Chapter 8: Ecology

Contents

8.1 Executive Summary 8-2
8.2 Introduction 8-2
8.3 Legislation, Policy and Guidelines 8-3
8.4 Consultation 8-5
8.5 Assessment Methodology and Significance Criteria 8-7
8.6 Baseline Conditions 8-13
8.7 Standard Mitigation 8-19
8.8 Receptors Brought Forward for Assessment 8-21
8.9 Potential Effects 8-25
8.10 Additional Mitigation and Enhancement 8-29
8.11 Residual Effects 8-30
8.12 Cumulative Assessment 8-30
8.13 Monitoring 8-31
8.14 Information to Inform Habitats Regulations Appraisal 8-32
8.15 Summary 8-34
8.16 References 8-34

8 Ecology

8.1 Executive Summary

8.1.1 This chapter considers the potential significant effects on important ecological features associated with the construction and operation of the Proposed Development.

8.1.2 The assessment is based upon comprehensive baseline data, comprising ecological field surveys of important and legally protected ecological features and desk study information, and is based on standard Environmental Impact Assessment (EIA) guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM) and NatureScot.

8.1.3 Ecology surveys carried out consisted of Phase 1 habitat surveys, National Vegetation Classification (NVC) surveys, protected terrestrial mammal surveys, fish habitat surveys and bat surveys.

8.1.4 The site supports modest pristine and mosaic Annex 1 habitats of the Habitats Directive, Scottish Biodiversity List (SBL) and / or potential Groundwater Dependant Terrestrial Ecosystems (GWDTE) habitats. It has very limited evidence of protected mammals, limited optimal fish habitat, and a bat species assemblage of 'Low/Medium Site Risk'. Both the River Tweed Special Area of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) are located immediately adjacent to the south of the site and are designated for the presence of aquatic vegetation, otters, and fish.

8.1.5 Standard mitigation measures to be adopted will include embedded mitigation in the Proposed Development design, good practice measures, for example, production of Species Protection Plans (SPP), Habitat Specific Protection Plans (HSPPs), pre-clearance surveys and the appointment of an Ecological Clerk of Works (ECoW) to oversee the implementation of the ecology mitigation measures, and habitat enhancement opportunities detailed in an outline Nature Enhancement Management Plan (NEMP). Following the application of the standard mitigation measures, no significant adverse direct and / or indirect effects on ecological features as a result of the Proposed Development are anticipated.

8.2 Introduction

8.2.1 This chapter considers the potential significant effects on important ecological features associated with the construction and operation of the Proposed Development.

8.2.2 The assessment is based upon comprehensive baseline data, comprising specifically targeted ecological field surveys of important and legally protected ecological features identified during desk study and consultation feedback. It draws on pre-existing information, where appropriate, from other studies, and survey data sources, and is based on the 'Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom' (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018) and NatureScot's 'Environmental Impact Assessment Handbook' (formerly Scottish Natural Heritage (SNH), 2018a).

8.2.3 The specific objectives of the chapter are to:

- describe the ecological baseline of the Proposed Development and associated study areas, to identify the ecological features, which will be the focus of this assessment;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- evaluate the sensitivity of each ecological feature;
- describe the likely significant effects, including direct, indirect, and cumulative effects;
- describe the mitigation measures proposed to avoid, reduce, and offset potential significant adverse effects; and
- assess the residual effects remaining following the implementation of mitigation.

8.2.4 The assessment has been carried out by Avian Ecology Ltd. Lead authors: Ms Catrin Scott MRes BSc (Hons) ACIEEM, Senior Ecologist and Dr Colin Bonnington DPhil MSc BSc (Hons) FBNA FLS MRSB MCIEEM, Principal Ecologist; with support from Mr Howard Fearn MSc MCIEEM, Director. Ms Scott, Dr Bonnington and Mr Fearn have over six, 12 and 22 years of experience respectively as professional ecologists, specialising in renewable energy developments. Both Dr Bonnington and Mr Fearn have contributed to and led on, many large-scale renewable energy projects in Scotland, including numerous wind energy projects.

8.2.5 This chapter is supported by the following Figures and Technical Appendices:

- Figure 8.1: Statutory Designated Sites for Nature Conservation with Ecological Interest.
- Figure 8.2: Non-Statutory Designated Sites for Nature Conservation Interest.
- Figure 8.3a: Desk Study Records - Notable Botanical Species.
- Figure 8.3b: Desk Study Records - Notable Faunal Species.
- Figure 8.4: Desk Study Records - Invasive Non-Native Species.
- Figure 8.5: Phase 1 Habitat Survey Plan.
- Figure 8.6a: National Vegetation Classification (NVC) Survey Plan.
- Figure 8.6b: Peatland Condition Areas.
- Figure 8.7: Protected Species Survey Results.
- Figure 8.8: Bat Survey Plan.
- Figure 8.9: Preliminary Bat Roost Appraisal Results.
- Figure 8.10: Fisheries Survey Plan.
- Figure 8.11: HSI Appraisal and eDNA Pond Survey Results.
- Confidential Figure 8.2.1: Protected Species Survey Results (Sensitive).
- Figure 8.12a – Priority Peatland (M19a) On-site.
- Figure 8.12b – Priority Peatland Loss.
- Figure 8.12c - Peatland Restoration for Compensation.
- Figure 8.13 - Outline Nature Enhancement Management Plan.
- Technical Appendix 8.1: Habitats and Vegetation.
- Technical Appendix 8.2: Protected Species.
- Technical Appendix 8.3: Bats.
- Technical Appendix 8.4: Fisheries.
- Technical Appendix 8.5: Peatland Compensation.
- Technical Appendix 8.6: Outline Nature Enhancement Management Plan.
- Figures and Technical Appendices are referenced in the text where relevant.

8.2.6 The site is defined by the red line boundary shown on Figures 8.1 to 8.11.

8.3 Legislation, Policy and Guidelines

Legislation

8.3.1 Relevant legislation and guidance documents have been reviewed and taken into account as part of this ecology assessment. Of particular relevance are:

- The Conservation of Habitats and Species Regulations 2017, as amended in Scotland by the Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 (collectively 'the Habitats Regulations').
- Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive).
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
- The Nature Conservation (Scotland) Act 2004.
- The Protection of Badgers Act 1992 (as amended in Scotland).
- The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.
- The Wildlife and Countryside Act 1981 (as amended).
- The Wildlife and Natural Environment (Scotland) Act 2011.
- The Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) (as amended in Scotland).

Planning Policy

8.3.2 Planning policy relevant to the Proposed Development is detailed in Chapter 4. Relevant policies (from the Scottish Borders Local Development Plan (LDP)), (adopted in 2016) to the ecology assessment are LDP policies within the Environmental Promotion and Protection (EP) which are summarised below:

- Policy EP1: International Nature Conservation Sites and Protected Species. The aim of this policy is to give designated or proposed Natura sites, Ramsar sites and sites where there is the likely presence of European Protected Species (EPS) protection from potentially adverse development. As part of the Habitats Regulations Appraisal (HRA) where a proposal could have a likely significant effect on a Natura site, an appropriate assessment will be required to demonstrate that the proposal will not affect the integrity of the site. If there is evidence that an EPS is present on-site, or may be affected by a Proposed Development, their presence must be established and any likely impact on the species fully considered prior to the determination of the planning application.
- Policy EP2: National Nature Conservation and Protected Species. The aim of this policy is to protect nationally important nature conservation sites and protected species. The sites and protected species are defined under the Wildlife and Countryside Act 1981 as amended and the Protection of Badgers Act 1992 as amended. Any development which directly or indirectly affects nationally important sites like SSSI and National Nature Reserves (NNR) would require mitigation measures of an appropriate nature to compensate for damage, and this may be required either on- or off-site.
- Policy EP3: Local Biodiversity. The aim of the policy is to safeguard and enhance local biodiversity.

8.3.3 National Planning Framework 4 (NPF4) adopted in February 2023, is also considered where relevant to ecology and biodiversity which are Policies 3 and 4. The aim of Policy 3 is to protect biodiversity, reverse biodiversity loss, deliver positive effects from development and strengthen nature networks. The aim of Policy 4 is to protect, restore and enhance natural assets making the best use of nature-based solutions. Furthermore, Policy 5 concerns protecting carbon-rich soils, restoring peatlands and minimising disturbance to soils from development; and Policy 6 concerns protecting and expanding forests, woodland and trees. Further details on NPF4 and these policies are provided in Chapter 4.

8.3.4 The Scottish Biodiversity List (SBL) 2020 and Scottish Borders Local Biodiversity Action Plan (2018-2028) are also considered in the assessment, where applicable.

Guidance

8.3.5 Consideration has been taken of the following best practice guidelines/guidance:

- Assessing the Cumulative Impact of Onshore Wind Energy Developments (NatureScot, 2012).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, 2016).
- Bat Surveys: Good Practice Guidance 2nd edition (Hundt, 2012).
- Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (NatureScot, 2021).
- Carbon and Peatland map (NatureScot, 2016).
- Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines (Marine Scotland Science, 2021).
- Good Practice During Wind Farm Construction (NatureScot, 2019).
- Planning guidance on on-shore wind farm development (Scottish Environmental Protection Agency (SEPA), 2014).
- Guidance on Assessing the Impacts of Groundwater Abstractions and Groundwater Dependant Terrestrial Ecosystems (GWDTEs) (SEPA, 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).
- General Pre-application and Scoping Advice for Onshore Wind Farms (NatureScot, 2022).
- Land Use Planning System Guidance Note 4: Planning Guidance on On-shore Windfarm Developments. Scottish Environment Protection Agency (Scottish Environmental Protection Agency, 2017a).
- Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Groundwater Abstractions and Groundwater Dependant Terrestrial Ecosystems. Scottish Environment Protection Agency (Scottish Environmental Protection Agency, 2017b).
- Standing Advice for Planning Consultations – Protected Species: Badger (NatureScot, 2020a).
- Standing Advice for Planning Consultations – Protected Species: Bats (NatureScot, 2020b).

- Standing Advice for Planning Consultations – Protected Species: Freshwater Pearl Mussel (NatureScot, 2020c).
- Standing Advice for Planning Consultations – Protected Species: Great Crested Newt (NatureScot, 2020d).
- Standing Advice for Planning Consultations – Protected Species: Otter (NatureScot, 2020e).
- Standing Advice for Planning Consultations – Protected Species: Pine Marten (NatureScot, 2020f).
- Standing Advice for Planning Consultations – Protected Species: Red Squirrel (NatureScot, 2020g).
- Standing Advice for Planning Consultations – Protected Species: Water Vole (NatureScot, 2020h).

8.3.6 Relevant legislation, policy and guidance documents have been reviewed and taken into account as part of this assessment.

8.4 Consultation

8.4.1 Table 8.1 provides details of consultations undertaken with relevant regulatory bodies, together with action undertaken by the Applicant in response to consultation feedback, relevant to ecology. Only those responses concerning ecology are included in Table 8.1.

Table 8.1 – Consultation

Consultee and Date	Consultation Response	Applicant Response
NatureScot 10 January 2023 - *Scoping*	Potential impacts on the qualifying interests of the River Tweed SAC will need to be considered given that the watercourses within the site flow into the River Tweed SAC and Site of Special Scientific Interest (SSSI).	Potential impacts have been addressed by good wind farm design, including embedded mitigation, and by a commitment to the employment of good construction and pollution prevention methods, the preparation and implementation of a Construction Environmental Management Plan (CEMP) (see outline CEMP within Technical Appendix 3.1) and having an Ecological Clerk of Works (ECoW) on-site at appropriate stages of the Proposed Development. Embedded mitigation includes a minimum 50 m buffer around all mapped watercourses for turbine hardstanding and substation compound, and no new vehicular watercourse crossings will be required (although an upgrade of an existing crossing may be required), avoiding direct impacts to watercourses. Two footbridge crossings will however be constructed over the Hallow Burn to accommodate the recreational heritage trail. See Section 8.7.
NatureScot 10 January 2023 – *Scoping*	The Proposed Development could have connectivity with the River Tweed SAC due to drainage and water flow within the site flowing into tributaries of the River Tweed SAC. Advise consideration is given to the potential effects of construction, operation and decommissioning of the Proposed Development in relation to the qualifying features of the SAC. Addressing the qualifying interests of the SAC would also address those of the SSSI.	Potential impacts on the qualifying interests of the River Tweed (SAC) have been considered, as detailed in Section 8.8.
NatureScot 10 January 2023 – *Scoping*	Welcomes the initial design considerations and mitigation proposed within the Scoping Report in relation to the SAC. Advise that sufficient information should be provided in the EIA Report to enable an appraisal of the likely impact of the Proposed Development on the qualifying interests of the River Tweed SAC. A Habitats Regulation Appraisal (HRA) will be required.	Noted; information to inform HRA is included in Section 8.14.

Consultee and Date	Consultation Response	Applicant Response
NatureScot 10 January 2023 – *Scoping*	Where impacts on protected species are identified, mitigation measures should be outlined within a species protection plan.	Noted; pre-construction surveys for protected terrestrial mammals including otter (*Lutra lutra*), water vole (*Arvicola amphibius*), badger (*Meles meles*), pine marten (*Martes martes*), and red squirrel (*Sciurus vulgaris*) will be undertaken prior to the commencement of construction works, as detailed in Section 8.7 and as outlined within the outline CEMP (see Technical Appendix 3.1). The results of pre-construction surveys will inform the need for further mitigation (if required) in respect of sensitive working practices, species protection plans (SPPs) and / or the requirement to consult with NatureScot in relation to protected species licencing. Based on the results of surveys to date, SPPs are likely to include otters as a minimum.
NatureScot 10 January 2023 – *Scoping*	Are content that Tweedsmuir Hills SSSI, Craigdilly SSSI and Moffat Hills SSSI/SAC are scoped out of assessment for the reasons given in the Scoping Report.	Noted; these have been scoped out of the assessment, as detailed in Section 8.8.
NatureScot 10 January 2023 – *Scoping*	Support the use of an Outline Habitat Management Plan (HMP). Support the proposal for an HMP to deliver biodiversity enhancement across the site. The EIA Report should offer an outline HMP that sets out broad measures to achieve this. The outline HMP would then be worked up in detail and implemented should the development be granted permission and be constructed. Reference can usefully be made to the Scottish Borders Council's Supplementary Planning Guidance for Biodiversity on their website.	Outline NEMP provided as Technical Appendix 8.6.
NatureScot 10 January 2023 - *Scoping*	Support the proposal for the EIA Report to include an outline Construction Environment Management Plan (CEMP)	Noted; Outline CEMP provided as Technical Appendix 3.1.
River Tweed Commission 21 December 2022 - *Scoping*	Recommend that construction avoids water bodies wherever possible. If construction is to be carried out near watercourses, a buffer zone of at least 50 m should be established.	Noted; avoidance of waterbodies and watercourses has been built into the Proposed Development design and no construction will be undertaken within 50 m of any waterbodies/watercourses. Works within 50 m of watercourses will be limited to some localised widening and upgrading of existing tracks. Two footbridge crossings will however be constructed over the Hallow Burn to accommodate the heritage trail.
River Tweed Commission 21 December 2022 - *Scoping*	Where there is a potential risk to salmonid populations, baseline survey data should be collected for a minimum of 12 months (ideally monitoring should be provided for more than 1 year) prior to construction to establish pre-construction characteristics.	Noted; a fish habitat survey has been completed for all watercourses within, and adjoining the site in 2022, as detailed in Technical Appendix 8.4. Embedded mitigation includes a minimum 50 m buffer around all mapped watercourses for turbine hardstanding and substation compound (and including BESS), and no new vehicular watercourse crossings will be required, avoiding direct impacts to watercourses (although an upgrade to an existing crossing may be required). Two footbridge crossings will however be constructed over the Hallow Burn to accommodate the heritage trail. It is considered that embedded mitigation and good practice to be implemented during construction and operational

Consultee and Date	Consultation Response	Applicant Response
		phases will prevent significant impacts on fish populations. A Fish Monitoring Plan (FMP), including pre-, during- and post-construction fish monitoring would be produced in consultation with the River Tweed Commission (see Section 8.7).
Scottish Borders Council 7 March 2024 – *Gatecheck Consultation*	Recommended that in cumulative assessment local woodland creation schemes should also be considered in the cumulative impact assessment.	Effects of (increasing) forestry cover on notable ecological features is considered in the cumulative assessment in Section 8.12.

8.5 Assessment Methodology and Significance Criteria

8.5.1 The assessment presented within this chapter has been undertaken in accordance with CIEEM guidelines (CIEEM, 2018) and considers the following main potential impacts upon ecological features associated with the construction and operation of the Proposed Development:

- habitat loss / deterioration - direct and indirect loss and deterioration of habitats;
- mortality / loss of life - direct or indirect loss of life or injury; and
- disturbance / displacement of species - disturbance and displacement of faunal species; loss, damage or disturbance to their breeding and/or resting places.

8.5.2 The potential effects are considered as a result of the Proposed Development alone and cumulatively, in-combination with other wind farm developments.

8.5.3 CIEEM guidelines (2018) stipulate that it is not necessary to carry out a detailed assessment of impacts upon ecological features that are sufficiently widespread, unthreatened and resilient to the impacts of the Proposed Development.

8.5.4 As such, the assessment considers effects upon designated sites and ecological features which are considered important on the basis of baseline information, relevant guidance, literature, professional judgement of the authors and opinions of statutory advisory bodies provided through consultations in relation to the Proposed Development and, where relevant, other wind farm developments.

8.5.5 Where ecological features are not considered so important as to warrant a detailed assessment, or where they will not be significantly affected on the basis of baseline information these are 'scoped out' (as agreed through the EIA Scoping Report and Opinion, see Table 8.1, or as detailed in Section 8.8) of the assessment. Mitigation measures for such features may, however, still be outlined as appropriate to reduce and/or avoid any potentially adverse effects or to ensure legislative compliance. Where relevant, these ecological features may also be discussed qualitatively within the EIA Report and given consideration in site-wide recommendations for habitat enhancement.

Study Area

8.5.6 Study areas, within which baseline information in relation to ecological features have been obtained, have comprised the site and areas out to 10 km from the site for specific species.

8.5.7 The locations of statutory designated sites for nature conservation with ecological qualifying interests have also been identified within 10 km of the site (Figure 8.1).

8.5.8 The study areas used have appropriately covered the developable areas within the site and adjacent habitats.

8.5.9 Full details of study areas adopted for desk study and field surveys are provided in Technical Appendices 8.1 to 8.4 and illustrated on Figures 8.1 to 8.12.

Desk Study

8.5.10 A desk study review of existing ecological information was undertaken to:

- identify the location of designated sites for nature conservation cited for ecological interest within the site and within close proximity to the Proposed Development (10 km for statutory sites and 2 km for non-statutory sites);
- identify existing records of protected and/or notable species and habitats within 2 km of the Proposed Development;
- identify any factor or features that may influence the potential for impacts on ecological features as a result of the Proposed Development;
- inform the requirement for further detailed survey; and

- provide context for assessment.

8.5.11 The following key sources were consulted:

- SiteLink website (NatureScot[1]).
- Scotland's Environment Map (Scottish Government[2]).
- The Wildlife Information Centre (TWIC).
- Saving Scotland's Red Squirrels.
- UK Habitats Directive Article 17 Report (JNCC, 2019).
- SEPA's River Basin Management Plan (SEPA, 2022).
- Tweed Fisheries Management Plan 6th Edition (The River Tweed Commission, 2018).
- Freshwater pearl mussel information web page (Joint Nature Conservation Committee, 2022).
- NatureScot Carbon and Peatland Map (SNH, 2016[3]).

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

8.5.13 Details and results of the desk study undertaken are provided in Technical Appendices 8.1 to 8.4.

Field Surveys

8.5.14 Detailed knowledge of habitats and vegetation, and the presence or likely presence of protected and notable faunal species, have been derived from field surveys.

8.5.15 The following field surveys have been completed:

- Phase 1 habitat survey;
- NVC survey;
- condition assessment – Glenmuck Bog Wildlife Site;
- terrestrial mammal surveys;
- great crested newt eDNA and Habitat Suitability Index Assessment;
- fish habitat survey;
- bat activity surveys; and
- preliminary bat roost assessment.

8.5.16 All field surveys have been undertaken within the most recently available two-year survey window prior to submission, in accordance with current NatureScot guidance (2022).

Phase 1 habitat survey

8.5.17 A Phase 1 habitat survey of the study area was undertaken on 17 June 2022. The surveys were undertaken in accordance with the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010).

8.5.18 The study area included coverage of all habitats within the site boundary (and some adjoining habitats), as shown on Figure 8.5, and as access permissions allowed.

8.5.19 Full details are provided in Technical Appendix 8.1.

NVC survey

8.5.20 An NVC survey of the study area was undertaken on 11 and 12 July 2022, following the guiding principles detailed in the NVC: Users' Handbook (Rodwell, 2006).

8.5.21 The study area included coverage of all habitats within the site boundary (and some adjoining habitats), as shown on Figure 8.6a, and as access permissions allowed, with a focus on those habitats likely to represent habitat types listed in Annex 1 of the Habitats Directive or comprising potential GWDTEs.

[1] https://sitelink.nature.scot/home [Accessed 15/04/2024]
[2] https://map.environment.gov.scot/sewebmap/ [Accessed 15/04/2024]
[3] https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map [Accessed 15/04/2024]

8.5.22 In April 2024, a further NVC survey was undertaken of the habitat classified as 'M19' during the July 2022 survey towards the north-west of the site (to be affected by the Proposed Development) to refine the habitat classification and record information into the condition of the habitat (see Figure 8.6b).

8.5.23 Full details are provided in Technical Appendix 8.1.

Condition Assessment – Glenmuck Bog Wildlife Site

8.5.24 A condition assessment was undertaken of the habitats in the Glenmuck Bog wildlife site in May 2023. The methodology was adapted from the Common Standards Monitoring Guidance for Upland Habitats, published by the JNCC (2009) and used by NatureScot for monitoring SSSIs. The results of the condition assessment are provided in Technical Appendix 8.1.

Protected Species

8.5.25 A walkover survey of the study areas for badger, pine marten, water vole, otter and red squirrel was undertaken over two visits between June and July 2022. In addition, an extended Phase 1 habitat survey was carried out of the mammal survey area on 17th June 2022 where signs of (or potential for) terrestrial mammals were searched for.

8.5.26 The survey methodology followed industry standard guidance: Chanin (2003), Cresswell *et al*. (2012), Dean *et al*., (2016), Harris *et al*., (1989) and NatureScot (SNH, 2018b).

8.5.27 The study area, as shown on Figure 8.7, comprised all areas within the site. This meant that, in accordance with NatureScot species-specific guidance (NatureScot, 2020a-e), potentially suitable habitats within the appropriate species-specific survey buffers (ranging from 50 m to 250 m from the Proposed Development) were typically covered, where accessible. The only exceptions are some of the larger survey buffers (out to 250 m) from Turbine 4 and some of its infrastructure, due to design evolution. However, the areas associated with this part of the Proposed Development to which effects are to be determined were appropriately covered from the surveys as shown in Figure 8.7. Furthermore, any evidence of protected species out to 250 m from the proposed turbine locations would have been anecdotally noted during the preliminary roost assessment for bats.

8.5.28 Two waterbodies, as shown on Figure 8.11**,** were identified within the site during the extended Phase 1 habitat survey; both were subject to great crested newt (*Triturus cristatus*) Habitat Suitability Index (HSI) assessment and environmental DNA (eDNA) surveys in May 2023. An additional two ponds were identified, during the extended Phase 1 habitat survey, within 250 m of the site boundary, however, these ponds are not within 250 m of the Proposed Development area, and as such, these ponds were not subject to HSI assessment and eDNA surveys.

8.5.29 The great crested newt eDNA surveys provide presence or likely absence data. NatureScot accepts the results of eDNA surveys to ascertain the presence or likely absence of great crested newt, providing the surveys conform to the methods in the technical report that accompanied Defra's research into eDNA (Biggs *et al*., 2014).

8.5.30 A great crested newt HSI appraisal of both waterbodies was made using the HSI methodology as developed by Oldham *et al.* (2000), and as detailed within ARG UK guidance (2010), and terrestrial habitats both within and immediately adjacent to the waterbodies was considered in terms of providing foraging opportunities and places of shelter and refuge.

8.5.31 The site is >125 km from the nearest priority area ('Angus Glens' in north-east Scotland) for Scottish wildcat (*Felis silvestris*)[4], and the species is considered absent from southern Scotland, and therefore the potential for this species to be present on-site was discounted.

8.5.32 Full details are provided in Technical Appendix 8.2.

Bat Habitat Appraisal

8.5.33 The habitats present within the site were appraised in June 2022 for their potential to support bats in terms of foraging and commuting opportunities in accordance with Bat Conservation Trust (BCT) guidance (Collins, 2016; applicable at the time of the survey).

8.5.34 The habitat appraisal was undertaken through a review of aerial imagery and OS mapping, together with ground truthing during other on-site surveys. Full details are provided in Technical Appendix 8.3.

Bat Activity Surveys

8.5.35 Bat activity surveys were undertaken in 2022 in accordance with NatureScot guidance (2021) comprising the use of ten automated monitoring stations located as close to each Proposed Development turbine location as possible whilst also considering on-site habitats and particularly

[4] https://opendata.nature.scot/datasets/snh::wildcat-priority-areas/explore?location=55.547334%2C-3.332362%2C9.99 [Accessed 15/04/2024]

focusing on habitats potentially suitable for foraging/commuting bats (e.g. with a linear feature within 50 m) (see Figure 8.8).

8.5.36 NatureScot guidance (2021) advises a minimum of ten consecutive monitoring nights for each activity period (spring, summer and autumn) and this has been exceeded for all monitoring stations across all three seasons, with the exception of a single station during the spring survey period and two monitoring stations during the summer period.

8.5.37 All sonogram data obtained from activity surveys was uploaded to the online Ecobat tool in order to quantify bat activity in accordance with NatureScot guidance (2021), with full details presented in Technical Appendix 8.3.

Preliminary Bat Roost Assessment

8.5.38 Structures and trees within the study area with the potential to support maternity bat roosts and significant hibernation and/ or swarming sites were identified through a review of aerial imagery and the preliminary habitat appraisal.

8.5.39 A daytime, ground-level preliminary roost assessment in accordance with BCT guidance (Collins, 2016) was undertaken in June 2022 to identify suitable bat roost features within trees and structures.

8.5.40 The study area comprised the site, which resulted in all potentially suitable structures within 280 m of the Proposed Development's turbine locations being appraised, where accessible (see Figure 8.9).

8.5.41 Full details are provided in Technical Appendix 8.3.

Fisheries Habitat Survey

8.5.42 A fish habitat survey, comprising a walkover, was completed of watercourses within, and adjoining, the site, as shown on Figure 8.10**,** on 20 and 21 October 2022. Watercourses were then classified in accordance with the Scottish Fisheries Co-ordination Centre's Habitat Surveys Training Course Manual (SFCC, 2007).

8.5.43 Full details are provided in Technical Appendix 8.4.

Field Survey Personnel

8.5.44 All field surveys were completed by experienced, reputable and professional ecologists, fully conversant in established ecology survey methodologies for proposed wind developments.

8.5.45 Details of field surveyors are provided in Technical Appendices 8.1 to 8.4.

Assessment of Potential Effect Significance

8.5.46 The assessment has been undertaken in accordance with CIEEM guidelines (2018) and includes the following stages:

- determination and evaluation of important ecological features;
- identification and characterisation of impacts;
- outline of mitigating measures to avoid and reduce significant impacts;
- assessment of the significance of any residual effects after such measures; and
- identification of appropriate compensation measures to offset significant residual effects.

Criteria for Assessing the Sensitivity of Features

8.5.47 Relevant European, national and local guidance from governments and specialist organisations has been referred to in order to determine the sensitivity (or importance) of ecological features. Reference has also been made to NatureScot guidance on key ecological features when considering the development of onshore wind farms in Scotland (NatureScot, 2022).

8.5.48 In addition, sensitivity has also been determined using professional judgement and taking account of the results of baseline field and desk study findings and the functional role of features within the context of the geographical area.

8.5.49 It should be noted that sensitivity, or importance does not necessarily relate to the level of legal protection that a feature receives, and ecological features may be important for a variety of reasons, such as their connectivity to a designated site, rarity or the geographical location of species relative to their known range.

8.5.50 For the purposes of this assessment the sensitivity or importance of an ecological feature is considered in the context of a defined geographical area, ranging from International to Local, as detailed in Table 8.2.

Table 8.2 – Sensitivity / Geographic Scale of Ecological Feature Importance

Sensitivity / Geographical Scale of Importance	Definition
High – International / National	An internationally or nationally designated site (i.e., SAC, Ramsar site or candidate site (e.g., cSAC) and/or SSSI). Large areas of priority habitat listed under Annex 1 of the Habitats Directive, and smaller areas of such a habitat that are essential to maintain the viability of that ecological resource. Or significant extents of a priority habitat identified in the SBL, or smaller areas which are essential to maintain the viability of that ecological resource. A regularly occurring, nationally or regionally significant population of any internationally or nationally important species, listed under Annex 2 or Annex 4 of the Habitats Directive, or Schedule 1 or Schedule 5 of the Wildlife and Countryside Act, or a SBL priority species.
Medium - Regional	Viable areas of key semi-natural habitat identified in the UKBAP. A regularly occurring, locally significant population of any nationally important species listed on the SBL and species listed under Schedule 5 of the Wildlife and Countryside Act or Annex 2 or Annex 4 of the Habitats Directive. Sites which exceed the local authority-level designations but fall short of SSSI selection guidelines, including extensive areas of semi-natural woodland.
Low – Local	Other species of local conservation. Areas of habitat or species considered to appreciably enrich the ecological resource within the local context (e.g., species-rich flushes or hedgerows). All other species and habitats that are widespread and common and which are not present in locally, regionally or nationally important numbers, or habitats which are considered to be of poor ecological value.

Criteria for Assessing the Magnitude of Impacts

8.5.51 Once identified, potential impacts are described making reference to the following characteristics as appropriate:

- adverse or beneficial;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and
- reversibility.

8.5.52 The assessment only makes reference to those characteristics relevant to understanding the nature of an impact and determining the significance of the resulting effect. For the purposes of this assessment the temporal nature of potential effects are described as follows:

- negligible: of inconsequential duration;
- short-term: for 1-5 years;
- medium-term: for 5-10 years;
- long-term: for 10-30 years; and
- permanent: >30 years.

8.5.53 The criteria used to determine the magnitude of impacts are set out in Table 8.3.

Table 8.3 – Impact Magnitude

Magnitude	Definition
Very High	The impact (either on its own or in-combination with other proposals) may result in the permanent total or almost complete loss of a designated site and/or species/habitat status or productivity. Or alternatively notable gains in the designated site and/or species/habitat status or productivity.
High	The impact (either on its own or in-combination with other proposals) may adversely, or beneficially, affect the conservation status of a designated site and/or species population, in terms of the coherence of its

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

Criteria for Assessing Effect Significance

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

8.5.55 For the purposes of assessment, significant effects are identified as those which encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).

8.5.56 Such effects are identified by considering the sensitivity of a receptor, the magnitude of the impact and applying professional judgement based on best available evidence, to identify whether the integrity of a receptor will be affected.

8.5.57 The term integrity is used here to refer to the maintenance of the conservation status of a population of a species at a specific location or geographical scale.

8.5.58 For the purposes of this assessment, significant effects are primarily expressed with reference to an appropriate geographical scale.

8.5.59 In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect has been assumed as a precautionary approach. Where uncertainty exists, this is acknowledged.

8.5.60 Where the assessment proposes measures to mitigate adverse effects on ecological features, a further assessment of residual effects, taking into account such measures, has been undertaken.

8.5.61 The predicted significance of the effect has been determined through a standard method of assessment based on the exercise of professional judgement, a combination of sensitivity and magnitude of change as detailed in Table 8.4 below and has been further informed by relevant information on species ecology, population trends, distributions, and evidence from the studies of ecological feature and wind farm interactions, as referenced herein. Unless otherwise stated, all effects are assumed to be adverse.

8.5.62 Major and moderate effects are considered significant in the context of the EIA Regulations.

Table 8.4 – Effect (EIA Significance)

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

Requirements for Mitigation

8.5.63 A mitigation hierarchy has been adopted to avoid, mitigate and compensate for potential ecological impacts as a result of the Proposed Development:

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

Assessment of Residual Effect Significance

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

Cumulative Assessment

8.5.65 Potentially significant cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location.

8.5.66 For aquatic features, potential cumulative effects are likely to be significant only for other developments located relatively close (i.e., within 2 km) and within the same hydrological sub-catchments.

8.5.67 For (non-avian) species, potentially significant cumulative effects are only likely where other developments are located within the regular range of more mobile species (e.g., bats). Cumulative effects have therefore been assessed with reference to NatureScot guidance (2021) for bats only and within 10 km of the Proposed Development.

8.5.68 The cumulative assessment includes consideration of:

- existing wind farm developments, either operational or under construction;
- consented wind farm developments, awaiting implementation; and
- wind farm applications awaiting determination within the planning process with design information in the public domain.

8.5.69 Those developments which have been withdrawn and/or refused are not considered, unless an appeal is currently in progress and information is available.

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

8.5.71 As such, the cumulative assessment considers those wind farm developments which are the subject of a valid planning application and so have sufficient information available in the public domain to allow a meaningful assessment.

Enhancement Opportunities

8.5.72 As a fundamental part of the Proposed Development, habitat enhancement opportunities on-site are investigated. The requirements of Policy 3 of NPF4 state that developments will contribute to the enhancement of biodiversity, and this could include restoring degraded habitats and strengthening nature networks and connections between them. Enhancement measures to be investigated and adopted are accordingly provided in the outline NEMP, Technical Appendix 8.6.

Limitations to Assessment

8.5.73 Limitations are discussed in full within Technical Appendices 8.1 to 8.4.

8.5.74 Overall, no limitations to the survey data in establishing an accurate reflection of the levels of target species activity and distributions, and habitats, within adopted study areas, particularly the site, are identified.

8.6 Baseline Conditions

Current Baseline

8.6.1 This section provides a summary of baseline ecological conditions in relation to designated sites with qualifying ecological interests, habitats and vegetation, protected species, fisheries and bats.

8.6.2 Full details are provided within Technical Appendices 8.1 to 8.4.

<u>Designated Sites for Nature Conservation</u>

8.6.3 This section should be read with reference to Figures 8.1 and 8.2.

8.6.4 The distances provided in Tables 8.5 and 8.6 are from the site boundary to the designated site boundary at their nearest points.

8.6.5 Statutory and non-statutory sites designated for ornithological features are addressed separately in Chapter 9.

Statutory Designated Sites for Nature Conservation

8.6.6 Table 8.5 provides a summary of statutory designated sites for nature conservation with cited ecological interests, located within 10 km of the site.

8.6.7 The site does not form a part of any internationally or nationally designated site for nature conservation with designated ecological interest.

Table 8.5 – Statutory ecological designated sites within 10 km of the site

Designated Site	Distance at closest point and orientation from site boundary	Qualifying Features
River Tweed SAC	– Immediately adjacent to the site to the south-east	– Atlantic salmon (*Salmo salar*) – Brook lamprey *(Lampetra planeri)* – Otter – River lamprey (*Lampetra fluviatilis*) – Sea lamprey (*Petromyzon marinus*) – Rivers with floating vegetation often dominated by water-crowfoot
River Tweed SSSI	– Immediately adjacent to the site to the south-east	– Atlantic salmon – Beetle assemblage – Brook lamprey – Fly assemblage – Otter – River lamprey – Sea lamprey – Trophic range river/stream – Vascular plant assemblage
Tweedsmuir Hills SSSI	– 2.38 km east	– Bryophyte assemblage – Upland assemblage – Vascular plant assemblage
Craigdilly SSSI	– 8.8 km south-east	– Sub-montane scrub
Moffat Hills SAC	– 9.25 km south-east	– Acidic scree – Alpine and subalpine heaths – Blanket bog – Dry heaths
Moffat Hills SSSI	– 9.25 km south-east	– Upland habitat assemblage – Vascular plant assemblage

Non-statutory Designated Sites for Nature Conservation

8.6.8 Consultation with TWIC indicated there are three non-statutory designated sites for nature conservation within 2 km of the site, one of which is located within the site boundary, as summarised in Table 8.6. All three are designated as both Scottish Wildlife Trust 'Wildlife Sites' (SWT) and also 'Local Biodiversity Sites – to be adopted' (LBS).

Table 8.6 – Non-statutory Designated Sites of Nature Conservation

Designated Site	The distance at the closest point and orientation from the site boundary	Botanical and/or Habitat Qualifying Features
Glenmuck Bog SWT & LBS	Within the site	Unmodified blanket bog, valley mire, flush and species-rich marshy grassland along a small burn.
Hawkshaw Bog SWT & LBS	Adjacent to southern site boundaries, other side (south) of the River Tweed	Blanket bog on the banks of the River Tweed, with small areas of base-rich flush and marsh with a range of flora and fauna, including amphibians. The riverside vegetation supports regenerating broadleaf trees.
Talla Reservoir SWT & LBS	1 km south-east	A large, oligotrophic man-made reservoir with a narrow fringe of grassland and conifer plantation; surrounded by upland grassland and conifer plantation.

Priority Habitats

8.6.9 No information on priority habitats was returned by the TWIC data search,

8.6.10 No woodland habitat listed on the ancient woodland inventory[5] is present within or adjacent to, the site.

Habitats and Vegetation

8.6.11 This section should be read with reference to Technical Appendix 8.1 and Figures 8.5 and 8.6.

[5] https://opendata.nature.scot/datasets/f51238bf8c8f4f859831c9a6ebd2598b/explore?location=55.515040%2C-3.443415%2C11.57 [Accessed 17/04/2024]

8.6.12 Coniferous plantation (A1.2.2) covers the majority of the site and mainly consists of Sitka spruce with some scattered larch and a few areas of Scots pine in the south-east of the site. Key habitats include dry heath, blanket bog and swamp. A summary of habitat types and approximate areas is provided in Table 8.7.

8.6.13 No protected plant species on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) or non-native plant species on Schedule 9 of the Act were found within the study area.

8.6.14 NVC communities identified through the NVC survey present on-site are summarised in Table 8.8 along with corresponding Habitats Directive (92/43/EEC) Annex 1 Habitat types, SBL priority habitat type and potential GWDTE status in accordance with SEPA guidance (2014) and NatureScot NVC / EUNIS / Annex 1 correspondence tables (2017). NVC communities inconsequential in extent (i.e. very localised) are not included in Table 8.8.

8.6.15 There are also a number of watercourses and small ponds within the site which are likely to be SBL priority habitats.

8.6.16 Some of the habitats within the study area are protected by non-statutory nature designations. Towards the west of the site, on the north side of Weird Law, habitats including blanket bog and marshy grassland are included in Glenmuck Bog – part of this designated site is an existing Scottish Wildlife Trust Wildlife Site, and part a proposed Local Biodiversity Site.

8.6.17 Some areas of the M19a *Calluna vulgaris – Eriophorum vaginatum* mire, *Erica tetralix* sub-community (which are classified as 'blanket bog', see Table 8.8) are of possible national interest, as detailed in Technical Appendix 8.1.

Table 8.7 – Summary of Baseline Habitats Including Approximate Area and Relative Percentage Coverage within the Site

Phase 1 Habitat Type	Extent (ha)	Relative Cover (%)
A1.1.1 Broadleaved woodland-seminatural	2.30	0.66
A1.1.2 Broadleaved woodland-plantation	2.79	0.80
A1.2.2 Coniferous woodland-plantation	176.74	50.71
A1.3.2 Mixed woodland-Plantation	0.21	0.06
A2 Scrub	0.16	0.05
A3/B1.2 Parkland & Scattered trees/Acid grassland-semi-improved	4.89	1.40
A4 Recently felled woodland	4.10	1.18
B1.1 Acid grassland-unimproved	0.73	0.21
B1.1/B5 Acid grassland-unimproved/Marshy grassland	5.64	1.62
B1.1/B5/C1 Acid grassland-unimproved/Marshy grassland/Bracken	11.37	3.26
B1.1/C1 Acid grassland-unimproved/Bracken	1.57	0.45
B1.1/C1/B5/D1 Acid grassland unimproved/Bracken/Marshy grassland/Dry dwarf shrub	5.40	1.55
B1.1/D1/B5 Acid grassland-unimproved/Dry dwarf shrub heath/Marshy grassland	9.45	2.71
B1.2 Acid grassland-semi-improved	11.54	3.31
B1.2/C1 Acid grassland-semi-improved/Bracken	0.04	0.01
B5 Marshy grassland	14.21	4.08
C1 Bracken	1.53	0.44
C1.1 Bracken	0.17	0.05
C1/D1 Bracken/Dry dwarf shrub heath	3.45	0.99
D1 Dry dwarf shrub heath	0.32	0.09
D1.1 Dry dwarf shrub heath - acid	4.04	1.16
D1.1/B5 Dry dwarf shrub heath - acid/Marshy grassland	3.81	1.09
D1/B1.1/C1 Dry dwarf shrub heath/Acid grassland-unimproved/Bracken	12.62	3.62
D1/B5 Dry dwarf shrub heath/Marshy grassland	0.88	0.25
D1/C1/B5 Dry dwarf shrub heath/Bracken/Marshy grassland	0.34	0.10
D1/C1/E3 Dry dwarf shrub heath/Bracken/Fen	0.78	0.22
E1.6.1 Blanket bog	40.36	11.58
E1.6.1/E1.7 Blanket bog/Wet modified bog	5.43	1.56
E1.6.1/E1.7/D1.1 Blanket bog/Wet modified bog/Dry dwarf shrub heath - acid	5.96	1.71
E1.7 Wet modified bog	8.32	2.39
E1.7/D1.1 Wet modified bog/Dry dwarf shrub heath - acid	0.23	0.07
F1 Swamp	0.21	0.06
G1.1 Standing water - eutrophic	0.59	0.17
Track	8.34	2.39
Total	**348.52**	**100**

Table 8.8 – Summary of Vegetation Communities in the Study Area

Phase 1 habitat	NVC community	Principal corresponding Habitats Directive Annex 1 type/s	Corresponding SBL Priority Habitat Type	Potential dependence of community/ habitat on groundwater.* 1=high, 2=moderate, 3=low
D1 Dry heath	H10a *Calluna vulgaris – Erica cinerea* heath, typical sub-community	4030 European dry heaths	Upland Heathland	3
D1 Dry heath	H12a *Calluna vulgaris – Vaccinium myrtillus* heath, *Calluna vulgaris* sub-community	4030 European dry heaths	Upland Heathland	3
E1.6.1 Blanket bog	M19a *Calluna vulgaris – Eriophorum vaginatum* mire, *Erica tetralix* sub-community	H7130 Active blanket bog	Blanket Bog	3
B5 Marshy grassland	M23a *Juncus effusus / acutiflorus - Galium palustre* rush pasture, *Juncus acutiflorus* sub-community	-	Upland flushes, fens and swamps	1
B5 Marshy grassland	M23b *Juncus effusus/acutiflorus - Galium palustre* rush pasture, *Juncus effusus* sub-community	-	-	1
B5 Marshy grassland	M25 *Molinia caerulea-Potentilla erecta* mire.	-	-	2
E3 Fen	M27 – *Filipendula ulmaria – Angelica sylvestris* mire	-	Lowland fen	2
F1 Swamp	S9 *Carex Rostrata* swamp	3160 Natural dystrophic lakes and ponds	Freshwater and wetland	3
B1.1 Acid grassland – unimproved	U4a *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community	-	-	3
B1.2 Acid grassland – semi-improved	U4b *Festuca ovina - Agrostis capillaris - Galium saxatile* grassland, *Holcus lanatus - Trifolium repens* sub-community	-	-	3
C1 Bracken	U20 *Pteridium aquilinum – Galium saxatile* community	-	-	3
A2 Scrub	W2 *Salix cinerea-Betula pubescens-Phragmites australis* woodland	-	Wet woodland	2
A1.1.2 Broadleaved semi-natural woodland.	W15 *Fagus sylvatica-Deschampsia flexuosa* woodland	-	-	3
* As listed in Appendix 4 of SEPA (2014) LUPS Guidance Note 31. The categorisation of GWDTEs is preliminary and is based on vegetation communities present, and therefore confirmed GWDTE categorisation is based on subsequent formal hydrological assessment.				

Peatlands

8.6.18 The Carbon and Peatland Map (NatureScot, 2016) was consulted to determine likely peatland habitat classes present at the site. The Carbon and Peatland map has been developed as *"a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities*". It identifies potential areas of *"nationally important carbon-rich soils, deep peat and priority peatland habitat"*. Class 1 peatlands are *"likely to be of high conservation value"* and Class 2 *"of potentially high conservation value and restoration potential"*. Class 1 and Class 2 peatlands are considered to be nationally important under Scottish Planning Policy. It is recognised that this definition is not purely for nature conservation and so not directly applicable to evaluating purely the Nature Conservation Value of a peatland.

8.6.19 Priority peatland habitats are defined by NatureScot as *"land covered by peat-forming vegetation or vegetation associated with peat formation"* which is considered to be comparable to the definition of Annex 1 'active' bog habitats.

8.6.20 The Carbon and Peatland Map (2016) identifies that the site is not located within areas of Class 1 or Class 2 priority peatland; comprising mainly of Class 3 peatland but with some small areas of Class 4 and Class 5 towards the peripheries and south-east. There is a small area of Class 1 peatland approximately 27 m west of the site.

8.6.21 Class 3 peatland (which covers most of the site) is described in guidance (SNH, 2017) as: *"Dominant vegetation cover is not a priority peatland habitat but is associated with wet and acidic types. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat".* Class 5 peatland is described as an *"Area of peat but no peatland habitat recorded"*.

8.6.22 As the Carbon and Peatland Map is a high-level tool, peat depth surveys (as detailed in Chapter 10 and Technical Appendix 10.2.) and detailed Phase 1 habitat and NVC surveys have also been carried out to inform the detailed site assessment on peatland. Information derived from site-specific surveys is considered to be the most accurate and is subsequently the most appropriate dataset for use in the assessment.

8.6.23 This chapter includes an assessment of priority habitats. For clarity, for the purposes of impact assessment, priority habitats have been defined with reference to Annex 1 of the Habitats Directive, SBL priority habitats and GWDTE. Chapter 10 provides a more detailed assessment of the effects of the Proposed Development on the peatland on-site.

Terrestrial Mammals (excluding bats)

8.6.24 Baseline terrestrial mammal conditions are summarised in Table 8.9.

8.6.25 Full details are provided in Technical Appendix 8.2 and Figure 8.7, and Confidential Figure 8.2.1.

Table 8.9 – Summary of Terrestrial Mammal Survey Results

Terrestrial Mammal Species	Summary of Survey Results
Red squirrel	A single record of red squirrel was returned from TWIC approximately 0.5 km east of the site, dating from 2014. Seventeen records of red squirrels were returned from Saving Scotland's Red Squirrels website within 2 km of the site, the closest of which was located within the site. No signs of red squirrels were recorded during the surveys, however, woodland habitat across the study area has the potential to be used by the species. A grey squirrel (an invasive non-native species) was recorded within the site.
Water vole	No records of water vole were returned from the desk study sources and no evidence of this species was recorded during field surveys. The watercourses on-site are considered to be sub-optimal for water vole.
Badger	A single record of badger was returned from TWIC within 2 km of the site, dating from 2013. Evidence of badger was recorded within the mammal study area; given the sensitivity of the records, details are presented in Confidential Figure 8.2.1. Habitats present on-site (woodland) are suitable for the species.
Otter	No records of otter were returned from the TWIC. The baseline protected species surveys for the consented Whitelaw Brae Wind Farm revealed the presence of otters along the Hawkshaw Burn, Fingland Burn and the River Tweed, with a couch (resting place) identified in the study area adopted for the surveys (location not disclosed). Surveys recorded evidence of the presence of otter within the site, with otter spraint found at the waterbody between Glenmuck Height and Weird Law, and to the east of the site adjacent to a tributary to Bield Burn.
Pine marten	No records of pine marten were returned from the desk study sources. Evidence of pine marten was recorded within the mammal study area, comprising scats located at three distinct locations, primarily at the edge of woodland habitat. Woodland habitat across the study area has the potential to be used by the species.

Bats

8.6.26 This section should be read with reference to Technical Appendix 8.3 and Figures 8.8 and 8.9.

Desk Study

8.6.27 The Proposed Development is not located within 10 km of any national or internationally designated site for nature conservation, with bat-qualifying interests.

8.6.28 Talla Reservoir SWT & LBS lists common pipistrelle (*Pipistrellus pipistrellus*) as a 'notable' species.

8.6.29 TWIC returned five records of soprano pipistrelle and four records of common pipistrelle within 2 km of the site, all of which were dated from 2018 and located at Blacklaw, Tweedsmuir, approximately 2 km south of the site.

8.6.30 In a review of the UK Habitats Directive Article 17 Report 'Habitats Directive Report 2019: Species Conservation Status Assessments 2019' based on JNCC (2019a), the site is located within the known UK distribution range of common pipistrelle, soprano pipistrelle (*Pipistrellus pygmaeus*), Daubenton's

bat (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri*), whiskered bat (*Myotis mystacinus*) and brown long-eared bat (*Plecotus auritus*).

Bat Habitat Appraisal

8.6.31 A large proportion of the study area comprises coniferous plantation woodland which is likely to provide limited foraging and roosting opportunities within the interior of forestry blocks, but which may provide suitable foraging and commuting opportunities along rides and woodland edges, providing connectivity to more favourable habitats in the wider surrounding area.

8.6.32 The watercourses that flow through the study area (tributaries of the River Tweed) are likely to provide some connectivity to the wider area, but foraging opportunities are limited within the study area and are likely to be localised to clear-fell areas, around ponds and open grassland areas where shelter is provided by woodland edge.

8.6.33 Overall, the bat study area is considered to offer low suitability habitats for bats (in accordance to Collins, 2016), although small areas of habitats of increased suitability are present and offer localised foraging opportunities, such as watercourses, ponds and their associated habitats.

Bat Activity Surveys

8.6.34 Common pipistrelle, soprano pipistrelle, *Nyctalus* species, brown long-eared bat and *Myotis* species were recorded during the bat activity surveys.

8.6.35 The site is not within the published usual range of noctule *Nyctalus noctula* or Leisler's bat *Nyctalus leisleri;* however, *Nyctalus* species were recorded during the bat activity surveys and therefore it is considered that one or both of these species are present at the locality.

8.6.36 Common pipistrelle was the most frequently recorded species, representing 45.3 % of all recordings. The species was recorded on 202 nights out of 359 and represented 28.46 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) common pipistrelle activity was concluded to be low to moderate at the 33rd median percentile and high at the 100th max percentile.

8.6.37 Soprano pipistrelle represented 38.7 % of all recordings. The species was recorded on 192 nights out of 359 and represented 24.34 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) soprano pipistrelle activity was concluded to be low at the 18th median percentile and moderate to high at the 80th max percentile.

8.6.38 *Myotis* species bats represented 9.9 % of all recordings. The species group was recorded on 143 nights out of 359 and represented 6.22 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) *Myotis* species activity was concluded to be low to moderate at the 30th median percentile and high at the 100th max percentile.

8.6.39 *Nyctalus* species represented 6 % of all recordings. The species group was recorded on 133 nights out of 359 and represented 3.74 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles), *Nyctalus* species activity was concluded to be low at the 17th median percentile and high at the 100th percentile.

8.6.40 Brown long-eared represented 0.1 % of all recordings. The species was recorded on 23 nights out of 359 and represented <1 pass per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) activity of brown long-eared bats was considered to be moderate at the 42nd median percentile and moderate to high at the 69th max percentile.

8.6.41 Based on the Ecobat analysis, it is possible that common pipistrelle, soprano pipistrelle, *Myotis* species, *Nyctalus* species and brown long-eared bat roosts may be present within close proximity to the site.

8.6.42 The site has been assessed as having an overall 'Site Risk' of 2, representing a Low Site Risk:

- the site 'Habitat Risk' is classified as Low.
- the site 'Project Size' is classified as being Medium.

8.6.43 In summary, the Overall Risk Assessment is considered to fall under "Low/Medium Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for common pipistrelle; "Low Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for soprano pipistrelle; and "Low Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for *Nyctalus* species. *Myotis* species and brown long-eared bats are not considered further given they are not 'high collision risk species'.

Preliminary Bat Roost Assessment

8.6.44 Areas of broad-leaved and mixed woodland comprising tall mature trees, located in the centre/south of the site, particularly the scattered trees close to the A701 road, were considered to have features suitable to support roosting bats.

8.6.45 Trees with bat roost potential are presented on Figure 8.9.

8.6.46 All structures with the potential to support roosting bats are >280 m from Proposed Development turbines.

8.6.47 The majority of the study area, comprising coniferous plantation woodland, is sub-optimal for roosting bats.

Fish

8.6.48 This section should be read with reference to Technical Appendix 8.4 and Figure 8.10.

8.6.49 TWIC returned no fisheries records within 2 km of the site, dating from the last ten years.

8.6.50 The watercourses within the site all drain into the River Tweed catchment. The River Tweed is designated as both a SAC and SSSI on account of its Atlantic salmon and lamprey populations. There are two SEPA classified watercourses within the study area; the River Tweed and the Fruid Water (a tributary of the River Tweed). The River Tweed has an overall ecological status of moderate, whilst the Fruid Water is assessed as having good overall ecological status. There are some minor waterfalls within the study area which will likely reduce the potential for fish migration (Fruid Water and Bield Burn). The main stem of the River Tweed is highly suitable for a range of migratory and non-migratory fish of all ages, and the Menzion Burn and Rigs Burn offer spawning and juvenile habitats for fish. However, the majority of the watercourses lie on moderately steep to steep gradients and many are peaty headwaters with low-negligible suitability for fish. No evidence of freshwater pearl mussel was identified during the survey, but the River Tweed has the potential to support the species.

Great crested newts

8.6.51 This section should be read with reference to Technical Appendix 8.2 and Figure 8.11.

8.6.52 The two ponds surveyed on-site scored ‘below average’ for the HSI appraisal, and the eDNA surveys of both ponds did not provide any evidence for the presence of great crested newts.

Future Baseline

8.6.53 In the absence of the Proposed Development, assuming a “do-nothing” scenario or gap between baseline surveys and the commencement of construction of the Proposed Development, changes in the baseline ecology conditions (i.e. distributions and populations) are most likely to result from habitat modifications within, or surrounding, the site due to local land management practices, principally, forestry works and some livestock grazing.

8.6.54 Whilst short-term and small-scale variability in populations and distributions may occur, and revisions to conservation statuses and designations are possible, such changes would be unlikely to qualitatively alter the conclusion of the assessment presented within and have been accounted for through the application of a precautionary approach and appropriate mitigation.

8.6.55 Increased summer and winter temperatures and higher average precipitation rates in summer and winter, predicted by climate change, are likely to result in an extended growing/breeding season with earlier in the year vegetation growth and breeding activity of key species. Increased rainfall is likely to result in greater vegetation growth, although for some botanical species, it may have adverse effects (through water-logging). Higher rates of juvenile mortality for key species may be expected as a result of higher rates of rainfall. The bat activity season is likely to be extended by the higher seasonal temperatures, but conversely, higher rates of rainfall are likely to adversely affect foraging activity.

8.6.56 The opposing potential effects of climatic change on ecology receptors makes predicting future likely outcomes difficult. However, the potential effects on ecology receptors detailed in this chapter are not predicted to substantively change in relation to climate change over the next 50 years.

8.7 Standard Mitigation

Mitigation through Design

8.7.1 The Proposed Development has been subject to a number of design iterations and evolution in response to constraints identified as part of the baseline studies, intended to reduce environmental effects (see Chapter 2 for further details).

8.7.2 In accordance with the mitigation hierarchy, the following design considerations have been incorporated to avoid and minimise adverse effects upon ecological features:

- Proposed Development design has been sensitive to the River Tweed SAC and SSSI which sit adjacent to the southern site boundary (on the other side of the A701). Turbines and infrastructure have been offset from the SAC and SSSI boundary as far as practicable (144 m from the substation compound and 720 m from the nearest turbine), and existing commercial forestry between the

SAC/SSSI and the turbines will also largely be retained. This aimed to avoid the potential for direct and/or indirect effects upon the designation and its ecological qualifying interests;

- the design of the Proposed Development has largely avoided those areas of bog, for example, five of the Proposed Development's seven turbines (and the majority of other infrastructure) are located within commercial forestry plantation blocks;
- the Proposed Development avoids direct impacts on watercourses, no new vehicular watercourse crossings will be required (although, subject to structural analysis at the detailed design stage, an upgrade of an existing crossing may be required, it will be sensitively designed to allow the continued movement of water and wildlife therein);
- two footbridge watercourse crossings will be constructed over the Hallow Burn to accommodate the recreational heritage trail. These will be designed to allow the continued movement of water and wildlife therein, with effects on the watercourse, and its bank, minimal (see Chapter 10);
- the length of new track construction has been minimised with existing forestry tracks used to minimise land take;
- a minimum 50 m buffer has been included around all mapped watercourses for turbine hardstanding and substation compound (including BESS);
- the length of the access track within 50 m of mapped watercourses has been minimised as part of the sensitive Proposed Development design. Works within 50 m of watercourses will be limited to localised widening and upgrading of existing tracks;
- a minimum 55 m buffer[6] between turbine locations and watercourses has additionally been included to achieve a minimum 50 m 'standoff' from bat habitat features (watercourses) and turbine blade tips in accordance with current good practice mitigation outlined in NatureScot guidance (2021);
- a minimum 98 m radius key-holing requirement around turbine locations has been incorporated into felling and restocking plans for the Proposed Development, to achieve a minimum 50 m 'standoff' from bat habitat features (woodland) and turbine blade tips in accordance with current good practice mitigation outlined in NatureScot guidance (2021);
- a minimum 50 m buffer (from blade tip) from all buildings has been maintained, in the event bat roost establishment may occur between baseline surveys and the commencement of operation;
- a minimum 50 m buffer between proposed working areas and waterbodies has been included to protect potential amphibian habitat; and
- a minimum 30 m buffer between turbine locations, track and substation compound and the identified badger sett has been included in accordance with current good practice mitigation outlined in NatureScot guidance (2020a).

Embedded Mitigation Measures

8.7.3 Full details of construction phase mitigation measures for the Proposed Development will be contained within a CEMP (see outline CEMP, Technical Appendix 3.1). The CEMP will include all good practice construction measures, pollution prevention controls, sediment management and sensitive techniques with regard to construction in peatlands and near watercourses to be implemented over the course of the construction of the Proposed Development in line with current industry and statutory guidance. The CEMP will include information on water quality monitoring during the construction phase of the Proposed Development (which will be agreed upon with The River Tweed Commission). The CEMP will also include a commitment to no nocturnal works using artificial lighting, which could otherwise adversely affect foraging/commuting bats.

8.7.4 Information about the tree felling and re-planting is provided in Chapter 15.

8.7.5 Good practice measures to protect retained habitats during the construction works will also be implemented, including the sensitive demarcation of working areas, to be overseen by an ECoW.

8.7.6 The CEMP will include HSPPs detailing good practice measures for construction works within Annex 1, SBL or potential GWDTE habitats. HSPPs will detail measures required to manage construction works within these sensitive habitats and include habitat restoration measures.

8.7.7 Good practice pollution prevention measures during work are discussed further in Chapter 3.

8.7.8 Good practice measures to prevent harm to faunal species will also include SPP (see Pre-construction Surveys, below) and the careful storage of potentially dangerous substances or materials within construction compounds. Excavations will either be temporarily covered at night or designed to include a ramp.

[6] Micrositing will take these required buffers into account.

8.7.9 Good practice habitat reinstatement measures will also be adopted and implemented in areas subject to disturbance during construction works as soon as it is practical to do so. Further details of habitat reinstatement measures to be implemented will be provided within the CEMP and with habitat enhancement measures provided within the outline NEMP (see Technical Appendix 8.6).

8.7.10 A fish monitoring plan will also be implemented to record pre-, during and post-construction fish populations in watercourses on and adjoining the site, in consultation with The River Tweed Commission.

Pre-construction Surveys

8.7.11 There is potential for a change in the distribution of protected terrestrial mammal species within the site, between the completion of baseline surveys presented herein and the commencement of construction activities for the Proposed Development. Pre-construction surveys for protected terrestrial mammals including otter, water vole, badger, pine marten, and red squirrel will therefore be undertaken, within a defined period prior to the commencement of construction works and as set out within the outline CEMP (Technical Appendix 3.1).

8.7.12 This will cover all areas within 250 m of the Proposed Development and associated working areas.

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

Ecological Clerk of Works

8.7.14 A suitably qualified ECoW will be employed for the duration of the construction and reinstatement periods, to ensure ecological interests are safeguarded, although this may not necessarily be a full-time role throughout. The role of the ECoW related to ecological work will include the following tasks:

- provide toolbox talks and information to all staff on-site, so staff are aware of the ecological sensitivities within the site and the legal implications of not complying with agreed working practices;
- agree and monitor measures designed to minimise damage to retained habitats;
- undertake pre-construction surveys and advise on ecological issues and working restrictions where required;
- complete site-supervision works as required, in relation to sensitive habitats and protected species; and
- oversee restoration of working areas following construction.

Operational Period

8.7.15 Direct effects for sensitive ecological receptors (such as habitat loss and disturbance) are not anticipated to occur during the operational period of the Proposed Development with good practice measures in place, including pollution prevention controls and operational vehicles keeping to defined access routes.

8.7.16 During the operation of the Proposed Development maintenance visits would be infrequent and unlikely to result in disturbance to ecological receptors.

Decommissioning Environmental Management Plan

8.7.17 At the point of decommissioning, a Decommissioning Environmental Management Plan (DEMP) will be developed through consultation with the Scottish Borders Council (SBC), NatureScot and other relevant consultees in line with relevant legislation and guidance at that point in time. This will detail those measures to be adopted to ensure the protection of key ecological receptors. This will typically mirror those measures adhered to in the CEMP and will include pollution prevention protocols and pre-decommissioning surveys.

8.8 Receptors Brought Forward for Assessment

8.8.1 The results of the desk study and field surveys were used to inform the identification of important ecological features within and around the site to be considered in the assessment.

8.8.2 Through consultation (see Table 8.10) and by virtue of the static nature of the sites' qualifying habitats interests, spatial separation and/or absence of hydrological pathways of connectivity, potential for indirect effects upon the ecological qualifying interests of any statutory designated site for nature conservation located greater than 2 km from the site are scoped out of this assessment (given lack of identified pathways of effects to qualifying interest).

8.8.3 A summary of identified Important Ecological Features in the study area relevant to the Proposed Development is provided in Table 8.10, and details whether each feature is scoped in or out of the assessment.

Table 8.10 – Summary of Sensitive/Important Ecological Feature Sensitivity

Important Ecological Feature	Sensitivity	Scoped In or Out?	Justification
River Tweed SAC (excluding otter)	High / International	Out	The River Tweed SAC sits adjacent to the site boundary (on other side of the A701), but it is approximately 75 m away from the Proposed Development, at its nearest point (the existing track which will be used for access, with only localised widening and upgrading works). Proposed Development design and evolution have eliminated the need for new vehicular watercourse crossings (with only one existing watercourse upgrade potentially required, and any upgrade will be sensitively designed to allow the continued, uninterrupted flow of water and wildlife therein, see Chapter 10 for further information). There are two footbridge crossings across the Hallow Burn (which tributes into the River Tweed SAC) proposed to accommodate the recreational heritage trail. These will be sensitively designed to allow the continued free flow of water and wildlife therein, as well as minimising effects on the burn's banks (see Chapter 10 for further details). Futhermore, a minimum 50 m buffer around all mapped watercourses from turbine hardstanding and substation compounds has been adopted, and works within 50 m of watercourses will be limited to vehicular access along existing tracks (with some localised upgrading and widening works). Embedded mitigation and good practice measures implemented under the CEMP, including (but not restricted to) pollution and siltation protection measures, water quality monitoring (pre-, during and post-construction) and the presence of an ECoW during construction, would prevent adverse impacts associated with the Proposed Development to the River Tweed SAC and it's solely aquatic species. Although the majority of the watercourses, within the site, lie on moderately steep to steep gradients and many are peaty headwaters with negligible-low suitability for fish, an FMP, including provision for pre, during- and post-construction fish monitoring would be produced in consultation with River Tweed Commission. As such, and providing the implementation of good practice construction measures detailed herein (and in the outline CEMP provided as Technical Appendix 3.1), there is no route to impact for any of the solely aquatic qualifying features of the SAC (Atlantic salmon, brook lamprey, river lamprey, sea lamprey and rivers with floating vegetation often dominated by water-crowfoot), and such likely significant effects on the solely aquatic qualifying features are be scoped out and are not considered further in this EIA.
River Tweed SSSI (excluding otter)	High / National	Out	The River Tweed SSSI sits adjacent to the site boundary, but it is approximately 75 m away from the Proposed Development, at its nearest point (the existing track which will be used for access, with some localised widening and upgrading works). Proposed Development design and evolution have eliminated the need for new vehicular watercourse crossings (with only one existing watercourse crossing potentially needing upgrading, but will be sensitively designed to allow the continued, uninterrupted flow of water and movement of wildlife therein, see Chapter 10 for further information). There are two footbridge crossings across the Hallow Burn (which tributes into the River Tweed SSSI) proposed to accommodate the recreational heritage trail. These will be sensitively designed to allow the continued free flow of water and wildlife therein, as well as minimising effects on the burn's banks (see Chapter 10 for further details). Furthermore, a minimum 50 m buffer around all mapped watercourses from turbine hardstanding and substation compounds has been adopted and works within 50 m of watercourses will be limited to vehicular access along existing tracks (with some localised upgrading and widening required). Embedded mitigation and good practice measures implemented under the CEMP, including (but not restricted to) pollution and siltation protection measures, water quality monitoring (pre-, during and post-construction) and the presence of an ECoW during construction, would prevent adverse impacts associated with the Proposed Development to the River Tweed SSSI and it's solely aquatic species. Although the majority of the watercourses within the site lie on moderately steep to steep gradients and many are peaty headwaters with negligible-low suitability for fish, an FMP, including provision for pre, during- and post-construction fish monitoring would be produced in consultation with River Tweed Commission. As such, and providing the implementation of good practice construction measures detailed herein (and in the outline CEMP provided as Technical Appendix 3.1), there is no route

Important Ecological Feature	Sensitivity	Scoped In or Out?	Justification
			to impact for any of the solely aquatic qualifying features of the SSSI (Atlantic salmon, brook lamprey, river lamprey, sea lamprey and rivers with floating vegetation often dominated by water-crowfoot), and such likely significant effects on the solely aquatic qualifying features are be scoped out and are not considered further in this EIA. The fly assemblage (which is a qualifying feature) includes mayflies (order *Ephemeroptera*), caddisflies (order *Trichoptera*), stoneflies (order *Plecoptera*), soldier flies (family *Stratiomyidae*), long-legged flies (family *Dolichopodidae*), craneflies (superfamily *Tipuloidea*) and dance flies (family *Empididae*). Beetles which live in the marginal shoals of silt, gravel and shingle are also qualifying features of the SSSI. The fly and beetle assemblages are largely aquatic or rely on aquatic habitats during one or more life stages. Due to the design of the Proposed Development and embedded mitigation/good practice measures, as outlined above and in the outline CEMP provided as Technical Appendix 3.1, likely significant effects on qualifying SSSI fly and beetle assemblage features are scoped out of this EIA.
River Tweed SAC & SSSI (otter only)	High / International High / National	In	Otter is provided protection under the Habitats Regulations. While there is no route to impact for most of the qualifying features of both the SAC and SSSI, otter is a mobile species that may use habitats within the site. Although no holts or potential otter resting places were recorded within the site, the potential for breeding or resting places to be established prior to the commencement of construction activities for the Proposed Development cannot be discounted. The nature of potential impacts on otters relates to the construction phase (injury/mortality; and, temporary disturbance). Given the status of otter as a qualifying feature of the River Tweed SAC and SSSI and its known presence within the site (spraint), as well as the existence of suitable habitat for this species within and surrounding the site, the potential for impacts upon the otter qualifying interest of the River Tweed SSSI and SAC is assessed within this chapter.
SWT & LBS (Glenmuck Bog, Hawkshaw Bog and Talla Reservoir)	Low / Local	Out	The SWTs and LBSs will not be subject to direct or indirect effects of the Proposed Development by virtue of distance from the Proposed Development. Works within 50 m of Glenmuck Bog SWT and LBS will be limited to vehicular access along the existing forestry access track; with some localised widening and upgrading works to existing tracks. Embedded mitigation, including good practice measures in relation to pollution risk, sediment management and sensitive techniques with regard to construction near watercourses, are considered appropriate to avoid any potentially significant adverse effects upon habitats within the SWT and LBS. As such, these receptors are scoped out of this assessment. An outline NEMP for the Proposed Development (Technical Appendix 8.6), details enhancement measures and includes restoration of habitats within Glenmuck Bog. Furthermore, peatland restoration of additional areas of Glenmuck Bog are detailed as compensation for the modest loss of priority peatland habitat as a result of the Proposed Development (see Technical Appendix 8.5).
Annex 1, SBL or potential GWDTE habitats	Medium/Regional	In	These habitats are included on Annex 1 of the Habitats Directive and are potentially GWDTE and/or listed on the SBL. Habitat loss as a result of the Proposed Development has been minimised through a sensitive and iterative design process, however direct land-take resulting in the loss of some Annex 1/ GWDTE/SBL habitat types will be unavoidable. Additionally, temporary habitat losses are also anticipated to occur during the construction phase of the Proposed Development. The potential for indirect effects on adjoining/ nearby habitats through local changes to hydrology is also considered within the assessment. Direct effects on habitats are not anticipated to occur during the operational period of the Proposed Development with good practice measures in place, including pollution prevention controls and operational vehicles keeping to defined access routes. Furthermore, the effects of pollution and run-off to habitats during the construction phase are also scoped out with the implication of the CEMP (see outline CEMP in Technical Appendix 3.1). As such, the potential for impacts upon Annex 1, SBL or potential GWDTE habitats through habitat loss only during the construction stage is assessed within this chapter.
All other habitats	Low / Local	Out	Habitats within the site which are not subject to direct or indirect effects of the Proposed Development by virtue of distance from the Proposed Development are scoped out. Habitats and vegetation communities

Important Ecological Feature	Sensitivity	Scoped In or Out?	Justification
			which are not listed in Annex 1 (of the Habitats Directive) or the SBL, or which are considered of low groundwater dependency, are also scoped out.
Bats - foraging/commuting	Medium / Regional	In	All bat species are protected under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act 2004 (as amended). They are also SBL priority species. The Overall Risk Assessment is considered to fall under "Low/Medium Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for common pipistrelle; "Low Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for soprano pipistrelle; and "Low Site Risk" when using the median percentile and "Low/Medium Site Risk" when using the max percentile for *Nyctalus* species (see Technical Appendix 8.3). The nature of potential impacts on foraging and commuting bats relate to the construction phase (loss of foraging habitat) and the operational phase (loss of foraging habitat; death or physical injury via collision or barotrauma; and, displacement of individuals or populations from the area). As such, commuting and foraging bats are considered in this assessment.
Bats - roosting	Low / Local	Out	All bat species are protected under the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), the Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act 2004 (as amended). They are also SBL priority species. No trees or structures with the potential to support maternity roosts and/or significant swarming or hibernation roosts were identified within at least 200 m plus rotor radius of the Proposed Development turbines and therefore roosting bats are scoped out of the assessment.
Badger Red squirrel Water vole Pine marten Fish Freshwater pearl mussel Reptiles Amphibians Invertebrates	Low / Local	Out	Protected species of 'Local' importance are scoped out of this assessment. Such features are considered to be generally common and widespread (with some not sensitive to wind farm developments; see NatureScot, 2022) and/ or were recorded very infrequently or in numbers of very low importance during the baseline studies, in that the potential for effects from the Proposed Development on the species is considered inconsequential. Furthermore, embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered appropriate to avoid any potentially significant adverse effects upon species including water vole, badger, pine marten, red squirrel, reptiles, and amphibians. Also, the construction works will be located far beyond the minimum 30 m buffer required between badger setts and construction zones. Potential effects on fish populations and freshwater pearl mussels (*Margaritifera margaritifera*) are scoped out given the adoption of embedded mitigation which will include the maintenance of appropriate buffers between the Proposed Development and watercourses, avoidance of direct impacts to watercourses (no new vehicular watercourse crossings, although, subject to structural analysis at the detailed design stage, upgrading of one existing watercourse crossing may be required, and this will be sensitively designed to allow the continued uninterrupted movement of water flow and any potential wildlife present therein), and fish monitoring, prior to, and over the course of, the construction phase of the Proposed Development (as detailed in Section 8.7). Two footbridges are also proposed across the Hallow Burn to accommodate the recreational heritage trail. This watercourse is appraised as offering limited suitable habitat for fish fauna (and no identified suitable habitat for freshwater pearl mussel), see Technical Appendix 8.6. It is considered that with the above listed measures including the sensitive design of footbridges to allow the continued free flow of water (and wildlife therein) and fish monitoring, prior to, and over the course of the construction phase effects on fish populations and freshwater pearl mussel with respect to the construction of the two footbridges are scoped out of assessment.

8.9 Potential Effects

8.9.1 This section presents an assessment of effects upon important ecological features (Table 8.10), as a result of the Proposed Development alone, and with cumulative in-combination effects with other wind farm developments (and other major developments if relevant), in the absence of additional mitigation, considered in Section 8.12.

8.9.2 Table 8.12 summarises the potential effects of the Proposed Development on ecological features.

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

Construction

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

- direct land take (habitat loss) to accommodate the Proposed Development;
- temporary disturbance and land take for laydown areas and construction compounds;
- disturbance to, fragmentation or severance of connecting habitat or potential commuting routes within, and adjacent to, the site; and
- disturbance and pollution (indirect effects such as noise and vibration, dust, and pollution from surface water run-off) resulting from site clearance and construction, plant and vehicle movements, and site workers' activities.

8.9.5 Potential effects are assessed on the assumption that embedded mitigation measures, as detailed in Section 8.7 and within Chapter 3 are implemented.

Habitats and Vegetation

Habitat Loss

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

- direct loss – the loss of habitats and vegetation under the footprint of the Proposed Development; and
- indirect loss – calculated for Annex 1, SBL and / or potential GWDTE habitats which are located within 2 m and 10 m of direct habitat loss areas, to account for potential changes in habitat vegetation structure due to drying effects as a result of construction works.

8.9.7 For the purposes of assessment, a precautionary approach has been taken which assumes that direct habitat loss and indirect loss of Annex 1, SBL and / or potential GWDTE habitats represents a permanent, irreversible adverse effect. In practice, some areas indirectly/temporarily affected may be able to be restored i.e., during habitat reinstatement following construction in accordance with the outline CEMP (Technical Appendix 3.1).

8.9.8 Table 8.11 details the estimated direct and indirect/ temporary habitat losses as a result of the construction of the Proposed Development on Annex 1, SBL and / or potential GWDTE habitats. Many areas of the site comprise a mix of habitats which are too complex to separate into defined habitat types. As such, habitats have been grouped into the following categories; peatland (separated into M19a, M25/a), and mosaics containing both M19a and M25/a, heath, marshy grassland and swamp. The habitat type categories comprise both habitat mosaic and pristine examples of these habitats recorded within the site. These are shown on Figures 8.5 and 8.6a and are included in Table 8.11.

8.9.9 Total direct land take for the Proposed Development will be 9.97 ha[7], of which 2.89 ha are accounted for in Table 8.11. The remaining habitats are not Annex 1, SBL and / or potential GWDTE habitats which have been scoped out of this assessment.

8.9.10 Potential indirect losses of protected and notable habitats within 10 m of the Proposed Development are of a greater extent (see Table 8.11), though are less certain to take place.

[7] Note this includes hardstanding/track which forms part of the Proposed Development, some of which is existing track, so 9.97 ha is considered worst-case scenario in terms of total direct landtake.

Table 8.11 – Summary of Habitat Losses on Scoped in Habitats

Habitat Type Category	NVC Community/sub-community	Total Area Within Site (ha)	Habitat Losses (ha)			Relative Coverage Lost (%)
			Direct	Indirect (out to 10 m)	Total (Direct plus out to 10 m)	
Peatland (M19a)	M19a	36.180	0.761	1.247	2.008	2.103 (Direct) 3.447 (indirect)
Peatland (M25/a)	M25/a	28.275	1.396	1.782	3.178	4.937 (Direct) 6.302 (Indirect)
Peatland (mosaics containing both M19a and M25)	M19a and M25/a	14.158	0.172	0.956	1.128	1.215 (Direct) 6.752 (Indirect)
Heath	H12a H10a	41.227	0.516	1.361	1.877	1.252 (Direct) 3.301 (Indirect)
Marshy Grassland	M23b	14.341	0.045	0.212	0.257	0.314 (Direct) 1.478 (Indirect)
Swamp	S9	0.208	0.00	0.003	0.003	0.000 (Direct) 1.442 (Indirect)

8.9.11 In addition to direct and indirect habitat losses as stated in Table 8.11, there will be some small, localised temporary losses as a result of the location of the temporary construction compound of 0.199 ha heath mosaic (comprising H12a, U4a and U20) and 0.060 ha peatland mosaic (comprising M19a, M25a and H12a), which will be fully reinstated back to those respective habitats after the construction phase. Temporary losses are therefore not considered further in this assessment.

8.9.12 The recreational heritage trail (see Figure 3.13) will be paved stone or tarmac for the wheelchair accessible trail and unpaved crushed stone for the non-wheelchair accessible trail. The trail passes adjacent to the eastern extreme of the M19a habitat in the south of the site (see Figure 8.6a). It is proposed that effects on M19a at this locality will be inconsequential and losses of M19a habitat are not considered in relation to the recreational heritage trail in this assessment.

8.9.13 The permanent direct and indirect loss of the above habitats would be of permanent, low/medium magnitude of impact, resulting in a **minor** adverse effect which is considered non-significant in the context of the EIA Regulations.

Bats

8.9.14 The construction of the Proposed Development will result in the permanent and temporary loss of habitats, which are typically of low foraging and commuting value to bats. Baseline surveys have also demonstrated an Overall Risk Assessment of “Low/Medium Site Risk”, with the majority of the bat activity relating to common and soprano pipistrelle.

8.9.15 The closed canopy coniferous plantation woodland which dominates the site is appraised as having low suitability for bats (in accordance with Collins, 2016), although woodland edge and woodland rides offer some foraging potential. Watercourses and ponds within the site and their associated habitats also offer higher suitability foraging and commuting opportunities compared to the largely closed canopy commercial forestry which dominates the site.

8.9.16 The baseline surveys revealed activity of common pipistrelle, soprano pipistrelle, *Myotis* species, *Nyctalus* species and brown long-eared bat on-site within the established emergence time for these species (as detailed in Technical Appendix 8.3). Therefore, it is likely there are roosts for these species in the local area (but note no potential maternity or hibernation/swarming sites were identified within at least 200 m plus rotor radius of the Proposed Development turbines).

8.9.17 Noise, lighting and dust generation during the construction period could potentially result in disturbance and reduced foraging opportunities for bats, particularly if night-time work is undertaken. Extensive night-time working is not anticipated during the core bat activity period, April to September, due to available daytime working hours.

8.9.18 Given the largely suboptimal foraging/commuting habitat for bats on-site and the adoption of embedded mitigation (bat buffers from key bat features) impacts of bat displacement/disturbance during construction are considered to be of no more than a short-term, low magnitude, resulting in a **minor/negligible** adverse effect which is considered non-significant in the context of the EIA Regulations.

Otter

8.9.19 Otter is a qualifying interest of the River Tweed SAC; the impact upon otter with regards to River Tweed SAC is discussed separately in Section 8.14.

8.9.20 Although surveys recorded evidence of the presence of otters within the site (otter spraint found at the waterbody between Glenmuck Height and Weird Law), and also east of the site adjacent to a tributary to Bield Burn), no evidence indicating the presence of otters holts within the study area were recorded. No otter spraints were identified within 200 m of the Proposed Development's turbine locations.

8.9.21 Construction of the Proposed Development has the potential to affect the otter through death, injury, or disturbance of an otter. Although no holts or potential otter resting places were recorded within the site, the potential for breeding or resting places to be established prior to the commencement of construction activities for the Proposed Development cannot be discounted.

8.9.22 Embedded mitigation includes a minimum 50 m buffer around all mapped watercourses for turbine hardstanding and substation compound, and no new vehicular watercourse crossings will be required, avoiding direct impacts to watercourses. Note, that one existing watercourse crossing may need to be upgraded, but the design will be sensitively designed to allow the continued flow of water and wildlife therein. Furthermore, two footbridges are proposed over the Hallow Burn to accommodate the recreational heritage trail, and these will be sensitively designed to allow the continued free flow of water and wildlife therein, with effects on banks of watercourse minimised through best practice measures (as detailed in the CEMP, Technical Appendix 3.1).

8.9.23 Overall, habitat loss for otters as a result of the Proposed Development will therefore be very small (comprising commercial forestry which is typically sub-optimal for the species), and with no watercourses to be directly impacted, particularly relative to the availability of comparable habitats remaining within the site and the extent of preferable habitats within the surrounding area.

8.9.24 Such impacts are therefore predicted to be no more than a short-term, low magnitude, resulting in a **minor** adverse which is considered non-significant in the context of the EIA Regulations.

Operation

8.9.25 Potential operational effects are restricted to bats only; effects on all other important ecological features are scoped out (see Table 8.10).

Bats

8.9.26 Operational turbines can affect bats in a number of ways, although the main concerns to species populations relate to collision mortality, barotrauma (i.e. injury caused by a change in air pressure) and other injuries resulting from collision with, or flying in very close proximity to moving turbines (NatureScot, 2021). The Proposed Development also has the potential to result in the loss of, or damage to, commuting or foraging habitat and displacement of individuals or populations from the area (see NatureScot, 2021).

8.9.27 The assessment of potential effects upon bats resulting from the operation of the Proposed Development's turbines has been based on the two-stage methodology set out in NatureScot guidance (2021) using the Ecobat tool. Full details are presented in Technical Appendix 8.3.

8.9.28 In accordance with NatureScot guidance (2021) a Stage 1 'Initial Site Risk Assessment' of the potential risk level of the Proposed Development site has been undertaken based on a consideration of the site's habitats and development-related features. This concludes that the site is assessed as having an overall 'Site Risk' of 2, which represents a Low/Lowest Site Risk.

8.9.29 Stage 2 'Overall Risk Assessment' of the two-stage process detailed within NatureScot guidance (2021) has then subsequently been completed to provide an overall assessment of risk to bat species, by considering the conclusions of Stage 1 in relation to relative levels of bat activity obtained through using the Ecobat tool and considering the vulnerability of species recorded, at the population level.

8.9.30 In accordance with NatureScot guidance (2021), Stage 2 has been carried out separately for all high collision-risk species recorded during baseline bat activity surveys, and which includes the following species:

- soprano pipistrelle;
- common pipistrelle; and
- *Nyctalus* species.

8.9.31 The calculated Stage 2 'Overall Risk Assessment' per species, both temporally and spatially is presented in Technical Appendix 8.3.

8.9.32 It is highlighted that the Ecobat tool is in its infancy and given current limitations in available reference data on the database for many developments, definitive bat activity for regions is not generated and bat

activity representations for regions are instead considered to be indicative. In summary, the Overall Risk Assessment is considered to fall under “Low/Medium Site Risk” when using the median percentile and “Low/Medium Site Risk” when using the max percentile for common pipistrelle; “Low Site Risk” when using the median percentile and “Low/Medium Site Risk” when using the max percentile for soprano pipistrelle; and “Low Site Risk” when using the median percentile and “Low/Medium Site Risk” when using the max percentile for *Nyctalus* species. However, given the current limitations of the Ecobat tool, these conclusions should be treated with caution.

8.9.33 The risk of operational mortality to bats is generally acknowledged to be lowest at locations with low bat activity. Additionally, the availability of suitable foraging habitats within 1.5 km of proposed turbine locations, such as watercourses, waterbodies and woodland, is suggested to have a protective effect on bat species, with bats more likely to use these high-value foraging habitats (and other suitable linear features) than be attracted to the turbines (Mathews *et al*., 2016). At the Proposed Development, bat records returned from TWIC were all located within the vicinity of Fruid Water reservoir and watercourse, in Blacklaw, approximately 2 km south of the site, suggesting high-value foraging habitats off-site.

8.9.34 When using the max percentile, the Overall Risk Assessment for common pipistrelle was moderate across all monitoring stations, with the exception of low at MS3 and MS4. The Overall Risk Assessment for soprano pipistrelle was low across all monitoring stations, with the exception of moderate at MS5, MS7, MS8 and MS9. The Overall Risk Assessment for *Nyctalus* species was low across all monitoring stations, with the exception of moderate at MS7, MS8, MS9 and MS10. Generally, the Overall Risk Assessment was highest (moderate) at locations where monitoring stations were positioned at woodland edge habitats and lowest (low) at more open habitats such as bog and heath habitats.

8.9.35 NatureScot guidance (2021) advises that to reduce potential impacts upon bats resulting from operational wind turbine development, a 50 m 'stand-off' distance should be maintained around bat habitat features, into which no part of the turbine intrudes. The guidance provides a formula for calculating this 'stand-off' distance.

8.9.36 The Proposed Development turbine locations include a 50 m 'stand-off' (from blade tip) around bat habitat features (including woodland, watercourses and waterbodies) to reduce potential impacts on bats in accordance with NatureScot guidance (2021).

8.9.37 The layout of the Proposed Development would require the felling of plantation woodland habitat around all Proposed Development turbines. Re-planting would be undertaken within much of the felled area (with the exception of some areas for peatland/heath restoration), but a minimum buffer of 97 m (dependent on specific turbine size) would be maintained between the turbine and the re-planted plantation woodland, creating a ‘key-hole’ design. This is based on the calculation provided in the bats and wind farm guidance (NatureScot, 2021) and tree height reaching a maximum of 30 m during the lifespan of the Proposed Development. As such the Proposed Development provides a 50 m buffer (from blade tip) for all turbine locations.

8.9.38 The Proposed Development is not considered to represent a site of concern for bat collision risk following the approach set out in the bats and wind farm guidance (NatureScot, 2021). It is acknowledged that low-risk sites can still result in bat casualties, and therefore embedded mitigation (i.e. the turbines are located away from those habitat features most used by bats) would reduce the level of risk for all turbines.

8.9.39 A 50 m buffer between the blade tip and woodland edge will ensure appropriate mitigation requirements for all bat species in accordance with Joint Agencies Guidance (2021) are implemented as part of the Proposed Development. With these measures in place, impacts of bat collision risk mortality are subsequently considered to be of no more than a permanent, low magnitude of impact, resulting in a **minor/negligible** adverse effect which is considered non-significant in the context of the EIA Regulations.

8.9.40 Loss and damage to bat foraging or commuting habitat is considered to be inconsequential through the adoption of embedded mitigation (bat buffers from key bat habitat features) and because it is largely suboptimal commercial forestry being lost due to the Proposed Development. Impacts on loss and damage to bat foraging or commuting habitat is therefore subsequently considered permanent, negligible magnitude of impact, resulting in a **negligible** adverse effect which is considered non-significant in the context of the EIA Regulations.

8.9.41 Based on activity levels recorded and subsequent analysis as outlined, displacement levels are likely to be low and are subsequently considered to represent no more than a permanent, low magnitude of impact, resulting in a **minor/negligible** adverse effect which is considered non-significant in the context of the EIA Regulations.

Decommissioning

8.9.42 Decommissioning phase impacts are considered to result in no greater scope and significance of effects upon ecological features than as would occur during the construction phase, albeit occurring over a shorter timescale.

8.9.43 As such, decommissioning phase effects upon ecological features are not considered explicitly within this assessment.

8.10 Additional Mitigation and Enhancement

Mitigation

8.10.1 Embedded mitigation and good practice measures are detailed in Section 8.7, as well as in the outline CEMP (Technical Appendix 3.1). Note, that methods and mitigation during the decommissioning phase will follow best practice and guidance at that time, which will be detailed in a DEMP.

8.10.2 No significant adverse effects upon any important ecological feature are predicted as a result of the construction or operation of the Proposed Development, however, the below additional mitigation measures are proposed, given consideration of recent guidance and advice.

8.10.3 In accordance with NatureScot guidance (2023), M19a are considered likely to be priority peatland, while M25 are communities that are unlikely to raise issues of national interest as they are almost always a replacement for the original bog vegetation following unfavourable management such as burning on too short a rotation followed by heavy grazing. M19a mosaics with other habitats (which comprise a total of 14.16 ha on-site habitats) are not considered priority peatland particularly considering the peat depth results and modest areas of deep peat on-site (see Figures 10.2.3 and 10.2.4). In accordance with NatureScot (2023), the loss of peatland should be offset by the restoration of a substantive area of peatland. On-site peatland, losses and restoration measures are included in Technical Appendix 8.5.

8.10.4 In summary, 2.01 ha of priority peatland (M19a) would be lost (direct/indirect) and 10.04 ha of peatland would be subject to restoration.

8.10.5 Technical Appendix 8.5 and Figures 8.12a-c details the specifics in terms of priority peatland on-site, the losses of priority peatlands as a result of the Proposed Development, and available peatland on-site for restoration to compensate for the modest loss (2.01 ha) of priority peatland from the Proposed Development. A total of 10.04 ha of peatland (and M19a and M25) on-site has been identified for restoration as compensation. This comprises of areas of commercial forestry which are located on areas of peat (>0.5 m) which will be cleared and will not be restocked but instead, the underlying peatland restored (2.04 ha), areas of M19a habitat which has invasive scrub/commercial saplings encroaching on them (2.4 ha) and 5.6 ha of M19a and/or M25, including mosaic (within the Glenmuck Bog LWS). This level of compensation for peatland restoration is likely to be an underestimate (given additional, peripheral areas of the 2.04 ha clear-felled areas will also be managed), and is considered proportionate and justifiable for the site.

8.10.6 The amount of priority peatland (M19a) to be lost is 2.01 ha (only 0.76 ha to be directly lost) and this includes some M19a habitat which is not of national interest (see Technical Appendix 8.5). The area of genuine priority peatland to be lost is therefore considered to be lower than this, but 2.01 ha is considered worst-case scenario and as a precaution.

8.10.7 The site is predominantly Class 3 peatland and therefore ‘occasional peatland habitats’ and ‘some areas of deep peat’ are present. The northern extreme of the site is Class 5 peatland. The site therefore does not contain any Class 1 or 2 peatland which is representative of nationally important priority peatland habitat of high (or potentially) high conservation value. The peat probing results (see Figures 10.2.3 and 10.2.4) revealed the site has only a modest extent of peat (> 0.5 m) mainly in the west and central localities. These are the areas which will be targeted for peatland restoration works. A proportion of the peatland to be restored for compensation is within the on-site Glenmuck Bog LWS, with 5.6 ha of peatland to be restored. Restoration of a qualifying habitat (bog) of a LWS is considered to represent a notable biodiversity gain, of greater significance than restoration of peatland outside designated sites.

8.10.8 To reduce effects on foraging/commuting bats, during the operation phase of the Proposed Development, additional mitigation in the form of pitching the blades out of the wind (“feathering”) to reduce rotation speeds below 2 rpm while idling, as detailed in Joint Agencies Guidance (2021) will be implemented. The reduction in speed resulting from feathering compared with normal idling can reduce bat fatality rates by up to 50 % (Joint Agencies Guidance, 2021). Feathering will therefore be implemented using automated SCADA data for the lifetime of the Proposed Development.

Enhancement

8.10.9 An outline NEMP for the Proposed Development is provided in Technical Appendix 8.6, which details enhancement measures and includes native (including riparian) tree planting, peat/bog restoration (including within the on-site non-statutory site Glenmuck Bog) and grassland management.

8.10.10 As per NatureScot guidance (2023), a further 10 % of the baseline amount of priority peatland (M19a) would be required to be restored to achieve a significant level of enhancement. Accordingly, with 36.18 ha of the site comprising M19a habitat (noting this also includes M19a classified not of national interest), an additional 3.62 ha of peatland would be required to be restored to deliver enhancement. This is achieved with 3.62 ha of M25 mosaic habitat within Glenmuck Bog LWS being restored to achieve the required level of enhancement.

8.11 Residual Effects

8.11.1 No significant residual adverse effects are predicted to occur upon any important ecological feature as a result of the construction, operation or decommissioning of the Proposed Development. With the adoption of the mitigation and enhancement measures, it is anticipated that a permanent, low-magnitude of impact, resulting in a **minor** beneficial effect on notable (peatland) habitats on-site is predicted, which is considered non-significant in the context of the EIA Regulations.

8.12 Cumulative Assessment

8.12.1 The nearest operational wind farms to the Proposed Development are:

- Glenkerie Wind Farm, near Biggar – approximately 2.2 km north of the site, 11 turbines with a maximum height to blade tip between 100 m and 118 m; and
- Clyde Wind Farm and Extensions, near Abington – approximately 2.1 km west of the site, a total of 206 turbines with height to blade tip between 125 m and 142 m.

8.12.2 There is a single wind farm under construction within 10 km of the site:

- Whitelaw Brae Wind Farm, near Moffat – approximately 2.3 km south of the site, 14 turbines with a height to blade tip of 133.5 m.

8.12.3 There is a single consented wind farm within 10 km of the site:

- Glenkerie Extension, near Biggar – approximately 2.2 km north of the site, six turbines with a height to blade tip of 100 m.

8.12.4 A second consented wind farm is located within 10.5 km of the site, and considered as part of this cumulative assessment as a precautionary measure:

- Priestgill Wind Farm (variation), near Abington – approximately 10.5 km west of the site, seven turbines with a height to blade tip between 180 m and 200 m.

8.12.5 'In planning', for a single wind farm within 10 km of the site:

- Grayside Wind Farm, near Coulter – approximately 1.7 km north-east of the site, 15 turbines with a height to blade tip up to 200 m.

8.12.6 Note, given no major non-wind developments, were requested to be considered by consultees within the EIA Scoping opinion (see Table 8.1), the cumulative assessment considers only the effects of wind farm projects (as detailed above). The only exception to this, and following the request during the Gatecheck consultation with the SBC, (see Table 8.1) is consideration into the potential effect on ecological features of increased forestry cover as a result of the Proposed Development, and this is considered in this section.

Construction

8.12.7 Construction cumulative effects are considered for those other wind farms (that may have construction phases which coincide with that of the Proposed Development) within 5 km of the Proposed Development (Glenkerie Extension and Grayside Wind Farm).

8.12.8 The potential for construction adverse cumulative effects on bats are considered highly unlikely to occur in recognition of the implementation of the 50 m buffer between the blade tip and woodland edge, which is a key component in the design of the Proposed Development. Furthermore, no potential bat roost feature was identified within 200m plus rotor radius of the proposed turbines. Such effects are therefore scoped out of further assessment.

8.12.9 Habitat loss (particularly of notable habitats) from the Proposed Development is considered to be limited and habitat restoration detailed above, and enhancement measures proposed under the outline NEMP (see Technical Appendix 8.6) will restore notable habitats (peatland) on-site, and result in the increase

in the extent of this habitat on-site. As such, no potential for significant adverse cumulative construction habitat loss effects are anticipated (in fact for the Proposed Development, with the adoption of restoration and enhancement effects on peatland habitats are considered to be minor beneficial), and habitat loss is scoped out of further cumulative assessment.

8.12.10 Effects on otters (qualifying species of the River Tweed SAC and SSSI) are predicted to be negligible for the Proposed Development alone, through design and embedded mitigation including good practice measures (such as pollution control protocols), pre-commencement surveys, SPP and ECoW (as detailed in Section 8.7). Therefore, cumulative adverse effects on otters are predicted to be non-significant in the context of the EIA Regulations.

8.12.11 The Proposed Development would result in a net loss of forestry on-site (24.3 ha) due to the requirement for key-holing (and retention of appropriate bat buffers) and use of at least some of the clear-fell area for peatland restoration measures. Some off-site compensatory planting will therefore be required (with no net increase in the extent of commercial forestry). Anticipated adverse effects of increasing levels of commercial forestry cumulatively on ecological features are therefore discounted, with no net increase in forestry cover as a result of the Proposed Development anticipated.

8.12.12 It is predicted that cumulative adverse effects upon all important ecological receptors during the construction phase will be non-significant in the context of the EIA Regulations.

Operation

8.12.13 Cumulative operation effects are considered in relation to bats only (given this was the only ecological feature scoped into the assessment at the operational stage), and those other wind farms within 10 km of the Proposed Development.

8.12.14 Bat collision impacts have been minimised through the sensitive and considered design of the Proposed Development and by the implementation of standard good practice measures regarding buffer distances of turbines from woodland edges, commuting corridors and other bat features in order to minimise the potential for impacts on commuting and foraging bats and therefore the likelihood of cumulative impacts. Further precautionary mitigation in the form of pitching the blades out of the wind ("feathering") to reduce rotation speeds below 2 rpm while idling, as detailed in Joint Agencies Guidance (2021) will be implemented.

8.12.15 A review of publicly available information of consented wind farms and wind farms under construction within 10 km of the site has confirmed that good practice measures regarding buffer distances of turbines from suitable foraging and commuting habitats (such as woodland edge and watercourses) is proposed for the following projects: Whitelaw Brae Wind Farm, Grayside Wind Farm and Glenkerie Extension. Grayside Wind Farm also commits to the adoption of feathering to reduce effects further. Priestgill Wind Farm EIA states that there is limited habitat suitable for bat foraging and commuting within the application site, and therefore the magnitude of the impact on bats from the project are likely to be low.

8.12.16 The implementation at other wind farm sites of standard good practice measures regarding buffer distances to minimise impacts on commuting and foraging bats, further minimises the likelihood of cumulative impacts. Cumulative impacts on bats are considered to be no more a long-term, low-magnitude of impact, resulting in a **minor/negligible** adverse effect which is considered non-significant in the context of the EIA Regulations.

8.13 Monitoring

8.13.1 Monitoring would be undertaken during construction in accordance with the CEMP (see outline CEMP in Technical Appendix 3.1) in relation to pollution prevention measures and also fish and water quality monitoring (see details in Section 8.7).

8.13.2 The fish (and water quality) monitoring plan would also be established and incorporated into the CEMP in consultation and agreement with The River Tweed Commission. The aim of the monitoring plan would be to review and where necessary, update baseline conditions prior to construction works commencing and to continue throughout the construction and operational phase to confirm that the mitigation measures with respect to fish populations, water quality, sedimentation and maintenance of potential fish passages are performing.

8.13.3 The monitoring plan would also include details of checks of the habitat mitigation (peatland compensation) and habitat enhancement measures, and details of response and remediation measures in the event mitigation/enhancement measures are found not to be performing.

8.14 Information to Inform Habitats Regulations Appraisal

Screening for Likely Significant Effect

8.14.1 This section summarises information relating to the potential for likely significant effects upon ecological qualifying features of the River Tweed SAC (and SSSI), as a result of the Proposed Development.

8.14.2 The River Tweed SAC sits adjacent to the site boundary (opposite the A701 to the Proposed Development infrastructure), but it is approximately 75 m away from the Proposed Development infrastructure, as its nearest point (the existing track which will be used for access which may require some localised widening and upgrading). Proposed Development design and evolution have eliminated the need for new vehicular watercourse crossings (with only one existing crossing potentially needing upgrading, although this will be of sensitive design to allow the continued flow of water and wildlife therein), and have adopted a minimum 50 m buffer around all mapped watercourses for turbine hardstanding and substation compounds. Note, two footbridges are proposed over the Hallow Burn to accommodate the recreational heritage trail, and these too will be sensitively designed to allow the continued free flow of water and wildlife therein, with effects on banks of watercourse minimised through best practice measures (as detailed in the outline CEMP, Technical Appendix 3.1). Works within 50 m of watercourses will be limited to vehicular access along existing tracks (with some minimal, localised upgrading and widening where required). Embedded mitigation and good practice measures implemented under the CEMP, including (but not restricted to) pollution and siltation protection measures, water quality monitoring (pre-, during and post-construction), fish population monitoring (fish monitoring plan) and the presence of an ECoW during construction, would prevent adverse impacts associated with the Proposed Development to the River Tweed SAC and it's solely aquatic species. Although the majority of the watercourses on-site lie on moderately steep to steep gradients and many are peaty headwaters with low-negligible suitability for fish, an FMP, including provision for pre-, during- and post-construction fish monitoring would be produced in consultation with River Tweed Commission. As such, and providing the implementation of good practice construction measures detailed herein (and in the outline CEMP provided as Technical Appendix 3.1), there is considered to be no route to impact for any of the solely aquatic qualifying features of the SAC (Atlantic salmon, brook lamprey, river lamprey, sea lamprey and rivers with floating vegetation often dominated by water-crowfoot), and likely significant effects on the solely aquatic qualifying features are discounted.

8.14.3 As effects on the solely aquatic features of the SAC are discounted, only conservation objectives relating to otters are considered in this section.

8.14.4 The Overarching Conservation Objectives for all Species for River Tweed SAC[8] are:

1. To ensure that the qualifying features of the River Tweed SAC are in favourable condition and make an appropriate contribution to achieving favourable conservation status.
2. To ensure that the integrity of the River Tweed SAC is restored by meeting objectives 2a, 2b and 2c for each qualifying feature.

8.14.5 Conservation Objectives for otter for River Tweed SAC are:

2a. Maintain the population of otters as a viable component of the site.

2b. Maintain the distribution of otters throughout the site.

2c. Maintain the habitats supporting otters within the site and the availability of food

8.14.6 Although the River Tweed SAC sits adjacent to the site boundary, it is approximately 75 m away from any areas of the Proposed Development infrastructure, at its nearest point (the existing track which will be used for access). The design of the Proposed Development is sensitive to the River Tweed SAC and embedded mitigation includes a minimum 50 m buffer around all mapped watercourses for turbine hardstanding and substation compounds. Furthermore, no new vehicular watercourse crossings will be required, avoiding direct impacts to watercourses (although one existing crossing may need upgrading, and the design would be open span and sensitive to allow the continued flow of water and wildlife therein). Furthermore, two footbridges are proposed over the Hallow Burn to accommodate the recreational heritage trail, and these too will be sensitively designed to allow the continued free flow of water and wildlife therein, with effects on banks of the watercourse minimised. Good practice measures in relation to pollution risk, sediment management and sensitive techniques with regard to construction near watercourses will be adopted during the construction and operation phases (and in accordance with the outline CEMP, Technical Appendix 3.1).

8.14.7 Any works to the access route which are necessary will only be short-term, and localised and will be carried out in accordance with the good practice measures (such as pollution prevention protocols) outlined in Section 8.7. This will nullify any potential adverse effects on adjacent habitats and particularly any watercourses which are hydrologically connected to the SAC.

[8] https://sitelink.nature.scot/site/8369 [Accessed 22/04/2024].

8.14.8 Although otter spraint was recorded within the site during surveys, no holts or potential otter resting places were recorded within the site. Otters can occupy home ranges of up to 32 km[9]; given their large home ranges, the otter signs recorded on-site are likely reflecting the movement of at least one individual from the River Tweed up the tributaries to the site. As such, the potential that breeding or resting places may be established prior to the commencement of construction activities for the Proposed Development, cannot be discounted.

8.14.9 Construction activities are likely to result in a short-term increase in vehicular movements and plant activity during the construction phase. Furthermore, the River Tweed SAC is on the other side of the A701 from the Proposed Development. The Proposed Development design and evolution have eliminated the need for vehicular watercourse crossings and works within 50 m of watercourses will be largely limited to vehicular access along existing tracks. Note, however, that there will be some minimal, localised widening and upgrading of some of the existing tracks, and an existing watercourse crossing may need to be upgraded (but this would be sensitively designed to be open span and allow the continued flow of water and wildlife therein). Two footbridges are also proposed over the Hallow Burn to accommodate the recreational heritage trail, and these will be sensitively designed to allow the continued free flow of water and wildlife therein, with effects on banks of watercourse minimised through best practice measures (as detailed in the CEMP, Technical Appendix 3.1).

8.14.10 Operational activities, including maintenance, are likely to result in occasional vehicular movements during the operational phase of the Proposed Development; however, this would be constrained to the access tracks and infrastructure. No disturbance to watercourses and surrounding habitats is anticipated. Due to the occasional and localised nature of operational activities, combined with the lack of evidence of holts and resting places recorded during surveys, impacts with respect to operational effects on otters are discounted.

8.14.11 The proposed recreational heritage trail (see Figure 3.13) is in the south of the site, north of the A701 from the River Tweed SAC and is 225 m from the SAC. Given the presence of the A701 between the River Tweed SAC and the heritage trail and the spatial separation of the trail from the SAC and watercourses considered most suitable for otters, impacts on otters from recreational use of the trail (by walkers) are discounted.

8.14.12 As part of the NEMP (outline NEMP in Technical Appendix 8.6) works on the flower meadow adjacent to the River Tweed SAC are to be carried out. The final NEMP will include measures to ensure that works in the meadow will be carried out for the benefit of biodiversity while being sensitive to the River Tweed SAC (and qualifying otter) and minimising the potential for effects on the otter. Measures including the adoption of appropriate buffers between works and the River Tweed SAC, pre-construction surveys and pollution/run-off prevention protocols will be applied. Effects on otters associated with the River Tweed SAC are therefore discounted.

8.14.13 Likely significant effects from the Proposed Development cannot be ruled out for otters in the absence of mitigation. All other qualifying features have been scoped out of further assessment. An Appropriate Assessment (AA) should be carried out by the relevant competent authority and information to inform the AA has been provided in this chapter.

Information to Inform Appropriate Assessment

8.14.14 In the absence of mitigation, the potential for likely significant effects is identified (one feature: otter) for River Tweed SAC as a result of the Proposed Development.

8.14.15 This section therefore considers the potential for adverse effects upon the integrity of otter, in view of the site's conservation objectives and on the basis of mitigation measures.

Construction Environmental Management Plan (CEMP)

8.14.16 A CEMP will be prepared for the Proposed Development, to be approved by SBC. The CEMP would be finalised and implemented by way of a suitably worded planning condition.

8.14.17 The CEMP, once finalised, would include all standard measures to ensure the Proposed Development is constructed in accordance with industry good practice applicable at the time of commencement. The CEMP would also include habitat restoration measures following the cessation of construction works.

8.14.18 With specific reference to the protection of ecological features during the construction and operation of the Proposed Development, the CEMP and Operational Environmental Management Plan (OEMP) respectively, would include all good practice construction measures, pollution prevention controls and monitoring to be implemented over the course of the construction or operation of the Proposed Development in line with current industry and statutory guidance.

[9] https://www.nature.scot/plants-animals-and-fungi/mammals/land-mammals/otter#:~:text=Otters%20that%20live%20in%20freshwater,including%20man%2Dmade%20ones) [Accessed 22/04/2024]

8.14.19 Good practice construction measures to be provided within the CEMP include:

- measures in relation to pollution risk, sediment management and sensitive techniques with regard to construction near ditches;
- measures to protect retained habitats during construction works and works to be overseen by an ECoW; and
- measures to prevent harm to faunal species, including careful storage of potentially dangerous substances or materials, covering of excavations and/or fitted with means of escape.

Pre-construction Surveys

8.14.20 Pre-construction surveys for otters be undertaken prior to the commencement of construction works and as outlined within the CEMP to ascertain any changes in baseline conditions within the site to identify the requirement for additional species-specific mitigation.

8.14.21 This would cover all suitable otter habitat areas within 250 m of the Proposed Development infrastructure and associated working areas.

8.14.22 The results of the pre-construction surveys would inform the need for further mitigation (if required) with respect of sensitive working practices, SPPs and the requirement to consult with the SBC in relation to protected species licensing.

8.14.23 With the adoption of these mitigation measures, no likely significant effects on otters are predicted as a result of the Proposed Development.

In Combination Impacts

8.14.24 As impacts on the single relevant qualifying feature of the SAC (otter) can be mitigated, which is also a legislative requirement, it can be confidently concluded that there will be no measurable in combination effects on otter from the Proposed Development, alone or in combination with other developments.

8.15 Summary

8.15.1 Using a comprehensive programme of baseline ecological surveys, supplemented by desk study data, an assessment has been made as to the potential impacts of the Proposed Development on ecological features.

8.15.2 Important ecological features have been identified and assessed for potential impacts on these features. Embedded mitigation measures, including the following of good practice guidelines, have been taken into account when undertaking the assessments.

8.15.3 Embedded mitigation and pre-construction surveys, together with the employment of a suitably qualified ECoW, would enable the protection of ecological features, including otters, bats, badger, red squirrels, water voles, pine marten, fish and amphibians during construction.

8.15.4 A fish monitoring plan will also be implemented to record pre-, during and post-construction fish populations in watercourses on and adjoining the site, in consultation with The River Tweed Commission. Monitoring will also be adopted to assess peatland compensatory restoration areas and habitat enhancement measures during the operational phase of the Proposed Development.

8.15.5 Some peatland habitats on-site (including some currently under commercial forestry) will be restored to compensate for the loss of modest amounts of priority peatland.

8.15.6 The Proposed Development turbine locations include a 50 m 'stand-off' (from blade tip) around bat habitat features to reduce potential impacts on bats in accordance with NatureScot guidance (2021). Further precautionary additional mitigation in the form of pitching the blades out of the wind ("feathering") to reduce rotation speeds below 2 rpm while idling, as detailed in Joint Agencies Guidance (2021) will be implemented.

8.15.7 No significant adverse effects are predicted in terms of the EIA Regulations.

8.15.8 The Proposed Development includes substantial habitat enhancement that will benefit ecological features.

8.16 References

ARG UK. (2010). *ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index.* Available at: https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file. Accessed on: 15 April 2024.

Chanin, P. (2003). *Monitoring the Otter Lutra lutra.* Conserving Natura 2000 Rivers Monitoring Series No 10. Available at: https://publications.naturalengland.org.uk/publication/78009. Accessed on: 22 April 2024.

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

CIEEM (2019). *Advice Note on the lifespan of ecological reports & surveys*.. Available at: https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf. Accessed on: 17 April 2024.

Chapman, P. (2007). *Conservation grazing of semi-natural habitats*. Available at: https://www.sruc.ac.uk/media/ic3dqglq/tn586-conservation.pdf. Accessed on: 17 April 2024.

Collins, J. (Ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd Edn). The Bat Conservation Trust, London.

Cresswell, W. J., Birks, J. D. S., Dean, M., Pacheco, M., Trewhella, W. J., Wells, D. and Wray, S. (2012). *UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigations.* The Mammal Society, Southampton.

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

Harris, S., Cresswell, P. and Jefferies, D. (1989). *Surveying Badgers, Mammal Society*. English Nature, Peterborough.

JNCC (2009). *Common Standards Monitoring Guidance for Upland Habitats*. Version July 2009, JNCC, Peterborough.

Hundt (2012). *Bat Surveys: Good Practice Guidelines* 2nd edition. Bat Conservation Trust, London.

JNCC (2010). *Handbook for Phase 1 habitat survey: A technique for environmental audit*. Joint Nature Conservation Committee (JNCC), Peterborough.

JNCC (2019a). *Fourth Article 17 UK Habitats Directive Report* . JNCC, Peterborough

JNCC (2019b). *Supporting documentation for the conservation status assessment for the species: Freshwater pearl mussel Margaritifera margaritifera*. Available at: https://jncc.gov.uk/jncc-assets/Art17/S1029-SC-Habitats-Directive-Art17-2019.pdf. Accessed on: 15 April 2024.

JNCC (2022). *Freshwater pearl mussel Margaritifera margaritifera*. Available at: https://sac.jncc.gov.uk/species/S1029/. Accessed on: 15 April 2024.

NatureScot (2019). *Good Practice During Wind Farm Construction*. NatureScot, Inverness.

NatureScot (2020a). *Standing Advice for Planning Consultations - Badger*. NatureScot, Inverness.

NatureScot (2020b). *Standing Advice for Planning Consultations – Bats*. NatureScot, Inverness.

NatureScot (2020c). *Standing Advice for Planning Consultations – Freshwater pearl mussel*. NatureScot, Inverness.

NatureScot (2020d). *Standing Advice for Planning Consultations – Great crested newt*. NatureScot, Inverness.

NatureScot (2020e). *Standing Advice for Planning Consultations – Otter*. NatureScot, Inverness.

NatureScot (2020f). *Standing Advice for Planning Consultations – Pine marten*. NatureScot, Inverness.

NatureScot (2020g). *Standing Advice for Planning Consultations – Red squirrel*. NatureScot, Inverness.

NatureScot (2020h). *Standing Advice for Planning Consultations – Water vole*. NatureScot, Inverness.

NatureScot (2021). *Bats and onshore wind turbines: Survey, Assessment and Mitigation* (Version: August 2021). A document prepared jointly by Scottish Natural Heritage (SNH), Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) with input from other key stakeholders.

NatureScot (2022). *Guidance: General pre-application and scoping advice for onshore wind farms*. NatureScot, Inverness.

NatureScot (2023). *Advising on peatland, carbon-rich soils and priority peatland habitats in development management.* November 2023.

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10(4), 143-155.

The River Tweed Commission (2018). *Tweed Fisheries Management Plan* 6th Edition. The River Tweed Commission

Rodwell, J. S. (2006). *National Vegetation Community Users' Handbook*. JNCC, Peterborough.

Scottish Borders Council (2016). *Local Development Plan*. Available at: https://www.scotborders.gov.uk/plans-guidance/local-development-plan. Accessed on: 15 April 2024.

Scottish Borders Council (2018). *Scottish Borders Local Biodiversity Action Plan*. Supplementary Guidance. 2018-2028. Available at: https://www.scotborders.gov.uk/directory-record/7442/local_biodiversity_action_plan. Accessed on: 17 April 2024.

Scottish Government (2004). *Nature Conservation (Scotland) Act 2004*. Available at: https://www.legislation.gov.uk/asp/2004/6/contents. Accessed on: 15 April 2024.

Scottish Government (2011). *Wildlife and Natural Environment (Scotland) Act 2011*. Available at: https://www.legislation.gov.uk/asp/2011/6/contents/enacted. Accessed on: 15 April 2024.

Scottish Government (2017). *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017*. Available at: https://www.legislation.gov.uk/ssi/2017/101/contents/made. Accessed on: 15 April 2024.

Scottish Government (2019). *The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019*. Available at: https://www.legislation.gov.uk/sdsi/2019/9780111041062. Accessed on: 15 April 2024.

Scottish Government (2020). *Scottish Biodiversity List 2020*. Available at: https://www.nature.scot/doc/scottish-biodiversity-list. Accessed on: 15 April 2024.

SEPA (2014). *Land Use Planning System SEPA Guidance Note 4: Planning guidance on on-shore windfarm developments*. Scottish Environmental Protection Agency (SEPA), Scotland.

SEPA (2017). *Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems*.

SFCC (2007). *Habitat Surveys: Training Course Manual*. Scottish Fisheries Co-ordination Centre (SFCC), Pitlochry.

SNH (2012). *Assessing the Cumulative Impact of Onshore Wind Energy Developments*. NatureScot, Inverness.

SNH (2016). *Carbon and Peatland 2016 map*. Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/soils/carbon-and-peatland-2016-map. Accessed on: 15 April 2024.

SNH (2017). *Peatland Restoration. Information on how to source on-line information on soils and peatland for the purpose of soil / habitats restoration and conservation management*. Peatland Action. Updated July 2017.

SNH (2018a). *Environmental Impact Assessment Handbook*. V5. Available at: https://web.archive.org/web/20220901050635/https://www.nature.scot/sites/default/files/2018-05/Publication%202018%20-%20Environmental%20Impact%20Assessment%20Handbook%20V5.pdf. Accessed on: 17 April 2024.

SNH (2018b). *Best Practice Badger Survey Guidance Note*. SNH, Inverness.