protection of Birds (RSPB)	Aug 2020	Agreed with the EcIA only concentrating on those receptors (habitats) which may be subject to significant effects from the Proposed Development (either directly or indirectly) providing it is based on results of thorough	The proposed turbines layout has changed since the scoping report. After scoping re-assessment of the NVC results indicate only wet modified bog present on site.

[37] Operational monitoring at an undisclosed Wind Farm, Northumberland. Natural Power 2017-2020

[38] CIEEM Webinar, 16th June 2020 Patterns of Bat Activity at Upland Windfarms: Implications for Sampling and Mitigation. Peter Robson (Scottish Power)

Consultee	Date	Issues raised and recommendations	Scoping response addressed
		assessment of impact to all scoped-in receptors in the EcIA. Noted that impacts to deep peat habitat will be addressed through the production of an HMP. Advising that impacts to deep peat habitat should be addressed primarily through avoiding impact through design and that the purpose of a HMP should be to compensate for impact to habitat that cannot be addressed. The Scoping report confirms that turbines 4,5 and 12 are to be located on Annex1 blanket bog habitat which we would advise should be avoided through 75 m allowance of micrositing thereby fulfilling the above mitigation through design.	Habitat Loss Calculations are provided in Section 7.7, Table 7.8. Proposals for an outline HMP have been considered as part of this assessment. See Section 7. Paragraph 7.6.63.
River Tweed District Salmon Fishery Boards		As part of the EIA a fish survey should be carried out for neighbouring tributaries to help inform the assessment.	Fish surveys were not carried out, although a fish habitat suitability survey was carried out to inform the EIAR. Results of the fish habitat assessment are presented in Section 7.6, Paragraphs 7.6.49 – 7.6.54. Fish are assessed in Section 7.7, Paragraphs 7.7.16 – 7.7.17.

Source: Natural Power

7.6 BASELINE CONDITIONS

7.6.1 This section presents the baseline results for desk-based review and field surveys in relation to the Proposed Development.

Desk Study

Statutory, National and Locally Designated Sites of Nature Conservation

7.6.2 Two statutory sites of International and National importance are located less than 1 km from the Proposed Development Area:

- Moorfoot Hills SAC/SSSI, designated for protected upland habitats including blanket bog, dry heath and birch woodland, lies directly adjacent to the north and east of the Proposed Development Area.
- River Tweed SAC/SSSI, designated for Atlantic salmon, lamprey species and for freshwater habitats and species assemblage, lies to the south of the site with protected tributaries to the west of the Proposed Development Area.

7.6.3 There are works proposed which are immediately adjacent to the Moorfoot Hills SAC/SSSI. A screening assessment for this site is provided in Section 7.11. In addition, the proposed abnormal delivery route for Scawd Law Wind Farm runs from the port of Grangemouth to the point where the delivery vehicles leave the public highway off the B709. An assessment for the access route requirements for the Abnormal Indivisible Loads (AILs) associated with the Proposed Development is presented in Appendix 12.1.

7.6.4 Along the entire delivery route a total of 27 Pinch Points have been identified. A section of the route falls within the Moorfoot Hills SAC/SSSI where five Pinch Points have been identified within the SAC/SSSI. A full assessment of all Pinch Points is provided in the Appendix 7.1.

7.6.5 The estimated area lost due to road widening (overrun) at the five locations identified within the Moorfoot Hills SAC/SSSI is present below:

- Pinch Point 23 - 99.21 m^2;
- Pinch Point 24 – 57.05 m^2;
- Pinch Point 25 - 6.96 m^2; and
- Pinch Point 26 – 0 m^2.

7.6.6 Pinch Point 27 encapsulates the southern section of the B709 to the site entrance. It is anticipated there will be overrun required at various points along this section which could not be determined due to the lack of information in the OS Mastermap data. It is conservatively assumed that strip widening of the road would be required over the entire length. The overrun area is fully within the road shown on mastermap which is 2315.66 m^2. However it is anticipated that any overrun will be limited to discreet sections within the road boundary and therefore the total area will be less than 2315.66 m^2.

7.6.7 There are works proposed which are immediately adjacent to the River Tweed SAC/SSSI. Details of the proposed works for Pinch Point 27 are provided in Figure 12.3z. A screening assessment for this site is provided in Section 7.11.

7.6.8 There are four statutory sites of National importance area located within 5 km from the Proposed Development Area:

- Plora Wood SSSI designated for upland oak woodland lies 2.1 km south of the Proposed Development Area.
- Williamhope SSSI designated for lowland calcareous and neutral grasslands, lowland dry heath and springs lies 4 km south-east of the Proposed Development Area.
- Nut Wood SSSI designated for upland mixed ash woodland lies 4.2 km west of the Proposed Development Area.
- Glenkinnon Burn SSSI designated for upland birch and mixed ash woodland and lichen assemblage lies 4.8 km south-east of the Proposed Development Area.

7.6.9 Statutory sites designated solely for ornithological features are presented in Chapter 8: Ornithology.

Protected Species and Habitats

7.6.10 TWIC provided records of all protected or notable species occurring within 5 km of the Proposed Development Area, extended to 10 km for bat species.

7.6.11 Distribution of records may be biased by the distribution of observers and many records were more than five years old, indicating that these records may not be representative of current species presence in the vicinity of the Proposed Development Area. Table 7.6 provides information as to the conservation status of these species, with those (non-avian) species listed on the Wildlife & Countryside Act (WCA Sch. 5), the Habitat Regulations (Habs Regs Sch. 2, 3, 4, 5) and priority species listed on the Scottish Biodiversity List (SBL). Full details are provided in Appendix 7.1.

Table 7.6: Desk study records of non-avian protected species within 5 km of the Proposed Development Area (10 km for bats)

Taxon	Species	No. records	Last Record	Protection/Conservation status
Mammal	Common pipistrelle	45	2016	WCA Sch. 5; SBL

Taxon	Species	No. records	Last Record	Protection/Conservation status
	Soprano pipistrelle	51	2019	WCA Sch. 5; SBL
	Myotis species	125	2017	WCA Sch. 5; SBL
	Brown long-eared bat	25	2018	WCA Sch. 5; SBL
	Bat species	7	2018	WCA Sch. 5; SBL
	Otter	5	2018	WCA Sch. 5; Habs Regs Sch. 2,
	Water vole	1	2015	WCA Sch. 5; SBL
	Red squirrel	65	2017	WCA Sch. 5; SBL
	Badger	4	2018	Protection of Badgers Act 1992
	Pine marten	17	2018	WCA Sch. 5; Habs Regs Sch. 4; SBL
	Hedgehog	32	2020	SBL
Reptile	Common lizard	3	2018	WCA Sch. 5; SBL
Amphibian	Common toad	1	2013	WCA Sch. 5; SBL
	Common frog	4	2017	WCA Sch. 5
Fish	Lamprey species	2	2011	Habs Regs Sch. 3; SBL
Invertebrates	Northern brown argus	4	2016	SBL
	Small heath	12	2017	SBL
	Bilberry bumblebee	3	2014	SBL
	Anomalous	1	2014	SBL
	Autumnal rustic	7	2018	SBL
	Brindled ochre	2	2014	SBL
	Broom moth	12	2018	SBL
	Brown-spot pinion	2	2018	SBL
	Buff ermine	7	2018	SBL
	Centre-barred sallow	3	2018	SBL
	Dark brocade	6	2018	SBL
	Dusky brocade	4	2016	SBL
	Feathered gothic	1	2018	SBL
	Garden tiger	13	2018	SBL
	Ghost moth	5	2018	SBL
	Green-brindled crescent	1	2018	SBL
	Haworth's minor	2	2014	SBL
	Heath rustic	1	2013	SBL
	Knot grass	7	2017	SBL
	Minor shouldered knot	2	2013	SBL
	Neglected rustic	1	2013	SBL
	Pale eggar	2	2014	SBL
	Powdered quaker	2	2018	SBL
	Rosy rustic	14	2018	SBL
	Sallow	3	2018	SBL
	Shoulder-striped wainscot	1	2014	SBL
	Small phoenix	4	2018	SBL
	Small square-spot	8	2018	SBL
	Streak	2	2018	SBL
	White ermine	13	2018	SBL

Source: TWIC

Field Surveys – Habitats

Overview

7.6.12 The Proposed Development Area located within an upland landscape context is comprised of a mosaic of wet and dry modified blanket bog and heath in the more level areas on the hill tops in the northwest section and along the north boundary. These habitats are only represented in small patches elsewhere on the hill tops as acid grassland becomes more prevalent. On the steeper slopes of the hillsides dry heath and continuous bracken are more widespread. Small flushes and areas of marshy grassland are present along small header streams that ultimately flow into the Gatehopeknowe Burn. The entrance to the Proposed Access is off the B709 and runs north then east around the Tweed Valley Forest Park towards Glede Knowe. Habitats present along the route consist mainly of semi-improved acid grassland and marshy grassland and turning into unimproved acid grassland as the route nears the Proposed Development.

7.6.13 There is an existing access route in to the area of the site that generally follows the Gatehopeknowe Burn north from the A72 road. Towards the northern end of this route dry heath and continuous bracken dominate the vegetation of the steep slopes down to the Gatehopeknowe Burn. Towards the southern end near the A72 road where the terrain is more level acid grassland and agricultural improved grassland becomes more frequent with dry heath, continuous bracken and European gorse scrub on the steeper slopes. Additionally, a mosaic of calcareous and acid grassland is associated with thinner soils on rock outcrops. There are no proposals to improve this track as part of the application,

7.6.14 Topography within the Proposed Development Area ranges from 130 m near the A72 road to 657 m Above Ordnance Datum (AOD) at the highest point within the Proposed Development Area.

7.6.15 There are several small header streams that flow into Gatehopeknowe Burn and this watercourse flows into the River Tweed just south of the A72 road. Within the valley in which Gatehopeknowe Burn flows small blocks of coniferous woodland have been planted and they increase in frequency towards the A72. Here also, semi-natural wet and mixed broadleaf woodland becomes prevalent near where the burn joins the River Tweed. Additionally, patches of marshy grassland, swamp and flush habitat can be found along the banks of Gatehopeknowe Burn.

7.6.16 The upland habitats found within the Proposed Development Area are consistent with that of the surrounding area, which encompasses open moorland to the north and east and a mixture of open moorland and planted coniferous woodland to the west.

Habitat Phase 1 and NVC Results

7.6.17 An overview of the Phase 1 Habitat Survey results, showing the area of recorded habitat occurring within the Proposed Development Area is provided in Table 7.7 and illustrated in Figure 7.5, found in Volume 3a. Further details defining each habitat type along with target notes taken during the survey are provided within Appendix 7.1, found in Volume 4. The NVC survey characterised the habitats further and results are included in Table 7.8 and illustrated on Figure 7.6, found in Volume 3a. The survey identified a range of typical upland habitat types within the Proposed Development Area to community and sub-community level where possible.

7.6.18 The NVC M25 community can represent two Phase 1 classifications: marshy grassland and wet modified bog. This community has been recorded as both Phase 1 habitat types within the Proposed Development Area, depending on the peat depths in the area of habitat. Where the peat depths average more than 0.5 m the species present within these areas are better fitted to mire (wet modified bog) as opposed to marshy grassland. Also, the NVC community M20 is represented as wet and dry modified bog Phase 1 habitat classifications within the Proposed Development Area. Where recent burns have occurred within the M20 habitat it has been classified as dry modified bog due to the lack of Sphagnum bog moss cover.

7.6.19 Ground Water Dependant Terrestrial Ecosystems (GWDTEs) have protection under the Water Environment and Water Services (Scotland) Act 2003, to prevent deterioration, protect and enhance the status of terrestrial ecosystems, wetlands and the aquatic ecosystems they depend on. Therefore, mitigation must be undertaken when carrying out any activities that may impact upon any of these ecosystems. The NVC survey results were used to identify potential GWDTEs. Altogether ten NVC communities were present which are classed in SEPA guidance[21] as indicative of potential GWDTEs, meaning that they have moderate or high dependency on groundwater in certain hydrological settings. Further details on GWDTE assessment can be found in Chapter 9: Hydrology, Geology and Hydrogeology.

Table 7.7: Phase 1 and NVC communities present within a 300 m buffer of the Proposed Development area with conservation designations, GWDTE potential and percentage of habitat lost to Proposed Development.

Phase 1 Habitat type	NVC Community	Conservation Designation	GWDTE potential	Area in Proposed Development Area (ha)	Area lost to Proposed Development (ha)	% lost to Proposed Development
A1.1.1 Semi-natural broadleaved woodland				7.11	0	0
	W7: *Alnus glutinosa-Fraxinus excelsior-Lysimachia nemorum* woodland	Annex 1: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* SBL: Wet woodland	High			
	W9: *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis*; W11: *Quercus petraea-Betula pubescens- Oxalis acetosella* woodlands	SBL: Lowland mixed deciduous woodland	No			
A1.2.2 Plantation coniferous woodland				20.99	0	0
	N/A	N/A				
A1.3.2 Plantation mixed woodland				6.38	0	0
	W8: *Fraxinus excelsior-Acer campestre-Mercurialis perennis*; W9: *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodlands	SBL: Lowland mixed deciduous woodland	No			
A2.1 Dense/ continuous scrub				4.96	0	0
	W21: *Crataegus monogyna-Hedera helix* scrub; W23: *Ulex europaeus-Rubus fruticosus* scrub	N/A	No			
A2.2 Scattered scrub				1.63	0	0
		N/A	No			
B1.1 Unimproved acid grassland				252.96	8.70	3.44
	U2: *Deschampsia flexuosa;* U4*: Festuca ovina-Agrostis capillaris-Galium saxatile* grasslands	N/A	No			
	U5: *Nardus stricta-Galium saxatile* grassland	SBL: *Nardus stricta-Galium saxatile* grassland	No			

Phase 1 Habitat type	NVC Community	Conservation Designation	GWDTE potential	Area in Proposed Development Area (ha)	Area lost to Proposed Development (ha)	% lost to Proposed Development
	U6: *Juncus squarrosus-Festuca ovina* grassland	SBL: *Juncus squarrosus-Festuca ovina* grassland	Mod			
B1.2 Semi-improved acid grassland				62.97	2.03	3.22
	U4*: Festuca ovina-Agrostis capillaris-Galium saxatile*; MG6 *Lolium perenne-Cynosurus cristatus* grasslands	N/A	No			
B2.1 Unimproved neutral grassland				0.43	0	0
	MG9: *Holcus lanatus-Deschampsia cespitosa* grassland	N/A	Mod			
B2.2 Semi-improved neutral grassland				1.73	0	0
	MG1: *Arrhenatherum elatius* grassland	N/A	No			
	MG9: *Holcus lanatus-Deschampsia cespitosa* grassland	N/A	Mod			
B3.1 Unimproved calcareous grassland				12.30	0.02	0.16
	CG10: *Festuca ovina-Agrostis capillaris-Thymus praecox* grassland	SBL: Upland calcareous grassland	High			
B4 Improved grassland				20.11	0.42	2.08
	MG6: *Lolium perenne-Cynosurus cristatus* grassland	N/A	No			
B5 Marshy grassland				50.30	0.99	1.96
	M10: *Carex dioica-Pinguicula vulgaris* mire	Annex 1: Alkaline fens; SBL: Upland flushes, fen and swamp	High			
	M25: *Molinia caerulea-Potentilla erecta* mire	N/A	Mod			
	M23: *Juncus effusus/ acutiflorus-Galium palustre* mire	SBL: Upland flushes, fen and swamp	High			
	M32: *Philonutus fontana-Saxifraga stellaris* spring	SBL: Upland flushes, fen and swamp	High			
	MG9: *Holcus lanatus-Deschampsia cespitosa* grassland	N/A	Mod			
B6 Poor semi-improved grassland				5.16	0	0
	MG6: *Lolium perenne-Cynosurus cristatus* grassland	N/A	No			
C1.1 Continuous bracken				57.07	0	0
	U20: *Pteridium aquilinum-Galium saxatile* community	N/A	No			
D1.1 Acid dry dwarf shrub heath				201.83	4.51	2.23
	H9: *Calluna vulgaris-Deschampsia flexuosa*; H10: *Calluna vulgaris-Erica cinerea*; H12: *Calluna vulgaris-Vaccinium myrtillis*; H18: *Vaccinium myrtillus-Deschampsia flexuosa* heaths.	Annex 1: European dry heaths; SBL: Upland heathland	No			

Phase 1 Habitat type	NVC Community	Conservation Designation	GWDTE potential	Area in Proposed Development Area (ha)	Area lost to Proposed Development (ha)	% lost to Proposed Development
D5 Dry heath/acid grassland mosaic				35.11	0	0
	H12: *Calluna vulgaris-Vaccinium myrtillis*; H18: *Vaccinium myrtillus-Deschampsia flexuosa* heaths; U4*: Festuca ovina-Agrostis capillaris-Galium saxatile* grassland; U20: *Pteridium aquilinum-Galium saxatile* community	Annex 1: European dry heaths; SBL: Upland heathland	No			
	U5: *Nardus stricta-Galium saxatile* grassland	SBL: *Nardus stricta-Galium saxatile* grassland	No			
	U6: *Juncus squarrosus-Festuca ovina* grassland	SBL: *Juncus squarrosus-Festuca ovina* grassland	Mod			
E1.7 Wet modified bog				46.67	5.48	11.75
	M3: *Eriophorum angustifolium* bog pools; M19: *Calluna vulgaris- Eriophorum vaginatum* blanket mire; M20: *Eriophorum vaginatum* blanket mire	Annex 1 and SBL: Blanket bog	No			
	M25: *Molinia caerulea-Potentilla erecta* mire (when on peat >0.5 m deep)	Annex 1 and SBL: Blanket bog	Mod			
E1.8 Dry modified bog				2.05	0.07	3.48
	M20: *Eriophorum vaginatum* blanket mires	Annex 1 and SBL: Blanket bog	No			
E2.3 Bryophyte dominated flush/spring				0.53	0	0
	M23: *Juncus effusus/acutiflorus - Galium palustre* rush-pasture	SBL: Upland flushes, fen and swamp	High			
F1 Swamp				0.08	0	0
	S10: *Equisetum fluviatile;* S19: *Eleocharis palustris* swamps	SBL: Upland flushes, fen and swamp	No			
G1.3 Oligotrophic standing water				0.02	0	0
	N/A	SBL: Oligotrophic and dystrophic lakes	No			
G2 Running water				1.15	0	0
	N/A	SBL: Rivers	No			
I1.2.1 Scree acid/neutral				0.57	0	0
	N/A	N/A	No			
J1.1 Arable				4.27	0	0
	N/A	N/A	No			

Source: Natural Power, Tringa Ecology

Field Surveys – Species

Bats

7.6.20 Full details of bat roost and bat activity survey, including photographs are presented in Appendix 7.1, found in Volume 4. Locations of bat detectors are provided in Table 7.8 and on Figure 7.2, found in Volume 3a.

Table 7.8: Static bat detector deployment locations

Detector	X	Y	Habitat	Location description	Closest turbines (distance)	Elevation (AOD)
MCB	337211	641486	Grassland; Mixed Woodland	Adjacent woodland on eastern slopes of Scawd Law.	T4 (685 m)	360
Pond	337384	641572	Grasslands; open water	Below Seathope Rig, adjacent to pond and small watercourses	T4 (883 m)	300
Stream	337660	640702	Grassland; Stream	Along watercourse between Scawd Law and Seathope Law.	T5 (810 m)	240
A	335165	640360	Woodland; Heathland	North of Priesthope along woodland edge.	T1 (978 m)	450
B	335244	640887	Woodland; Heathland	Below Glede Knowe near woodland edge.	T2 (749 m)	520
C	335422	641378	Grassland; Heathland	On Glede Knowe.	T3 (462 m)	590
D	335960	641674	Mire	On the site boundary north of Glede Knowe.	T3 (285 m)	625
E	336291	642037	Grassland; Heathland and Mire	On the site boundary north of Glede Knowe.	T6 (125 m)	655
F	336595	641178	Grassland; Mire	North of Scawd Law.	T4 (20 m)	540
G	336876	640451	Grassland; Heathland	On Scawd Law.	T5 (407 m)	535
H	337274	642633	Grassland; Mire	Top of Seathope Rig	T8 (409 m)	590
I	337496	642260	Grassland; Heathland	On Seathope Rig.	T7 (734 m)	480
J	337695	641845	Grassland; Heathland and Mire	On Seathope Rig.	T7 (1,137 m)	430

Source: Natural Power

Roost Assessment

7.6.21 A roost assessment was conducted in July 2019 which identified a number of features having the potential to support roosting bats within 200 m of the Proposed Development and along the existing access track . Additional surveys were conducted in May 2021 along the Proposed Access but no features were identified.

7.6.22 The results comprise four buildings, four bridges, a bricked outbuilding and 14 trees within the Proposed Development Area and were assessed from the ground to identify potential for bat roost features. Three trees were assessed as having low potential.

7.6.23 No potential roosting features were identified within 200 m of the Proposed Development during the bat roost survey. All 24 potential roosting features were more than 800 m from the nearest infrastructure (T5 and associated infrastructure) and were identified to have low to medium roost suitability. Distances from these locations to the nearest turbine can be found in Appendix 7.1, found in Volume 4.

7.6.24 In order to further inform the likelihood of nearby roost locations, analysis was carried out to determine how many of the bat calls recorded were within half an hour before or after sunset and sunrise, categorised by species and detector location (Table 7.9 below). The time with which bats are detected on site, coupled with contextual behaviour information, is a useful proxy for the likely distance travelled from or to roosts where no confirmed roost sites have been found. In early summer 99.9% calls (2428 calls) were recorded between sunset and sunrise, with 0.08 % (2 calls) recorded from half an hour before sunset. In summer-autumn 99.1% calls (37,055) were recorded between sunset and sunrise, with 0.08 % (30 calls) recorded from half an hour before sunrise to sunrise.

Table 7.9: Recorded call times before/ after sunset/ sunrise

Species	Location	Pass time (within 30 minutes before/after sunset/sunrise)	Total passes recorded for species, location and pass time per season
Early Summer			
Soprano pipistrelle	MCB	sunset	2
Summer			
Common pipistrelle	Pond	sunrise	1
Noctule	MCB	sunrise	1
Noctule	A	sunrise	1
Autumn			
Soprano pipistrelle	B	sunrise	27

Source: Natural Power 2021

Static Detector Surveys

7.6.25 As required by guidance[24], survey data was input into Ecobat online tool[39], which allows a comparison of activity levels within the Proposed Development Area and other sites located within a similar habitat and within a set vicinity. The recommended reference range is for each species to have more than 200 records within the set radius. This was not achieved for all species during the early summer by using the recommended 100 km radius, however this was satisfied in the summer and autumn except for the locally rare Nathusius' pipistrelle, brown long-eared bat and *Myotis spp*. The fact that there are fewer than 200 records for Nathusius' pipistrelle and brown long-eared bat is due to their rarity in the Region, rather than due to the search radius being too small; the radius

[39] http://www.ecobat.org.uk

required to achieve more than 200 records of these species would be disproportionally large relative to the risks posed to these species. Therefore, comparison on Ecobat was made using a 100 km radius for all species.

Early summer detector deployment

7.6.26 Detectors were placed on site at 13 locations with valid nights of effort recorded from the 3 - 16 June 2019 inclusive. Nine out of the 14 survey nights recorded sub-optimal temperatures (below 8 ˚C). There were no reports of technical issues. Table 7.10 shows the actual number of nights of data recorded per detector.

7.6.27 Detectors D, E and G were used for the summer and autumn surveys.

Table 7.10: Recording nights per detector: early summer deployment

Detector identity	Number of nights detectors were recording	Number of survey nights bat passes were recorded
MCB[40]	14	10
Pond	14	11
Stream	14	11
A	14	9
B	14	2
C	14	1
F	14	2
H	14	4
I	14	1
J	14	2

Source: Natural Power 2020

7.6.28 Table 7.11 below provides a brief summary of the number of calls obtained from detectors in the Proposed Development Area during the early summer deployment.

Table 7.11: Summary of static detector data: early summer deployment

Species/species group	Total number of passes	Percentage of total (%)
Common pipistrelle	614	25.27
Soprano pipistrelle	1653	68.02
Nathusius' pipistrelle	16	0.66
Pipistrelle sp.	72	2.96
Myotis sp.	29	1.19
Noctule	37	1.52
Leisler's bat	2	0.08
Brown long-eared	7	0.29
Total	**2430**	**100**

Source: Natural Power 2021

7.6.29 Bat activity indices were calculated as part of the Ecobat output and are provided as both the maximum percentile and also the median level of activity per night (as per guidance[17, 24]), which takes into account the fact that specific detectors had different effort depending on the number of nights that they were operating. Table 7.12 shows the bat activity index calculated by species across the Proposed Development Area. Figure 7.4 found in Volume 3a shows species distribution by detector location.

7.6.30 Using information provided within guidance[41] an overall risk assessment can be made in relation to the site and relative activity. This defines the Proposed Development Area as a small project (≤8 turbines) with moderate habitat present to support bats (habitat used extensively by foraging bats; site connected to the wider landscape by linear features) which gives it a risk level of 2. This risk level of the site, combined with the level of bat activity identified from the percentile of relative activity provided in Ecobat (categorised from Table 1 from guidance[41]) provides a classification of overall risk to species or species group and is provided in Table 7.12 below.

7.6.31 Overall risk assessment is classed as low (green), medium (amber) or high as (red).

Table 7.12: Bat Activity Index and overall risk assessment by species: early summer deployment

Species	Median Percentile	95% CIs*	Max Percentile	Nights Recorded
Common pipistrelle	56	49 – 86	94	34
Soprano pipistrelle	51	65 – 91	99	40
Nathusius' pipistrelle	5	5 – 33.5	62	8
Pipistrelle sp.	79	95 – 95	100	18
Myotis sp.	5	5 – 5	54	14
Noctule	57	0	83	2
Nyctalus sp.	5	0	5	2
Brown long-eared	5	18 – 18	31	5

*CIs Confidence intervals

Source: Ecobat 2021

Source: Natural Power 2021

[40] Mixed conifer and broadleaf plantation.

[41] SNH (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

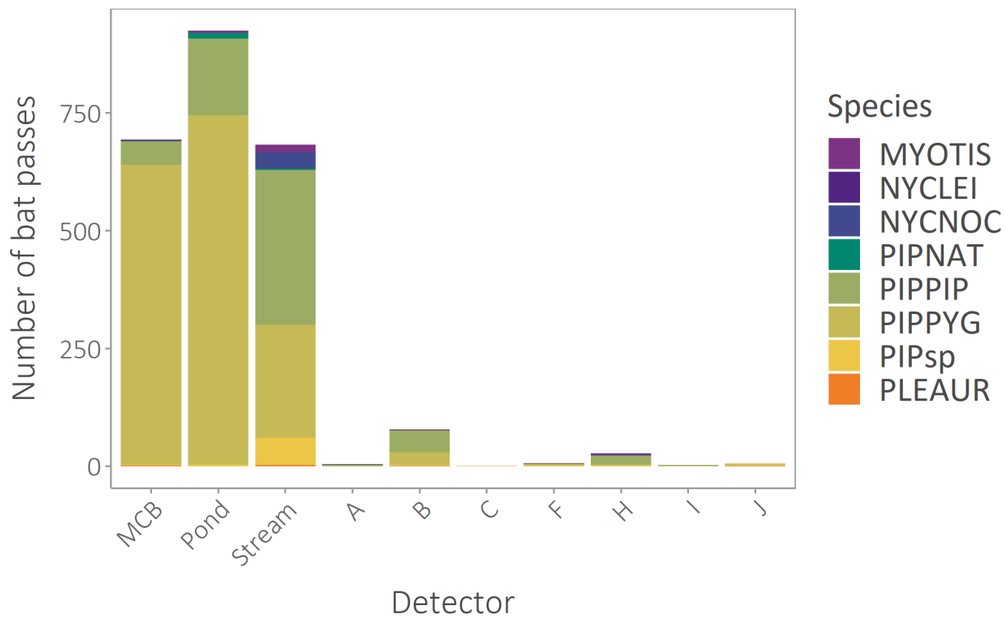

Image 7.1: Total number of passes of each species by detector location: early summer 2019 deployment[42]

7.6.32 The controlled locations: mature coniferous and broadleaved woodland (MCB), pond and stream had the highest levels of activity, all of which located are more than 600 m from the nearest turbines (T4 and T5) within the Proposed Development. Detector B was located approx. 100 m from woodland edge and more than 900 m from the nearest turbines (T2). Detectors C, F, H, I and J were located within open high ground.

Summer detector deployment

7.6.33 13 detectors were placed out on site with valid nights of effort recorded from the 17-30 July. There were no reports of unsuitable weather conditions or technical issues. Table 7.13 shows the actual number of nights used for analysis per detector.

Table 7.13: Recording nights per detector: summer deployment

Detector identity	Number of nights detectors were recording	Number of survey nights bat passes were recorded
MCB	14	13
Pond	14	14
Stream	14	13
A	14	13
B	14	10
C	14	9
D	14	8
E	14	4
F	14	8
G	14	9
H	14	10
I	14	12
J	14	13

Source: Natural Power 2021

7.6.34 Table 7.14 below provides a summary of the number of calls obtained from detectors at Proposed Development Area during the summer deployment.

Table 7.14: Summary of static detector data: summer deployment

Species/species group	Total number of passes	Percentage of total (%)
Common pipistrelle	4026	37.65
Soprano pipistrelle	4068	38.04
Nathusius' pipistrelle	193	1.80
Pipistrelle sp.	403	3.77
Myotis sp.	157	1.47
Noctule	1807	16.90
Nyctalus sp.	13	0.12
Brown long-eared	27	0.25
Total	**10694**	**100**

Source: Natural Power 2021

7.6.35 As per the early summer survey period, bat activity indices were calculated as part of the Ecobat output. Table 7.15 below shows the bat activity index calculated by species across Proposed Development Area in order to allow comparisons with the early summer data. Image 7.2 (this chapter) shows species distribution by detector location.

7.6.36 As per the early summer deployment, overall assessment is categorised as low (green), medium (amber) and high (red).

Table 7.15: Bat activity index and overall risk assessment by species: summer deployment

Species	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Common pipistrelle	65	66 – 68	97	107
Soprano pipistrelle	58	79.5 – 94.5	99	110
Nathusius' pipistrelle	21	37.5 – 57	74	52
Pipistrelle sp.	86	92.5 – 98	99	68
Myotis sp.	21	33 – 33	65	51
Noctule	49	62.5 – 84.5	94	112
Nyctalus sp.	51	51 – 68.5	74	11
Brown long-eared	0	25.5 – 25.5	51	15

[42] As referred to in the chart, species abbreviations with species name in brackets; MYOTIS (*Myotis* sp.), NYCNOC (noctule bat), PIPNAT (Nathusius pipistrelle), PIPIP (common pipistrelle), PIPPYG (soprano pipistrelle), PIPsp (*Pipistrellus* sp.), PLEAUR (brown long-eared), NYCsp (*Nyctalus* sp.).

Source: Ecobat 2021

Source: Natural Power 2021

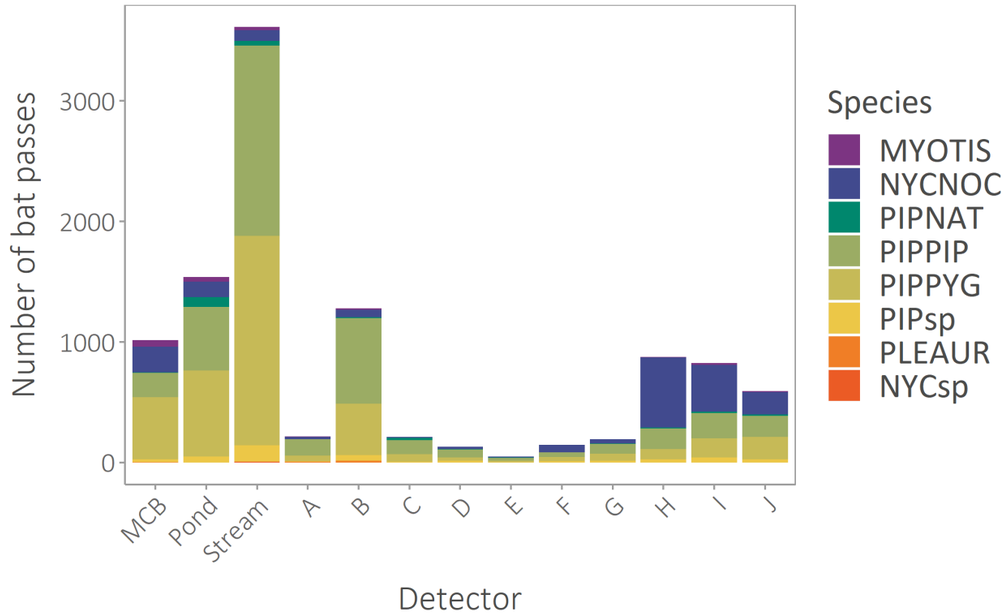

Image 7.2: Total number of passes of each species by detector location: summer 2019 deployment[42]

7.6.37 As per the early summer, the three controlled locations (MCB - 685 m from T4, pond - 883 m from T4 and stream - 810 m from T5) had the highest levels of activity along with Detector B (749 m from T2). High levels of activity was also recorded from detectors H, I and J. These detectors were located along Seathope Rig, representing T8.

Autumn detector deployment

7.6.38 Detectors were placed on site with valid nights of effort recorded from the 19 August to 1 September 2019 at 13 locations. Three out of the 14 survey nights recorded sub-optimal temperature (below 8 ˚C). There were no reports of technical issues. Table 7.16 shows the actual number of nights of data recorded per detector.

Table 7.16: Recording nights per detector: autumn deployment

Detector identity	Number of nights detectors were recording	Number of survey nights bat passes were recorded
MCB	14	14
Pond	14	14
Stream	14	14
A	14	14
B	14	13
C	14	11
D	14	8
E	14	6
F	14	11
G	14	9
H	14	12
I	14	12
J	14	14

Source: Natural Power 2021

7.6.39 Table 7.17 below provides a summary of the number of calls obtained from detectors at Proposed Development Area during the summer deployment.

Table 7.17: Summary of static detector data: autumn deployment

Species/species group	Total number of passes	Percentage of total (%)
Common pipistrelle	8717	33.03
Soprano pipistrelle	15389	58.31
Nathusius' pipistrelle	18	0.07
Pipistrelle sp.	257	0.97
Myotis sp.	196	0.74
Noctule	1726	6.54
Nyctalus sp.	4	0.02
Brown long-eared	84	0.32
Total	**26391**	**100**

Source: Natural Power 2021

7.6.40 As per the summer survey periods, bat activity indices were calculated as part of the Ecobat output. Table 7.18 below shows the bat activity index calculated by species across Proposed Development Area in order to allow comparisons with the early summer/summer data. Image 7.3 (this chapter) shows species distribution by detector location.

7.6.41 As per the summer deployments, overall assessment is categorised as low (green), medium (amber) or high (red).

Table 7.18: Bat activity index and overall risk assessment by species: autumn deployment

Species	Median Percentile	95% CIs	Max Percentile	Nights Recorded
Common pipistrelle	70	94 – 98	100	122
Soprano pipistrelle	76	96 – 99	100	129
Nathusius' pipistrelle	2	2 – 24	35	14
Pipistrelle sp.	94	99.5 – 100	100	42
Myotis sp.	24	29.5 – 43.5	72	57
Noctule	43	45.5 – 63.5	95	123
Nyctalus sp.	39	0	72	4
Brown long-eared	2	22.5 – 22.5	52	53

Source: Ecobat 2021

Source: Natural Power 2021

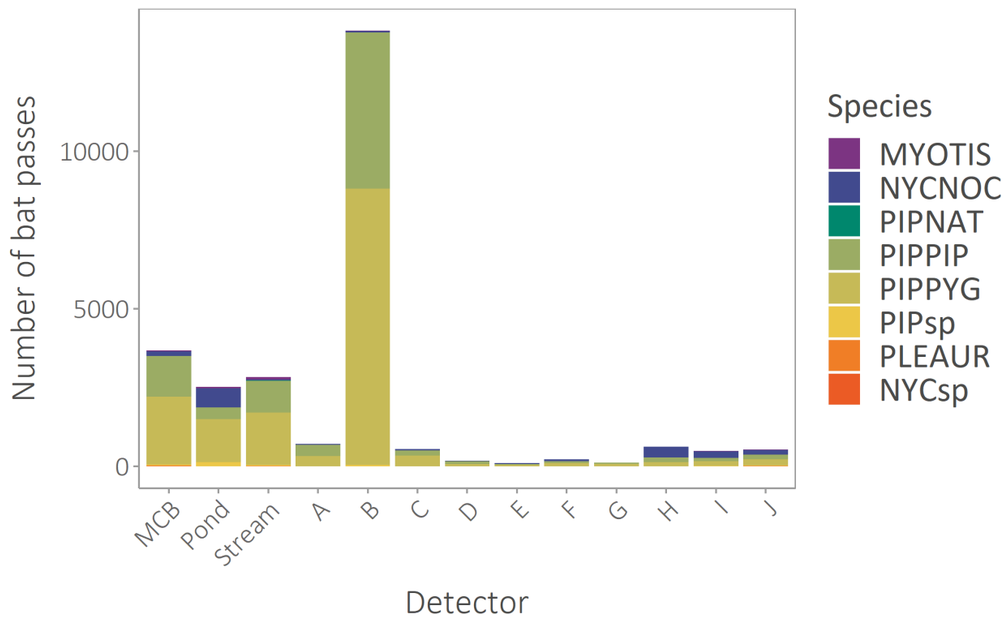

Image 7.3: Total number of passes of each species by detector location: autumn 2019 deployment[42]

7.6.42 Bat activity continued to increase throughout the Proposed Development Area with Detector B (749 m from T2) recording the highest levels of activity along with the three controlled locations (MCB, pond and stream).

Otter

Signs

7.6.43 Otter spraints were recorded in the 2019 surveys within the Proposed Development Area along the Gatehopeknowe Burn (see Figure 7.7, in Volume 3a, and Appendix 7.1, in Volume 4). There were otter spraints recorded at three locations along the southern section of the burn and close to Holylee Farm. The smaller tributaries that feed into Gatehopeknowe Burn within the proposed site were regarded as unsuitable for otter due to the steep terrain and were not surveyed.

Resting Sites

7.6.44 There were no holts or couches recorded along the Gatehopeknowe Burn during the 2019 surveys within the Proposed Development Area.

7.6.45 During the May 2021 surveys along the Proposed Access no signs of otter were recorded, however it is considered that there is suitable habitat present along the Leithen Water, which falls within the survey buffer of the Proposed Access, to support otter.

Water Vole

7.6.46 No water vole signs were recorded within the Proposed Development Area during the 2019 surveys. Suitable habitat was not recorded along the Gatehopeknowe Burn, nor along other permanent water courses or ditches within the survey area, therefore it was regarded as having low potential for water vole.

7.6.47 During the May 2021 surveys along the Proposed Access no signs of water vole or suitable habitat were recorded.

Red Squirrel

Signs

7.6.48 Surveys were undertaken in 2019 within the Proposed Development Area. Feeding signs were recorded in four locations within the woods around Holylee Farm, and within a small plantation block near the centre of the site (see Figure 7.7, Volume 3a, and Appendix 7.1, Volume 4). Two live sightings of squirrel were recorded in the southern part of the site, one red and one grey indicating that the feeding signs recorded are likely to be connected with both species in this area. The remains of a squirrel was found near the feeding sign within the centre of Proposed Development Area, but species was unknown due to the extent of decomposition.

The feeding signs encountered in the plantation block within the centre of the site were old suggesting low activity or that squirrels were no longer present in that area.

Drey Sites

7.6.49 No drey sites were recorded within the Proposed Development Area during the 2019 surveys.

7.6.50 During the May 2021 surveys along the Proposed Access no signs of squirrel were recorded, however the forestry that lies to the south-east of the Proposed Access has suitable habitat for squirrel.

Badger

Signs

7.6.51 One latrine was found within the Proposed Development Area during the 2019 surveys, which was recorded as being fresh (see Figure 7.7, Volume 3b, and Appendix 7.1, Volume 4).

Setts

7.6.52 Two active badger setts (a single and four entrance sett) were recorded within the Proposed Development Area. A further two inactive setts; a two entrance sett and a six entrance sett with a fresh latrine nearby were also found within the Proposed Development Area (see Confidential Appendix 7.2 for detail on locations).

7.6.53 During the May 2021 surveys along the Primary Proposed Access no signs of badger were recorded, however suitable habitat is present within the vicinity of the Proposed Access.

Pine Marten

7.6.54 No pine marten signs were recorded within the Proposed Development Area during the 2019 surveys. However, suitable habitat is present within the site, particularly along the Gatehopeknowe Burn and forested areas that fell within the survey buffers.

7.6.55 During the May 2021 surveys along the Proposed Access no signs were recorded, however the forestry that lies to the south of the Proposed Access is considered suitable habitat.

Fish

7.6.56 The entire length of the Gatehopeknowe Burn and three tributaries within the Proposed Development Area (see Figure 7.8, Volume 3a, and Appendix 7.1, Volume 4) were surveyed and considered to represent highly suitable habitat for fish along its entire length. A summary of the results are presented in Table 7.19. The flow characteristics were fairly uniform between sections, and principally comprised glides interspersed with riffles and slacks, with occasional pools. Sediment types were primarily gravel, pebble or cobble interspersed with boulders, sand and silt. In some areas clay and bedrock were present in very low percentages (5-10%).

7.6.57 Suitable spawning habitat for both salmon and lamprey species incorporating riffle with gravel and pebble was evident within the site (Table 7.19). In addition, areas of silt sufficient for lamprey larvae were also available.

Boulder and cobble areas, providing good juvenile salmon habitat, can be found throughout the site in 50% of the watercourses.

7.6.58 Additional cover for fish was provided by low branches and fallen trees. Instream vegetation was present in 52% of the surveyed waterways, with occasional areas of heavy vegetation, mainly grasses and rushes. Bankside vegetation covered 44% of the banks, providing stabilisation, preventing bank erosion and giving additional cover for fish species.

7.6.59 Areas with pools and high flow rates are suitable for adult fish in Seathope Burn, to the east of the site, and the section of Gatehopeknowe Burn to the south of the site (near the A72 road) having the highest proportion of pools (over 20% on average). All surveyed areas were reported to have clear visibility and water depth averaged 22 cm (ranging from 5 to 50 cm), which indicates good habitat for spawning salmon and lamprey. Fish were extensively observed throughout the survey using the waterways although it was not practical to speciate these individuals during a walkover survey.

7.6.60 Flow constrictions throughout the site comprised primarily of debris from fallen trees and branches and several water gates throughout the site. There is a dam to the south of the site close to Holylee Farm, with a fish ladder installed for migrating fish. This is not considered to pose a barrier to salmon and sea lamprey. Further investigation would be required to ascertain if river and brook lamprey were able to pass this obstruction if they are found to be present on this site.

Table 7.19: Fish habitat survey results summary at Proposed Development

Category	Feature	% Cover
Habitat	% Riffle	14.9
	% Glides	59.0
	% Slack	18.7
	% Pools	7.4
Sediment	% Sand	5.0
	% Gravel	24.5
	% Pebble	27.6
	% Cobble	22.1
	% Boulder	8.7
	% Bedrock	0.1
	% Silt	11.4
	% Clay	0.6
Flow	% High	16.8
	% Low	83.2
Visibility	% Clear	100.0
Vegetation	% Bank Vegetation	43.6
	% No Instream Vegetation	48.5
	% Instream Vegetation	49.7
	% Heavy Instream Vegetation	1.8
Average Depth (cm)		21.7
Average Width (m)		2.0

Source: Natural Power

Reptiles

7.6.61 Reptiles were not recorded during the 2019 surveys, however suitable habitat for both common lizard and adder was identified within the Proposed Development Area. These areas include grasslands, mires and bracken that are suitable for foraging, resting and shelter. Drystone is also present that has potential for use as reptile hibernacula.

Amphibians

7.6.62 No specific surveys for amphibians were undertaken as part of the baseline surveys, however suitable habitat for both common frog and common toad was identified within the Proposed Development Area.

Incidental Records

7.6.63 There were no incidental records of non-avian protected species in the Proposed Development Area during ornithological or ecological surveys undertaken as part of the baseline assessment.

7.7 ASSESSMENT OF POTENTIAL EFFECTS

7.7.1 The EcIA has been undertaken in accordance with CIEEM guidelines with establishment of baseline ecological conditions within the Proposed Development Area and identification of IEFs through a combination of ecological field surveys and a desk-based review. Each identified IEF is assessed separately, with consideration of impact extent, magnitude, duration, timing, frequency and reversibility, along with assessment of the level of confidence in the impact assessment for the determination of impact significance.

Predicted Effects

7.7.2 Impacts may arise for species and habitats at the proposed development via a number of mechanisms:

- Direct impacts associated with habitat loss and/or mortality;
- Direct impacts on protected species associated with resting place destruction;
- Direct impacts on protected species associated with altering foraging and commuting behaviour;
- Indirect impacts on habitats and species associated with dust, siltation, leaks and spillages;
- Indirect impacts on protected species associated with disturbance; and
- Indirect impacts on species through pollution of habitats/watercourses affecting food sources.

7.7.3 Embedded mitigation measures are proposed at the outset of the Proposed Development, to reduce impacts associated with construction and operation, as outlined below.

Embedded mitigation

7.7.4 During the design process, several aspects were taken into consideration in order to minimise the potential risk to species and habitats arising from the Proposed Development. See Chapter 3: Site Selection and Design Evolution for detail on the overall design process.

7.7.5 A minimum distance of 50 m has been maintained between the Proposed Development and watercourses, with the exception of locations where tracks cross watercourses. See Chapter 9: Hydrology, Geology and Hydrogeology for further information regarding watercourse crossings that will be designed to allow otter and fish passage.

7.7.6 The layout of the Proposed Development has avoided impacts to sensitive habitats where possible (e.g. wet modified bog), and areas of deepest peat and peat slide hazard zones, taking into account other constraints. Where avoidance has not been possible, the infrastructure will be constructed in such a way as to maintain the integrity and connectivity of the hydrology of hydrologically sensitive habitats. Access tracks would be designed in

keeping with SNH good practice guidance[25]. Further detail is provided in Chapter 9: Hydrology, Geology and Hydrogeology.

7.7.7 All proposed turbine locations are over 100 m from forestry (which also takes into account the micrositing allowance of 75 m), which gives more than the 82 m buffer between turbine tower and nearest woodland edge in relation to bats and wind farms as set out in current NatureScot guidance[24].This calculation is based on assumed candidate turbine dimensions set out in Chapter 4: Project Description. The required buffer distance of 82 m is estimated by the equation:

$$\sqrt{(50 + bl)^2 - (hh - fh)^2}$$

Where *bl* = blade length (74 m); *hh* = hub height (113 m); and *fh* = feature (tree) height, estimated here as 20 m.

Construction

7.7.8 A Construction and Environmental Management Plan (CEMP) and Constructions Methods Statement (CMS) will be produced prior to construction works commencing in consultation with the Local Planning Authority (see Chapter 4: Project Description). The document will be a live document and will be updated throughout the pre-construction, construction and post-construction phases and will:

- Include measures to safeguard habitats and species to be implemented prior to construction, during construction and post-construction; and
- Provide details of all pre-construction surveys required including methods and timings.

7.7.9 An Environmental Clerk of Works (ECoW) will be present during enabling works and throughout the construction period of the Proposed Development. They will be a suitably experienced individual, whose role would be to provide advice so that that works are carried out in accordance with environmental measures detailed in the CEMP, and to monitor compliance with relevant legislation and good practice (see 'Legislation, Policy and Guidance' above). The ECoW would contribute to all relevant CMS and CEMP documents. Once work has commenced, their role will be to provide ecological and pollution control advice, undertake water quality monitoring and monitor compliance of all relevant mitigation measures and legislation (see also Chapter 9: Hydrology, Geology and Hydrogeology). The ECoW will also give regular toolbox talks to make site personnel aware of the ecological sensitivities on site. The ECoW would have the authority to stop any construction activity that is having or likely to have a significant environmental impact or be in breach of legislation.

Habitats

7.7.10 Detailed mitigation measures will be provided in the CEMP for the protection of sensitive habitats during the pre-construction, construction and post-construction phases and will consist of:

- Toolbox talks to inform contractors of the sensitive habitats at the Proposed Development;
- Marking of sensitive areas of habitat close to construction areas, to prevent accidental encroachment;
- No storage of materials or machinery permitted within exclusion zones;
- Supervised vegetation clearance by the ECoW in sensitive areas prior to construction; and
- Construction phase control measures will continue during the operational phase, through the operational management plan, where potential effects exist.

7.7.11 Where possible (and where other constraints allow) an allowance of 75 m micrositing of infrastructure will be undertaken to ensure construction does not impact on the most sensitive habitats and any other identified ecological constraints and will be completed in consultation with the ECoW. This is particularly important when working in close proximity to waterbodies and sensitive habitats. Where micrositing cannot avoid areas of sensitive habitats or features, the ECoW would discuss and agree additional required mitigation to ensure impacts are minimised.

7.7.12 Any land degraded by construction and not required for the operation of the Proposed Development, such as the construction compound, around areas of tracks and borrow pits, would be restored as soon as possible after construction is completed. Turves would be carefully removed during construction as far as practicable and stored following good practice for re-use in the restoration of areas not required for the operation of the Proposed Development. As such, any vegetation removed for the construction phase would be reinstated within the Proposed Development Area, facilitating natural re-colonisation of vegetation communities. Permanent habitat loss would be limited to that required for the footprint of infrastructure and good site management practices would be implemented to minimise the risk of encroachment of the construction corridor into adjacent habitats. As far as is reasonably practicable, any notable floral species encountered will be marked with an exclusion zone or translocated to other suitable areas of habitat or stored for reuse in reinstatement of temporary infrastructure. The implementation of these measures will reduce the potential for impacts on sensitive habitats.

7.7.13 Site activities have the potential to cause pollution through dust, siltation, leaks and spillages associated with plant and materials during the construction and operational phases. If such incidents were to occur then these pollutants may reach waterbodies and surrounding vegetation. Therefore, these activities may directly or indirectly affect habitats and species, especially where they are hydrologically connected.

7.7.14 Pollution incidents may occur during construction as well as within the operational phase during maintenance works. Pollution prevention measures will be detailed in the CEMP and overseen by the ECoW. Pollution with regards to waterbodies is further discussed in Chapter 9: Hydrology, Geology and Hydrogeology. Measures to control the impact of dust on sensitive habitats would be implemented during the preparation and construction phase. These measures will be adopted, when necessary, in dry weather, in areas of active development, and will most likely involve the controlled dampening of tracks utilised by construction vehicles. In addition, as far as reasonably practicable, materials for construction will be sourced from on-site borrow pits, which would ensure the composition of materials used is as close to the local conditions as possible. Some material will be imported from local quarry sources, which will have similar chemical properties to stone found within the Proposed Development Area to ensure no alteration in soil chemistry. Further detail on the mitigation of potential dust impacts will be detailed within the CEMP.

Watercourses

7.7.15 The pre-construction quality of watercourses and waterbodies would be maintained during construction (see Chapter 9: Hydrology, Geology and Hydrogeology). Watercourse protection measures would be adopted within the CMS/CEMP and include protection against siltation and sedimentation, and pollution incidents such as the implementation of a pollution response plan and the safe storage of chemicals in bunded containers. Robust mitigation measures will be installed prior to works commencing to ensure the impacts on watercourses are minimised. Mitigation throughout the Proposed Development will be regularly monitored and maintained/replaced as required. Refuelling of vehicles and machinery will be carried out at a central designated area, on an impermeable surface, located at least 50 m away from any watercourse. Monitoring of water quality would be carried out before and during construction. The implementation of these measures would ensure impacts on protected species, such as otter and fish species, are minimised.

GWDTE

7.7.16 Details of how impacts upon groundwater flow are minimised and mitigated are detailed in Chapter 9: Hydrology, Geology and Hydrogeology.

Species

7.7.17 A Species Protection Plan (SPP) will be produced as part of the CEMP and agreed by Consultees prior to the commencement of development, detailing measures to be implemented before and during construction to protect species present in the Proposed Development Area. This will include good practice measures to prevent accidental mortality of protected species during construction, such as:

- A suitable vehicle speed limit to be enforced within the Proposed Development;
- Warning signs installed, where appropriate, to reduce risk of collision with protected species;
- Covering of deep excavations, foundations and pipe openings (or a ramp installed) when not active to prevent entrapment of animals;
- Pre-construction surveys undertaken for protected species, including bats, otter and badger within set buffer areas of the Proposed Development;
- If a potential resting place (e.g. bat roost or otter holt) of a protected species is found within set buffer areas of construction then work will cease within appropriate (species-specific) buffers until it can be established whether it is in active use by a protected animal. If presence is confirmed then NatureScot will be consulted to discuss possible mitigation measures and/or seek an appropriate licence;
- Watercourse crossings will be designed so as to not impede otters and fish, or their food sources;
- Lighting design will ensure watercourses and woodland remain unlit at night. Security lighting and lighting associated with the temporary compound will be low lux[43] and directed away from watercourses and woodland to reduce disturbance; and
- All site personnel will be made aware of the presence of protected species through toolbox talks.

Operation

7.7.18 With the exception of the operation of the wind turbines and general maintenance of the turbines, there will be little on-site activity during the operational phase.

7.7.19 Where potential effects exist, control measures will be incorporated into an Operation Management Plan (OMP). In particular, the potential for pollution incidents during routine maintenance activities will be minimised by adoption of SEPA good practice guidance[44].

7.7.20 Any routine maintenance works will take place during the day where practicable to minimise the potential for disturbance to protected species within the Proposed Development (since these are mostly nocturnal/crepuscular) and a speed limit of 15 mph will be enforced for any vehicles going onto the Proposed Development, in order to reduce the risk of collision with protected species.

7.7.21 The OMP will detail mitigation measures required during the operational phase relating to protected species to ensure ongoing compliance with relevant environmental legislation.

Decommissioning

7.7.22 Good practice measures as described in the construction stage will be followed including specific guidance for the restoration and decommissioning of wind farms (Welstead *et al.* 2013[45]). New guidance available at the decommissioning phase would be adopted if appropriate, and a decommissioning plan will be drafted for agreement by consultees prior to commencement of decommissioning.

Feature Assessment

7.7.23 On the basis of the description of the ecological baseline and the definitions provided in Table 7.3 above, a summary of the habitats and species within the Proposed Development Area is provided in Table 7.20 below, together with the legislation and guidance.

7.7.24 In identification of designated sites as IEFs, consideration has been given to the existence of pathways for effects to occur. This includes direct effects such as impact on habitats and indirect effects through downstream hydrological connectivity. Where habitat mosaics have been identified by the baseline survey, the constituent Phase 1 habitat types are taken to be the relevant IEFs. Where no significant effects are likely with the application of embedded mitigation this is specified, and the feature is not considered an IEF requiring EcIA.

Table 7.20: Summary of designated sites, habitats and species and their conservation importance

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
Moorfoot Hills SAC	SACs are statutory European protected sites designated under the Habitats Regulations. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds that are covered under SPAs and assessed in Chapter 8: Ornithology).	International	Yes	Moorfoot Hills SAC lies directly to the north and east of the Proposed Development and adjacent to Proposed Development Area. It is designated for its upland dry heath and blanket bog of which both are considered some of the best areas in the UK. There is potential hydrological connectivity between the Proposed Development and the SAC, particularly infrastructure between proposed Turbines 6, 7 and 8 where access tracks may impact shallow groundwater flows to and from the Moorfoot Hills SAC (for further information see Chapter 9: Hydrology, Geology and Hydrogeology). However, given the proximity to the catchment borders from proposed Turbines 6, 7 and 8 embedded mitigation measures will be in place. There is the potential for direct impacts at five pinch points on the AIL route (for further information see Appendix 7.1). There is the potential for an indirect impact from dust created during construction works. Measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to the SAC. This is considered to be an IEF in the context of the Proposed Development due to potential hydrological connectivity between the Proposed Development and the SAC.
Moorfoot Hills SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	Yes	Moorfoot Hills SSSI lies directly to the north and east of the Proposed Development and is adjacent to the site boundary. It is designated for a range of upland habitat features, the most extensive of which is blanket bog. The upland assemblage habitats include heather moor, grasslands of various types including small areas of more calcareous grassland, moss-rich springs, sedge or rush dominated flushes, and scattered areas of block scree which is uncommon on the Moorfoot Hills. There is potential hydrological connectivity between the Proposed Development and the SSSI, particularly the infrastructure between proposed Turbines 6, 7 and 8 where access tracks may impact shallow groundwater flows to and

[43] A standardised unit of measurement of light level intensity (illuminance)

[44] SEPA, (2010). Engineering in the water environment: good practice guide - river crossings (2nd Edition), SEPA.

[45] Welstead, J., Hirst, R., Keogh, D., Robb G. and Bainsfair, R. (2013). Research and guidance on restoration and decommissioning of onshore wind farms. Scottish Natural Heritage Commissioned Report No. 591.

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
				from the Moorfoot Hills SSSI (for further information see Chapter 9: Hydrology, Geology and Hydrogeology). However, given the proximity to the catchment borders from proposed Turbines 6, 7 and 8 embedded mitigation measures will be in place. There is the potential for direct impacts at five pinch points on the AIL route (for further information see Appendix 7.1). This is also the potential for an indirect impact from dust created during construction works. Measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to the SSSI. This is considered to be an IEF in the context of the Proposed Development due to potential hydrological connectivity between the Proposed Development and the SSSI.
River Tweed SAC	SACs are statutory European protected sites designated under the Habitats Regulations. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds that are covered under SPAs and assessed in the Chapter 8: Ornithology).	International	Yes	The Proposed Development is within the catchment area of the River Tweed and hence, hydrologically connected (for further information see Chapter 9: Hydrology, Geology and Hydrogeology). The River Tweed SAC lies to the south of the site and runs alongside the southern boundary of the Proposed Development Area. The Leithen Water is a protected tributary of the River Tweed SAC and lies west of the Proposed Development, approximately 16 m to the Proposed Development, near the entrance of the Primary Proposed Access. It is designated for Atlantic salmon and lamprey species: river, brook and sea, for otter and freshwater habitats. Watercourses within the Proposed Development Area feed into several tributaries that flow into the River Tweed SAC and is therefore considered to be an IEF in the context of the Proposed Development.
River Tweed SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	Yes	The Proposed Development is within the catchment area of the River Tweed and hence, hydrologically connected (for further information see Chapter 9: Hydrology, Geology and Hydrogeology). The River Tweed SAC lies to the south of the site and runs alongside the southern boundary of the Proposed Development. It is designated for Atlantic salmon, river lamprey and brook lamprey, otter and freshwater habitats, vascular plant assemblage and invertebrate assemblage. Watercourses within the Proposed Development Area flow into the River Tweed SSSI and is therefore considered to be an IEF in the context of the Proposed Development.
Plora Wood SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	No	Plora Wood SSSI is located approximately 2.2 km to the south-west of the Proposed Development and approximately 3.8 km from the nearest turbine and site infrastructure. This is designated for upland oak woodland with associated plant communities and being one of the largest remaining areas of ancient oak woodland in the Scottish borders. Given the distance from the development activity to the SSSI and the nature of the features for which the SSSI is designated, it is considered that there is no route to impact to the SSSI and so it is not considered to be an IEF in the context of the Proposed Development.
Williamthorpe SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	No	Williamthorpe SSSI lies approximately 3.7 km to the south-east of the Proposed Development and approximately 7.8 km from the nearest turbine and site infrastructure. This is designated for lowland calcareous and neutral grasslands, lowland dry heath and springs. Given the distance from the development activity to the SSSI and the nature of the features for which the SSSI is designated, it is considered that there is no route to impact to the SSSI and so it is not considered to be an IEF in the context of the Proposed Development.
Nut Wood SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	No	Nut Wood SSSI lies approximately 4.3 km to the west of the Proposed Development and approximately 5.4 km from the nearest turbine and site infrastructure. This is designated for ancient ash-wych elm woodland and contains the largest known area of hazel scrub woodland in the Tweed valley area. Given the distance from the development activity to the SSSI and the nature of the features for which the SSSI is designated, it is considered that there is no route to impact to the SSSI and so it is not considered to be an IEF in the context of the Proposed Development.
Glenkinnon Burn SSSI	A SSSI is an area that has been notified as being of special interest due to its flora, fauna or geological or physiographical features under the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act, 2004.	National	No	Glenkinnon Burn SSSI lies approximately 4.5 km to the south-east of the Proposed Development and approximately 8.7 km from the nearest turbine and site infrastructure. This is designated for upland birch and mixed ash woodland, and lichen assemblage. Given the distance from the development activity to the SSSI and the nature of the features for which the SSSI is designated, it is considered that there is no route to impact to the SSSI and so it is not considered to be an IEF in the context of the Proposed Development.
Semi-natural/plantation broadleaved	Annex 1 of Habitat Directive; SBL; GWDTE	Local	No	This habitat was predominantly planted trees along riparian corridors with some areas classified as W7 NVC community which may correspond with priority habitat on Annex 1. W9 and W11 NVC communities were also present and are listed as priority habitats on the SBL. None of this habitat will be lost as part of the Proposed Development. W7 NVC community

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
woodland and scrub				habitat (*Alnus glutinoso-incanae*) has a high potential to be GWDTE, however infrastructure will be located more than 2 km from this habitat and therefore the proposed development will not have an impact on the hydrology of this habitat. This habitat is therefore not considered to be an IEF.
Coniferous and mixed plantation woodland	NA	Negligible	No	The habitat in the Proposed Development Area holds little to no conservation interest and is widespread throughout Scotland. This habitat is therefore not considered to be an IEF.
Improved and semi-improved grassland	NA	Negligible	No	The habitat in the Proposed Development Area holds little to no conservation interest and is widespread throughout Scotland. This habitat is therefore not considered to be an IEF.
Unimproved acid grassland	SBL	Local	No	This habitat covers 31% of the total area within the Proposed Development. Some of this habitat will be lost as part of the Proposed Development (8.70 ha/3.44% of habitat within Proposed Development Area). Some areas of unimproved grassland within the Proposed Development Area correspond with habitats that are included on the SBL, however this is a 'watching brief only' requiring monitoring to prevent decline and therefore has only low conservation value. There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat. Given the relatively small area of habitat loss from the Proposed Development and the low conservation value this habitat is not considered to be an IEF in the context of the Proposed Development.
Calcareous grassland	Annex 1 of Habitat Directive; SBL; GWDTE	Local	No	Some of this habitat will be lost as part of the Proposed Development (0.02 ha/0.16% of habitat within Proposed Development Area). There is also the potential for an indirect impact from dust created during construction works. The habitat will be identified within the CEMP and marked during construction to ensure that there is no disturbance or damage to the habitat, e.g. from tracking by works vehicles. Measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, this habitat is not considered to be an IEF. Given that this habitat has high potential for being a GWDTE the Proposed Development could impact on the hydrology of this habitat. Further discussion of GWDTEs is presented in Chapter 9: Hydrology, Geology and Hydrogeology.
Marshy grassland	SBL; GWDTE	Local	No	This habitat covers 6.3% of the total area within the Proposed Development. Some of this habitat will be lost as part of the Proposed Development (0.99 ha/1.96% of habitat within Proposed Development Area). Most areas of this habitat that will be lost to the Proposed Development have no conservation value (M25 marshy grassland makes up 53% of the marshy grassland habitat within the Proposed Development Area). 39% of the total area of marshy grassland habitats found within the Proposed Development Area are priority habitats on the SBL (M10, M23 and M32). Of these three communities 11% will be lost to the Proposed Development. The CEMP will include provision for micrositing (75 m allowance) of infrastructure where possible to ensure construction does not impact on the most sensitive areas of this habitat. There is also the potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, this habitat is not considered to be an IEF. NVC habitats M10 and M23 have high potential to be a GWDTE with M25 and MG9 moderate potential. Given that some infrastructure will be located within 250 m of these habitats, the Proposed Development could have an impact on the hydrology of this habitat. Further discussion of GWDTEs is presented in Chapter 9: Hydrology, Geology and Hydrogeology.

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
Dry dwarf shrub heath - Acid	Annex 1 of Habitat's Directive; SBL	Local	No	This habitat covers 25% of the total area within the survey area. Some of this habitat will be lost as part of the Proposed Development (4.51 ha/2.23% of dry dwarf shrub heath habitat within Proposed Development Area). Dry heath is a priority habitat on Annex 1 and the SBL. However, given the limited extent of the habitat lost within the Proposed Development Area it is not considered to appreciably enrich the ecological resource within the local context and is therefore considered to be of negligible value at the Proposed Development. There is potential for an indirect impact from dust created during construction works, or from accidental pollution. A pollution prevention plan and measures to control dust will be included in the CEMP and monitored by the ECoW, and so it is considered that embedded mitigation is sufficient to prevent adverse effects to this habitat arising from construction. The scale of habitat loss from the Proposed Development represents a low proportion of the community found within the Proposed Development Area and as such no significant effects of the Proposed Development on the integrity of this feature are likely. Therefore, the habitat is not considered to be an IEF.
Wet/dry modified bog	Annex 1 of Habitat's Directive; SBL	Regional	Yes	This habitat is mostly present on the higher ground covering 46.67 ha within the survey area of which 5.48 ha will be lost as part of the proposed development which constitutes 11.75% of all modified bog habitat lost within the Proposed Development Area. Blanket and modified bog are priority habitats on Annex 1 and the SBL. The habitat is widespread throughout Scotland; however, blanket bog communities are under-represented within the region. Blanket/modified bog is therefore considered to be important in Regional terms. Due to the extent of habitat loss, the Proposed Development could have a significant impact on this habitat and as such modified bog is considered to be an IEF.
Running water	SBL	Local	No	A number or watercourses are located within the Proposed Development Area. Rivers and burns are listed on the SBL. These habitats are widespread across Scotland and Scottish Borders. Protection for watercourses is embedded in the project design through good practice. Protection measures will be outlined in the CEMP. Further information on watercourses can be found in Chapter 9: Hydrology, Geology and Hydrogeology. This habitat is not considered to be an IEF and is therefore not discussed further in this chapter.
Bats (all)	Conservation Regulations; Wildlife and Countryside Act; SBL	Local	Yes	Potential bat roosts ranging from low to moderate suitability were identified along the corridor of Gatehopeknowe Burn which included mature trees, buildings and bridges. Overall, 14.9% of all bat passes recorded throughout the survey period were from detectors C, D, E, F, G, H, I and J. These detectors are the most comparable locations regarding habitat for much of the Proposed Development. Bat activity levels (other than common and soprano pipistrelles) within the Proposed Development were low; most of the species recorded were common and widespread and known to occur throughout Scotland, with the exception of Nathusius' pipistrelle, which is a rare species in the UK. This species is considered to be at high risk of collision with wind turbines. However, 28.6% of all recordings of this species (65 bat passes) were from the detectors, indicating that the Proposed Development Area is used by low numbers of individuals on an infrequent basis. Common and soprano pipistrelles had high activity levels recorded within the Proposed Development Area with moderate activity levels for noctule. Although these species are common and widespread across Scotland, they have a high collision risk. There is therefore a possibility that the Proposed Development could have a significant effect on bat populations within the Proposed Development Area. This means that bats are considered to be an IEF.
Otter	Habitat Regulations; Wildlife and Countryside Act; SBL	Local	No	Signs of otter were recorded within the southern part of the Proposed Development Area along the Gatehopeknowe Burn near Holylee Farm, involving three spraints. Although no feeding signs, holts or resting places were recorded it is considered that suitable habitat for otter is present within the Proposed Development Area, particularly along Gatehopeknowe Burn. Otters are widespread across Scotland and in the local area of the Proposed Development, and the levels of activity recorded indicate that while otter are present at the Proposed Development this is unlikely to be in sufficient numbers to consider the population of greater than Local value. Embedded mitigation measures, including protection via a SPP and a CEMP and pre-construction surveys, will be implemented during construction and operation to prevent a breach of legislation pertaining to this species. A significant effect on the integrity of the local population of otter arising as a result of impacts associated with the Proposed Development is considered unlikely, and as such they are not considered an IEF, in line with the principles of proportionate EIA.

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
Red squirrel	Wildlife and Countryside Act; SBL	Local	No	Most of all squirrel signs were recorded along the corridor of Gatehopeknowe Burn within the Proposed Development Area. Feeding signs were recorded within woods around Holylee and in central parts of the valley in wooded areas. A single live sighting of red squirrel was also recorded near Holylee. The signs of squirrel recorded within the centre of the Proposed Development Area were old suggesting low activity or that red squirrels were only irregularly present in these areas. Given the distance and location of recorded squirrel activity to the nearest turbine and infrastructure the Proposed Development would be unlikely to have any impact on the population of red squirrel within the site as any disruption would be minimal and temporary. Furthermore, there will be no felling of trees prior to and during construction works and therefore any suitable habitat will not be destroyed. Embedded mitigation as outlined in Section 7.7.4, will be sufficient to minimise any impacts on this species to negligible. Therefore, red squirrel are not considered to be an IEF.
Badger	Protection of Badgers Act	Local	No	Two active badger setts were recorded within the Proposed Development Area, approximately 500 m and 1.5 km from the nearest turbine and infrastructure. Two disused setts were also found along the corridor of Gatehopeknowe Burn. Signs of fresh latrines were also recorded in the wooded areas at the southern end of the Proposed Development Area. Badger activity was widely recorded around the Holylee area and north along Gatehopeknowe Burn showing that suitable habitat for sett creation and foraging is present within these low-lying areas of the Proposed Development Area. The Proposed Development would therefore be unlikely to have a significant impact on the population of badger within the site as no setts will be disturbed and any disruption will be temporary. Furthermore, embedded mitigation outlined in Section 7.7, including a CEMP and SSP, will ensure no breach of legislation relating to this species. Therefore, badger are not considered to be an IEF.
Reptiles	Wildlife and Countryside Act (protected against trade); SBL	Local	No	Consultation with TWIC provided records of common lizard within 5 km of the Site. Suitable reptile habitat is present and widespread including potential refugia/hibernacula within the Proposed Development Area. However, the Proposed Development would be unlikely to have a significant impact (in EIA terms) on the population of reptiles within the site as any disruption would be minimal and temporary with any habitat loss as negligible. Furthermore, embedded mitigation outlined in Section 7.7 above, including pre-construction surveys identifying potential hibernacula by the ECoW and avoided, toolbox talks and the implementation of a speed limit, will be sufficient to minimise any impacts to these species to local at a population level. Therefore, reptiles are not considered to be an IEF.
Amphibians	Annex IV, Wildlife and Countryside Act (protected against trade); SBL	Negligible	No	There were no records of great-crested newt returned from within 5 km of the Proposed Development Area through consultation with TWIC and no suitable habitat was recorded as present during the baseline surveys. Records of common frog and common toad were returned with suitable habitat recorded as being present on site. The Proposed Development would be unlikely to have a significant impact on the population of amphibians within the site as any disruption would be minimal and temporary. Furthermore, embedded mitigation outlined in Section 7.7 above, including toolbox talks and the implementation of a speed limit, will be sufficient to minimise any impacts to these species to negligible at a population level. Therefore, amphibians are not considered to be an IEF.
Fish	Atlantic salmon are listed on Appendix III of the Bern Convention and Annex II and V of the EC Habitats & Species Directive. Sea Lamprey are listed on Annex II of the EU Habitats Directive and Appendix III of the Bern Convention. Atlantic salmon, brown trout and sea lamprey species are listed on the SBL. The watercourses present across the site form tributaries of the River Spey SAC which is designated for sea lamprey and Atlantic salmon.	Regional	Yes	Atlantic salmon is widely distributed throughout Europe and UK, with Scottish rivers in particular being a European stronghold for the species. There are a number of watercourses within the Proposed Development that feed into the River Tweed which supports a very large population of Atlantic salmon. Three lamprey species are also a qualifying feature of the River Tweed. It is considered that the results from the fish habitat suitability survey along Gatehopeknowe Burn represents highly suitable habitat for fish, including suitable spawning habitat for both salmon and lamprey, areas sufficient for lamprey larvae and areas providing good juvenile salmon habitat. Given the proximity to the catchment from the Proposed Development embedded mitigation measures will be in place. There is the potential for indirect impact from construction works. Protection for watercourses is embedded in the project design through good practice and is considered that embedded mitigation is sufficient to prevent adverse effects to the SAC. Protection measures will be outlined in the CEMP. Further information on watercourses can be found in Chapter 9: Hydrology, Geology and Hydrogeology.

Species/Habitats	Covering legislation and guidance/conservation status	Geographical level of value	IEF	Rationale
				Salmon are an integral part of the River Tweed SAC. There is suitable habitat present within the site, and due to the protection status as a qualifying feature of the River Tweed SAC, fish numbers have the potential to be important in National terms and are therefore considered to be an IEF.
Invertebrates; Northern Brown Argus	SBL	Local	No	No specific surveys for invertebrates were undertaken as part of the baseline surveys for the Proposed Development. However, data from the desk-based study included species of butterfly (2) bumble bee (1) and moth (27) listed on the SBL including four records of the northern brown argus. Records indicate that the northern brown argus is present in the local area including one record from the Gatehopeknowe Burn area, approximately 2.44 km from the nearest infrastructure. The food plant of the northern brown argus is common rock rose and was generally present where the ground is steeper and rock more exposed. Suitable habitat (base-rich grasslands) that would typically support this plant were generally present on the slopes within the southern half of the Proposed Development, primarily only the steep sided valley of Gatehopeknowe burn, and away from any infrastructure. Common rock rose can grow in very small, localised areas for example south facing rock slopes within habitat that is otherwise unsuitable and therefore could have been missed. As this species is rare and has a very short dispersal distance, only 20-30 m, any populations on site would be likely to represent significant, largely isolated proportions of the wider local population. However, there are no works proposed in the vicinity of these habitats and are not considered to be an IEF.

Source: Natural Power

Impact Assessment

7.7.25 Five features have been identified as IEFs, requiring EcIA following the application of embedded mitigation (see Paragraphs 7.7.8 to 7.7.24). These are:

- Moorfoot Hill SAC/SSSI;
- River Tweed SAC/SSSI;
- Habitats: Wet/dry modified bog;
- Bats; and
- Fish.

7.7.26 Screening for Appropriate Assessment (AA) for Moorfoot SAC and River Tweed SAC is provided in Section 7.11. An assessment of impacts of the Proposed Development on the remaining IEFs is provided below.

Habitats: Wet/dry modified bog

Construction

7.7.27 Construction activities have the potential to indirectly impact the hydrological flow and connectivity affecting the integrity of the habitat type. In addition, dust particles have the potential to interfere with peat forming species such as *Sphagnum sp*. and other sensitive plants. There is also a small risk of water pollution incidents occurring during the construction phase of the Proposed Development, potentially impacting on the plant species present. However, application of embedded mitigation implemented via construction phase plans such as the CEMP reduces the likelihood and magnitude of these impacts to low and not significant.

7.7.28 The principal impact of the Proposed Development to modified bog is via permanent habitat loss. The total extent of wet/dry modified bog habitats lost to the footprint of the Proposed Development is 5.5 ha, which comprises 0.36% of the habitat within the Proposed Development Area and 0.22% of the estimate of all modified bog habitat within NHZ 20 (see Table 7.21).

7.7.29 Phase 1 habitat types have been used to calculate habitat loss calculations as some NVC communities can be classified as either modified bog or marshy grassland/wet heath (i.e., representing a different IEF or not an IEF), depending on the peat depth (e.g., M25 and M15). However, NVC communities can help determine areas of highest quality bog. NHZ Habitat estimates given in SNH (2001)[46] are for NVC communities and not Phase 1 habitat types. Therefore, NHZ estimates shown in Table 7.21 represent the sum of the NHZ estimates for NVC communities found within the site that correspond with each Phase 1 habitat type.

Table 7.21: Comparison of areas of bog habitats within the Proposed Development Area with NHZ 20 habitat area, showing area of habitat lost to Proposed Development as total area and percentage of Proposed Development Area and NHZ habitat estimates.

Phase 1 Habitat	Surveyed Area within Proposed Development Area (ha)	Area lost to Proposed Development (ha)	% habitat in Proposed Development Area lost	Estimated area of habitat in NHZ 20 (ha)[46]	% habitat in NHZ 20 lost
E1.7 Wet modified bog	46.67	5.48	11.75	1583.1	0.35
E1.8 Dry modified bog	2.05	0.07	3.41	908.4	0.01
Combined	**48.72**	**5.55**	**15.57**	**2491.5***	**0.22**

Source: Natural Power; SNH (2001)[46]
**These figures are not a total of all figures above because there is overlap in NVC communities (as described in SNH (2001)[46]) between habitat types.*

7.7.30 Wet/dry modified bog communities that will be affected by the Proposed Development are H12, M3, M19, M20 and M25. As described in Paragraphs 7.7.4 to 7.7.6, the layout of the Proposed Development has avoided bog habitats where possible, taking into account other constraints. As such, areas of the bog habitat at the Proposed Development have been avoided as part of the design process, and the extent of this habitat affected by the Proposed Development is a small proportion of the habitat available, particularly in relation to the extensive modification of bog habitat which is already taking place under baseline conditions. Without mitigation it is considered that impacts associated with loss of modified bog at the Proposed Development will lead to a low, not

[46] SNH. (2001). Natural Heritage Zones: A National Assessment of Biodiversity (Habitats). SNH, Edinburgh.

significant negative effect on the integrity of this feature at a Regional level. With the application of the proposed mitigation the magnitude of residual effect is expected to be low beneficial, and not significant (see Table 7.23).

Operation

7.7.31 It is proposed that an Outline HMP is detailed in Paragraphs 7.7.64 to 7.7.68 will be finalised and an approved HMP will be in place throughout the life of the wind farm. This will comprise the works to achieve the restoration of highly modified and degraded bog habitats, resulting in an overall net increase of good quality blanket bog habitats, and reversing some of the baseline modification which may be expected to continue in the absence of the Proposed Development. Furthermore, it will include the introduction of a grazing regime that would improve the modified bog areas and revert acid grassland to dry heath.

7.7.32 The operation of Proposed Development is considered likely to have a low magnitude and not have a significant effect on modified bog nevertheless the proposed outline HMP is intended to provide a mechanism to maximise the function of the peatland during the operational life of the wind farm and to enhance biodiversity.

Bats

Construction

7.7.33 A number of potential roosting features were found during surveys within the Proposed Development Area, however all but three were greater than 1 km from the Proposed Development (the closest three being greater than 360 m) and therefore will not be affected by the construction works for the Proposed Development. Static detector data highlighted low activity (5 passes) during the summer surveys of soprano pipistrelle, common pipistrelle and noctule 30 minutes before sunset and after sunrise from detectors MCB, pond and A, therefore it is considered unlikely that there are any significant roost locations nearby. However, during the autumn survey some activity 30 minutes before sunrise was recorded of soprano pipistrelle from detector B, which is likely to be indicative of roosts within the wider area i.e. significant bat activity recorded close to known emergence times for species found within the Proposed Development Area.

7.7.34 The loss of habitat to the infrastructure for Proposed Development will not significantly reduce the foraging opportunities within the Proposed Development Area. However, some foraging and commuting behaviour may be altered as a result of construction, but this is likely to be of short-term temporal magnitude only. Furthermore, the implementation of lighting mitigation as included within CEMP and outlined within embedded mitigation (see Section 7.7) means that any disruption caused by construction works will be minimised. Thus, the likelihood of significant effects of displacement or disturbance to foraging or commuting bats during construction is considered negligible.

7.7.35 Pre-construction surveys of potential bat roosts will be carried out on any trees or structures, including those identified during the protected species surveys (full details provided in the Technical Appendices 7.1) with potential to support roosting bats within 30 m of working areas, as part of the SPP.

7.7.36 Bats are considered to be of Local nature conservation importance and after application of embedded mitigation the impact during construction is considered to be negligible and not significant.

Operation

7.7.37 During the operational phase, rotating turbines present a risk to flying bats resulting in potential collision[47] when flying in close proximity to turbines. Recent research work by Exeter University (DEFRA 2016[48]) found that most bat fatalities at UK wind farms were common pipistrelle, soprano pipistrelle and noctule bats. The study also found that the percentage casualty rates for soprano pipistrelle, common pipistrelle and noctule bats were higher than the relative proportions of their calls recorded from ground level acoustic surveys.

7.7.38 It is recommended in Section 7 paragraph 7.7.21 that within the OMP the undertaking of searches for carcasses from potential collision are carried out in order to identify any changes over the longer-term.

7.7.39 The Proposed Development Area offers some foraging and commuting corridors along the adjacent Caberston forestry edge and burns. There are no potential roost sites found within 200 m of the location of turbines within the Proposed Development during field surveys (see Figure 7.3, in Volume 3a). The overall bat activity level within the Proposed Development is considered to be moderate. The Proposed Development is therefore considered of Local conservation importance for all occurring species of bats.

7.7.40 Bat activity levels are classified according to the guidance provided by NatureScot[17] and relative activity levels based on the output provided by Ecobat can be found in Appendix 7.1.

Common and Soprano Pipistrelle

7.7.41 Common and soprano pipistrelle bats were both recorded at the Proposed Development, accounting for more than a third of all recorded bat passes during each three survey periods (spring - 93%, 75% - summer and 91% - autumn) and were assessed as being at a medium collision risk in the summer and autumn. Detectors recorded where these species were assessed as being at a medium collision risk were not close to turbine locations and at areas of higher potential for support bats, on the edges of Caberston forest and the controlled locations MCB, pond and stream. Both species are assessed as having a high collision risk with wind turbines. Due to both species being common and widespread across Scotland they have a medium population vulnerability to wind turbines.

7.7.42 Detectors C, D, E, F, G, H, I and J are the most comparable locations regarding habitat for much of the Proposed Development as they are located along ridge lines and away from Caberston forest. Overall low activity levels of common and soprano pipistrelle were recorded at these locations, representing 4.2% and 4.4% respectively of all data recorded throughout the surveys.

7.7.43 All turbines are greater than 500 m from Caberston Forest. No potential roost features were identified within these plantations. Detectors H, I and J are most comparable to turbine 8 in terms of habitat.

7.7.44 As the overall population vulnerability of these two species to wind turbines is medium it is considered that operational effects of the Proposed Development on common and soprano pipistrelle due to collisions would not affect the integrity of the local populations of these species and therefore considered to be **moderately negative** and **not significant**.

Nathusius' pipistrelle

7.7.45 Nathusius' pipistrelle bats are assessed by NatureScot guidance[24] to be of high risk in terms of collision and threat to national populations. For the periods during which this species was active, activity levels at the Development Site were low. Therefore this species has been assessed as being at low risk (during periods of activity) at the Proposed Development. Nathusius' pipistrelles were recorded during all three survey periods totalling 227 passes, of which 7.05% were recorded in early summer, 85.02% in summer and 7.93% in the autumn. This species was recorded throughout the Proposed Development Area, however the detector located at the pond recorded the highest level of activity, which is greater than 400 m from the nearest proposed turbine location.

7.7.46 Overall, low activity levels were recorded throughout the Proposed Development Area (see Tables 7.11, &.14 and 7.17), with the exception of medium to high activity levels recorded at the controlled pond and stream detectors situated along the linear features of Caberston Grain and Gatehopeknowe Burn, respectively. The overall collision

[47] Barotrauma, injury caused by a change in air pressure, affecting typically the ear or the lung has previously been suggested as a potential cause of bat deaths at wind farms. However it is unlikely to be a significant cause of bat fatalities. Modelling of changes of air pressure caused by rotating turbine blades suggests that the low-pressure region over the blade suction side is extremely localized and bats that experience the low-pressure region are likely to impact the blade. Furthermore, observations showed that most bat deaths occurred at low wind speeds near 5 m/s, when bats are the most active. Fatalities at higher wind speeds (> 5 m/s) are less common, likely because fewer bats are flying in these conditions. Considering that the pressure changes around wind turbine blades at low wind speeds are insignificant and that there are few bat deaths at higher wind speeds, it seems unlikely that barotrauma is a significant cause of bat fatalities around wind turbines, and that most bat fatalities are a result of blade strikes. See Lawson et al. 2018 Estimating the Likelihood of Bat Barotrauma using Computational Simulations and Analytical Calculations. NREL poster presentation to the AWEA siting meeting in March 2018.

[48] DEFRA (2016). Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management. University of Exeter.

risk assessment (see Tables 7.12, 7.15 and 7.18) indicates that the locations of proposed turbines along the two ridges is not commonly used by Nathusius' pipistrelle and are most likely to be using the linear features of the burns within the Proposed Development. It is therefore considered that operational effects of the Proposed Development on Nathusius' pipistrelle due to collisions would not affect the integrity of the local populations of this species and is therefore considered to be **low negative** and **not significant**.

Nyctalus species (noctule and Leisler's bat)

7.7.47 Leisler's bat and noctule bats are assessed as having high population sensitivity in NatureScot guidance[24]. For the periods during which these species were active, they were assessed as having low or medium collision risk at the Proposed Development. Noctules were recorded frequently throughout the survey period (with a total of 3570 passes); Leisler's bat was recorded twice from detectors A and B during the early summer survey; and unidentified *Nyctalus* sp. were recorded on 17 occasions during the 2nd summer and autumn surveys in the Proposed Development Area.

7.7.48 This activity level indicates that the Proposed Development Area was more commonly used by these species during the summer and autumn months.

7.7.49 Overall, the activity levels and collision risk assessment (see Tables 7.12, 7.15 and 7.18) indicates that the Proposed Development Area is frequently used by *Nyctalus* bats (primarily noctule) during the summer and autumn periods. Overall, *Nyctalus* bats accounted for 3.6% of all bat passes recorded away from the Proposed Development and 5.5% within or near to proposed infrastructure.

7.7.50 It is therefore considered that operational effects of the Proposed Development on *Nyctalus* bats due to collisions would not affect the integrity of the local populations of these species, and therefore considered to be **moderately negative** and **not significant**.

Myotis species

7.7.51 *Myotis* sp. are assessed by NatureScot guidance[24] to be of low risk in terms of collision and threat to national populations. This species group was assessed as having a medium to high risk at the Proposed Development (dependent on activity levels and location). *Myotis* species were recorded during all three survey periods totalling 382 passes, of which 7.59% were recorded in early summer, 41.10% in summer and 51.31% in the autumn. The highest activity levels for *Myotis* sp. were at the controlled locations MCB, pond and stream. All three detectors were located along linear features (Caberston Grain and Gatehopeknowe Burn) and were greater than 400 m from proposed turbine locations. Relative activity levels of *Myotis* sp. at detectors located in habitats most similar to turbine locations (detectors C, D, E, F, G, H, I and J) were low; 14.4% of all *Myotis* passes.

7.7.52 Overall, the activity levels and collision risk assessment (see Tables 7.12, 7.15 and 7.18) indicates that the Proposed Development Area is occasionally used by *Myotis* bats with levels increasing during the summer and autumn periods. Overall, *Myotis* bats accounted for 0.83% of all bat passes recorded away from the Proposed Development and 0.14% within or near to proposed infrastructure.

7.7.53 The significance of effect during operation is considered to be **low negative** and **not significant**.

Brown long-eared bat

7.7.54 The overall activity rates of brown long-eared bat were low and the species is considered to be at low risk in terms of collision with turbines (NatureScot[17]). This species was assessed as having a low to moderate collision risk (during periods of activity) at the Proposed Development. Brown long-eared bats activity accounted for 0.30% of all overall total of bat passes recorded throughout the survey period (a total of 118 passes). Activity was recorded from only four locations during the spring and six in the summer, becoming more widespread during the autumn, but still at low rates at each detector.

7.7.55 The significance of effect during operation is considered to be **low negative** and **not significant**.

Fish

Construction

7.7.56 The waterways throughout the Proposed Development represent good habitat for salmon and lamprey species at all life stages, throughout the surveyed area. Atlantic salmon is a qualifying feature of the River Tweed SAC, which runs along the southern boundary of the site, however the nearest infrastructure to this SAC is approx. 3.3 km away. The Leithen Water is a protected tributary of the River Tweed SAC and lies approximately 107 m from the Proposed Access.

7.7.57 Potential impacts on fish populations during the preparation and construction phase include water pollution incidents or increases in sedimentation from construction works taking place within or close to watercourses.

7.7.58 The minor tributaries of West Grain/ East Grain Water that feed into Priesthope Burn encompass the southern face of Middle Hill and are no closer than 315 m from the nearest infrastructure (T2). Caberston Grain and Seathope Burn which feeds into Gatehopeknowe Burn encompass the southern face of Seathope Rig and lie no closer than 590 m from the nearest infrastructure (T8). In the absence of mitigation, there remains a potential impact on fish populations from pollution incidents or contamination of watercourses via sediment or run-off during construction. Any unmitigated effects of preparation and construction on fish species is considered likely (probable) to be of **moderate negative and therefore not significant** in terms of the EIA regulations.

7.7.59 A comprehensive Fish and Macro-invertebrate Monitoring Programme (FMMP) will be produced prior to commencement of development in consultation with NatureScot and local fishery boards to monitor the watercourses and the species that depend on them. The monitoring will commence during the pre-construction phase and continue during the period of construction of the Proposed Development. The requirement for operational monitoring will be determined following completion of the pre-construction and construction monitoring.

7.7.60 In order to obtain up-to-date baseline and pre-construction information regarding the status of fish populations, electrofishing surveys will be carried out along watercourses draining from the Proposed Development. Macro-invertebrate monitoring will also be undertaken to establish water quality information (using biological indicator species) to assess the health of the watercourse ecosystems. This monitoring programme will run alongside the pre-construction and construction water quality monitoring detailed in Chapter 9: Hydrology, Geology and Hydrogeology which includes assessments of turbidity levels and chemical indicators of pollution as well as biological indicators.

Operation

7.7.61 During operation there remains a risk of contamination of the watercourses from surface water run-off, oil or other leaks from turbine machinery, spills during maintenance or leaks from maintenance vehicles. Due to the low levels of site personnel, vehicles or machinery required during operation of the Proposed Development within proximity to watercourses, any operational effects of the Proposed Development on fish is considered to be unlikely, of **low magnitude and therefore not significant** in terms of the EIA regulations. Prevention and consideration of these effects are further discussed in Chapter 9: Hydrology, Geology and Hydrogeology.

Predicted Effects – Decommissioning

7.7.62 Decommissioning would be expected to lead to short term, temporary disturbance on habitats and species. For all habitats and species assessed above, decommissioning effects are predicted to be of similar or lower magnitude to the effects during construction. Habitat restoration following removal of infrastructure will lead to an increase of habitats on site in comparison to the operational phase.

Outline Habitat Management Plan (HMP)

7.7.63 An outline HMP for the Proposed Development will be provided, subject to consultation with the landowner, NatureScot and Scottish Borders Council. The aim of this outline HMP will be to improve and restore areas of

wet/dry modified bog and enhance riparian habitat within the Proposed Development Area (see Figure 7.9, Volume 3a).

7.7.64 As described in the Trends and Future Baseline section (Paragraphs 7.4.23 to 7.4.24), much of the modified bog within the Proposed Development Area already has areas of extensive drainage and/or hagging and erosion. Existing bog habitat is limited in area and is already degraded within the proposed development. No onsite bog habitat restoration is proposed, instead it is proposed that financial support is provided to suitable local bog restoration projects. It is proposed that specific methods to be employed will be decided and agreed with consultees post-consent, as part of the production of the approved HMP.

7.7.65 Overgrazing (present and past grazing) has helped modify the bog as well as modify the dry more level areas from heathland to acid grassland. A grazing regime would benefit these habitats, therefore it is proposed that specific methods to be employed and areas for a grazing regime will be decided and agreed with landowners and consultees post-consent, as part of the production of the approved HMP.

7.7.66 Riparian and other broad-leaved planting is proposed within the proposed development which will be beneficial for biodiversity. It is proposed that specific methods to be employed and areas for planting will be decided and agreed with landowners and consultees post-consent, as part of the production of the approved HMP.

7.7.67 It is proposed that specific methods to be employed and areas for planting will be decided and agreed with landowners and consultees post-consent, as part of the production of the approved HMP.

7.7.68 A monitoring regime would be included as part of this plan in order to assess the effectiveness of management measures implemented as part of the approved HMP.

7.8 CONCLUSIONS

7.8.1 It is predicted that unmitigated, the Proposed Development would have no significant effects on any IEFs other than a moderate negative (not significant) effect on common and soprano pipistrelle bats and a low negative (not significant) effect on other bat species and on modified bog. Despite the absence of significant effects, mitigation measures are proposed for bats and an outline HMP is proposed, with the aim of restoring areas of modified and damaged bog habitats off site. It is considered that this will reduce the magnitude of the residual impacts to peatland habitats in the local area to low beneficial, not significant.

7.9 MITIGATION AND RESIDUAL EFFECTS

7.9.1 The magnitude of pre-mitigation effects and the magnitude and significance of residual effects on each IEF which has been scoped in during the construction phase and operation before and after mitigation is detailed in Table 7.22 below.

Table 7.22: Summary of pre-mitigation effects and residual effects on each IEF, and the residual significance of effect

IEF	Conservation importance	Nature of potential pre-mitigation effect	Magnitude of pre-mitigation effect	Significance of pre-mitigation effect	Specific mitigation/ compensation measure	Magnitude of residual effect	Residual significance	Level of certainty
Construction/Decommissioning								
Moorfoot Hill SAC/SSSI	International	Hydrological effects where access tracks may impact shallow groundwater flows to and from the Moorfoot Hills SSSI. There is also the potential for an indirect impact from dust created during construction works	Moderate	Not significant	Embedded mitigation measures will be in place. Measures to control dust will be included in the CEMP.	Negligible	Not significant	A measurable residual negative effect at an international or national level is considered to be unlikely.
River Tweed SAC	International	Hydrological effects via the upper tributaries; risk of water pollution incidents, run-off and erosion affecting watercourses downstream.	Moderate	Not significant	Pre-construction and construction fish and macro-invertebrate monitoring programme and water quality monitoring (see Chapter 9: Hydrology). Embedded mitigation, including: • Minimum buffer of 50 m between proposed infrastructure and watercourses where possible, with exception of construction and upgrade of five watercourse crossings; • Watercourse crossings to be designed in keeping with SEPA good practice[49]; • Good practice during construction, including: • Keeping within clearly defined construction areas; • Implementation of a pollution response plan, through the CMS and CEMP;	Negligible	Not significant	A measurable residual negative effect at an international or national level is considered to be unlikely.

[49] SEPA, 2010. Engineering in the water environment: good practice guide - river crossings (2nd Edition), SEPA.

IEF	Conservation importance	Nature of potential pre-mitigation effect	Magnitude of pre-mitigation effect	Significance of pre-mitigation effect	Specific mitigation/ compensation measure	Magnitude of residual effect	Residual significance	Level of certainty
					• Use of suitable storage areas for materials; • ECoW presence during construction; • For further detail on mitigation of impacts on watercourses see Chapter 9: Hydrology.			
River Tweed SSSI	National	Geographical separation of River Tweed SSSI and the nearest infrastructure suggests impacts unlikely.	Moderate	Not significant	As above	Negligible	Not significant	A measurable residual negative effect at an international or national level is considered to be unlikely.
Wet/Dry modified	Regional	Permanent habitat loss; changes to hydrology via drainage.	Low negative	Not significant	An outline HMP is proposed which will restore areas of modified bog habitat out with the Proposed Development Area.	Low beneficial	Not significant	Level of certainty: Probable
Bats	Local	Displacement or disturbance to foraging or commuting bats from construction activity and/or through habitat loss.	Low negative	Not significant	Embedded mitigation.	Negligible	Not significant	Level of certainty: Certain
Fish	Regional	Accidental pollution incident leading to contamination of watercourse	Moderate	Not significant	Pre-construction and construction fish monitoring programme.	Negligible	Not Significant	A measurable residual negative effect at a regional level is considered to be unlikely.
Operation								
Moorfoot Hill SAC/SSSI	International	Accidental pollution incident leading to contamination of habitats.	Low	Not significant	The potential for chance pollution incidents during routine maintenance activities will be minimised by adoption of good practice guidance.	Negligible	Not significant	A measurable residual negative effect at an international or national level is considered to be unlikely.
River Tweed SAC/SSSI	International / National	Hydrological effects via the upper tributaries of Priesthope Burn and Gatehopeknowe Burn.	Low	Not significant	The potential for chance pollution incidents during routine maintenance activities will be minimised by adoption of good practice guidance.	Negligible	Not significant	A measurable residual negative effect at an international or national level is considered to be highly unlikely.
Wet/ Dry modified	Regional	Accidental pollution incident leading to contamination of habitats.	Low negative	Not significant	The potential for chance pollution incidents during routine maintenance activities will be minimised by adoption of good practice guidance.	Negligible	Not significant	Level of certainty: Probable
Common and soprano pipistrelle	Local	Collision risk.	Moderate negative	Not significant	Embedded mitigation.	Low negative	Not significant	Level of certainty: Probable

IEF	Conservation importance	Nature of potential pre-mitigation effect	Magnitude of pre-mitigation effect	Significance of pre-mitigation effect	Specific mitigation/ compensation measure	Magnitude of residual effect	Residual significance	Level of certainty
Noctule bat	Local	Collision risk.	Moderate negative	Not significant	Embedded mitigation.	Low negative	Not significant	Level of certainty: Probable
Nathusius' pipistrelle; *Nyctalus* sp.; *Myotis* sp.; brown long-eared bat	Local	Collision risk.	Low negative	Not significant	Embedded mitigation.	Low negative	Not significant	Level of certainty: Probable
Fish	Regional	Contamination of watercourses via sediment, run-off or pollution event.	Low	Not significant	Construction phase control measures will continue during the operational phase, such as continued run-off management and erosion control.	Negligible	Not significant	A measurable residual negative effect at a regional level is considered to be unlikely.

Source: Natural power

7.9.2 The mitigation measures are expected to reduce the magnitude of residual effects for all IEFs to which they apply, in the short and long term, and as such no significant residual effects are predicted as a result of the construction and operation of Proposed Development.

7.10 CUMULATIVE EFFECTS

7.10.1 NatureScot guidance[22] states that assessments should focus on the significant cumulative impacts and conclude with a clear assessment of those which are likely to influence decision making. As per this guidance, any wind farm developments of fewer than three turbines (small scale wind energy proposals[50]) were excluded from the cumulative impact assessment. This is due both to the lack of quantitative environmental information which usually exists in the public domain for such small scale developments, and also due to the low likelihood that significant adverse effects would be predicted for them. Only IEFs for which a greater than negligible residual impact is predicted are considered in the cumulative impact assessment, as negligible impacts will not result in a detectable increase in cumulative impacts.

7.10.2 The context in which cumulative effects are considered depends upon the ecology of the species or habitat in question. Of all protected mammal species observed, bats are most likely to be affected by additional wind farm development because of the distances travelled by some species of foraging bat and the cumulative risks to bat populations as a result of collision with wind turbines during operation. The implementation of good practice measures regarding buffer distances of turbines from forestry edges to minimise impacts on commuting and foraging bats minimises likelihood of cumulative impact. With low negative residual effects predicted for Nathusius' pipistrelle, *Nyctalus* sp., *Myotis* sp. and brown long-eared bats, these have been scoped into the cumulative assessment, along with bog habitats which also have low beneficial residual effects predicted.

7.10.3 All existing, consented and submitted developments (of three or more turbines) within 10 km of the Proposed Development, were considered as part of the cumulative impacts assessment (CIA).

7.10.4 Within this search area there are a total of three developments that have been included in the CIA which include:

- **Bowbeat Wind Farm (operational)** – This is a 24-turbine operational site, located approx. 8 km to the north-west of the Proposed Development Area;
- **Greystone Knowe (application)** – This is a proposed 14-turbine site, located to the north of the Proposed Development Area approx. 5.5 km; and
- **Longpark Wind Farm (operational) –** This is a 19-turbine operational site, located approx. 8 km to the east of the Proposed Development Area.

7.10.5 Carcant Wind Farm lies on the verge of 10 km north of the Proposed Development and has been in operation since 2010. This three turbine site was excluded from the CIA due to the distance of the wind farm and no EcIA/EIAR chapters available.

7.10.6 It should be noted that cumulative assessments may be complicated by availability of EcIA/EIAR chapters and appraisals for consented developments and, where this information is available, survey periods and methods may differ between sites. Furthermore, some wind farms may have been in existence for many years, and thus contemporary data may not be available. No EIARs were available for two wind farms (Bowbeat and Longpark); thus cumulative totals reflect minimum values only (see Table 7.23).

Table 7.23: Cumulative Impact Assessment

Site	Scawd Law (Proposed Development)	Bowbeat	Greystone Knowe	Longpark	Cumulative residual effects
No. Turbines	8	24	15	19	76 turbines

[50] SNH (2016) Assessing the impact of small-scale wind energy proposals on the natural heritage (Guidance note). Scottish Natural Heritage.

Site	Scawd Law (Proposed Development)	Bowbeat	Greystone Knowe	Longpark	Cumulative residual effects
Site status	EIA	Operational since 2002	In planning	Operational since 2009	
Baseline surveys undertaken	2019	CIA could not be accessed.	2018 – 2019	Original ES could not be accessed but ES for a 10-turbine extension (2014) was used for information.	
Bats	**Low** magnitude of impact predicted for common and soprano pipistrelles. Bats considered to be **Local** value. Moderate - high activity of **common and soprano pipistrelle**. Low - moderate activity of Noctule and low activity of ***Nyctalus* sp**. ***Myotis* sp.**, Nathusius' pipistrelle and brown long-eared bat. No confirmed roosts, limited roosting features.	CIA could not be accessed.	No data available	Habitat within Longpark Wind Farm consist mostly of upland fringe habitat (mostly improved and semi-improved fields) and considered to offer limited foraging and commuting opportunities for bats **(taken from Longpark Extension EIAR)**.	Proposed Development has assessed the impacts on bat species (primarily Pipistrellus and *Nyctalus* sp.) as being low negative, but not significant in terms of implications on the overall populations present locally, in Scotland and in the UK. Fringe habitat present offering limited foraging and commuting opportunities for bats at Longpark Wind Farm. There has been a historic decline in the numbers of bats present in the UK due to loss of roost locations and impacts on commuting and foraging habitat, but long term population trends since 1999[51] show that these species in particular have been increasing in the UK as a whole. As a result, cumulative effect from the four wind farms is predicted to be not significant.
Fish		CIA could not be accessed.	No data available	Not assessed	
Wet/ dry modified bog	**5.5 ha** of wet/ dry modified bog to be lost. **Habitat will be** identified for restoration under HMP.	CIA could not be accessed.	No data available	**0 ha** lost	**5.5 ha** of wet/ dry modified bog to be lost. Additional bog restored overall.

Source: Natural power

7.10.7 With the application of good practice mitigation in relation to bats, the cumulative impact is predicted to be low negative magnitude and not significant. With the restoration of bog habitats as part of the outline HMP for the Proposed Development there will be an overall positive Regional impact on blanket bog. Additional bog will be restored above the extent of bog habitat loss. Therefore, no additional mitigation other than what has already been provided is required.

7.11 SCREENING FOR APPROPRIATE ASSESSMENT

River Tweed SAC

7.11.1 Under the Conservation (Natural Habitats, *&c.*) Regulations 1994, as amended (the Habitats Regulations) any development that may have a likely significant effect (LSE) on an SPA and SAC, either alone or in combination with other projects, requires an AA to be carried out by the relevant competent authority, to determine whether or not the development would have an adverse effect on the integrity of the SAC or SPA.

7.11.2 Before an AA is initiated a screening process is undertaken to determine whether any of the predicted impacts of the development will result in an LSE. This screening assessment is presented here to provide information to the

[51] Bat Conservation Trust, 2020. The National Bat Monitoring Programme Annual Report 2019. Bat Conservation Trust, London.

competent authority to allow them to reach a decision on whether or not the development will have an LSE on any SPA or SAC and therefore whether an AA is required

7.11.3 NatureScot responded to the scoping report (see Appendix 1.1) for the Proposed Development in August 2020. They noted that:

"*This wind farm development could have connectivity with the River Tweed SAC/SSSI due to drainage and water flow off the site through several watercourses reaching the River Tweed.*

Consideration needs to be given to the potential effects of construction, operation and decommissioning of the proposed development in relation to the qualifying interests of the SAC, including proposed access tracks. The SAC interests are sensitive to disturbance to the river habitat, including silt and sediment entering the watercourse and smothering gravel beds, suspended solids in the water column, pollution events, and changes in water quality and in water chemistry…

Potential impacts can be addressed by good wind farm design and by commitment to the employment of good construction methods…addressing potential impacts on the SAC interests will also address those of the SSSI."

7.11.4 In the absence of mitigation there is a route to impact on the River Tweed SAC through pollution, siltation or contamination of watercourses that flow into the tributaries of the River Tweed, or through potential impacts on the qualifying interests of the site (i.e. otter or fish species; see Section 7.7 paragraph 7.7.23). The following mitigation measures will be implemented in order to minimise the potential for impacts on the water environment and therefore the River Tweed SAC:

- A minimum distance of 50 m has been maintained between the proposed infrastructure and watercourses where practical, with the exception of a five watercourse crossing located within the Proposed Development;
- Watercourse crossings required for the Proposed Development will be designed in keeping with SEPA good practice[52], and to ensure that there are no restrictions to movement of otter or fish species (see Chapter 9: Hydrology, Geology and Hydrogeology). Dry culverts or mammal ledges will be installed where appropriate[53];
- Site water management, including drainage and watercourse crossing design would be included in a CEMP (see Section 7.7 above for further detail), to be agreed in consultation with NatureScot, SEPA and the local planning authority. This would include water protection measures as described in Chapter 9: Hydrology, Geology and Hydrogeology which will aim specifically to address the avoidance of impacts on the River Tweed SAC;
- A suitably qualified ECoW would be appointed prior to the commencement of construction in order to implement the agreed CEMP in relation to water protection measures, designated sites and protected species;
- A comprehensive Fish and Macro-invertebrate Monitoring Programme (FMMP) will be produced in consultation with NatureScot and local fishery boards to monitor the watercourses and the species that depend on them. The monitoring will commence during the pre-construction phase and continue during the period of construction of the Proposed Development. The requirement for operational monitoring will be determined following completion of the pre-construction and construction monitoring.

Table 7.24: Assessment of impacts on qualifying habitat feature of the River Tweed SAC

Conservation Objective	Predicted Impacts on Conservation Objectives	
To ensure for the qualifying habitat 'rivers with floating vegetation often dominated by water-crowfoot' that the following are maintained in the long term):	**Hydrological impacts via the tributaries of the watercourses that flow into the River Tweed SAC (i.e. risk of water pollution incidents, run-off, sedimentation and erosion).**	**Construction of and upgrade of watercourse crossings resulting in reduced hydraulic capacity of watercourses and potential contamination of watercourses via sediment, run-off or pollution event.**
1. Extent of the habitat on site	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the extent of this habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the extent of this habitat within the SAC is predicted.
2. Distribution of the habitat within the site	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the distribution of this habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the distribution of this habitat within the SAC is predicted.
3. Structure and function of the habitat	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, no LSE on the structure and function of this habitat is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice[52]. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the structure and function of this habitat within the SAC is predicted.
4. Processes supporting the habitat	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, no LSE on the processes supporting this habitat is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the processes supporting this habitat is predicted.

[52] SEPA, 2010. Engineering in the water environment: good practice guide - river crossings (2nd Edition), SEPA.

[53] SNH. Otters and Development. Available at: http://www.snh.org.uk/publications/on-line/wildlife/otters/mitigation.asp

Conservation Objective	Predicted Impacts on Conservation Objectives	
5. Distribution of typical species of the habitat	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of good practice during construction and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species (i.e. water crowfoot) of this habitat type are minimised. As such, no LSE on the distribution of typical species of the habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species (i.e. water crowfoot) of this habitat type are minimised. As such, no LSE is predicted.
6. Viability of typical species as components of the habitat	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of good practice during construction and water protection measures as detailed in Section 7.7above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure viability of typical species as a component of this habitat type is maintained. As such, no LSE is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure viability of typical species as a component of this habitat type is maintained. As such, no LSE is predicted.
7. No significant disturbance of typical species of the habitat.	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 67.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.
7. No significant disturbance of typical species of the habitat.	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.

Table 7.25: Assessment of impacts on qualifying species feature of the River Tweed SAC

Conservation Objective	Predicted Impacts on Conservation Objectives	
To ensure for the qualifying species 'otter, Atlantic salmon, brook lamprey, river lamprey, sea lamprey' that the following are maintained in the long term)	**Disturbance to otter; risk of incidental injury or mortality during preparation and construction. Water pollution incident resulting in loss of prey abundance; construction of and upgrade of watercourse crossings creating barriers to movement.**	**Barriers to fish migration from construction of watercourse crossings. Contamination of watercourses via sediment, run-off or pollution event.**
1.Population of the species, including range of genetic types for salmon, as a viable component of the site	Otter spraint was recorded at three locations on the Gatehopeknowe burn during baseline surveys. Of the three otter spraints observed during surveys, the closest is located approximately 2.4 km from the nearest infrastructure (T5). A minimum distance of 50 m has been maintained between infrastructure and watercourses, with the exception a single watercourse crossing between T3 and T6. Watercourse crossings will be designed in keeping with SEPA good practice[52] and to allow movement of otter through use of dry culverts or mammal ledges. Good practice measures during construction, such as covering deep excavations and pipe opening when not active to avoid entrapment, keeping within clearly defined construction areas, and 15 mph speed limit for vehicles to reduce risk of collision with protected species, will minimise potential	Suitable habitat and accessibility for protected fish was recorded throughout the waterways on the Proposed Development Area. Watercourse crossings will be designed in keeping with SEPA good practice[52] to ensure barriers to fish are avoided. Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. No LSE on the population of fish species is predicted. Fish monitoring undertaken prior to, during and post-construction construction will determine any impacts of construction on fish populations (see Section 7.7 above). Ongoing water quality monitoring during construction will allow

Conservation Objective	Predicted Impacts on Conservation Objectives	
	impacts on the local otter population (see Section 7.7 above). No LSE on the SAC otter population is predicted.	measures to be implemented should a pollution incident occur (see Chapter 9: Hydrology, Geology and Hydrogeology).
2.Distribution of the species within the site;	As per assessment on 'population of the species' above. Following mitigation, no LSE on the distribution of otter within the SAC is predicted.	As per assessment on 'population of the species' above. Following mitigation, no LSE on the distribution of fish species within the SAC is predicted.
3.Distribution and extent of the habitats supporting the species	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, impacts on watercourses and water quality will be minimised. No LSE on the distribution and extent of the habitats supporting the species is predicted.	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Watercourse crossings will be designed in keeping with SEPA good practice. Following mitigation, impacts on watercourses and water quality will be minimised. Therefore no LSE on the distribution and extent of the habitats supporting the species is predicted.
4. Structure, function and supporting processes of habitats supporting the species	Risk of water pollution incidents, run-off, sedimentation and erosion has the potential to result in a loss of prey abundance for otter species. Through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology impacts on water quality will be minimised. No LSE on the structure, function and supporting processes of habitats supporting this species is predicted.	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Watercourse crossings will be designed in keeping with SEPA good practice. Following mitigation, impacts on watercourses and water quality will be minimised. Therefore no LSE on the structure, function and supporting processes of habitats supporting the species is predicted.
5. No significant disturbance of the species	As per assessment on 'population of the species' above. Following mitigation, the potential for disturbance to otter will be minimised. No LSE is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice and will ensure that barriers to fish migration are minimised. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, significant disturbance impacts on fish populations is considered unlikely. No LSE is predicted.

7.11.5 Following implementation of the mitigation measures detailed above (see also Section 7.7) it is considered that there will be no LSE on the conservation objectives of the River Tweed SAC from the Proposed Development. In conclusion, the Proposed Development is not expected to impact upon the qualifying interest the River Tweed SAC and therefore no likely significant effect can be concluded.

Moorfoot Hills SAC

7.11.6 NatureScot responded to the scoping report for the Proposed Development in August 2020. They noted that: "*The northern boundary of the wind farm site marches with that of the Moorfoot Hills SAC/SSSI.*

The SAC qualifying interests are blanket bog and European dry heath with blanket bog as one of the interests of the SSSI. Our concern is that the topography of this area may mean that there is hydrological connectivity between the blanket bog on the wind farm site and that of the SAC/SSSI.

7.11.7 In the absence of mitigation there is a route to impact on Moorfoot Hill SAC through pollution or contamination and disruption of shallow groundwater flows to and from the Moorfoot Hills SAC that may have potential impacts on the qualifying interests of the site (i.e. blanket bog;). Mitigation measures will be implemented in order to minimise the potential for impacts on the habitats within the Proposed Development that are adjacent to the Moorfoot Hills SAC. The design of linear infrastructure elements will be done so to avoid modifying surface water and groundwater flow pathways. This includes:

- The use of permeable materials for track construction;
- Adoption of a site-wide drainage strategy integrating the use of regular cross drains and soakaways;
- The use of regular clay plugs within buried structures such as cable trenches; and
- A suitably qualified ECoW would be appointed prior to the commencement of construction in order to implement the agreed CEMP in relation to water protection measures, designated sites and protected species.

Table 7.26: Assessment of impacts on qualifying habitat feature of the Moorfoot Hills SAC

Conservation Objective	Predicted Impacts on Conservation Objectives		
To ensure for the qualifying habitat 'blanket bog and dry heath' that the following are maintained in the long term):	**Hydrological impacts via potential shallow groundwater flow between the site and Moorfoot Hill SAC (i.e. risk of water pollution incidents, run-off, sedimentation and erosion).**	**Construction of and upgrade of linear infrastructure resulting in the** modification of surface water and groundwater flows and of natural drainage patterns.	**Construction of and upgrade of the proposed abnormal delivery route that lies within the Moorfoot SAC resulting in the removal and loss of habitats.**
1. Extent of the habitat on site	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the extent of this habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the extent of this habitat within the SAC is predicted.	A small direct loss of habitat type will occur as a result of construction of the proposed route. A total of 2,478 m^2 will be lost due to road widening at the five Pinch Points. Any widening will be within the extent of the road corridor (i.e.to adjacent fence line / edge of ditch). The total area lost will consist mostly of grassland habitats which are not a qualifying habitat of the SAC. As such no LSE on the extent of this habitat within the SAC is predicted.
2. Distribution of the habitat within the site	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the distribution of this habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development; as such no LSE on the distribution of this habitat within the SAC is predicted.	A small direct loss of habitat type will occur as a result of construction of the proposed route. A total of 2,478 m^2 will be lost due to road widening at the five Pinch Points. Any widening will be within the extent of the road corridor (i.e.to adjacent fence line / edge of ditch). The total area lost will consist of predominantly of grassland habitats which are not a qualifying habitat of the SAC. As such no LSE on the extent of this habitat within the SAC is predicted
3. Structure and function of the habitat	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, no LSE on the structure and function of this habitat is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice[52]. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the structure and function of this habitat within the SAC is predicted.	Any watercourse crossings would be designed in keeping with SEPA good practice[52]. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the structure and function of this habitat within the SAC is predicted.
4. Processes supporting the habitat	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology. Following mitigation, no LSE on the processes supporting this habitat is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the processes supporting this habitat is predicted.	Any watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, no LSE on the processes supporting this habitat is predicted.
5. Distribution of typical species of the habitat	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of good practice during construction and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species (i.e. water crowfoot) of this habitat type are minimised. As such, no LSE on the distribution of typical species of the habitat within the SAC is predicted.	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species of this habitat type are minimised. As such, no LSE is predicted.	A small direct loss of this habitat type will occur as a result of preparation and construction of the proposed route. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species of this habitat type are minimised. As such, no LSE is predicted.
6. Viability of typical species as components of the habitat	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of good practice during construction and water protection measures as detailed in Section 6.6 above and Chapter 9: Hydrology, Geology	No direct loss of this habitat type will occur as a result of preparation and construction of the Proposed Development. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in Section 6.6	A small direct loss of this habitat type will occur as a result of preparation and construction of the proposed route. Implementation of SEPA good practice during design and construction of watercourse crossings and water protection measures as detailed in

Conservation Objective	Predicted Impacts on Conservation Objectives		
	and Hydrogeology will ensure viability of typical species as a component of this habitat type is maintained. As such, no LSE is predicted.	above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure viability of typical species as a component of this habitat type is maintained. As such, no LSE is predicted.	Section 7.7 above and Chapter 9: Hydrology, Geology and Hydrogeology will ensure impacts on typical species of this habitat type are minimised. As such, no LSE is predicted.
7. No significant disturbance of typical species of the habitat.	Any risk of water pollution incidents, run-off, sedimentation and erosion will be mitigated through implementation of good practice during construction, ECoW presence during construction and implementation of water protection measures as detailed in Section 6.6 above and Chapter 9: Hydrology, Geology and Hydrogeology. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.	Watercourse crossings would be designed in keeping with SEPA good practice. Site water management would be included in a CEMP, and an ECoW would be appointed to oversee the implementation of the agreed CEMP in relation to water protection measures and designated sites. Following mitigation, significant disturbance of typical species of this habitat is considered unlikely. No LSE is predicted.

7.11.8 Following implementation of the mitigation measures detailed above (see also Section 7.7), it is considered that there will be no LSE on the conservation objectives of the Moorfoot Hills SAC from the Proposed Development. In conclusion, the Proposed Development is not expected to impact upon the qualifying interest the Moorfoot Hills SAC and therefore no likely significant effect can be concluded.

7.12 STATEMENT OF SIGNIFICANCE

7.12.1 An assessment has been made of the potential for significant effects of the Proposed Development on habitats and non-avian species.

7.12.2 The Proposed Development is not expected to impact upon the qualifying interest the River Tweed SAC and Moorfoot Hills SAC therefore no likely significant effect can be concluded.

7.12.3 The Proposed Development is considered likely to have a low magnitude and not significant effect on wet/dry modified bog.

7.12.4 In relation to bats, the effects as a result of the proposed development are assessed as being low – moderate negative but not significant.

7.12.5 The Proposed Development is considered likely to have a low magnitude and not significant effect on fish.

7.12.6 By applying the proposed mitigation measures, mainly through the design process, and following good practice guidelines during construction including production of an approved HMP, the magnitude of residual effects of the Proposed Development are assessed as being reduced to low/negligible in terms of magnitude, and thus not significant.