Chapter 8
Ecology

SCOTTISHPOWER RENEWABLES

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Chapter 8
Ecology

8.1 Executive Summary

1. The potential effects of the proposed Development on habitats and non-avian animal species during the construction and operation have been assessed.

2. Information relating to protected and notable species and habitats in the vicinity of the Site, and designated nature conservation sites is provided. A radius of 10 km was applied for records of bats and for Internationally Designated Sites, 5 km radius for sites of National Importance, and 2 km for non-statutory sites and for recent records of legally protected or otherwise notable species.

3. Baseline surveys were conducted during the period May 2018 and June 2019. Surveys undertaken included bat surveys, surveys for a range of terrestrial mammal species, vegetation surveys and fish habitat assessment surveys.

4. There are four Internationally Designated sites within a 10 km radius of the Site, and eight Sites of Special Scientific Interest (SSSI) within 10 km of the Site, that are designated for their habitats or non-avian species. However, there is no potential for significant effects upon any of these sites due to distance (the closest of these sites is located 1.7 km from the Site boundary) and lack of hydrological connection or other pathways for effects.

5. There are five Local Nature Conservation Sites within 5 km of the proposed Development; all have been scoped out due to distance and lack of hydrological pathways. One area of Ancient Woodland is located within 200 m.

6. The Site is predominantly characterised by blanket bog and modified bog with areas of marshy grassland, with a large area of coniferous plantation also present. Smaller areas of neutral semi-improved grassland and unimproved acid grassland were present. Habitats, including those to be lost were identified as being potentially groundwater dependent but a detailed assessment, presented in **Chapter 10 Hydrology, hydrogeology, geology and soils,** confirmed that these habitats were sustained by incidental rainfall and surface water rather than groundwater.

7. The proposed Development has been designed to minimise the loss of blanket bog habitat where possible. The proposals would result in the direct loss, and indirect/temporary loss, of up to 14.90 ha of regionally important blanket bog and up to 29.07 ha of locally important modified bog habitat. The loss will be compensated for through measures aimed at restoring up to 84 ha of degraded bog habitat via ditch blocking, which would be delivered via a Habitat Management Plan (HMP). Given the confidence in the success of the restoration (see paragraph 151) it is considered that the peatland restoration would lead to a net positive impact and likely net gain in biodiversity in time once the peatland restoration has succeeded.

8. The loss of running water habitat through the creation of new water crossings and the enhancement of existing water crossings would be small and is not considered to be significant.

9. No species listed on Schedule 8 of the Wildlife and Countryside Act were identified within the Site. A stand of the Schedule 9 species Japanese Knotweed was identified adjacent to the proposed Site entrance preferred, as shown on Figure 8.1.1.1-8.1.1.5 within **Technical Appendix 8.1**.

10. The Clachan Burn and Clachan Burn NE were considered to provide medium habitat suitability for migratory fish. The Allt Mor catchment closest to Loch Ciaran was also considered to be of medium suitability for migratory fish, although this is not located in a catchment draining from the proposed Development. All other watercourses within the study area were of low habitat suitability for migratory fish. Except for watercourse crossings, suitable buffer distances have been maintained between all infrastructure and watercourses. Following the implementation of good practice pollution prevention measures, the likelihood of a pollution event within downstream watercourses is considered low, and therefore no significant effects upon salmonids are considered likely. However, as a precaution, pre and post construction fish monitoring would be carried out.

11. The assessment of impacts on bats was undertaken in accordance with SNH (2019) guidelines. Bat surveys identified at least six species of bat at the Site. Two species considered to have high population vulnerability to wind turbines, Leisler's bat and Nathusius' pipistrelle, were recorded, although neither was recorded close to proposed turbine locations, levels of activity by both species were low and no significant effects on either species are predicted. Moderate to High levels of activity by common and soprano pipistrelle bats, which are considered to have Medium population vulnerability to wind turbines, were recorded in some of the woodland habitats within the Site (with lower activity recorded in open habitats) but following the implementation of the proposed mitigation measures significant effects on these species are unlikely.

12. The proposed Development would result in the loss of up to 49.27 ha of potentially suitable habitat for common lizard, adder and slow worm although this is not considered significant, given the extensive availability of similar habitats within the surrounding area. Good practice mitigation measures would be employed during construction to prevent the injuring or killing of individual lizards and no contravention of the relevant legislation is likely.

13. There would be a small loss of habitat which could be used by otters due to the creation and upgrading of watercourse crossings for the proposed Development. This is not considered to lead to significant effects. No holts or other resting places were identified. Following the implementation of good practice measures, no significant effects upon otter are likely.

14. Evidence of pine marten presence was recorded although no dens were identified. There would be a loss of suitable habitat for this species although similar habitat is available in the surrounding area. Following the implementation of good practice measures, no significant effects upon otter are likely

15. No significant effects are predicted for any other protected or notable animal species, and no potential significant cumulative impacts were identified.

8.2 Introduction

16. This Chapter describes and evaluates the current nature conservation interest of the Site and surrounding area. It goes on to assess the potential effects of the proposed Development on important habitats and species and, where necessary, to describe proposed mitigation, compensation and enhancement measures. This Chapter considers habitats and non-avian animal species. Potential effects on birds are considered separately in **Chapter 9 Ornithology**. Together **Chapters 8 and 9** provide an assessment of the potential effects of the proposed Development on biodiversity.

17. This Chapter is supported by a number of Technical Appendices, as listed below:

- Technical Appendix 8.1: Phase 1 Habitat and National Vegetation Classification (NVC) Survey Report;
- Technical Appendix 8.2: Fish Habitat Assessment Report;
- Technical Appendix 8.3: Bats and Protected Species Report[1];
- Technical Appendix 8.4: Further Mammal Survey Report; and
- Technical Appendix 8.5: Draft Habitat Management Plan (HMP).

[1] Note that this report refers to Achaglass Wind Farm, which was the name being used by SPR for the proposed Development at the time the report was written.

8.3 Legislation, Planning Policy and Guidance

8.3.1 Legislation

18. The ecological assessment has been undertaken with reference to the following legislation:

- the EC Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora);
- the Wildlife and Countryside Act 1981 (as amended in Scotland);
- the Wildlife and Natural Environment (Scotland) Act 2011;
- the Nature Conservation (Scotland) Act 2004;
- the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) (as amended in Scotland);
- the Protection of Badgers Act 1992 (as amended by the Nature Conservation (Scotland) Act 2004); and
- the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.

8.3.2 Policy

19. Planning policies relevant to non-avian ecology are summarised as follows:

- Scottish Planning Policy (SPP) identifies that biodiversity is important because it provides natural services and products which we rely on, that it is an important element of sustainable development and makes an essential contribution to the economy and cultural heritage of Scotland. All Public Bodies in Scotland, including planning authorities, have a duty to '*further the conservation of biodiversity'* under the Nature Conservation (Scotland) Act 2004 and the SPP highlights that this should be reflected in development plans and development management decisions.
- The Argyll and Bute Local Development Plan was formally adopted on the 26th March 2015. The Argyll and Bute Local Development Plan provides the local planning framework for the Argyll and Bute Council (A&BC) area, excluding the Loch Lomond and Trossachs National Park area. It contains a number of policies relating to development and land use in Kintyre. Those relevant to this assessment include:
    - Policy LDP3- Supporting the Protection, Conservation and Enhancement of our Environment; and
    - Policy LDP6 – Supporting the Sustainable Growth of Renewables.
- In addition to the LDP, A&BC have adopted Supplementary Guidance (March 2016) and additional Supplementary Guidance (December 2016) with respect to Renewable Energy.
- The following Supplementary Guidance policies are potentially relevant:
    - SG LDP Sustainable – Sustainable Siting and Design Principles;
    - SG LDP ENV7 – Water Quality and the Environment;
    - SG LDP ENV1 – Development Impact on Habitats, Species and our Biodiversity;
    - SG LDP ENV2 – Development Impact on European Sites;
    - SG LDP ENV4 – Development Impact on Sites of Special Scientific Interest (SSSIs) and National Nature Reserves;
    - SG LDP ENV5 – Development Impact on Local Nature Conservation Sites (LNCS); and
    - SG LDP ENV 6 – Development Impact on Trees/Woodland.
- Planning Advice Note (PAN) 60: Planning for Natural Heritage (Scottish Government, 2008) provides details on how development and the planning system can contribute to the conservation, enhancement, enjoyment and understanding of Scotland's natural environment and encourages developers and planning authorities to be positive and creative in addressing natural heritage issues.

8.3.3 Guidance

20. Other documents and guidance reviewed and applied in the ecological assessment are outlined below (see also References Section at the end of this Chapter):

- The Scottish Biodiversity List (SBL) (Scottish Government, 2013): a list of animals, plants and habitats that the Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland. Both scientific and social criteria have been used to define the SBL. Scientific criteria include all Priority Species and Priority Habitats included in the now superseded UK Biodiversity Action Plan (BAP) (UK Biodiversity Partnership, 2007 *et seq*. (Joint Nature Conservation Committee (JNCC), 2016)), which occur in Scotland. Social criteria are based on the results of an omnibus survey of the Scottish public carried out in 2006, so it should, therefore, be noted that not all SBL species and habitats are necessarily rare or protected.
- The Argyll and Bute Local Biodiversity Action Plan (2010-2015) (A&BC, 2010) lists local priority habitats and species. Local priority habitats of most relevance to the Site include: purple moor grass and rush pastures, blanket bog, lowland dry acid grassland and lowland heathland. Local priority species of most relevance to the Site include: adder (*Vipera berus*), great crested newt (*Triturus cristatus*), red squirrel (*Sciurus vulgaris*), water vole (*Arvicola amphibius*), otter (*Lutra lutra*), 'Scottish' wildcat (*Felix sylverstris grampia*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long eared bat (*Plecotus auritus*), noctule bat (*Nyctalus noctula*), Atlantic salmon (*Salmo salar*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*). A range of invertebrates including marsh fritillary butterfly (*Euphydras aurina*) and freshwater pearl mussel (*Margaritifera margaritifera*).
- Argyll and Bute Council (2017) A Biodiversity Technical Note for Planners and Developers;
- Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018);
- Scottish Natural Heritage (SNH) general pre-application/ scoping advice to developers of onshore wind farms (SNH, 2018);
- Bats and onshore wind turbines: survey, assessment and mitigation (SNH *et al*., 2019);
- Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (GWDTEs) (Scottish Environment Protection Agency (SEPA), 2017); and
- Good Practice during Wind Farm Construction (SNH, 2019).

8.4 Scope and Consultation

8.4.1 Consultation and Scoping Responses

21. A scoping report (SPR, 2019) was submitted to Argyll and Bute Council in April 2019. Scoping responses containing comments relating to non-avian ecology were obtained from the following organisations:

- Scottish Natural Heritage (SNH);
- Scottish Environment Protection Agency (SEPA); and
- Argyll and Bute Council (A&BC);
- Marine Scotland (MS);
- Fisheries Management Scotland (FMS); and
- Argyll District Salmon Fisheries Board (ADSFB).

22. A summary of the key points from the relevant scoping responses and consultations, and details of how comments have been addressed in the EIA Report are provided in **Table 8-1**.

Consultee	Summary of Key Issues	Where addressed in Chapter
Argyll and Bute Council	Agreed that surveys are fit for purpose and are in line with guidance. Agreed with the species that have been scoped out but should be noted in the CEMP so remain on radar. Good practice methods to be applied pre, during and post construction. A CEMP is required.	Good practice methods to be applied pre, during and post construction (see paragraphs 112-122). A draft CEMP is provided in **Technical Appendix 3.1**.
Argyll District Salmon Fisheries Board	The proposed Development has some potential to affect watercourses with trout and salmon populations and should, therefore, undertake fish population, fish habitat and water quality surveys in pre and post construction phases to demonstrate that there has been no deterioration of the fisheries resource as a result of the development. Such surveys need to consider the	A fish habitat assessment has been undertaken (see **Technical Appendix 8.2**). Pre and post construction fish monitoring, fish habitat and water quality surveys are proposed see paragraph 191 and **Chapter 10 Hydrology, hydrogeology, geology and soils**.

Consultee	Summary of Key Issues	Where addressed in Chapter
	road and drainage network and how these link to fish habitats downstream of the site.	
Fisheries Management Scotland	The proposed Development falls within the district of the ADSFB, and the catchments relating to the Argyll Fisheries Trust (AFT). It is important that the proposals are conducted in full consultation with these organisations. Guidelines developed by FMS and MSS should be fully considered throughout the planning, construction and monitoring phases of the proposed Development.	ADSFB provided comments on the scoping report (see above) and AFT provided fish data (see paragraph 81 and **Technical Appendix 8.2**). FMS and MSS guidelines have been considered in the assessment.
Marine Scotland Science	MSS advised that the developer carry out the following: 1) site characterisation surveys of watercourses within and downstream of the proposed Development area, consults our generic scoping guidelines; 2) site specific mitigation measures including measures to mitigate for the potential impacts associated with felling on water quality and fish populations are required; 3) a robust integrated water quality and fish population monitoring programme to include the potential cumulative impact of adjacent developments on fish populations, particularly in the selection of control sites; and 4) contact the Argyll District Salmon Fishery Board and the Argyll Fisheries Trust, if not already done so, for information on local fish populations and fisheries	A fish habitat assessment has been carried out (see **Technical Appendix 8.2**). Mitigation measures relating to water quality during felling and construction are detailed in **Chapter 10 hydrology, hydrogeology, geology and soils**. A monitoring programme for fish prior to and post-construction has been included (see paragraph 191). Details of proposed water quality monitoring are provided in **Chapter 10 Hydrology, hydrogeology, geology and soils.** AFT provided local fish data. See **Technical Appendix 8.2** for further details and paragraph 81.
RSPB	Peatland Impacts - Deep peat should be avoided, especially in the Class 1 area and a detailed peat mapping exercise is required. The design process should ensure peat impacts are avoided, and should consider opportunities for restoration and positive management. We request further consultation in regard to the long-term forest windfarm plan and any compensatory planting associated with this proposal. We advise that these should consider measures to enhance forest biodiversity through increased provision of native tree species/open space – including peatland restoration where applicable. Compensatory planting should be seen as an opportunity to deliver priority	A detailed peat mapping exercise has been undertaken via peat probing (see **Chapter 10 Hydrology, hydrogeology, geology and soils**). The number of turbines, tracks and other infrastructure located in areas of higher quality blanket bog have been minimised and areas of deep peat have been avoided as far as possible (see Section 8.7.1). Proposals for peatland restoration and positive management are provided in the draft Habitat Management Plan (see **Technical Appendix 8.5)**. Proposals for compensatory planting will be developed and agreed post consent.
	biodiversity habitats, as well as for priority species and achieve aims within the Argyll and Bute Woodland and Forestry Strategy.	
Scottish Environment Protection Agency	Key issues that must be addressed in the EIA, relevant to ecology, include: - Map and assessment of impacts upon Groundwater Dependent Terrestrial Ecosystems and buffers. Site-specific comments relevant to ecology include: 1. promotion of peat avoidance principle, especially Class 1 Priority Habitat.	A map showing the location of potential Ground Water Dependant Terrestrial Ecosystem (GWDTE) communities, based on NVC data, is provided in **Technical Appendix 8.1**. A detailed assessment of GWDTEs is provided in **Chapter 10: Hydrology, hydrogeology, geology and soils**. The number of turbines, tracks and other infrastructure located in areas of higher quality blanket bog have been minimised and areas of deep peat have been avoided as far as possible (see Section 8.7.1)
Scottish Natural Heritage	Key considerations associated with this proposal, in respect of ecology, include: - Impacts on nationally important carbon-rich soils, deep peat and priority peatland habitat. SNH stated that they were satisfied with the range of ecological surveys and assessment proposed and were content for badger, red squirrel, water vole and Scottish wildcat to be scoped out of the assessment, although the Applicant should be mindful of these species should felling be required to accommodate works in the woodland to the north of the site. SNH acknowledged that the bat surveys were undertaken prior to the release of the new 'Bats and Onshore Wind Turbines Guidance' (2019); however, the surveys were undertaken in accordance with the relevant best practice guidance at that time. Due to the distance and lack of connectivity between the proposal site and ecological designated sites SNH stated that assessment of these sites could be scoped out of the EIA Report. SNH advised that siting the greater part of windfarm infrastructure on a nationally important feature (Class 1 Peatland) is inappropriate when alternative land is available.. SNH referred SPR to their 'general scoping and pre-application advice' note which provides advice on other considerations which should be taken into account in the EIA Report.	SNH comments in respect of the scope of survey work and assessment are noted. It is acknowledged that a large area in the south of the site is mapped as Class 1 peatland on the SNH Carbon and Peatland map. However, the purpose of the map is to indicate the likely presence of carbon-rich soils, deep peat and priority peatland habitat on a coarse scale, rather than confirming that these are present. More detailed surveys have been undertaken to inform the EIA and although areas of higher quality peatland habitat were identified by the NVC survey (see **Technical Appendix 8.1**) these are much smaller than the area mapped as Class 1 peatland. The number of turbines, tracks and other infrastructure located in areas of higher quality blanket bog has been minimised and areas of deep peat have been avoided as far as possible (see Section 8.7.1). Other issues raised by SNH are considered in this Chapter in line with SNH general scoping and pre-application advice.

Table 8-1: Key Issues Raised during the Scoping Process

Effects Scoped Out

24. The assessment concentrates on the effects of construction and operation of the proposed Development upon ecological features. Ecological features have been scoped out of further assessment where there is no potential for significant effects upon the ecological feature, or where the ecological feature is not considered important at a local level or above (**Table 8-4** and **Table 8-5**), is not a GWDTE or not subject to legal protection.

25. As agreed with SNH at the scoping stage, impacts upon designated sites for nature conservation have been scoped out in respect of non-avian ecology, due to the distance and lack of connectivity between the Site and any designated sites. The closest statutory site designated for ecological reasons, Claonaig Wood Site of Special Scientific Interest (SSSI) is 1.7 km from the proposed Development, and is not within the same hydrological catchment as the proposed Development (See **Chapter 10 Hydrology, hydrogeology, geology and soils**).

26. Following the protected species surveys in 2018 (see **Technical Appendix 8.3: Bats and Protected Species Report)** where no badgers, red squirrel, water vole or Scottish wildcat were recorded, it was proposed in the scoping report (SPR, 2019) that these species were scoped out of the assessment. SNH agreed with these species being scoped out but noted that they should be taken into account should felling be required to accommodate works in the woodland to the north of the Site. These species have not been considered further in the assessment but will be subject to pre-construction surveys prior to the commencement of construction activities.

27. Habitats which are of relatively low ecological value (see **Table 8-4**), are not potential GWDTEs, or would not be impacted by the proposed Development have been scoped out of detailed assessment. These habitats are as follows:

- Coniferous plantation woodland, bracken, semi-improved and acid grassland – assessed as having less than local value; and
- Roads/stoned tracks – assessed as having negligible value.

28. Based on the desk study and consideration of the extent and nature of the proposed Development, effects on the following species or species groups have been scoped out of assessment. For more information on each species/ group, please refer to **Table 8-5**.

- invertebrates: SNH (2018) general pre-application/ scoping advice to developers of onshore windfarms states that: "*there are some species, that with standard mitigation, are unlikely to experience a significant environmental effect during construction/ operation of onshore wind farms (e.g. moths and other invertebrates, reptiles, amphibians, etc.). Such species do not require surveys to inform the EIA*". Potentially suitable habitat for the legally protected marsh fritillary butterfly is present within the site but will not be affected by the proposed Development and due to the area of land take, being small in comparison with the availability of similar habitats in the wider area, significant negative effects on other invertebrate species are not considered likely. Therefore, invertebrates have been scoped out of further assessment;
- amphibian and reptile surveys have been scoped out, in line with SNH (2018) guidance and instead a habitat-based assessment has been undertaken to inform the assessment of potential impacts and the need for mitigation measures during construction. Following the habitat-based assessment, significant effects on amphibians are not considered likely and amphibians have been scoped out of further assessment, although potential effects on reptiles have been assessed; and
- hedgehog (*Erinaceus europaeus*) records have been provided for the 5 km search area; however, due to the suboptimal habitat for this species on the site, and the occurrence of more suitable habitat within the surrounding landscape, it is considered unlikely to be significantly affected and detailed assessment of effects on this species have been scoped out.

8.5 Approach and Methods

29. This Chapter takes an appropriate and topic-specific approach to assessment of the proposed Development within the parameters identified in **Chapter 3 Proposed Development**. This Chapter provides a worst case assessment for non-avian ecology and aims to present enough information for consultees and the decision makers to comment on and determine the application within the parameters of the proposed Development.

8.5.1 Study Area

30. The study area used for the EIA varies according to the ecological feature in question, based on relevant good practice guidance. The study area used for habitats and vegetation is shown in **Figures 8.2 and 8.3** (with further detail provided in **Figures 8.1.1 and 8.1.2** within **Technical Appendix 8.1: Phase 1 Habitat and NVC Survey**) and includes all areas within the application boundary, as well as some land beyond the Site to ensure coverage of wetland habitats within 250 m of the proposed Development infrastructure. SEPA guidelines (SEPA, 2017) stipulate survey of a 250 m buffer from excavations deeper than 1 m, and a 100 m buffer for excavations less than 1 m. The area surveyed, therefore, complies with SEPA guidelines.

31. The study areas for relevant faunal species are summarised in the Field Survey Methodology Section below (see **Section 8.4.3**) and are described in more detail within **Technical Appendices 8.2-8.4**. For ease of reference the study areas included all suitable habitat within the Site as well as watercourses within 250 m of proposed infrastructure (where this lies outside of the application boundary) for mammals and the Fish Habitat Assessment, and 200 m from proposed wind turbines for bats.

8.5.2 Information and Data Sources

32. A preliminary ecological desk study was undertaken by Arcus Consulting in December 2018 (see **Technical Appendix 8.3: Bats and Protected Species Report**). This included a review of publicly available online resources to identify the presence of records for bat species within up to 10 km of the search area. A 10 km radius was also used for Internationally Important Designated sites, 5 km for sites of National Importance and 2 km for non-statutory sites and 5 km radius was used for recent records of legally protected or otherwise notable species. Data was primarily sourced from the National Biodiversity Network (NBN) Atlas (http://nbnatlas.org)[2]. The results of that study have been incorporated within this assessment as appropriate. In addition, further existing information has been gathered, as follows:

- Non-statutory site information was sought from published online information regarding Scottish Wildlife Trust (SWT) reserves, Royal Society for the Protection of Birds (RSPB) Reserves, National Trust for Scotland (NTS) Reserves, Local Nature Reserves (LNRs) and A&BC Local Nature Conservation Sites (LNCS). Information was also collected from Saving Scotland's Red Squirrels and Butterfly Conservation Scotland. A search area of 5 km was applied during the search.
- The relevant Geographic Information System (GIS) database were searched for woodland recorded on the Ancient Woodland Inventory (AWI) within a 2 km radius of the site;
- SNH's Carbon and Peatland 2016 Map (SNH, 2016c) was reviewed, which gives a value to indicate the likely presence of carbon-rich soils, deep peat and priority peatland habitat for each individually-mapped area, at a coarse scale across Scotland;
- A search through the A&BC Planning Portal and the Energy Consents Unit (ECU) website for relevant reports submitted as part of the applications for other nearby developments was undertaken. The following Environmental Statements (ESs), which relate to consented or proposed windfarm developments within relatively close proximity to the Site, were reviewed for relevant ecological information:
    - Freasdail Windfarm ES (operational) (RES, 2016), with 11 turbines – located west of the Site;
    - Eascairt Windfarm Extension ES (consented) (PI Renewables, 2015) for 13 turbines– located west of the Site;
    - High Constellation Windfarm ES (submitted) (Blue Energy, 2019), with 10 turbines – located south of the Site;
- Fish data for the catchments in which the Site is located were obtained from AFT.

8.5.3 Field Study

33. A Phase 1 Habitat Survey and NVC Survey were undertaken in May and June 2019. The remainder of the baseline surveys (Fish Habitat Assessment, Mammal Surveys and bat surveys) were completed between May 2018 and June 2019. The scope of the surveys was agreed with SNH as part of the scoping process. The methodology for the survey work is briefly outlined in the next section. For the full methodology please refer to **Technical Appendices 8.1-8.4**.

[2] It should be noted that Argyll Biological Records Centre only holds ad-hoc records for VC101 (Kintyre) and don't claim to be the Local Records Centre for this Vice County. Records they hold are submitted to NBN.

Vegetation Surveys

Extended Phase 1 Habitat Survey

34. An Extended Phase I Habitat Survey was undertaken in May and June 2019, which covered the Site, as well off-site areas (where accessible) to provide coverage of areas within 250 m from proposed turbine locations and 100 m from proposed infrastructure. The survey was based on the standard methodology (JNCC, 2010).

National Vegetation Classification (NVC) Survey

35. An NVC survey of open habitats was undertaken simultaneously with the Phase 1 survey in May and June 2019 covering the same study area (but excluding areas of coniferous plantation and other habitats of low nature conservation value, e.g. bracken and poor semi-improved grassland). The surveys followed the methodology set out in the NVC survey guidelines (Rodwell, 2006) (see **Technical Appendix 8.1**).

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

36. Following the NVC survey, potential GWDTEs were identified in terms of their high, moderate or low potential groundwater dependence, based on SEPA (2017). A more detailed assessment of the likely groundwater dependence of these communities was then undertaken as part of the hydrogeology assessment (**Chapter 10 Hydrology, hydrogeology, geology and soils**).

Fish Habitat Assessment

37. A fish habitat assessment was undertaken in May 2019 (see **Technical Appendix 8.2**), to assess the potential for fish species of conservation concern (e.g. salmonids, lamprey and European eel (*Anguilla anguilla*)) to be present in watercourses within the study area. The survey included all watercourses within the Site, as well as watercourses within 250 m of potential infrastructure locations (where this encompassed land outside of the Site and where accessible). A walkover survey of each watercourse was undertaken and data on physical characteristics were collected at different locations along each watercourse in accordance with Scottish Fisheries Coordination Centre (SFCC) (2017) guidance. Any potential blockages to fish migration were also noted.

Mammal Surveys

38. A survey for protected species of terrestrial mammals, including bats, was undertaken between May – September 2018 by Arcus Consulting Services (see **Technical Appendix 8.3**). Since the 2018 surveys were completed the application boundaries have changed slightly and, therefore, a further survey for protected species of terrestrial mammal was undertaken within the western part of the Site in May 2019 (see **Technical Appendix 8.4**). The species specifically targeted were based on the likelihood of occurrence of each species, ascertained from known species distribution and habitat suitability. The mammal surveys particularly focussed on bats, pine marten, otter, red squirrel, water vole and badger, however, the survey recorded evidence of all protected or notable mammal species. A separate survey and habitat assessment for Scottish wildcat was also undertaken in 2018 (see **Technical Appendix 8.3**).

39. Surveys for ground-based mammals followed standard methodologies in place at the time of survey, see **Technical Appendices 8.3 and 8.4** for further details of the methodologies followed. The study area for ground-based mammals encompassed all potentially suitable habitats within the Site, as well as watercourses within 250m of potential infrastructure locations (where this encompassed land outside of the application boundary), in line with relevant guidance, e.g. SNH, 2016b.

40. Bat surveys were undertaken in 2018 including preliminary bat roost assessment and remote static activity surveys (see **Technical Appendix 8.3**). Activity surveys were undertaken using 13 static detectors, each employed for 30 consecutive nights per season (spring, summer and autumn) and covered the whole area within which wind turbines are proposed to be located, plus some areas outside the current application boundary. It is acknowledged that new guidance on bat surveys for onshore windfarms was published in early 2019 (SNH, 2019), but it was not possible to anticipate the requirements of this new guidance at the time of survey. Surveys were undertaken in accordance with relevant good practice guidance in place at the time (Hundt, 2012) but also went well beyond the requirements set out by Hundt (2012) and as such were largely compliant with the 2019 guidelines and survey data are considered sufficient for assessment.

41. In the scoping report (SPR, 2019), it was proposed to base the assessment on data collected by five of the 13 detectors, as most of the remaining detectors were either located outside the current application boundary or within habitats which were not representative of the proposed turbine locations, e.g. adjacent to water bodies or broad-leaved woodland. This approach would have been in line with Hundt (2012) and no objections to the assessment taking place based on five detector locations were received at the scoping stage. However, as survey data were collected at 13 locations, all of which are at least broadly representative of the habitats present within the site, a more precautionary approach has been adopted here whereby the assessment is based on data collected at all detector locations. The assessment takes into consideration that some of the detectors were located outside the application boundary or in different habitats to those present at the proposed turbine locations.

42. In June 2019, an external inspection of potential roost features of a derelict crofters' cottage (referred to as Scot Mill) close to proposed solar area 2, in the west of the Site, was undertaken. Additional information was collected through the use of a static bat detector left overnight. Due to the building's condition, absence of suitable features and that it was isolated from suitable foraging/commuting habitat no further survey work was required (See **Technical Appendix 8.4**). Bat activity surveys of proposed solar area 2 in the west of the Site were not considered necessary as the proposed solar arrays are not likely to significantly affect bat activity.

Incidental Sightings

43. During all ecological surveys, incidental sightings of other notable fauna were also recorded.

8.5.4 Assessment Methods

44. The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this Chapter. The CIEEM guidelines have been endorsed by SNH. The assessment of potential impacts on bats has been carried out based on SNH (2019) guidelines.

Sensitivity of Receptor

45. In accordance with the CIEEM guidelines only ecological receptors (habitats, species, ecosystems and their functions/ processes), which are considered to be important and potentially affected by the proposed Development should be subject to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to impacts from the proposed Development and will remain viable and sustainable.

46. Ecological receptors should be considered within a defined geographical context. For this assessment the following geographic frame of reference has been used:

- International;
- National (i.e. Scotland);
- Regional (i.e. Argyll & Bute);
- Local (i.e. within circa (c.) 10 km); and
- Less than local.

47. Detailed assessment has only been undertaken for receptors of local importance or greater and/or which are subject to legal protection or for which assessment has been specifically requested by consultees, e.g. GWDTEs.

48. For designated sites, importance should reflect the geographical context of the designation. For example, a SSSI would normally be considered nationally important.

49. In accordance with CIEEM guidelines, the value of habitats has been measured against published selection criteria and other relevant data where available. Examples of relevant criteria include Annex 1 of the Habitats Directive, the SBL and the Argyll and Bute LBAP.

50. In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Therefore, reference has been made to published lists and criteria where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive), species considered to be of principal importance for biodiversity in Scotland as listed on the SBL and priority species listed on the Argyll and Bute LBAP.

Impact Assessment

51. The impact assessment process involves the following steps:

- identifying and characterising impacts;

- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

52. When describing impacts, reference has been made to the following characteristics, as appropriate:

- positive or negative;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and
- reversibility.

53. Both direct and indirect impacts are considered: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat during construction. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. the creation of access tracks which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of adjacent peatland habitats.

54. For the purposes of this assessment, in accordance with CIEEM guidelines, a 'significant effect' is defined as an effect that either supports or undermines biodiversity conservation objectives for 'important ecological receptors' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/ local nature conservation policy). Effects can be considered significant at a wide range of scales from international to local (paragraph 46). For example, a significant effect on a SSSI is likely to be of national significance whilst a significant effect on a regionally important population of a species is likely to be of regional significance. The CIEEM guidelines do not prescribe the geographical level of importance at which effects should be considered significant 'in EIA terms', rather effects are either significant or they are not. However, to provide consistency with other EIA topics, for the purposes of this assessment it is assumed that significant effects on receptors of regional or greater importance may be considered significant 'in EIA terms'.

55. Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Avoidance, Mitigation, Compensation and Enhancement

56. A sequential process has been adopted to avoid, mitigate and compensate for ecological impacts. This is often referred to as the 'mitigation hierarchy'.

57. It is important for the EIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- avoidance is used where an impact has been avoided e.g. through changes in scheme design;
- mitigation is used to refer to measures to reduce or remedy a specific negative 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.

Cumulative Effects Assessment

58. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a particular location. The potential for cumulative effects with windfarm proposals within 10 km has been assessed here.

59. For aquatic features potential cumulative effects are only likely to be significant for other developments located relatively close by (i.e. within 2 km) and within the same hydrological sub-catchments. For (non-avian) terrestrial features potential cumulative effects are only likely where other developments are located within the regular range of more mobile species, e.g. bats. As such, the cumulative assessment has been restricted to windfarms within 10 km. The assessment includes operational projects; projects under construction; consented projects which are not yet under construction and projects for which planning applications have been submitted.

8.5.5 Assumptions, Limitations and Confidence

60. Presented here is a summary of limitations detected during the surveys, further details are presented in the **Technical Appendices 8.1-8.4**. It should be noted that none of these limitations are considered likely to significantly affect the assessment.

61. During the mammal surveys in 2018 it was not possible to fully access the full extent of watercourses and wetland areas for health and safety reasons. In addition, there were minor failures in the static detectors during the bat surveys (see **Technical Appendix 8.3**).

62. The further mammal surveys in 2019 were subject to minor limitations due to recent rainfall and some short sections of the burn were inaccessible for health and safety reasons (see **Technical Appendix 8.4).**

63. Many of the channels within the areas of coniferous plantation within the fish habitat assessment study area proved to be inaccessible during the fish habitat assessment due to the presence of dense coniferous forestry adjacent to each watercourse. However, it was considered that these had low fish habitat potential and were unsuitable for salmonid and lamprey species (see **Technical Appendix 8.2**).

8.6 Baseline Conditions

8.6.1 Desk Study

Statutory Designated Sites

64. There are no statutory designated sites within the application boundary. There are ten statutory designated sites, including Kintyre Goose Roosts which has been designated as a SPA/Ramsar/SSSI within a 10 km radius of the Site as detailed in **Table 8-2** and illustrated in **Figure 8.1**. All statutory designated sites have been listed in **Table 8-2** for completeness but those primarily designated for their ornithological interests are included in this assessment and are assessed separately in **Chapter 9 Ornithology**.

Site Name	Designation	Approximate Distance and Direction from the Site	Reason(s) for Designation
Ardpatrick and Dunmore Wood	Site of Special Scientific Interest (SSSI)	1.6 km west	Upland oak woodland.
Tarbert Woods	Special Area of Conservation (SAC)	1.7 km west	Western acid oak woodland.
Kintyre Goose Roosts	SPA/Ramsar/SSSI	5.0 km south west	Comprises five hill lochs together with an area of grassland and heath at Rhunahaorine Point. The site supports an important population of roosting Greenland White-fronted Goose *Anser albifrons flavirostris* (2,323 individuals representing 16.6% of the Great Britain population (winter peak mean)).
Knapdale Lochs	SPA/SSSI	9.6 km north west	Knapdale Lochs comprises a group of four small oligotrophic and mesotrophic lochs. They support the most southerly regular breeding population of Black-throated Diver *Gavia arctica* in Britain.

Site Name	Designation	Approximate Distance and Direction from the Site	Reason(s) for Designation
Claonaig Wood	SSSI	2.2 km east	Upland oak woodland.
Inner Hebrides and the Minches	SAC	3.7 km south west	Harbour porpoise.
Glen Ralloch to Baravalia	SSSI	6.4 km north	Upland oak woodland, bryophyte and lichen assemblage.
Rhunahaorine Point	SSSI	9.2 km south west	Shingle.
Kilberry Coast	SSSI	7.2 km west	Coastal habitats including maritime cliff and sand dunes.
Arran Northern Mountains	SSSI	9.6 km south east	Upland habitats assemblage including Killarney fern and invertebrate assemblage including three nationally scarce water beetles and a number of dragonflies including the keeled skimmer.

Table 8-2: Statutory Designated Sites within 10 km

66. The designated sites within 10 km are not likely to be impacted by the proposed Development due to distance or lack of connective pathways, which could lead to impacts on features for which the sites are designated. This assessment is for sites designated for habitats or non-avian faunal species only. Impacts upon designated sites are, therefore, scoped out from detailed assessment. This approach has been agreed with SNH as part of the scoping process.

Non-Statutory Sites

67. Five non-statutory designated sites for nature conservation have been identified within a 5 km radius of the Site. **Table 8-3** sets out the information available regarding these non-statutory designated sites. It should be noted on the A&BC website only the site name and location is available and no further information was available from a web search.

Site Name	Designation	Approximate Distance and Direction from the Site	Site Information
Loch Ciaran	LNCS	1.51 km south west	100.34 ha
Loch an Eilein Group	LNCS	1.29 km south	36.91 ha
Crossaig Glen	LNCS	2.69 km south east	69.30 ha
Ronachan	LNCS	3.92 km south west	71.59 ha
West Loch Tarbet	LNCS	840 m west	1,675 ha

Table 8-3: Non-Statutory Sites within 5 km

69. A number of areas classified on the Ancient Woodland Inventory are present within 2 km of the Site, although none are located within the Site (see **Figure 8.1**), the closest of which is located close to Clachan Burn approximately 142 m south of the Site.

70. All non-statutory sites are scoped out due to distance and the lack of hydrological or other connective pathways to the Site. Only one area of Ancient Woodland is subject to detailed assessment, as it is within 200 m of the Site and is located downstream close to Clachan Burn. The other areas of ancient woodland are all over 200 m away and are not likely to be affected.

71. The Site lies within three different class areas according to SNH's Carbon and Peatland 2016 map (SNH, 2016c): a Class 1 area which is described as '*nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value*'; a Class 3 area described as '*Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat*'; and a Class 5 area '*Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat.*'. The purpose of the map is to give a value to indicate the *likely* presence of carbon-rich soils, deep peat and priority peatland habitat on a coarse scale, rather than confirming that these are present. Site-specific information relating to carbon-rich soils and deep peat (including a peat depth survey) is contained in **Chapter 13 Hydrology, hydrogeology, geology and soils**. A description and evaluation of the peatland habitats present on the Site is contained in **Table 8-4**.

Existing Records of Protected and Notable Species

72. A summary of the results of the protected and notable species search (excluding marine and avian species) undertaken by Arcus Consulting (2018) (via the NBN portal), from other sources and through review of ESs for nearby windfarms are provided in section 8.5.3. Further details are provided in the relevant **Technical Appendices 8.2 – 8.4**.

8.6.2 Vegetation Baseline

Evaluation of Floral Receptors

73. Phase 1 habitats and NVC communities within the Study Area are shown in **Table 8-4** with more detailed habitat descriptions and quadrat data provided in **Technical Appendix 8.1: Phase 1 Habitat Survey and NVC Survey**. The mapped results are shown on **Figures 8.2 and 8.3**, with further detail provided in **Figures 8.1.1 and 8.1.2** within **Technical Appendix 8.1**.

74. **Table 8-4** also summarises the conservation status for each habitat/ community and evaluates the importance of each habitat/ community within the Site. For habitats where they create a mosaic, the mosaics have been evaluated based on their floristic composition, underlying substrate and occurrence within the study area.

75. No plant species listed on Schedule 8 of the Wildlife and Countryside Act 1981 were recorded, and it is considered unlikely that any Schedule 8 plant species are present within the study area. No Argyll and Bute BAP priority plant species, nor SBL higher plant, moss or liverwort species were recorded within the study area during the botanical surveys in 2019.

76. A stand of the Schedule 9 species Japanese knotweed (*Fallopia japonica*) was identified as being present adjacent to the A83, on the opposite side of the road from the new proposed Site entrance which will be constructed. The stand was within the study area but outside the Site. A stand of Rhododendron (*Rhododendron* species) was identified approximately 600 m south west of the Site during the fish habitat assessment. Further stands of Rhododendron are also present close to the property at Achaglass (see TN88 on **Figure 8.1.1.4** within **Technical Appendix 8.1**).

Phase 1 Habitat Type (Area in hectares (ha)[3])	NVC Community (Area in hectares (ha))	Conservation Status	Likely Groundwater Dependency	Reason for Evaluation	Evaluation
E1.6.1 Blanket bog (280.64)	M15 *Scripus cespitosus-Erica tetralix* wet heath (52.24)	Annex 1 SBL LBAP	Moderate	There is an estimated 2.2 million ha of blanket bog in the UK (BARS, 2012), and 1.8 million in Scotland, representing an estimated 23% of the Scottish land area (Bruneau and Johnson, 2014). Blanket bog is a rare habitat globally, and Scotland holds a significant proportion of the world resource (Bruneau and Johnson, 2014). Blanket bog is one of the dominant habitat types within the site. Although the habitats within the Site show evidence of drainage in places, there was only limited evidence of man-made drainage within the areas mapped as blanket bog and no signs of historical peat cutting, other than a very small area close to Scotmill (see **Technical Appendix 8.1**). Although too small an area to be considered nationally important, the blanket bog habitats are assessed as being of regional value due to their size, quality and relatively limited modification.	Regional value
	M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire (14.73)	Annex 1 SBL LBAP	-	See above.	Regional value
	M15/M17 wet heath/blanket mire mosaic (142.93)	Annex 1 SBL LBAP	-	See above.	Regional value
E1.7 Wet modified bog (484.46)	M15/M17 wet heath/blanket mire mosaic (modified)[4] (69.69)	Annex 1 SBL LBAP	-	A large part of the study area in the eastern corner has been substantially modified, predominately by drainage. This has modified the habitat present causing *Molinia caerulea* to dominate. Whilst, it is still considered possible that some of this area could be restored to blanket bog, due to the extent of modification it isn't currently considered to be of regional value and has therefore be valued as having local importance.	Local value
	M25 *Molinia caerulea-Potentilla erecta* mire (122.36)	Annex 1 SBL LBAP	Moderate	A large area of the centre of the study area supports this habitat, it has been modified by drainage but to a lesser extent than the areas of M15/M17 modified (above) and M25 modified (below). Whilst it is still considered possible that it could be restored to blanket bog, due to the extent of modification it isn't currently considered to be of regional value and has therefore been valued as having local importance.	Local value
	M25 modified mire (361.95)[5]	Annex 1 SBL LBAP	Moderate	The central and southern part of the study area supports this habitat which has been heavily modified by drainage. It is dominated by *Molinia caerulea* and *Potentilla erecta*. Whilst, it is still considered possible that some of this area could be restored to blanket bog, due to the extent of modification it isn't currently considered to be of regional value and has therefore been valued as having local importance.	Local value
B5 Marsh/marshy grassland (121.02)	M23 *Juncus effusus/ Juncus acutiflorus-Galium palustre* rush pasture (120.29)	SBL LBAP	High	Marshy grassland is present across areas of the north eastern part of the study area, adjacent to the edge of the coniferous plantation and in the south east of the Site, often associated with burns or smaller tributaries. Where present it is generally dominated by J*uncus effusus* and is species-poor. M23 is a widespread community of gently sloping ground and is typically found at the margins of soligenous flushes. Given the species poor nature of this habitat at the site and the fact it was generally associated with areas subject to management (i.e. grazing or coniferous plantation) it is assessed as being of less than local value. This habitat is common and widespread (Rodwell, 1991) and the marshy grassland within the study area is species-poor. It is, therefore, considered to be of less than local importance. Its potential groundwater dependence is assessed in **Chapter 10 Hydrology, hydrogeology, geology and soils**.	Less than local value
B2.2 Neutral grassland – semi-improved (4.05)	MG10 *Holcus lanatus-Juncus effusus* rush pasture (3.14)	SBL	Moderate	Neutral grassland habitats are of a limited extent in the study area and are restricted to areas on the slopes above the Clachan Burn in the south western part of the Site, on areas of previously farmed land. Neutral grassland habitats occupy approximately one third of the total area of semi-natural grassland in Scotland, with approximately 6% of Scotland covered by this (Countryside Survey, 2007a). The habitats present on the site are small in area and are relatively common in the surrounding area, therefore, they are considered to be of less than local value.	Less than local value
	MG6 – *Lolium perenne – Cynosurus cristatus* grassland (0.80)	-	-	See above consideration of MG10 grassland.	Less than local value

[3] Hectares presented are for the study area.
[4] Habitat which has been described as modified has been significantly altered by man-made drainage which has altered the species composition in these areas (see **Technical Appendix 8.1**).
[5] Habitat which has been described as modified has been altered by man-made drainage which has altered the species composition in these areas significantly increasing the amount of purple moor grass present (see **Technical Appendix 8.1**).

Phase 1 Habitat Type (Area in hectares (ha)[3])	NVC Community (Area in hectares (ha))	Conservation Status	Likely Groundwater Dependency	Reason for Evaluation	Evaluation
B1.1 Unimproved acid grassland (7.20)	U4 – *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland (2.63)	SBL	-	Acid grassland habitats are of a limited extent in the study area and are restricted to areas on the slopes above the Clachan Burn in the south western part of the Site, generally on the thinner soils on land which has been historically farmed. Acid grassland increased in extent by 8% in Scotland between 1998 and 2007 covering approximately 12% of Scotland (Countryside Survey, 2007a). Although unimproved and an SBL priority habitat, acid grassland is very common throughout Scotland, the habitats present on the Site are small in area and given the lack of significant species associated with them (see **Technical Appendix 8,1**) are assessed as of less than local value only	Less than local value
	U6 – *Juncus squarrosus-Festuca ovina* grassland (4.57)	SBL	Moderate	See above consideration of U4 grassland	Local value
C1.1 Tall herb and fern continuous – bracken (15.77)	U20 *Pteridium aquilium-Galium saxatile* (15.51)	-	-	Dense stands of bracken were present and are restricted to areas on the slopes above the Clachan Burn in the south western part of the study area, and a stand within the buffer area in the north east of the study area. Bracken extended its area between 1998 and 2007 by 27% (Countryside Survey, 2007b) and represents 1.6% of Scotland. Bracken is, therefore, a widespread an abundant habitat and the small area present within the study area is not significant and, therefore, is considered to be of less than local value.	Less than local value
F1 Swamp (0.20)	S4 – *Phragmites australis* swamp and reedbed (0.20)	LBAP SBL	-	A small area of swamp was present surrounding one of the smaller lochans in the coniferous plantation woodland. Approximately 1.7% of Great Britain in 2007 was covered by fen, marsh and swamp. In Scotland this habitat covered approximately 3% of the land area (Countryside Survey, 2007b). Although an LBAP and SBL priority habitat, this type of habitat is widespread in Scotland and, therefore, given the small extent of this habitat it has been assessed as being of no more than local value.	Local value
A1.1.2 Coniferous woodland plantation (including newly planted Coniferous Woodland Plantation) (158.53)	N/A	-	-	The southern and 24 western areas of the study area support blocks of coniferous plantation, predominately densely planted Sitka spruce (*Picea sitchensis*). Although some of these will have been planted over blanket bog/wet heath few species typical of these habitats remain. Due to the abundance of coniferous woodland plantation in the wider area and that as a rule they have only low species richness they are considered to be of less than local value.	Less than local value
A4.2 Recently-felled Coniferous Woodland (164.71)	N/A	-	-	Within and adjacent to the stands of coniferous woodland plantation are areas of recently felled coniferous plantation. In some cases, grassland species have begun to colonise. See above A1.1.2 Coniferous woodland plantation for reasons for its evaluation.	Less than local value
G1 open water – standing water (7.97)	N/A-	LBAP SBL	-	The waterbodies present vary in size from small lochans to larger lochs. These habitats were not surveyed in detail due to the stand offs from these waterbodies by the development and the absence of perceived impacts. However, mesotrophic or oligotrophic/dystrophic lochs are LBAP priority habitats and are also likely to support a range of faunal species. The lochs are, therefore, considered to have at least local value.	Local value
G2 – open water – running water (6.09 km)	N/A	-	-	The watercourses present are mostly minor, except the Clachan and Larachmor Burns. They are not particularly notable in terms of their habitats but do provide suitable habitat for a range of faunal species. Therefore, they are considered to be of local value.	Local value
J4 – bare ground (3.49)	N/A	-	-	Existing gravel access track with negligible ecological value	Less than local value
J3.6 building (0.01)	N/A	-	-	Existing disused building with negligible ecological value	Less than local value
J5 hardstanding (0.001)	N/A	-	-	Existing area of hardstanding with negligible ecological value	Less than local value

Table Key: Status

Annex 1 = Listed on Annex 1 of the EC Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.
LBAP = listed in Argyll and Bute Biodiversity Action Plan. (Argyll and Bute Biodiversity Group, 2010)
SBL = Listed on Scottish Biodiversity List (SBL) (Scottish Government, 2013)

Table 8-4: Evaluation of the Phase 1 Habitats and NVC Communities Present within the Study Area

8.6.3 Faunal Baseline

77. A summary of the protected or otherwise notable fauna recorded within the relevant study areas during the various ecological surveys and/ or for which records were obtained during the desk study is provided in the following sections. Further details are provided in **Technical Appendices 8.1–8.4**.

Invertebrates

78. The desk study provided records of the A&BC BAP species marsh fritillary within the 5 km search area, the closest record was from approximately 2 km north west of the Site and it is possible that this species could be present within the Site. There were considered to be some small areas of suitable habitat within the survey area, close to an unnamed burn near the property at Scotmill, in the west of the study area, on the eastern and western side of the access track. These areas of the habitat are not optimal due to an absence of any grazing by cattle leading to a dense sward in places and no adult butterflies were observed here during the Phase 1 habitat survey, which was carried out during the adult butterflies' usual flight period. The weather conditions during the Phase 1 survey were conducive to butterflies being active as other butterflies including green veined white (*Piers napi*) were observed in flight. The areas of potentially suitable habitat are within the 50 m standoff from the watercourse which has been built into the mitigation therefore, these would not be affected by the proposed Development. Detailed surveys for marsh fritillary were, therefore, not considered necessary.

79. Freshwater pearl mussel records were collected from the NBN gateway, although the nearest records are from over 5 km away, close to Loch Sween. No records for this species or observations were reported in the Freasdail and Escairt ES chapters. Based on the information collected during the Fish Habitat Assessment (**Technical Appendix 8.2**) most of the watercourses within the study area are not suitable for this species. Freshwater pearl mussel is, therefore, considered unlikely to be present in the study area.

Fish

80. An assessment of habitat suitability for fish of conservation importance within the study area is provided in **Technical Appendix 8.2**. In total 53 sites within 10 catchments and one sub-catchment were assessed for their suitability in relation to fish habitat and spawning areas.

81. Two watercourses within the study area, the Clachan Burn (including the Clachan Burn North East (NE) section) and the Allt Mor (close to Loch Ciaran only) were considered to have medium suitability for migratory fish. These two watercourses have previously been subject to fish surveys by AFT who recorded brown trout, Atlantic salmon, river lamprey (Clachan Burn only), brook lamprey (Clachan Burn only), European eel, rainbow trout, minnow and flounder downstream from the Site in 2005.

82. All other watercourses within the study area were considered to have low suitability for migratory fish.

Amphibians and Reptiles

83. A number of observations of common frog (*Rana temporaria*) and common toad (*Bufo bufo*) were made within the study area during the 2018 mammal survey (see Technical Appendix 8.3). There was no suitability within the study area for great crested newt (GCN) and GCN is largely absent from Argyll & Bute (see **Technical Appendix 8.3**). Information from the ES for Eascairt Windfarm indicated that the only records for GCN were from over 20 km south of the site and the records were over 50 years old. The protected species surveys undertaken for Eascairt and Freasdail Windfarms did not identify any GCN or likelihood of their presence within their study areas. The grid connection works for Freasdail Windfarm identified the presence of common frog, common toad and palmate newts (*Lissotriton helveticus*) in habitat south of the Site. Therefore, the study area is not considered to be of particular importance for amphibians.

84. During the surveys at the site incidental records for reptiles were made. These included recordings of adder (*Vipera berus*) from the south of the study area on the Kintyre Way and along the central track through the woodland in the centre of the Site. The study area is considered to offer good potential habitat for reptiles in particular the areas of 'rough' tussock grassland, areas of clear fell woodland for foraging, refuge and basking for species including adder, common lizard (*Zootoca vivipara*) and slow worm (*Anguis fragilis*).

85. Surveys undertaken for Freasdail and High Constellation Windfarm identified incidental sightings of common lizard. Adder were also found during grid connection installation works for Freasdail Windfarm, with common lizard also being recorded within the Site (Catherine, 2016). Slow worm were also recorded during the grid connection installation works for Freasdail Windfarm (Catherine, 2016).

Otter

86. During the 2018 protected species surveys (**Technical Appendix 8.3**) an otter was observed on Loch Ciaran to the south west of the Site. In addition, evidence of otter in the form of spraints were observed on Loch Lurach (to the north of the Site), Lochan Fraoich (close to Kintyre Way in the south of the survey area) and Larachmor Burn (to the east of the survey area). Furthermore, spraints and an otter couch were located on Loch Cruinn on the north eastern boundary of the Site. No otter evidence was recorded during the further mammal surveys undertaken in 2019 (**Technical Appendix 8.4**), although suitable habitat was identified along the Clachan Burn. Additional records of otter within the surrounding area included spraints south of the Kintyre Way (Eascairt ES), a holt/spraints on Loch Freasdail (north of the Site) and a further holt/spraints present within the High Constellation Windfarm study area[6].

Pine Marten

87. The protected species survey did not identify the presence of pine marten dens during the surveys but did identify potential scats[7] predominately in the south of the study area (see **Technical Appendix 8.3**). Potential scats were also found south of the Site during the Phase 1 survey. Surveys undertaken for nearby windfarms did not identify any signs of pine marten to the north or east of the study area, although it was concluded that they would be likely to be present due to the presence of potential scats and some suitable habitat.

Badger

88. The study area was considered to offer low potential to support badgers although it was concluded that small pockets of the coniferous plantation forestry in the west may offer potential habitat for sett excavation. The open moorland habitat was considered to offer low value foraging habitat for badgers. No field evidence of badgers was recorded during either the 2018 or 2019 surveys. Surveys reported in the ES's for the surrounding windfarms, found evidence of badger with latrines found in woodland adjacent to Kintyre Way approximately 1 km south west of the Site (Eascairt Windfarm). In addition, badger latrines were recorded south of Loch Fraoich (Eascairt Windfarm).

Bats

89. Data from Eascairt Windfarm identified the presence of common pipistrelle and soprano pipistrelle in its study area. Freasdail Windfarm, to the east of the study area, identified the presence of common pipistrelle, soprano pipistrelle and brown long-eared bats, with records of *Nyctalus* and *Myotis* species. Surveys undertaken for High Constellation Windfarm recorded the presence of six bat species (common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), Daubenton's (*Myotis daubentonii*), Natterer's (*Myotis nattereri*) and brown long-eared bat (*Plecotus auritus*). One genus group (Myotis spp.) was also recorded.

90. Bat surveys undertaken at the Site in 2018 provided records of activity for the following species (see **Technical Appendix 8.3** for further details):

- Soprano pipistrelle;
- Common pipistrelle;
- Nathusius' pipistrelle;
- Leisler's bat;
- Brown long eared bat;
- *Myotis* sp.; and
- *Pipistrellus* sp.

91. 98.67% of the records from the static detector surveys which were from common pipistrelle, soprano pipistrelle and *Pipistrellus* species. In the 2019 guidelines (SNH, 2019) these species are considered to be high collision risk species, that said whilst individuals are at a high risk overall due to the abundance of these species the population vulnerability is only moderate. Small numbers of other low risk bat species (*Myotis* bats and Brown long eared bat) were also recorded. The species with high population vulnerability, *Nathusius'* pipistrelle and Leisler's bat, were responsible for a very small percentage (<0.1%) of the total bat activity recorded. Bat surveys recorded relatively low levels of activity with an overall mean Bat Activity Index of 4.2

[6] Location is only available in a confidential appendix/survey report, which was not available.

[7] Pine marten scats are hard to separate from fox scats even by experts, and the confirmation can only be made by use of DNA.

passes per hour within the study area. The records of bat activity were mostly closely associated with edge and riparian habitat features, with the highest proportion of records being from riparian features. It is recognised that foraging and commuting activity decreases significantly at a distance of 35-50m from these features (Mitchell-Jones, 2014). Some activity was also recorded at recording locations within more open habitat however.

92. No bat roosts were identified within the study area (see **Technical Appendices 8.3 and 8.4**).

Water Vole

93. Water voles were absent within the Freasdail and Eascairt Windfarm study areas, although signs of water voles were found within the High Constellation Windfarm study area, although the signs were only scattered.

94. No signs of water vole were recorded during the surveys in either 2018 or 2019 (see **Technical Appendices 8.3 and 8.4**). Most of the watercourses within the study area were unsuitable for water vole, although some potentially suitable habitat was identified and there were some sections of watercourses that were unable to be surveyed due to dense vegetation or for health and safety reasons. As such, the presence of water vole within the study area cannot be completely ruled out, although it is considered unlikely to be present.

Scottish Wildcat

95. The closest recent record of Scottish wildcat is from northern Knapdale, a distance of between 20-30 km which is at the limit of the known home ranges of wildcats. No signs of wildcat were found during the surveys for Eascairt Windfarm, although the site was considered to be of 'medium' importance for the species. No evidence of wildcat was found during the surveys for High Constellation Windfarm. No information was provided by the Freasdail Windfarm study report.

96. In western areas of Scotland, wildcats prefer to hunt in suitable grassland and/or moorland in proximity to woodland edge habitats (Clegg, 2017). They are also known to utilise recently felled plantation woodland (SNH, 2017). The majority of the study area was assessed to be largely of low value to wildcat due to the dominance of large areas of clear-felled woodland and because of an absence of a suitable sward to support prey species. It was noted that suitable habitat was present to the north and west of the study areas, mostly outside of the site and, therefore, it was considered possible that wildcat could use the study area on an occasional basis (see **Technical Appendix 8.3** for further details).

Red Squirrel

97. There are records for red squirrel within 1 km of the study area (see **Technical Appendix 8.3**). The surveys undertaken to inform the three windfarm applications in the surrounding area did not identify the presence of red squirrel at any of the sites and no sightings or evidence of the species was found within the study area during the mammal surveys in 2018 (see **Technical Appendix 8.3**). The study area is within the known range of red squirrel; however, it is considered that the majority of the site being moorland, wet grassland and felled woodland is unsuitable for this species. The more mature areas of woodland are dominated by Sitka spruce which is less favoured by red squirrel than woodland dominated by pine species (Gurnell, 2009). Whilst red squirrels are not considered likely to be present, their presence cannot be ruled out within areas of mature forest.

Red Deer

98. Two red deer were recorded north of Clachan Burn during the further mammal surveys in 2019. This was the only record during the surveys and few deer droppings were observed in the survey area indicating that deer are only likely to be present in low numbers. No information regarding deer was provided by Eascairt or Freasdail Windfarms. Deer are therefore not considered further in this Chapter.

Brown Hare

99. Records of brown hare were provided for the 5 km search area from the NBN gateway. Although this species was not recorded incidentally on the site during surveys, the site does have some suitability for this species. However, due to the mobility of this species and limited habitat loss, with an abundance of suitable habitat within the surrounding landscape, detailed assessment of effects on this species have been scoped out.

Hedgehog

100. Records of hedgehog were provided for the 5 km search area (from the NBN gateway). This species was not recorded incidentally on the site, and the site is considered predominantly suboptimal for this species due to its upland peatland and wet nature, with more suitable habitat for this species present in the wider area. As such, this species is scoped out from further assessment.

8.6.4 Evaluation of Faunal Receptors

101. An evaluation of the non-avian faunal ecological receptors, which are either known to be present or considered likely to be present within the study area, is provided in **Table 86**.

Receptor	Legal/ Conservation Status	Reason for Evaluation	Evaluation
Fish: brown trout, Atlantic salmon, river lamprey, brook lamprey, rainbow trout and European Eel	SBL, LBAP, SFF	A range of fish species were identified within the study area. Clachan Burn and Clachan Burn NE were considered to be of medium habitat suitability for migratory fish, with the other habitats assessed being of low suitability. It is therefore considered that Clachan Burn and Clachan Burn NE are of local value to migratory fish species and the other habitats are assessed as less than local value.	Clachan Burn and Clachan Burn NE only – local value. All other watercourses – less than local value.
Common lizard, slow worm and adder	WCA Sch5 SBL, LBAP (adder only)	Adder is described as widespread across the Scottish mainland (SNH, 2016e). Adder has been recorded at two different locations within the study area and there is an abundance of suitable habitat in the surrounding area for this species. Therefore, the study area is considered to be of no more than local value to adders. Common lizard was not recorded within the study area during other surveys but suitable habitat was present. The habitats present are generally widespread and relatively common in the wider area. Common lizard is described as being widespread throughout Scotland (SNH, 2016d). Therefore, as common lizard are relatively common and widespread and given the abundance of similar habitat in the surrounding area, the site is not assessed as being of higher than local value should it be present. Slow worm is described as being fairly common across Scotland (SNH, n.d.). Limited suitable habitat is present within the site but similar habitat is widespread in the wider area. Therefore, given suitable habitat is in the surrounding area even if present the site is assessed as being of no more than local value for this species.	Local value
Otter	HR Sch2, WCA Sch5, SBL and LBAP	Otters are described as occurring throughout Scotland, they can be found within 200 m of suitable water courses or wetlands (SNH, 2007). Otters, spraints and a couch were observed within the study area during surveys in 2018. The habitat within the site is considered to be suitable for commuting and foraging. Otters have been widely recorded at other nearby sites and given the abundance of suitable habitat in the surrounding area, the site is assessed as being of no more than local value.	Local value
Pine Marten	HR Sch2, WCA Sch5, SBL	Pine martens are widely distributed throughout the Scottish mainland, being mainly found in woodlands including conifer plantations (SNH, u.d). Evidence of likely use of the study area by pine marten was recorded with the habitats being of moderate suitability. However, given the abundance of similar habitat within the surrounding area the site is assessed as being of no more than local value.	Local value
Badger	Protection of Badgers Act, 1992	No evidence of badgers was identified within the study area. The study area is considered to offer only small areas suitable for sett excavation, with the open moorland being of low value for foraging badgers. If present, the study area is assessed as being of less than local value to badgers.	Less than local value
Bats	HR Sch2, WCA Sch5, SBL, LBAP[8]	No roosts were identified within the study area and the habitats at the Site are considered to be of only low to moderate value to bats. Activity of both foraging and commuting bats was dominated by common and widespread bat species such as soprano and common pipistrelle and was moderate to high in places but not sufficiently high for the site to be regarded as regionally important. Activity levels for other species were much lower with the absence of broadleaved woodland potentially explaining the limited presence of woodland specialists, such as *Nyctalus* species.	Local value
Water vole	WCA Sch5, SBL, LBAP	No evidence of water vole occupation was found during the surveys in 2018 or 2019 and the study area was considered to provide sub-optimal habitat for this species. Whilst their presence could not be ruled out, the site is considered to be of less than local value to water voles, even if present, owing to the limited extent of potentially suitable habitat.	Less than local value
Scottish wildcat	HR Sch2, WCA Sch5, SBL, LBAP	No evidence of wildcat was found in the study area and the nearest recent record is around 30 km away. The study area is assessed as low value to wildcat, although the presence of wildcat on an occasional basis cannot be ruled out.	Less than local value
Red Squirrel	WCA Sch5, SBL, LBAP	No evidence of red squirrels was recorded within the study area during surveys in 2018 and the majority of the site is considered unsuitable for this species. Although their presence can't be ruled out the lack of records and the limited habitat suitability mean the site is not likely to be of significant value to them.	Less than local value

Table Key: status

HR Sch2 = included on Schedule 2 of the Conservation (Natural Habitats &c) Regulations 1994 (as amended in Scotland)
WCA Sch5 = Listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended in Scotland)
SBL = Listed on Scottish Biodiversity List (SBL) (Scottish Government, 2013).
LBAP = listed in *Argyll and Bute Biodiversity Action Plan. (Argyll and Bute Biodiversity Group, 2010)*
SFF = Salmon spawning beds protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003

Table 8-5: Evaluation of Faunal Receptors

[8] Soprano pipistrelle, brown long-eared bat and noctule bat only.

8.6.5 Cumulative Situation

103. When undertaking the cumulative effects assessment, it is important to consider only those projects which could potentially contribute to significant cumulative effects with the proposed Development. As set out in paragraphs 58 - 59, for this assessment potential cumulative effects have been assessed for the following receptors and developments:

- Cumulative effects on aquatic receptors within the same sub-catchments and within 2 km; and
- Cumulative effects on bat populations, which are possible in combination with windfarms within a 10 km radius.

104. Other projects considered in the cumulative effects assessment are detailed in **Table 8-6**. These include all windfarms within the relevant areas which are either operational, under construction, consented or for which a planning application has been submitted. No large-scale solar developments were identified within the search area.

Project	Status	Distance from the Site (km)	Number of Turbines
Freasdail	Operational	Immediately to north east (63m)	11
Eascairt	Consented	Immediately to south east (165m)	13
High Constellation	Submitted	5.4 km to south	10
Ronachan	Scoping	3.7 km south west	14
Cour	Operational	6.9 km south	10
Airigh	Submitted	6.2 km north west	14
Willow	Submitted	6.9 km south west	13
Cruach chaorainn	Scoping	10 km north	28

Table 8-6: Other Projects Considered in Cumulative Effects Assessment

8.6.6 Future Baseline

105. In the absence of the proposed Development, the Site is likely to remain as open moorland (with blanket bog, modified bog and marshy grassland habitats) and forestry with open habitats grazed by sheep and cattle.

106. The coniferous plantation blocks in the north west and to the south of the study area are likely to be felled once the trees reach maturity but it is understood that these areas would likely be replaced with further plantation woodland.

107. To allow for possible changes in the distribution of protected species pre-construction surveys for protected mammal species (otter, badger, water vole and pine marten) would be undertaken to ensure legislative compliance during construction, as detailed in paragraphs 113-115.

108. There is no reason to expect the suitability of the watercourses for fish to change significantly in the absence of the proposed Development. Similarly, bats are likely to continue to forage in low numbers across the Site in future years, and in the absence of the proposed Development the usage of the Site by bats is expected to remain low.

109. It is considered possible that the areas of modified bog will continue to deteriorate in quality as the effects of drainage continue with *Molinia* increasing in its dominance.

110. In summary, in the absence of the proposed Development the ecological condition of the Site is unlikely to change significantly over the next 30 years.

8.7 Assessment of Effects

111. The assessment of effects is based on the information outlined in **Chapter 3 Proposed Development**. **Figures 8.2 and 8.3** illustrate the proposed Development infrastructure over the Phase 1 and NVC survey results respectively.

8.7.1 Embedded Mitigation

112. The Arg 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 Site Description and Design Evolution** for further details). With respect to (non-avian) ecology the following changes have been incorporated to avoid or minimise negative effects:

- It was not possible to avoid blanket bog and wet modified bog habitats, as these comprise the majority of the site. However, the site infrastructure (e.g., solar arrays, wind turbines, tracks and substation) located in areas of higher quality blanket bog has been minimised and areas of deep peat have been avoided as far as possible;
- A 50 m buffer has been included around all mapped watercourses for turbines and associated access tracks (except for watercourse crossings);
- A 20 m buffer has been included around all mapped watercourses for solar arrays (except for watercourse crossings);
- Tree clearance would ensure a minimum 50 m buffer between wind turbine blade tips and the closest forest edge (at its nearest point), in accordance with current good practice guidelines (SNH, 2019); and
- Track length and the number of watercourse crossings was minimised as far as possible to minimise land take.

8.7.2 Good Practice Measures

Mitigation Measures

113. Full details of construction mitigation measures would be provided in a CEMP. A draft CEMP is included as **Technical Appendix 3.1**. Good practice measures in relation to pollution risk, sediment management and watercourse crossings to be adopted during the construction and operation phases are set out in **Chapter 10 Hydrology, hydrogeology, geology and soils**. During the construction phase, good practice techniques with respect to peatland environments, as contained within SNH (2019), would be implemented. Further details on peat and water management during construction are provided in **Chapter 10 Hydrology, hydrogeology, geology and soils** and **Technical Appendix 3.1: Draft CEMP**. Good practice measures to protect retained habitats during the construction phase would be implemented, including the erection of temporary protective fencing demarcating the working footprint, to be overseen and policed by an Ecological Clerk of Works (ECoW) (also see paragraphs 116-117); further details are provided in the draft CEMP. Good practice techniques for vegetation and habitat reinstatement would be adopted and implemented on areas subject to disturbance during construction as soon as is practicable.

Pre-Construction Surveys

114. Due to the time that will have elapsed since the last surveys and the possibility that activity by protected mammal species could have changed in the intervening period, a pre-construction survey for otter, badger, water vole and pine marten would be undertaken prior to tree felling and construction taking place. This would cover all watercourses and other suitable habitat (focussing on forest edges and rides) within 250 m of infrastructure and associated working areas. The results of the pre-construction surveys would inform the need for further mitigation (if required) in respect of working practices or to consult with SNH if required.

115. In addition, pre-felling checks for red squirrel dreys and for any evidence of wildcat would be undertaken. If necessary further mitigation in respect of working practices would be developed, licences obtained and consultation with SNH undertaken if required.

116. A preconstruction and pre-felling survey would also be undertaken for invasive non-native species such as Japanese knotweed and rhododendron. Should invasive non-native species be identified then further mitigation in respect of working practices or treatment may be required.

Ecological Clerk of Works

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

- give toolbox talks to all staff onsite, e.g. an ecological induction, so staff are aware of the ecological sensitivities on 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 where required; and
- pre-construction inspections of areas which require reptile mitigation (i.e. supervision during vegetation clearance).

118. The ECoW would also undertake additional roles such as assisting with water quality monitoring or checking for nesting birds (see **Chapter 9 Ornithology** and **Chapter 10 Hydrology, hydrogeology, geology and soils**).

Reptiles

119. In order to comply with the Wildlife and Countryside Act 1981 (as amended in Scotland) mitigation would be employed to reduce the chances of inadvertently killing or injuring individual reptiles during construction works. Given the low numbers of reptiles likely to be present, the large areas of suitable habitat that would remain unaffected by the works and given also the large spatial scale of the works, fencing and translocation are not considered appropriate. Proposed mitigation, therefore, would involve vegetation management and the identification/ removal of potential refugia and hibernacula if present.

120. Where appropriate and safe to do so, potentially suitable habitats for reptiles located within construction working areas would be cut, under the supervision of the ECoW, prior to construction works commencing in that area, in order to encourage reptiles to leave the area. Suitable habitat within working areas would also be searched by the ECoW prior to construction commencing and any potentially suitable refuges would be removed. These works would take place during the active season for reptiles (typically April to October, although this is dependent upon the nature weather conditions in any one year).

Protected Mammals

121. All potentially dangerous substances or materials within the construction compound would be carefully stored to prevent them causing any harm to otters or other mammal species which may enter the compound at night.

122. During construction, all excavations greater than 1m depth would either be temporarily covered at night or designed to include a ramp to allow otters and other animals a means of escape should they fall in.

8.7.3 Potential Effects - Construction

123. Potential effects, assuming that the good practice mitigation measures outlined in paragraphs 112 to 122 are implemented, are addressed for each receptor in turn in paragraphs 123 to 154. Effects have been assessed only for important ecological receptors (i.e. those with a value of Local level or above, potential GWDTEs or legally protected species) and those not scoped out of assessment due to there being no potential for significant effects. These comprise:

- Ancient woodland adjacent to Clachan Burn;
- Blanket bog, wet modified bog, marsh/marshy grassland (due to potential GWDTE status), swamp, open water and running water; and
- Otter, pine marten, reptiles, bats and fish.

Designated Sites

124. The area of ancient woodland adjacent to Clachan Burn is over 140 m downstream from the proposed Development and, therefore, would be not subject to any habitat loss. There is, however, the potential for the Site to be impacted due to changes in water quality or quantity which reach the woodland. It is considered that with the 50 m buffer from watercourses for turbines and 20 m from watercourses for solar arrays (except for water crossings) and use of standard good practice measures this risk is minimal and no significant effect is predicted.

Habitats

125. Impacts on habitats are categorised as follows:

- Direct habitat loss – this includes habitats present under the footprint of the proposed Development and includes areas which would be subject to cut and fill, grading and cable laying; and
- Indirect/ temporary habitat loss – indirect loss has been calculated for blanket bog and wet modified bog habitats which lie within 10 m of the direct habitat loss areas; the allowance of 10 m is to allow for drying effects and vegetation changes due to construction works[9]. Taking a precautionary approach, the same allowance has been applied to the creation of the solar arrays due to construction works. For other habitats an allowance for temporary loss of 5 m is included to allow for possible temporary loss due to damage during construction.

126. For the purposes of assessment, a precautionary approach has been taken which assumes that direct habitat loss (all habitats) and indirect loss of blanket bog and wet modified bog habitats represents a permanent, irreversible negative effect, although in practice some areas indirectly affected may be able to be restored, e.g. during reinstatement following construction. A precautionary approach has also been used when assessing the impact with respect to solar arrays with total loss being assumed, although in practice some habitat is likely to be retained beneath and between the arrays.

127. **Table 8-7** details the estimated direct and indirect/ temporary habitat loss for habitats with local or greater value, and potential GWDTE communities. This excludes areas of forestry plantation.

[9] This figure is in line with similar assessments for other projects, and although arbitrary, is considered precautionary based on experience at other sites.

Phase 1 Habitat	NVC Community	Direct Habitat Loss (ha unless stated)[10]	Infrastructure causing Direct Habitat Loss	Indirect or Temporary Habitat loss (ha unless stated)	Total Loss (ha)
Blanket bog	M15*	9.86	Access tracks and paths, wind turbine foundation, crane pad, solar area 2	1.93	11.79
	M17	0.02	Solar area 2. Note that the very small area predicted to be directly lost is likely a result mapping scale and in practice M17 would be avoided at the micro-siting stage.	0.56	0.58
	M15/M17mosaic*	0.71	Access track, wind turbine foundation, crane pad, passing place	1.82	2.53
Wet Modified bog	M15/M17 mosaic modified*	1.44	Access track, crane pad, wind turbine foundation, turning head, shelter, recreational route	3.04	4.48
	M25*[11]	2.07	Access track, wind turbine foundation, crane pad, passing place, possible borrow pit, hide location	4.66	6.73
	M25 modified*	6.05	Access track, wind turbine foundation, crane pad, recreational route, passing place, borrow pit	11.81	17.86
Marsh/Marshy grassland	M23 rush pasture	1.76	Access track, passing place, crane pad, wind turbine foundation and watercourse crossing location	2.21	3.97
Swamp	S4	0	-	0	0
Open water	-	0	-	0	0
Running water	-	66 m	Watercourse crossing points (new and upgraded)	110 m	176 m
Total		**21.91**		**26.03**	**47.94**

Table 8-7: Summary of Habitat loss by Phase 1 Habitat / NVC Community Type

Communities marked with a '*' are potential GWDTE communities

[10] Rounded up to two decimal places
[11] Further information regarding how and why M25 has been split into two categories M25 and M25 modified is given in **Technical Appendix 8.1**. M25 *Molinia caerulea-Potentilla erecta* mire is by its nature associated with modified habitats however at the site there is a difference in the extent of the modifications and the impacts this appears to be having on the vegetation between those areas marked as M25 mire and M25 mire modified i.e.: the areas marked as M25 *Molinia caerulea-Potentilla erecta* mire modified area have a poorer species diversity, support fewer herb species, are more dominated by purple moor grass than those illustrated as being M25 mire. This separation has been made to indicate which areas of habitat are of higher quality and potentially more capable of being restored to blanket mire if desired.

129. Adopting the precautionary approach to habitat loss set out above, the proposed Development would result in the direct loss of 10.59 ha of blanket bog (M15, M17 and M25 mire communities) and 9.56 ha of modified bog plus the indirect loss of 4.31 ha of blanket bog and 19.51 ha of modified bog.

130. The direct and indirect loss of up to 14.90 ha of regionally important blanket bog is considered to constitute a significant negative effect at a regional level. The direct and indirect loss of up to 29.07 ha of modified bog habitat is considered to constitute a significant negative effect at a local level.

131. An upgrade watercourse crossing is proposed on the existing Clachan Burn access track to access the solar area, five new watercourse crossings are proposed to access the turbine area, and four existing watercourse crossings are proposed to be upgraded. It is considered that given the small area of each water crossing and the low value of the majority of the watercourses that there would not be a significant effect on running water habitat. All other infrastructure is situated a minimum of 50 m away from watercourses. Assuming that best practice pollution prevention measures are adopted (see **Chapter 10 Hydrology, hydrogeology, geology and soils** for further details), no significant effect is predicted on the running water environment. An assessment of effects specific to fish and otter is addressed separately in paragraphs 133 - 136 and 139- 141 respectively.

GWDTE Communities

132. **Table 8-7** shows the habitat loss (direct and indirect/ temporary) for all potential GWDTE communities. The communities marked with an asterisk in **Table 8-7** have conferred upon them a potential to have a high or moderate groundwater dependency (based on SEPA, 2017).

133. For a detailed assessment of the groundwater dependency of these habitats, please refer to **Chapter 10 Hydrology, hydrogeology, geology and soils**. In summary, the GWDTE assessment concludes that all areas of potential GWDTE are sustained by incidental rainfall and surface water rather than groundwater. As such, no GWDTEs would be affected by the proposed Development.

Fauna

Fish

134. The Clachan Burn and Clachan Burn NE were considered to provide medium habitat suitability for migratory fish. The Allt Mor catchment closest to Loch Ciaran was also considered to be of medium suitability for migratory fish, although this is located in a separate catchment to all of the infrastructure included as part of the proposed Development. All other watercourses within the study area were of low habitat suitability for migratory fish.

135. Watercourse crossing WX10, which is existing but needs to be upgraded and WX04, which is proposed, would both involve a crossing of Clachan Burn and/or its tributaries. A number of other watercourse crossing points will be created or upgraded across the smaller tributaries/ditches elsewhere within the site, although these all affect watercourses of low suitability for migratory fish. Apart from these crossings there is a 50 m buffer between wind turbines (20m from solar arrays) and watercourses. On the basis of the above, no direct loss of habitat of migratory fish is anticipated.

136. Given the separation distance between proposed wind turbine infrastructure and watercourses of a minimum of 50 m except for water crossing points and with the implementation of good practice pollution prevention measures (**Chapter 10 Hydrology, hydrogeology, geology and soils**), the likelihood of a pollution event affecting fish within downstream watercourses is considered to be very low. Therefore, no significant effect on salmonids or other fish species of conservation concern is considered likely.

137. In the case of the proposed solar areas, although the area SA2 is located close to Clachan Burn, a standoff of over 20 m will be maintained, except where the existing access track and watercourse crossing is used. The other watercourses are more than 50 m away from areas of proposed solar development. Given this separation and the implementation of good practice pollution prevention measures (**Chapter 10 Hydrology, hydrogeology, geology and soils**), the likelihood of a pollution event affecting fish within downstream watercourses is considered to be very low. Therefore, no significant effect on salmonids or other fish species of conservation concern is considered likely.

Reptiles

138. Although only adder have been recorded on site, the Site is also expected to support common lizard and possibly slow worm, given the suitable habitat present. The construction of the renewable energy development would result in the direct loss of 49.27 ha of potentially suitable habitat for these species. This loss is not considered significant, given the extensive availability of similar suitable habitats within the Site and the wider area. Indirect/ temporary loss of habitat has not been considered here, as it is anticipated that areas subject to drying or other temporary damage would still be used by reptiles for activities such as basking and potentially foraging (following habitat reinstatement).

139. Good practice mitigation measures aimed at reptiles (see paragraphs 118-119), would be implemented during the construction phase, to prevent the inadvertent injury or killing individuals. On the basis that the proposed measures are implemented no significant effects are predicted and no contravention of the relevant legislation is likely.

Otter

140. The death or injury of an otter during construction could have a significant effect on the conservation status of this species. However, following implementation of the good practice measures outlined in paragraphs 112 to 122, death or injury to otters during construction is not considered likely. As such, no significant effects would be likely to occur.

141. There would be a small loss of running water habitat (up to 66 m permanent loss and 110 m temporary loss) due to the creation or upgrading of the watercourse crossings for the proposed Development. This scale of habitat loss would not lead to any significant effects.

142. Construction activities have some potential to cause temporary disturbance to otters which can use the watercourses and water bodies on and around the Site for foraging or commuting, this disturbance would likely be via noise and human presence. No evidence of otters was identified on the smaller tributaries within the eastern part of the Site where new watercourse crossings are proposed. To cross the Clachan Burn for the solar area 2, an existing and a new crossing point are proposed; no evidence of otter was found in this area. With the exception of the watercourse crossing points there is a 20 m minimum stand-off of solar array infrastructure from watercourses. In addition, pre-construction surveys are proposed and if otter presence was recorded close to working areas mitigation measures would be employed to avoid significant disturbance. Furthermore, otters have large home ranges and are able to adapt to a certain level of human disturbance (Chanin, 2003). As such, the likelihood of potential disturbance to otter is low, and no significant effects are considered likely.

Pine Marten

143. The death or injury of a pine marten during construction could have a significant effect on the conservation status of this species. However, following implementation of the good practice measures outlined in paragraphs 112 to 1221, death or injury to pine martens during construction is not considered likely. In addition, pre-construction surveys are proposed and if pine marten presence was recorded close to working areas, mitigation measures would be employed to avoid significant disturbance. As such, no significant effects would be likely to occur.

144. The likely presence of pine marten was identified in the study area through the presence of potential scats, although no dens were identified and the habitats were considered to be of moderate suitability for the species. There would be a loss of potential suitable habitat for this species within the Site due to the construction of turbines, access roads and other associated infrastructure. This area of habitat makes up only a very small part of the total area of available habitat within the Site and surrounding area. Therefore, it is expected that the loss of habitat for the construction of the proposed Development would not have a significant effect on pine marten.

Bats

145. No potential bat roosting habitat would be affected by the proposed Development and as such there would be no direct effect on roosting bats.

146. The bat survey results show that the proposed turbine area was subject to low levels of usage by bats. Construction would mainly take place during daylight hours during the season when bats are active (April to October, 07:00 to 19:00 hours). Any disturbance to foraging bats during construction is, therefore, likely to be minimal and not significant.

147. The proposed Development would cause the direct loss of up to 47.94 ha of blanket bog, marshy grassland and unimproved grassland habitats. The loss of this sub-optimal foraging habitat, when compared with the availability of higher quality foraging habitats within the wider area, e.g. woodland edge habitat, and riparian habitat, is unlikely to have a significant effect on the conservation status of the local bat population.

Cumulative Effects

148. For the cumulative effects on aquatic receptors during construction, the only potential for significant cumulative effects would be via the discharge of particulate matter into watercourses, or through a pollution incident. Windfarms which are already operational are not likely to give rise to significant cumulative effects and, therefore, the assessment has been restricted to windfarms within the same catchments which are yet to be constructed.

149. The watercourses within the eastern part of the Site drain into Larachmor Burn to the east of the Site. High Constellation Windfarm, if consented and constructed would also drain partly into this catchment. Even if constructed simultaneously, which is unlikely, due to the implementation of best practice measures and that Larachmor Burn has low suitability for fish there is, therefore, no potential for significant cumulative effects.

150. None of the ES chapters reviewed identified significant impacts on bats during construction, therefore, there is considered to be no risk of cumulative effects during construction.

Mitigation, Compensation and Enhancement

151. Embedded mitigation and good practice measures are detailed in paragraphs 112 to 122, as well as in the draft CEMP (**Technical Appendix 3.1**) and **Chapter 10 Hydrology, hydrogeology, geology and soils**. No further mitigation measures are proposed to mitigate against potentially significant effects upon important ecological features during construction. However, a Habitat Management Plan (HMP) would be produced, which would detail compensation and enhancement measures to compensate for the significant residual effects of habitat loss associated with the proposed Development. A Draft HMP is provided in **Technical Appendix 8.5**.

152. The Draft HMP outlines proposals for the restoration of an area of 84 ha of wet modified bog in the south of the Site, which has been heavily drained and is of a lower quality than would be expected of intact blanket mire. The Draft HMP aims to restore underlying conditions for modified blanket bog and improve the quality of blanket mire habitat within the HMP area. This would be achieved by the damming of approximately 38 km of drains across the HMP area. SPR has developed a technique to successfully restore drained blanket bog, termed “wave damming” which has been proven to work well on several similar sites in Scotland and is also proposed to be used here. Confidence that the proposed measures would be successful is therefore high.

Residual Effects

153. During the construction phase, the permanent loss of up to 14.90 ha of blanket bog habitats is considered to constitute a significant negative effect at the regional level. The permanent loss of up to 29.07 ha of wet modified bog habitats is considered to constitute a significant negative effect at the local level.

154. In order to compensate for the habitat loss, as outlined previously, an 84 ha area, almost twice the size of the area of habitat to be lost, would be targeted for peatland restoration and this would represent a significant positive effect at the regional level, which would offset the predicted loss of habitat. Given the confidence in the success of the restoration (see paragraph 151) it is considered that the peatland restoration would lead to a net positive impact and likely net gain in biodiversity in time once the peatland restoration has succeeded.

155. Assuming the proposed good practice mitigation measures are implemented, no significant residual effects are likely upon other important ecological receptors during the construction phase.

8.7.4 Potential Effects - Operation

156. Operational effects have been addressed for relevant receptors in paragraphs 156 - 189. Should any maintenance be required onsite which would require construction type activities, mitigation measures would be adhered to along with the measures in the CEMP (see **Chapter 10 Hydrology, hydrogeology, geology and soils)** and the assessment here is made on the basis that these measures are implemented.

Designated Sites

157. During the operational phase, no significant effects are predicted on the area of ancient woodland adjacent to Clachan Burn, approximately 200 m downstream from the proposed Development. Infrastructure would be in place and only occasional service vehicles would be present on the site, with the potential for incidents and spillages affecting woodland habitats downstream considered to be very low. In addition to this good practice measures would be implemented further reducing the risk of an incident occurring.

Habitats

158. During the operational phase, no significant effects on retained habitats are predicted. Infrastructure would be in place and only occasional service vehicles would be present on the Site, with the potential for incidents and spillages affecting sensitive habitats considered to be very low. In addition to this good practice, measures would be implemented further reducing the risk of an incident occurring.

Fish

159. During the operational phase, maintenance traffic would be minimal. No hazardous chemicals would be regularly stored on the Site during the operational phase. During major maintenance events, temporary storage of hazardous chemicals could occur onsite, but would be subject to implementation of standard pollution prevention control measures. Once the proposed Development is operational, should it be consented, due to the proposed good practice measures and the separation distance of at least 50 m from wind turbines and associated tracks (except for watercourse crossing points) and 20 m for solar arrays, there would be limited mechanisms present for causing water pollution, and as such no significant effects upon fish are predicted.

Reptiles

160. Human activity associated with maintenance would be limited to the permanent infrastructure areas and only minimal maintenance traffic would be present, which would be restricted to the access tracks and subject to similar speed limits to those in place during construction. No significant effects on reptiles are, therefore, predicted.

Otter

161. Human activity associated with maintenance would be limited to the permanent infrastructure areas and only minimal maintenance traffic would be present, which would be restricted to the access tracks and subject to similar speed limits to those in place during construction. As discussed in the Construction Effects Section, paragraph 139 - 141, otter presence within the Site does occur but they are likely to be present on watercourses and waterbodies all of which (except for watercourse crossing points) are more than 50 m away from wind turbines and associated tracks (20 m for solar arrays) and, therefore, the potential for otter to be affected during operation is considered to be very low.

162. No hazardous chemicals would be regularly stored on the Site during the operational phase, and activities involving excavations would have ceased. During major maintenance events, temporary storage of hazardous chemicals could occur onsite, but would be subject to implementation of standard pollution prevention control measures. As a result, there would be limited mechanisms present for causing water pollution.

163. Based on the above, and assuming that the proposed good practice measures are implemented, no significant effects on otter are considered likely during the operational phase.

Pine Marten

164. Human activity associated with maintenance of the proposed Development would be limited to the permanent infrastructure areas and only minimal maintenance traffic would be present, which would be restricted to the access tracks and subject to similar speed limits to those in place during construction. The potential for pine marten to be affected during operation is, therefore, considered to be very low and no significant effects are predicted.

Bats

165. The proposed solar arrays are not likely to be subject to high levels of bat activity and the proposed solar arrays are not likely to significantly affect bat activity. As such, no significant effects on bats are predicted during the operation of the solar arrays. The assessment of operational phase impacts therefore focusses on impacts resulting from the proposed wind turbines. Operational wind turbines can affect bats in a number of ways, although the main concerns 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 turbine blades (SNH, 2019).

166. The assessment of potential impacts on bats resulting from the operation of the proposed wind turbines is based on the methodology set out in current SNH (2019) guidelines. As noted in paragraph 40, bat surveys were undertaken prior to the publication of the SNH (2019) guidelines. However, the surveys were largely compliant with the 2019 guidelines and the survey data are considered sufficient for assessment using the assessment methodology set out in the SNH (2019) guidelines.

Assessment Methodology

167. Under the SNH (2019) guidelines the first stage in the assessment process is to assess the relative levels of bat activity. This is done through the use of the secure online tool *Ecobat*[12], initially designed by the University of Exeter and now hosted and developed by the Mammal Society (Lintott *et al*., 2018). *Ecobat* compares data entered by the user with bat survey information collected from similar areas at the same time of year and in comparable weather conditions[13]. *Ecobat* generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain.

168. Bat survey data collected within the study area in 2018 (summarised in **Technical Appendix 8.3: Bats and Protected Species Survey Report**) were entered into the Ecobat tool and relative levels of activity were determined by comparison with a reference data set including records from within 30 days of each survey date and within 200 km of the survey location. Because the survey data were collected prior to publication of the SNH (2019) guidelines a number of conversions needed to be made to get the data into the format required for entry into the *Ecobat* tool. However, these were mostly very minor and none are considered likely to have affected the assessment.

169. Estimating the vulnerability of bat populations to wind turbines is based on three factors: relative abundance (nationally); collision risk (based on information provided by SNH, 2019); and the relative level of bat activity recorded at the site. According to SNH (2019) five bat species in Scotland have a high collision risk (noctule, Leisler's, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle). Of these, three (noctule, Leisler's and Nathusius' pipistrelle) are considered to have high population vulnerability with the other two (soprano and common pipistrelle) having medium population vulnerability.

170. SNH (2019) propose a two-stage process for assessing potential risk to bats. Stage 1 gives an indication of potential site risk based on a consideration of habitat and development-related features. Stage 2 then makes an overall assessment of risk by considering the site assessment in relation to the bat activity output from *Ecobat* and taking into account the relative vulnerability of each species of bat present, at the population level. In accordance with the guidelines Stage 2 should be carried out separately for all high collision risk species recorded, which at Sheirdrim included Leisler's bat, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle. This process is illustrated in Box 8.1 and Box 8.2 (taken from SNH, 2019).

Relative Levels of Bat Activity

171. A summary of the output from *Ecobat* is presented in **Table 8-8**. **Table 8-8** shows, for each species or species group (where bats could not be reliably identified to species) recorded by each detector (see **Figure 1 in Technical Appendix 8.3** for detector locations), the following information:

- Median percentile - providing a numerical representation of average activity levels relative to the surrounding landscape (within 200 km) for each night of surveying. Percentiles are then assigned to activity categories (low, moderate, high), in line with SNH (2019) guidelines to provide a quantifiable measure of bat activity;
- 95% Confidence Intervals - providing an indication of the confidence in the median percentile;
- Max percentile – providing a numerical representation of maximum activity levels on any one night relative to the surrounding landscape (within 200 km) for each night of surveying;
- Nights recorded – the number of nights the species was recorded at that location (out of a maximum of 90 recording nights);
- Reference range – the number of other records that data for the study area have been compared against; and
- Level of bat activity – as determined primarily from consideration of the median percentile and associated confidence limits but also taking into consideration other parameters where relevant (e.g. where there are a very small number of records). In accordance with SNH (2019) this is determined as follows:
  - 0-20th percentile – low;
  - 21st-40th percentile – low to moderate;
  - 41st-60th percentile – moderate;
  - 61st-80th percentile – moderate to high; and
  - 81st-100th percentile – high.

Site Risk Level (1-5)*		Project Size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Key: Green (1-2) - low/lowest site risk; Amber (3) - medium site risk; Red (4-5) - high/highest site risk.

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

Habitat Risk	Description
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features.
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site.

Project Size	Description
Small	Small scale development (≤10 turbines). No other wind energy developments within 10km. Comprising turbines <50m in height.
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.
Large	Largest developments (>40 turbines) with other wind energy developments within 5km. Comprising turbines >100m in height.

Box 8-1: Stage 1: Initial Site Risk Assessment (Table 3a in SNH, 2019)

Site risk level (from Table 3a)	Ecobat activity category (or equivalent justified categorisation)					
	Nil (0)	Low (1)	Low-moderate (2)	Moderate (3)	Moderate-high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Med (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

Box 8-2: Stage 2: Overall Risk Assessment (Table 3b in SNH, 2019)

[12] http://www.mammal.org.uk/science-research/ecostat/

[13] Comparison with data collected in comparable weather conditions was not possible here as weather data were not collected alongside bat activity data. This is also likely to be the case for several of the reference sites in the database.

Detector ID	Description of Detector Location	Species / Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range	Level of Bat Activity
A	Woodland edge with felled woodland to the south. Within the application boundary but away from proposed turbine locations.	*Myotis*	7	7 - 19	43	16	1774	Low
		Pipistrellus sp.	89	85.5 - 90	99	80	3850	High
		Common pipistrelle	57	43 - 61.5	92	52	2796	Moderate
		Soprano pipistrelle	78	71.5 – 80.5	97	66	3165	Moderate to High
B	Forest ride containing marshy grassland. Within the area in which turbines are proposed to be located and broadly representative of habitats in which turbines would be located.	*Myotis*	7	7 – 19	55	36	1774	Low
		Pipistrellus sp.	72	59.5 – 72.5	99	68	3850	Moderate to High
		Common pipistrelle	37	31 – 46.5	95	46	2796	Low to Moderate
		Soprano pipistrelle	55	46.5 – 62.5	96	64	3165	Moderate
C	Adjacent to small pond and swamp habitat within forest. Within the area in which turbines are proposed to be located but not representative of habitats in which turbines would be located.	*Myotis*	7	19 – 25	55	53	1774	Low
		Leisler's bat	19	7 - 31	31	4	573	Low
		Pipistrellus sp.	77	69 - 79.5	99	75	3850	Moderate to High
		Nathusius' pipistrelle	7	7 - 25	43	7	122	Low
		Common pipistrelle	68	52.5 - 71.5	98	57	2796	Moderate to High
		Soprano pipistrelle	65	52.5 - 67	96	68	3165	Moderate to High
		Brown long-eared bat	31	7 - 50	50	3	192	Low to Moderate
D	Woodland edge adjacent to felled woodland. Within the area in which turbines are proposed to be located and broadly representative of habitats in which turbines would be located.	*Myotis*	7	7 - 19	50	29	1774	Low
		Pipistrellus sp.	93	80.5 - 90.5	100	83	3850	High
		Common pipistrelle	50	40.5 - 62	99	48	2796	Moderate
		Soprano pipistrelle	89	76.5 - 87.5	100	82	3165	High
E	On the edge of Loch Lurach. Within the application boundary, relatively close to proposed turbine locations but not representative of habitats in which turbines would be located.	*Myotis*	7	7 - 19	43	21	1774	Low
		Pipistrellus sp.	83	70.5 - 86	98	40	3850	High
		Common pipistrelle	59	38.5 - 64.5	94	37	2796	Moderate
		Soprano pipistrelle	68	50.5 - 70.5	94	41	3165	Moderate to High
F	Open heather moorland habitat. Within the area in which turbines are proposed to be located and broadly representative of habitats in which turbines would be located.	*Myotis*	7	7 - 19	31	9	1774	Low
		Pipistrellus sp.	70	49.5 - 73.5	94	27	3850	Moderate to High
		Common pipistrelle	31	19 - 59	89	19	2796	Low to Moderate
		Soprano pipistrelle	47	31 - 52.5	86	32	3165	Moderate

Detector ID	Description of Detector Location	Species / Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range	Level of Bat Activity
G	Within felled plantation woodland. Outside the application boundary.	*Myotis*	7	7 - 19	31	14	1774	Low
		Pipistrellus sp.	50	31 - 50	67	32	3850	Moderate
		Nathusius' pipistrelle	7	0	7	1	122	Low
		Common pipistrelle	7	7 - 28.5	50	23	2796	Low
		Soprano pipistrelle	7	7 - 25	70	40	3165	Low
H	Within felled plantation woodland. Outside the application boundary.	*Myotis*	7	7 - 19	31	16	1774	Low
		Pipistrellus sp.	55	40 - 58	77	43	3850	Moderate
		Common pipistrelle	7	7 - 28.5	50	25	2796	Low
		Soprano pipistrelle	43	28.5 - 43	68	43	3165	Moderate
I	On the edge of Loch Chorra-riabhaich. Within the application boundary but away from proposed turbine locations.	*Myotis*	31	25 - 37	67	50	1774	Low to Moderate
		Pipistrellus sp.	95	88 - 95	100	65	3850	High
		Nathusius' pipistrelle	31	0	31	1	122	Low
		Common pipistrelle	62	54.5 - 69.5	95	47	2796	Moderate to High
		Soprano pipistrelle	89	76 - 88	99	74	3165	High
J	Within tree line on edge of Lochan Fraoich. Within the application boundary but away from proposed turbine locations.	*Myotis*	7	19 - 28.5	55	41	1774	Low
		Pipistrellus sp.	93	83.5 - 92.5	100	62	3850	High
		Common pipistrelle	65	48 - 68	98	41	2796	Moderate to High
		Soprano pipistrelle	86	76 - 88	100	62	3165	High
K	In open habitat adjacent to the Kintyre Way footpath. Within the application boundary but away from proposed turbine locations.	*Myotis*	7	7 - 7	7	4	1774	Low
		Pipistrellus sp.	50	39 - 54	71	20	3850	Moderate
		Common pipistrelle	7	7 - 25	43	16	2796	Low
		Soprano pipistrelle	7	7 - 28.5	50	28	3165	Low
L	In open habitat adjacent to the Kintyre Way footpath. Within the application boundary, relatively close to proposed turbine locations and broadly representative of habitats in which turbines would be located.	*Myotis*	7	7 - 7	7	5	1774	Low
		Pipistrellus sp.	37	19 - 49	55	6	3850	Low to Moderate
		Common pipistrelle	7	7 - 7	31	5	2796	Low
		Soprano pipistrelle	7	7 - 19	31	9	3165	Low
M	In scrub habitat close to the A83. Outside the application boundary.	*Myotis*	31	19 - 31	71	53	1774	Low to Moderate
		Pipistrellus sp.	93	88 - 92.5	99	75	3850	High
		Common pipistrelle	62	54 - 64.5	87	74	2796	Moderate to High
		Soprano pipistrelle	90	82 - 88.5	98	79	3165	High
		Brown long-eared bat	7	7 - 7	7	3	192	Low

Table 8-8 Summary of Ecobat Output showing Relative Level of Bat Activity by Species and by Detector

172. Relative levels of activity for each species or species group, based on the data provided in **Table 8-8**, are summarised below.

Leisler's Bat

173. Leisler's bat was recorded on a total of only four nights at one location, Location C which lies next to a small lochan and swamp within the forest in the north of the Site and is not representative of the habitats in which turbines would be located. Compared with other sites in the region the level of activity was Low.

Nathusius' Pipistrelle

174. Nathusius' pipistrelle was recorded at only three locations, Locations C, G and I, all of which are located within the forest, either at the forest edge or in recently clear-felled areas, either outside the application boundary, away from proposed turbine locations or within habitats not representative of the habitats in which turbines would be located. Nathusius' pipistrelle was recorded on between 1-7 nights at each location and compared with other sites in the region the level of activity at all locations in which the species was recorded, was low.

Common and Soprano Pipistrelle

175. A relatively large number of pipistrelle records were not able to be identified to species (see **Technical Appendix 8.3: Bat and Protected Species Survey Report** for further details). Common and soprano pipistrelle have therefore been assessed together here, enabling consideration of all of the pipistrelle sp. records in addition to the records identified to species level.

176. Pipistrelle activity was Moderate to High or High compared with other sites in the region at nine of the 13 detector locations, although at two of these locations (E and F) pipistrelle activity was recorded on less than half of the nights surveyed. *Ecobat* does not include nil records in its calculations and, therefore, in practice, if nights when no bat activity was recorded were to be included, relative activity at these two locations is likely to be much lower than indicated. The remaining seven locations, only three of which are in locations in which turbines are proposed to be located, were located within or on the edge of the forest. The four locations at which *Ecobat* indicated lower relative levels of activity (including those where nil activity was recorded on more than half of the nights) included two within the forest to the south of the application boundary and two in open habitats along the Kintyre Way, along the south eastern application boundary. On the basis of the above, a precautionary approach has been adopted which assumes that activity of common and soprano pipistrelle bats within woodland habitats across the Site is either moderate to high or high, although activity within more open habitats is considered to be low or low to moderate.

Myotis Bats

177. *Myotis* bats were not able to be identified to species level and are therefore treated together here. *Myotis* bats were recorded at all 13 recording locations, although in all but two locations the level of activity was low compared with other sites in the region. At two recording locations, Locations I and M, in woodland edge and roadside scrub habitats respectively, Low to Moderate levels of activity were recorded compared with other sites. *Myotis* bats are at low risk of collision and have low vulnerability to wind turbines at a population level. Given the relatively low levels of activity recorded significant effects are unlikely and *Myotis* bats are therefore not considered further in this assessment.

Brown Long-eared Bat

178. Brown long-eared bat was only recorded at two locations, Locations C and M, within the forest and roadside scrub habitats respectively. Activity levels were Low or Low to Moderate compared with other sites in the region. Brown long-eared bat is at low risk of collision and has low vulnerability to wind turbines at a population level. Given the relatively low levels of activity recorded significant effects are unlikely and brown long-eared bat is therefore nor considered further in this assessment.

Risk Assessment for High Collision Risk Species

179. The open habitats at the Site are considered to be of low risk for bats and the woodland habitats are considered to be of low to moderate habitat risk for bats (Box 1). Very few roost features were identified and most of the study area represents low quality foraging habitat for bats, particularly the open habitats, with the forest edge providing some foraging potential (see **Technical Appendix 8.3: Bat and Protected Species Survey Report**). The Site is connected to the wider landscape via watercourses and other linear habitats such as forest edge, although these connections mostly apply to the woodland habitats within the site.

180. The project is considered to be of medium size (Box 1), comprising between 10 and 40 turbines. It is noted that the SNH (2019) guidelines suggest that sites comprising turbines >100m in height, as here, represent large developments but on this basis all windfarms currently proposed and under construction would represent large developments, making the project size parameter meaningless. It is therefore considered more appropriate to regard the proposed Development as being of medium size, based on the number of proposed turbines.

181. Based on the above, the initial site risk assessment score would be 2-3. An overall risk assessment (Box 2) for each species (or species group) considered to be at high collision risk, taking into account the initial site risk assessment score is provided below:

- Leisler's bat – relative activity levels are low and therefore combined with a site risk score or either 2 or 3 the overall risk is Low.
- Nathusius' pipistrelle - relative activity levels are low and therefore combined with a site risk score or either 2 or 3 the overall risk is Low.
- Common and soprano pipistrelle – relative activity levels are moderate to high within woodland areas and low to moderate in open areas and therefore combined with a site risk of either 2 or 3 the overall risk is likely to be Medium for woodland areas and Low for the open areas.

182. The level of risk for the two species recorded during the surveys which are considered to have high population vulnerability to wind turbines, Leisler's bat and Nathusius' pipistrelle, is Low. Significant effects in relation to these species are therefore unlikely.

183. The level of risk for common pipistrelle and soprano pipistrelle, which are considered to have medium population vulnerability to wind turbines, is Medium for the woodland areas and Low for the open areas. Embedded mitigation is proposed, which would ensure buffers of at least 50 m between turbine blades and the closest forest edge (see paragraph 111) and is considered by SNH (2019) to represent adequate mitigation in most, lower risk situations. This will reduce the level of risk in woodland habitats, such that the level of risk is likely to be reduced to low to medium. Additional mitigation is proposed, which should further reduce the level of risk to pipistrelle species (see Section 8.10.1.3).

Cumulative Effects

184. Freasdail Windfarm recorded low to moderate levels of common pipistrelle and soprano pipistrelle bat activity, although note that the terms low and moderate were not defined and are not likely to meet the definitions in SNH (2019) guidelines. Habitats within the site were concluded as being of low quality for bats. Very low levels of non-pipistrelle bat activity were recorded. It was concluded that the operation of the windfarm due to its location and distance from suitable habitat there would be no significant effect on bats as a result of collision. Surveys for Eascairt Windfarm, also carried out prior to publication of SNH (2019) guidelines, only recorded a single common pipistrelle within 1 km of the turbine envelope. Therefore, it was concluded that with low levels of activity there would be no significant effect. Bats were scoped out of assessment for High Constellation Windfarm due to the numbers, location and type of species recorded.

185. It is impossible to carry out a meaningful assessment of cumulative effects on bats owing to the differences in the assessment methodologies used and the limitations in the assessments for the nearby windfarms, all of which were completed prior to publication of SNH (2019) guidelines. However, based on the above data, given the low levels of bat activity reported at all windfarms within 10 km, significant cumulative effects are considered unlikely.

186. Significant cumulative effects on aquatic receptors, including fish, are very unlikely during the operational phase.

Mitigation, Compensation and Enhancement

187. SNH (2019) guidelines state: "*The reduction in speed resulting from feathering*[14] [i.e. the reduction of rotation speed while the turbine is idling (based on the findings of Arnett et al. (2013))] *compared with normal idling may reduce fatality rates by up to 50%. As this option does not result in any loss of output, as best practice, it is recommended wherever it is practically possible and there remains uncertainty over the risk posed to bats. It can be applied at any site with a blade pitch control system which can be automated using SCADA data*." In order to mitigate for possible impacts on common and soprano pipistrelle bats feathering below the cut in speed would be employed at the proposed Development. The next level of mitigation to reduce

[14] Feathering: when blades are pitched to the fully open position slowing the rotor to approximately 1 RPM

impacts on bats, as set out in SNH (2019) guidelines, is curtailment, i.e. increasing the cut-in speed at which a wind turbine operates. However, the level of risk following the implementation of feathering below the cut-in speed is low, relating only to common and soprano pipistrelle and curtailment, therefore, cannot be justified at this stage.

188. No additional mitigation measures are required for the operational phase. However, compensation and enhancement measures provided as part of the HMP (paragraphs 151 to 152 and **Technical Appendix 8.5**) would remain in place throughout the operational phase.

Residual Effects

189. Following the implementation of the proposed mitigation measures significant effects on common and soprano pipistrelle bats are not likely.

190. No significant residual effects are anticipated in respect of any other ecological receptors during the operational phase.

8.7.5 Further Survey Requirements and Monitoring

Habitat Monitoring

191. Vegetation monitoring would be undertaken as part of the HMP, as detailed in **Technical Appendix 8.5**, in order to assess the efficacy of the implemented measures.

Fish Monitoring

192. As requested by ADSFB, fish monitoring would be undertaken prior to and post-construction. Further details would be provided in a detailed Fish Monitoring Plan, to be produced and agreed with A&BC, in consultation with ADSFB, prior to development commencing. Monitoring would involve electro-fishing, during the relevant season, in accordance with SFCC (2007).

8.7.6 Summary of Predicted Effects

Proposed Development

193. **Table 8-8** provides a summary of effects on important ecological features, mitigation, compensation and enhancement measures and residual effects.

Predicted Effects	Good Practice Measures	Significance	Additional Mitigation/ Compensation	Residual Significance
Construction				
Permanent loss (direct and indirect) of up to 14.90 ha of blanket bog habitat.	Hydrological mitigation measures and erection of temporary protective fencing to minimise effects on retained habitats.	Significant at a regional level.	Restoration of up to 84 ha of peatland habitat as part of the HMP.	Significant negative effect offset by a significant positive effect resulting from proposed peatland restoration.
Permanent loss (direct and indirect) of up to 29.07 ha of wet modified bog habitat.	Hydrological mitigation measures and erection of temporary protective fencing to minimise effects on retained habitats.	Significant at a local level.	Restoration of up to 84 ha of peatland habitat as part of the HMP.	Significant negative effect offset by a significant positive effect resulting from proposed peatland restoration.
Permanent loss of up to 66 m of running water habitat	None	Not significant	None	Not significant
Water quality impacts (running water), including impact on fish habitat within the site and downstream of the site.	Hydrological and pollution prevention measures (detailed in **Chapter 10 Hydrology, hydrogeology, geology and soils** and **Technical Appendix 3.1: Draft CEMP);** including adherence to SEPA PPGs/GPPs. 50m watercourse buffer zone for wind turbines and 20 m for solar arrays (apart from watercourse crossings).	Not significant	None	Not significant
Loss of relatively small areas of suitable habitat for reptiles, otter and pine marten	Reinstatements of habitats subject to temporary loss.	Not significant	None	Not significant
Inadvertent disturbance, injury and/ or death of otter and pine marten.	Pre-construction surveys. Covering/ ramping of excavations. Site speed limit. Suitable storage of materials.	Not significant.	None.	Not significant.
Inadvertent disturbance, injury and/ or death of reptiles.	Habitat manipulation to make habitat unsuitable (overseen by ECoW). Site speed limit.	Not significant.	None	Not significant.
Operational				
Bats – collision with moving turbines/ barotrauma	Inclusion of a minimum 50m buffer between turbine blades and habitat features of potential value to bats, e.g. forest edge.	Unlikely to be significant for common and soprano pipistrelle Not significant for other species	Feathering of turbines below cut-in speed.	Not significant for any bat species
Damage to habitats and killing/injury of fish species	Environmental measures implemented during operational maintenance similar to construction period. 50 m watercourse buffer zone for wind turbines and 20 m for solar arrays (apart from single watercourse crossing).	Not significant	None	Not significant
Damage to habitats, and disturbance/ injury/ killing of otter, pine marten and reptiles.	Environmental measures implemented during operational maintenance similar to construction period. 50 m watercourse buffer zone for wind turbines and 20 m for solar arrays (apart from single watercourse crossing). Adherence to SEPA PPGs/GPPs. Site speed limit. Suitable storage of chemicals.	Not significant	None	Not significant

Table 8-8: Summary of Effects on Important Ecological Receptors

Cumulative Effects

195. Significant cumulative effects, during both the construction and operational phases, are considered unlikely, as detailed further in paragraphs 147-149 and 183-185.

8.8 Statement of Significance

196. Following the avoidance of important receptors during the project design where possible, and with the implementation of the proposed good practice measures and additional mitigation, impacts would be minimised as far as possible.

197. The proposed Development would result in a significant negative effect for the loss of blanket bog at the regional level and for the loss of wet modified bog at the local level. However, the loss of blanket bog and wet modified bog would be offset through the compensatory peatland restoration proposed, to be delivered via a HMP. Given the confidence in the success of the restoration (see paragraph 151) it is considered that the peatland restoration would lead to a net positive impact and likely net gain in biodiversity in time once the peatland restoration has succeeded.

198. With the implementation of continued good practice measures and the implementation of the proposed HMP, no significant negative residual effects are predicted during the operation phase.

8.9 References

Argyll and Bute Biodiversity Group (2010) *The Argyll and Bute Local Biodiversity Action Plan 2010-2015.* Available at https://www.argyll-bute.gov.uk/planning-and-environment/biodiversity#note. [Accessed September 2019].

Argyll and Bute Council (2017) *A Biodiversity Technical Note for Planners and Developers.* Argyll and Bute Planning Service. https://www.argyll-bute.gov.uk/sites/default/files/biodiversity_technical_note_feb_2017_4.pdf. [Accessed September 2019].

Arnett, E., Johnson, G., Erickson, W. & Hein, C. (2013) *A synthesis of operational mitigation studies to reduce bat fatalities at wind energy facilities in North America*. A report submitted to the National Renewable Energy Laboratory. Bat Conservation International. Austin, Texas, USA. The National Renewable Energy Laboratory. Austin, Texas, USA: Bat Conservation International.

BARS (2012) *Biodiversity Action Reporting System* [Previously available on Line] Available at: www.ukbap-reporting.org.uk [Accessed October 2019]

Bruneau, P. M. C. & Johnson, S. M. (2014) *Scotland's peatland – definitions and information resources*. Scottish Natural Heritage Commissioned Report No 701

Catherine, C. & Bradley, I. (2016) *Freasdail Wind Farm Grid Connection: Reptile Mitigation*. Presented to The Vanishing Viper: Priorities for Adder Conservation. 9 October 2016, Cheddar.

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

Clegg, C, 2017 *The Scottish Wildcat: Britain's Most Endangered Mammal*. Merlin Unwin Books.

Countryside Survey (2007a) Countryside Survey: Scotland Results from 2007. Chapter 4: Semi-Natural Grasslands: Neutral, Calcareous and Acid Grassland Broad Habitats. http://www.countrysidesurvey.org.uk/sites/default/files/CS-Scotland-Results2007-Chapter04.pdf. Accessed September 2019.

Countryside Survey (2007b) Countryside Survey: Scotland Results from 2007. Chapter 7: Mountain, Moor and Heath. http://www.countrysidesurvey.org.uk/sites/default/files/CS-Scotland-Results2007-Chapter07.pdf. Accessed September 2019.

Grunell, J., Lurz, P. & Pepper, H. (2009) *Practical Techniques for Surveying and monitoring Squirrels.* Forestry Commission.

JNCC (2010) *Handbook for Phase 1 Habitat Survey. A technique for environmental audit*. Revised re-print. JNCC, Peterborough.

JNCC (2016) UK Biodiversity Partnership (2007) species and habitats lists. Available at: http://jncc.defra.gov.uk/page-5705 [Accessed in September 2019]

Lintott, P. R., Davison, S., Breda, J., Kubasiewicz, L., Dowse, D., Daisley, J. & Mathews, F. (2018). Ecobat: An online resource to facilitate transparent, evidence-based interpretation of bat activity data. *Ecology and Evolution* 8(2): 935-941.

Mathews F., Richardson S., Linott P. and Hosken D. (2016) *Understanding the risk to European protected species (bats) at onshore wind turbine sites to inform risk management*. Final report. University of Exeter.

Mitchell-Jones, T & Carlin, C. (2014) *Natural England Technical Information Note TIN051 – Bats and Onshore Wind Turbines. Interim Guidance (3rd Edition)*. Natural England.

Rodwell J.S (Editor) (1991 *et seq*.) *British Plant Communities*. Cambridge University Press.

Rodwell, J.S, (2006), *NVC Users' Handbook*, 68 pages, ISBN 978 1 86107 574 1.

Scottish Fisheries Co-ordination Centre (SFCC) (2007) *Introductory electrofishing training manual & electrofishing team leader training manual*. Available at http://www.sfcc.co.uk/resources/electrofishing.html [Accessed in August 2019]

Scottish Government (2013) *Scottish Government Scottish Biodiversity List SBL* [online] Available at: http://www.gov.scot/Topics/Environment/Wildlife-Habitats/16118/Biodiversitylist/SBL [Accessed in September 2019]

Scottish Government (2014) *Scottish Planning Policy*. Available at: http://www.gov.scot/Resource/0045/00453827.pdf [Accessed in August 2019]

Scottish Power Renewables (2019) *Sheirdrim Renewable Energy Development: EIA Scoping Report*.

SEPA (2017). *Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems.* Land Use Planning System SEPA Guidance Note 31 (LUPS – GN31). Version 3 Issued 11 September 2017

SNH (2007) *Otters and Development*. Available at: http://www.snh.org.uk/pdfs/publications/wildlife/squirrels%20leaflet.pdf [Accessed in September 2019]

SNH (2016b) *Protected Species for Developers (otters)* [On line] Available at: https://www.nature.scot/sites/default/files/2019-01/Species%20Planning%20Advice%20Project%20-%20otter.pdf /> [Accessed in September 2019]

SNH (2016c) Carbon and Peatland 2016 Map. Available at: http://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016map/ [Accessed in September 2019]

SNH (2016d) *Information on common lizard [online] Available at: https://www.nature.scot/plants-animals-and-fungi/amphibians-and-reptiles/common-lizard* [Accessed in August 2019]

SNH (2016e) *Information on adder [online] Available at: https://scottishwildlifetrust.org.uk/species/adder/* [Accessed in August 2019]

Scottish Natural Heritage (2017) Sharing Good Practice Event: Scottish Wildcats – Development, Forestry and SRDP.

SNH (2018) *SNH general pre-application/ scoping advice to developers of onshore wind farms*. Available at: http://www.snh.gov.uk/docs/A1150291.pdf [Accessed in September 2019]

SNH (2019) *Good Practice during Wind Farm Construction, 4th Edition*. Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction [Accessed in September 2019]

SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and the Bat Conservation Trust (BCT) (2019) B*ats and onshore wind turbines: survey, assessment and mitigation.*

SNH (n.d.) *Protected Species for Developers (pine martens)* [On line] Available at: https://www.nature.scot/sites/default/files/201901/Species%20Planning%20Advice%20Project%20-%20pine%20marten.pdf /> [Accessed in September 2019]

SNH (n.d) *Information on slow worm [online] Available at:* https://www.nature.scot/plants-animals-and-fungi/amphibians-and-reptiles/slow-worm. [Accessed September 2019]

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