8 Ecology

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8 Ecology

8.1 Executive Summary

8.1.1 This Chapter considers the potential significant effects on important ecological features associated with the Proposed Development.

8.1.2 The assessment is based upon comprehensive baseline data, comprising results from ecological field surveys of important and legally protected ecological features and desk study information, and is based on standard Environmental Impact Assessment (EIA) guidance.

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

8.1.4 The site supported relatively limited areas of Annex 1 habitat blanket bog and wet heath, protected mammals, badger (*Meles meles*) and water vole (*Arvicola amphibius*), limited optimal fish habitat and a bat community, activity was considered at most 'Low/Medium Site Risk'.

8.1.5 Standard mitigation adopted will include embedded mitigation in scheme design, good practice measures, like production of a species protection plan (SPP), pre-clearance surveys and appointment of an Ecological Clerk of Works (ECoW) to oversee the implementation of the ecology mitigation measures, and habitat enhancement opportunities detailed in an outline habitat management plan to be implemented. Following the application of the standard mitigation, no significant adverse direct and/or indirect effects on ecological features as a result of the Proposed Development are anticipated.

8.2 Introduction

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

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

8.2.3 The specific objectives of the Chapter are to:

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

8.2.4 The assessment has been carried out by Avian Ecology Ltd. Lead authors: Mr Howard Fearn MSc MCIEEM, Director and Dr Colin Bonnington DPhil MSc BSc (Hons) MCIEEM, Senior Ecologist. Mr Fearn and Dr Bonnington have over 15 and ten years' experience respectively as professional

ecologists, specialising in renewable energy developments. Both Mr Fearn and Dr Bonnington have contributed to, and led on, many large-scale renewable energy projects in Scotland, including numerous wind energy projects.

8.2.5 This Chapter is supported by the following figures (Volume 2) and technical appendices (Volumes 4 and 5):

- Figure 8.1: Non-Ornithological Statutory Designated Sites;
- Figure 8.2: Terrestrial Mammal Survey Results;
- Figure 8.3: Confidential Terrestrial Mammal Desk Study;
- Figure 8.4: Confidential Terrestrial Mammal Survey Plan;
- Figure 8.5: Fish Habitat Survey Plan;
- Figure 8.6: Phase 1 Habitat Plan;
- Figure 8.7: National Vegetation Classification Plan;
- Figure 8.8: Bat SurveyResults;
- Figure 8.9: Bat Roost Survey Plan;
- Technical Appendix 8.1: Terrestrial Mammals;
- Technical Appendix 8.2: Confidential Terrestrial Mammals;
- Technical Appendix 8.3: Fisheries;
- Technical Appendix 8.4: Habitats and Vegetation;
- Technical Appendix 8.5: Bats;and
- Technical Appendix 8.6 Outline Habitat Management Plan.

8.2.6 Figures and technical appendices are referenced in the text where relevant.

8.2.7 The Proposed Development is defined by the red line site boundary shown on Figures 8.1 to 8.9.

8.3 Legislation, Policy and Guidelines

8.3.1 In the preparation of this Chapter, reference has been made to the following key pieces of legislation, policy and guidance:

Legislation

- the Conservation of Habitats and Species Regulations 2017, as amended in Scotland by the Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 (collectively 'the Habitats Regulations');
- the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017;
- the Nature Conservation (Scotland) Act 2004;
- the Protection of Badgers Act 1992 (as amended in Scotland);
- the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003;
- the Wildlife and Countryside Act 1981 (as amended in Scotland);
- the Wildlife and Natural Environment (Scotland) Act 2011; and

Planning Policy

8.3.2 Planning policy relevant to the Proposed Development is detailed in Chapter 5. Relevant policies (from the South Ayrshire Local Development Plan, adopted in 2014) to the ecology assessment are LDP policy: *Natural Heritage* which are summarised below.

- International Designations – developments (alone or in combination with other projects) likely to have a significant effect on a designated or proposed Natura 2000 site (Special Protection Areas, Special Areas of Conservation) will be subject to an Appropriate Assessment, with development proposals only supported if no adverse effects on integrity of the site are predicted, or there are no alternative solutions and the development is of overriding public interest.
- National Designations - developments (alone or in combination with other projects) which would affect a Site of Special Scientific Interest (SSSI) would only be permitted where appraisals have demonstrated to satisfaction of Council that the integrity of the designated site will not be adversely impacted by the development proposal, or any adverse effects are clearly out-weighed by social, environmental or economic benefits of national importance.
- Local Designations - developments (alone or in combination with other projects) which could affect Local nature reserves, sites with species protected by the Habitats Directive, Wildlife and Countryside Act 1981 or the Badgers Act 1992, Tree Preservation Order (TPOs), Forest Parks, wildlife sites, wildlife corridors and ornithological sites will only be supported where the developer can show the integrity of these sites would not be put at risk.
- In all instances the Council will require that all development proposals have regard to safeguard features of nature conservation value, such as woodlands, wetlands and wildlife corridors.
- Protected Species – planning permission will not be granted for development proposals which will have a likely adverse effect on protected species unless it can be justified in accordance with the relevant protected species legislation.

8.3.3 The Scottish Biodiversity List (SBL) 2020 and Ayrshire Local Biodiversity Action Plan (2007-2010) are also considered in the assessment. The SBL is a list of animals, plants and habitats that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.

Guidance

8.3.4 The following best practice guidelines and guidance have been reviewed and taken into account as part of this ecology assessment:

- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012);
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition (Collins, 2016);
- Bat Surveys: Good Practice Guidance 2nd edition (Hundt, 2012);
- Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (SNH, 2019a);
- Good Practice During Wind Farm Construction (SNH, 2019b);
- Guidance on Assessing the Impacts of Groundwater Abstractions and Groundwater Dependant Terrestrial Ecosystems (GWDTEs) (Scottish Environmental Protection Agency (SEPA), 2017);
- SEPA (2014) Land use planning system SEPA guidance Note 31;
- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018);

- General Pre-application and Scoping Advice for Onshore Wind Farms (NatureScot, 2020a);
- NatureScot Carbon and Peatland map (SNH, 2016);
- Standing Advice for Planning Consultations – Protected Species: Badger (NatureScot, 2020b);
- Standing Advice for Planning Consultations – Protected Species: Bats (NatureScot, 2020c);
- Standing Advice for Planning Consultations – Protected Species: Freshwater Pearl Mussel (NatureScot, 2020d);
- Standing Advice for Planning Consultations – Protected Species: Great Crested Newt (NatureScot, 2020e);
- Standing Advice for Planning Consultations – Protected Species: Otter (NatureScot, 2020f);
- Standing Advice for Planning Consultations – Protected Species: Pine Marten (NatureScot, 2020g);
- Standing Advice for Planning Consultations – Protected Species: Red Squirrel (NatureScot, 2020h); and
- Standing Advice for Planning Consultations – Protected Species: Water Vole (NatureScot, 2020i).

8.4 Consultation

8.4.1 A request for pre-application advice and an EIA Scoping Opinion was submitted to the Energy Consents Unit (ECU), and shared with statutory and non-statutory consultees, in October 2020.

8.4.2 In addition, consultation with species specialist and biological recording groups was undertaken to identify any existing ecological information for the site and the surrounding area.

8.4.3 The following consultees were contacted with regard to ecology:

- Ayrshire Rivers Trust (ART);
- Barr Community Council;
- Crosshill, Straiton and Kirkmichael Community Council;
- Dailly Community Council;
- Fisheries Management Scotland (FMS);
- Galloway & Southern Ayrshire Biosphere (GSAB);
- Galloway Fisheries Trust (GFT);
- Marine Scotland;
- NatureScot;
- River Girvan District Salmon Fishery Board (River Girvan DSFB);
- RSPB Scotland;
- Saving Scotland's Red Squirrels;
- Scottish Wildlife Trust;
- SEPA;
- South Ayrshire Council; and

- South West Scotland Environmental Information Centre (SWSEIC).

8.4.4 No responses were received from the Scottish Wildlife Trust or Barr Community Council, and no comments in relation to ecology were received from the remaining consultees not listed in Table 8.1.

8.4.5 Table 8.1 summarises the consultation responses received regarding ecology issues, and provides information on where and/or how they have been addressed in this assessment.

8.4.6 Full details of the consultation responses can be reviewed in Technical Appendix 4.1 to 4.4 (Volume 4).

Table 8.1 – Consultation Responses

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
NatureScot (30/5/19) – Operations Officer Strathclyde & Ayrshire	Other - survey scoping	Agreed with scope of information gathering including desk study requests and field surveys. Confirmed that designated sites with qualifying ecological interest can be scoped out of assessment.	Noted.
South West Scotland Environmental Centre (SWSEIC) (5/7/19 and 20/1/21) – Manager, SWSEIC	Other - data request	Provided existing records of non-statutory designated sites, protected and notable species within 2 km of the Proposed Development (extended to 10 km for bat species).	Records are included within the relevant Technical Appendices and considered in the assessment.
Marine Scotland Science (July 2020) – Included as part of the Dailly Community Council response	Scoping	Referenced general guidance in relation to onshore wind farm developments and fisheries.	Noted.
ART River Girvan DSFB (joint response received) (8/1/21) – Biologist and Project Manager	Scoping	Noted that a fish habitat survey has been completed but not published at the time of scoping consultation. Advised that an electrofishing survey should be undertaken in order to identify in detail, the distribution	Results of the fish habitat survey are presented in Technical Appendix 8.3. It is proposed that fish monitoring pre-, during and post-construction will be carried out with

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		and abundance of the fish populations.	input from ART and River Girvan DSFB, as part of a fish monitoring plan.
		Would welcome the opportunity to provide comments on proposed baseline survey methodology and survey site locations.	Baseline fish habitat surveys have already been undertaken to support the assessment, with details provided in Technical Appendix 8.3. As stated above, it is proposed that ART and River Girvan DSFB are consulted with regards to the fish monitoring plan, which will include pre-construction monitoring.
		Freshwater pearl mussel surveys should be undertaken to inform the baseline.	Freshwater pearl mussel habitat surveys were carried out and an assessment for the suitability of watercourses within the site for freshwater pearl mussel was undertaken and is detailed in Technical Appendix 8.3.
		ART and the River Girvan DFSB would like to be consulted on issues that concern watercourses such as on water crossings, electrofishing monitoring and potential opportunities for ecological enhancement.	As stated above, it is proposed that ART and River Girvan DSFB are consulted with regards to the fish monitoring plan.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		Macroinvertebrate surveys should be undertaken within the receptor watercourses to inform the baseline.	Macroinvertebrate surveys are not considered a fundamental survey to inform the assessment following NatureScot guidance 2020a), particularly given embedded mitigation and sensitive design of all watercourse crossings for the Proposed Development
		Other mammalian riparian species of conservation importance are known to be found in or nearby the development area including otter (*Lutra lutra*) and water vole.	Riparian mammal records were collected as part of the desk study as baseline data, and surveys for otter and water vole were carried out, with details of the desk study and field surveys in Technical Appendix 8.1.
		The EIA should assess the following potential effects on watercourses from construction activities including impediment to fish movement and siltation.	Section 8.7. details embedded mitigation, including adoption of culverts which allow free passage of fish, as well as good practice measures and pollution prevention controls.
		New water crossings (temporary or permanent) should only be installed using SEPA design and best practice guidelines. The River Girvan DSFB and ART should be consulted beforehand to assist with the design and necessary mitigation measures.	Section 8.7 considers installing ecologically sensitive water crossings and further details of water crossings are provided in Chapter 9.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		The CEMP should include provision for continuous monitoring of fish and macroinvertebrates and water quality parameters.	As stated above, it is proposed that ART and River Girvan DSFB are consulted with regards to the fish monitoring plan. The requirement for macroinvertebrate monitoring as part of this plan will also be considered.
FMS (3/2/21) – Director of Communications and Administration	Scoping	Consultation should be held with ART and River Girvan DSFB. FMS have developed, in conjunction with Marine Scotland, advice for DSFBs and Trusts in dealing with planning applications. We would strongly recommend that these guidelines are fully considered throughout the planning, construction and monitoring phases of the Proposed Development.	Consultation was held with ART and River Girvan DSFB. Noted.
Crosshill, Straiton and Kirkmichael Community Council (23/2/21) - Secretary	Scoping	Stated that much of the desk study and ecological surveys are pre-COVID 19 and out of date. Stated that there is no CEMP for the Proposed Development. Relationship to Galloway Biosphere should be examined.	Desk study and surveys have been updated and the results are detailed in Technical Appendices 8.1 to 8.5. Ecological survey data has been collected within 18 months of the application, following NatureScot guidance. An outline CEMP has been produced, as detailed in Technical Appendix 3.1 Consultation was held with GSAB who had no

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
			comments. An assessment of the potential effects on Galloway and South Ayrshire Biosphere Reserve has been included in Section 8.9.
NatureScot (17/2/21) – Operations Officer Ayrshire & Arran	Scoping	We refer the Applicant to our general pre-application/scoping advice for developers of onshore wind farms. Previous advice from NatureScot of 30 May 2019 stated that *"We do not consider any of the sites (SAC and SSSIs) noted by the Applicant to be connected to the Proposed Development. Therefore, we are satisfied that they do not require further consideration and can be scoped out of the EIA".* NatureScot welcome the intention to develop a Habitat Management Plan (HMP) for the development and recommend a draft of this is submitted with the EIA Report. The Habitat Management Plan should make provision for mitigation of, or compensation for, significant impacts of the development and measures to enhance the natural heritage interest of the area. The relationships between this plan and the proposed Windfarm Forest Plan should be made clear so that a unified, holistic approach to the management of habitats and land present on the site are presented for comment. Development of the HMP should follow NatureScot guidance on Planning for development: What	Noted. This guidance has been considered (see Section 8.3). Noted, and such designated sites have been scoped out of assessment. A HMP has been produced, as detailed in Technical Appendix 8.6.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		to consider and include in Habitat Management Plans and the plan should tie in with any relevant bog (and other) habitat restoration proposals for adjacent sites in the area.	
		Surveys for protected species should be completed no more than 18 months prior to submission of the application, to ensure that the survey results are a contemporary reflection of species activity at and around the site. Where the ongoing assessment process finds that particular species could be affected by the proposal, then a species-specific protection plan should be prepared. If the implementation of the identified mitigation measures within any such plan is not sufficient to avoid an offence under protected species legislation, a licence will be required from NatureScot before the works can proceed.	Details of the surveys are included in Technical Appendices 8.1-8.5, with surveys carried out within 18 months of application submission. Details of proposed mitigation to prevent impacts to species are given in Section 8.7.
		NatureScot note that no red squirrels (*Sciurus vulgaris*) were found in the preliminary surveys but, given the proximity to known red squirrel sites and the Nith Priority Area for red squirrel conservation, additional survey effort is recommended according to NatureScot standing guidance. If this survey work finds that red squirrel could be affected by the proposal a red squirrel protection plan should be prepared. If the implementation of the identified mitigation measures within this plan is not sufficient to avoid offences under	Red squirrel surveys were undertaken at the site and the results are detailed within Technical Appendix 8.1. Red squirrels will be considered in the protected species protection plan if there is a risk that squirrels could be affected by the works for the Proposed Development.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		protected species legislation, a licence will be required from NatureScot before the works can proceed.	
		NatureScot recommend that if deer are present on or will use the site, an assessment of the potential impacts on deer welfare, habitats, neighbouring and other interests (e.g., access and recreation, road safety, etc.) should be presented. If the development would, or could, result in significant impacts, a draft deer management statement should be provided, setting out how the impacts will be addressed.	Given the limited number of roe deer (*Capreolus capreolus*) recorded during the surveys (only two), and the sub-optimal habitat on site for deer, a deer assessment was not considered proportionate for the site.
		Terrestrial mammal surveys for bat, otter, red squirrel, badger, water vole all appear to be satisfactory but no information is available for pine marten (*Martes martes*) despite it previously being confirmed as species of conservation interest for this site. NatureScot advise that this omission should be rectified especially in relation to the Applicant's likely requirement to carry out forest felling works for access and key holing of turbine sites.	Technical Appendix 8.1 contains survey information with regard to pine marten.
		The Applicant should also fully evaluate the impact of forestry on red squirrels whose likely presence in close proximity to the site must be fully evaluated with reference to required tree felling operations.	No evidence of red squirrel was identified on the site during the surveys. As explained in Table 8.9, embedded mitigation, including a CEMP and the completion of pre-felling and pre-

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
			construction surveys (as detailed within Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon local red squirrel populations. Furthermore, tree removal to facilitate the Proposed Development will be limited (see Technical Appendix 3.2). Therefore, red squirrels have been scoped out of the EIA assessment.
		We welcome the general approach to assessing bat use of the site. We acknowledge the value of utilising the 2012-2013 bat survey data from the Linfairn Wind Farm site augmented by April to September 2020 static detector surveys. We recommend post-construction monitoring (static detectors) around the new turbines as this will identify if there have been changes in the pattern of bat activity since construction.	Additional bat surveys were undertaken in 2020 and are detailed in Technical Appendix 8.5.
		The impact of key holing and woodland edge realignment on the individual requirements of these bat species will need careful consideration in the EIA.	As detailed in Section 8.7 and Section 8.9, a minimum key holing radius of 115 m will be implemented and this is anticipated to be sufficient to avoid impacts on woodland edge habitats and local bat populations.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		If the development site does not contain suitable breeding ponds for great crested newt and the habitat quality within the site for this species is poor this should be explained within the EIA with full reference to habitat quality assessment. As a minimum, all areas directly (e.g. watercourse crossings) or indirectly (e.g. sediment run off) affected by the Proposed Development and appropriate buffers up and downstream should have a habitat survey following the Scottish Fisheries Coordination Centre method. This should inform the likelihood of the presence of salmonids, eels, freshwater pearl mussel (*Margaritifera margaritifera*) and other protected/ BAP species and so the need or otherwise for species specific surveys.	There are no suitable breeding ponds for great crested newt (*Triturus cristatus*) within the site boundary. Consideration for amphibians is summarised in Table 8.9. Embedded mitigation, including the implementation of good practice construction measures and RAMs (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse indirect effects upon amphibians. Therefore, amphibians have been scoped out of the assessment. Results of the fish habitat survey are presented in Technical Appendix 8.3.

Consultee and Date	Scoping / Other Consultation	Issues Raised	Applicant Action
		NatureScot advise that the EIA should include a map of the NVC habitat survey results (including all GWDTE) with the wind farm boundary, proposed turbines, tracks and infrastructure layout overlain. NatureScot would also expect the EIA report to include written descriptions of the NVC habitats found within the site and the impacts of the Proposed Development on these habitats. NatureScot welcome the proactive approach to site-based mitigation and welcome the opportunity to advise on the Construction Environmental Management Plan (CEMP).	Details of the NVC survey are provided in Technical Appendix 8.4 and in Figure 8.7, with descriptions given in Section 8.6 and impacts assessed in Section 8.9. Noted.
South Ayrshire Council (4/3/21) – Biodiversity Officer	Scoping	Considered that all the relevant species and methodology have been considered, including identification, characterisation of impacts and suitable mitigation measures.	Noted.
Saving Scotland's Red Squirrels (1/8/21)	Other - data request	Provided existing records of red squirrel within 2 km of the site.	Records are included within Technical Appendix 8.1, and considered in the assessment.

8.5 Assessment Methodology and Significance Criteria

Scope of Assessment

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

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

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

8.5.3 CIEEM guidelines (2018) stipulate that it is not necessary to carry out a detailed assessment of impacts upon ecological features that are sufficiently widespread, unthreatened and resilient to impacts of the Proposed Development. As such, the assessment considers effects upon designated sites and ecological features which are considered 'important' on the basis of relevant guidance and professional judgement.

8.5.4 Where ecological features are not considered so important as to warrant a detailed assessment, or where they would not be significantly affected on the basis of baseline information, these are 'scoped out' of the assessment. Mitigation measures for such features may, however, still be outlined as appropriate to reduce and/or avoid any potentially adverse effects or to ensure legislative compliance.

8.5.5 The assessment has been undertaken in recognition of design evolution and embedded mitigation measures, as detailed in full within Chapter 2 and Chapter 3 and standard practices and construction environmental management included within the outline CEMP, Technical Appendix 3.1.

8.5.6 The scope of the assessment has been informed by consultation responses summarised in Table 8.1 above.

Study Area

8.5.7 The main Study Area within which baseline information in relation to ecological features has been obtained has comprised the site boundary, extended to 5 km for proximity to designated sites with ecological interest (further extended to 10 km for sites with bats as qualifying interests).

8.5.8 Full details of Study Areas adopted for desk study and field surveys are provided in Volume 4, Technical Appendices 8.1 to 8.5 and illustrated in Volume 2, Figures 8.1 to 8.9.

Desk Study

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

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

8.5.10 The following key sources were consulted:

- SiteLink website (NatureScot);
- Scotland's Environment Map (Scottish Government);
- SWSEIC;
- Saving Scotland's Red Squirrels;
- UK Habitats Directive Article 17 Report (JNCC, 2019);
- SEPA's River Basin Management Plan (SEPA, 2021);

- The Ayrshire Rivers Trust Fishery Management Plan;
- NatureScot Carbon and Peatland Map (SNH, 2016); and
- EIA documentation for the refused Linfairn Wind Farm (2013) development (South Ayrshire Council Planning Reference 13/01130/DEEM).

8.5.11 Additional peer-reviewed literature and industry guidance is referred to where relevant.

8.5.12 Details and results of the desk study undertaken are provided in Technical Appendices 8.1 to 8.5.

Site Visit

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

8.5.14 The following field surveys have been completed:

- phase 1 habitat survey;
- NVC survey;
- terrestrial mammal surveys;
- bat activity surveys;
- bat roost surveys; and
- fish habitat survey.

8.5.15 All field surveys have been undertaken within the most recently available 18-month survey window prior to submission, in accordance with current NatureScot guidance (NatureScot, 2020a).

Phase 1 Habitat Survey

8.5.16 A Phase 1 habitat survey was undertaken on 20 July 2020 of the Study Area, with a further survey undertaken along the routes of the two proposed access roads on 5 May 2021, although only one access route will be progressed and utilised. The surveys were undertaken in accordance with the UK industry standard Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010).

8.5.17 The Study Area included coverage of all habitats within the site boundary and out to 250 m, as shown in Figure 8.6, and as access permissions allowed.

8.5.18 Full details are provided in Technical Appendix 8.4.

NVC Survey

8.5.19 An NVC survey of the Study Area was undertaken on 21 July 2020, following the guiding principles detailed in the National Vegetation Classification: Users' handbook (Rodwell, 2006). A further survey was undertaken along the route of the two proposed access roads on 5 May 2021.

8.5.20 The Study Area included coverage of all habitats within the site boundary and out to 250 m as shown in Figure 8.7, and as access permissions allowed, with focus on those habitats likely to represent habitat types listed on Annex 1 of the Habitats Directive or comprising potential Groundwater Dependent Terrestrial Ecosystems (GWDTEs).

8.5.21 Full details are provided in Technical Appendix 8.4.

Terrestrial Mammal Surveys

8.5.22 A walkover survey for badger, red squirrel, pine marten, otter and water vole was undertaken over five visits between July and September 2020, with a further survey undertaken along the route of the two proposed access roads on 5 May 2021. The survey methodology followed industry standard

guidance: Chanin (2003), Cresswell *et al.* (2012), Dean *et al.* (2016), Harris *et al*. (1989) and NatureScot (SNH, 2018b; 2020b).

8.5.23 The Study Area included coverage of all habitats within the site boundary and out to 50 m for water vole, 100 m for badger, 200 m for otter and 250 m for pine marten as shown in Figure 8.2 and Figure 8.3.

8.5.24 Full details are provided in Technical Appendices 8.1 and 8.2.

Bat Roost Surveys

8.5.25 A review of aerial imagery was undertaken to identify any structures or trees located within 200 m of the proposed turbine locations, plus turbine rotor radius, with the potential to support maternity roosts and/or significant hibernation or swarming sites. This identified three structures and several trees (see Figure 8.9), for which bat roost surveys were undertaken in July 2020 in accordance with NatureScot guidance (SNH, 2019a) and Bat Conservation Trust (BCT) guidance (Collins, 2016).

8.5.26 Surveys comprised a ground-level preliminary roost assessment in accordance with BCT guidance (Collins, 2016).

8.5.27 Full details are provided in Technical Appendix 8.5.

Bat Activity Surveys

8.5.28 Bat activity surveys were undertaken in 2019 and 2020 in accordance with NatureScot guidance (NatureScot, 2019a) comprising the use of 11 automated monitoring stations distributed within the site boundary at representative turbine locations, and habitat features (see Figure 8.8). This represents more than the minimum number of monitoring stations required for a nine turbine scheme in accordance with NatureScot guidance (SNH, 2019a).

8.5.29 NatureScot guidance (SNH, 2019a) advises a minimum of ten consecutive monitoring nights for each activity period (spring, summer and autumn) and which has been far exceeded at the minimum number of monitoring stations required for the Proposed Development.

8.5.30 All sonogram data obtained from activity surveys was uploaded to the online Ecobat tool in order to quantify bat activity in accordance with NatureScot guidance (SNH, 2019a), with full details presented in Technical Appendix 8.5.

Fish Habitat Surveys

8.5.31 A fish habitat survey, comprising a walkover, was completed of all watercourses within the site boundary on 14 July 2020 (see Figure 8.5). Watercourses were then classified in accordance with the Scottish Fisheries Co-ordination Centre's Habitat Surveys Training Course Manual (SFCC, 2007).

8.5.32 Full details are provided in Technical Appendix 8.3.

Assessment of Potential Effect Significance

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

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

Criteria for Assessing the Sensitivity of Features

8.5.34 Relevant European, national and local guidance from governments and specialist organisations has been referred to in order to determine the sensitivity (or importance) of ecological features. Reference has also been made to NatureScot guidance on key ecological features when considering the development of onshore wind farms in Scotland (NatureScot, 2020a).

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

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

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

Table 8.2 – Sensitivity / Geographic Scale of Ecological Feature Importance

Sensitivity / Importance	Definition
Very High – International	An internationally designated site (i.e., Special Area of Conservation (SAC) and/or Ramsar site or candidate site (e.g., cSAC)). Large areas of priority habitat listed under Annex 1 of the Habitats Directive, and smaller areas of such a habitat that are essential to maintain the viability of that ecological resource. A regularly occurring, nationally significant population of any internationally important species, listed under Annex II or Annex IV of the Habitats Directive.
High – National	A nationally designated site (e.g., SSSI) or area meeting criteria for national level designations. Significant extents of a priority habitat identified in the SBL, or smaller areas which are essential to maintain the viability of that ecological resource. A regularly occurring, regionally significant population of any nationally important species listed as a SBL priority species and species listed under Schedule 1 or Schedule 5 of the Wildlife and Countryside Actor Annex II or Annex IV of the Habitats Directive.
Medium – Regional	Viable areas of key semi-natural habitat identified in the UKBAP. A regularly occurring, locally significant population of any nationally important species listed on the SBL and species listed under Schedule 5 of the Wildlife and Countryside Act or Annex II or Annex IV of the Habitats Directive. Sites which exceed the local authority-level designations but fall short of SSSI selection guidelines, including extensive areas of semi-natural woodland.
Low – Local	Other species of local conservation, specifically those listed by the Ayrshire Local Biodiversity Action Plan (LBAP). Areas of habitat or

Sensitivity / Importance	Definition
	species considered to appreciably enrich the ecological resource within the local context (e.g., species-rich flushes or hedgerows). All other species and habitats that are widespread and common and which are not present in locally, regionally or nationally important numbers or habitats which are considered to be of poor ecological value.

Criteria for Assessing the Magnitude of Change

8.5.38 Once identified, potential effects are described making reference to the following characteristics as appropriate:

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

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

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

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

Table 8.3 – Impact Magnitude

Magnitude	Definition
Very High	The impact (either on its own or in-combination with other proposals) may result in the permanent total or almost complete loss of a site and/or species status or productivity.
High	The impact (either on its own or in-combination with other proposals) may adversely affect the conservation status of a site and/or species population, in terms of the coherence of its ecological structure and function (integrity), across its whole area, that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest.
Medium	The impact (either on its own or in-combination with other proposals) would not adversely affect the conservation status of a site and/or species, but some element of the functioning might be affected and

Magnitude	Definition
	impacts could potentially affect its ability to sustain some part of itself in the long term.
Low	Neither the above or below applies, but some observable adverse impact is evident on a temporary basis or affects extent of habitat/species abundance in the local area.
Negligible	A very slight (indiscernible) reduction in a site and/or species status or productivity and/or no observable impact.
Beneficial	The impacts are considered to be beneficial to a species or sites nature conservation status.

Criteria for Assessing Significance

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

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

8.5.43 Such effects are identified by considering the importance of a feature, the magnitude of the effect and applying professional judgement based on best available evidence, to identify whether the integrity of a feature would be affected.

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

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

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

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

8.5.48 CIEEM guidelines (2018) do not recommend the sole use of a matrix table as commonly set out in EIA Report Chapters to determine 'significant' and 'non-significant' effects. For the purposes of this assessment presented herein, Table 8.4 sets out adapted CIEEM terminology and equivalent in the context of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

8.5.49 Major and moderate effects are considered significant in the context of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Table 8.4 – Effect (EIA Significance)

Significance		Definition
Significant	Major Adverse/Beneficial	A medium or high, medium or long-term adverse or beneficial effect upon the integrity

Significance		Definition
		of an ecological feature at a national (Scottish) or international level.
	Moderate Adverse/Beneficial	A high or very high, long-term or permanent adverse or beneficial effect upon the integrity of an ecological feature at a regional level or above.
Non-significant	Minor Adverse/Beneficial	A low or medium, short-term or long-term adverse or beneficial effect upon the integrity of an ecological feature at a regional level or below.
	Negligible/Beneficial	A negligible or low adverse or beneficial effect upon the integrity of an ecological feature, typically at a site level or below.

Requirements for Avoidance, Mitigation, Compensation and Enhancement

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

- avoidance is used where an impact has been avoided e.g., through changes in 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

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

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

8.5.53 For (non-avian) species, potentially significant cumulative effects are only likely where other developments are located within the regular range of more mobile species (e.g., bats). Cumulative impacts have therefore been assessed with reference to NatureScot guidance (SNH, 2019a) for bats only and within 10 km of the Proposed Development.

8.5.54 The cumulative assessment includes consideration of:

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

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

8.5.56 Whilst single or small-scale wind turbine developments (three turbines or less) may contribute to cumulative effects, these have been scoped out of assessment as applications for such developments do not generally consider the potential for impacts upon ecological features in sufficient detail.

Limitations to Assessment

8.5.57 No limitations considered likely to significantly affect the assessment presented within this Chapter are identified.

8.5.58 Access permissions beyond the application boundary were not provided for the purposes of field surveys and these areas were surveyed from Public Right of Ways (PRoWs), where possible. Extensive existing data sources are, however, available for the local and immediate surrounding area. Field surveys have provided comprehensive coverage of the Proposed Development footprint together with appropriate buffers within which to inform an assessment of potential impacts upon important ecological features presented within this Chapter.

8.5.59 Occasional detector failures occurred during the bat activity surveys. These are common events and are not considered to affect the overall validity of the data set. Some of the bat activity surveys were subject to weather constraints but these were not considered to represent a significant limitation as sufficient data within appropriate weather conditions was obtained. Full details of the bat activity survey limitations are provided in Technical Appendix 8.5.

8.6 Baseline Conditions

Current Baseline

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

- designated sites for nature conservation;
- habitats and vegetation;
- terrestrial mammals;
- bats;
- fisheries; and
- additional species.

8.6.2 Detailed information regarding desk study records and field survey results are presented in Technical Appendices 8.1 to 8.5.

Designated Sites for Nature Conservation

Statutory Designated Sites

8.6.3 This section should be read with reference to Figure 8.1.

8.6.4 A review of Sitelink identified that the Proposed Development does not form part of any statutory designated site for nature conservation.

8.6.5 Table 8.5 provides a summary of statutory designated sites with cited ecological interests located within 10 km of the Proposed Development. Distances specified within Table 8.5 are measured from the Proposed Development to the designated site boundary at its nearest point.

8.6.6 There are no non-statutory designated sites located within 2 km of the Proposed Development.

8.6.7 Sites designated for ornithological interests only are considered separately in Chapter 7.

Table 8.5 – Statutory Designated Sites for Nature Conservation

Site Name	Distance and Direction from Site	Qualifying Interests
Auchalton SSSI	4.6 km north-west.	Lowland neutral grassland.
Bogton Lochs SSSI	8.6 km north-east.	Openwater transition fen.
Loch Doon SSSI	8.8 km east.	Arctic charr (*Salvelinus alpinus*).
Ness Glen SSSI	8.8 km east.	Upland mixed ash woodland.
Dalmellington Moss SSSI	8.9 km north-east.	Raised bog.
Merrick Kells SSSI	9.4 km south-east.	Multiple interests, including: • blanket bog; • upland plants; • invertebrates; and • dragonflies.
Merrick Kells SAC	9.4 km south-east.	Multiple interests, including: • blanket bog; • dry heaths; • otter; • montane acid grasslands; and • acidic scree.

Non-statutory Designated Sites

8.6.8 Consultation with SWSEIC identifies that there are two provisional Local Wildlife Sites (pLWS) within 2 km of the Proposed Development, including Straiton Hills pLWS, located within the north-east part of the site boundary. These are summarised in Table 8.6.

8.6.9 The site is within the Galloway and Southern Ayrshire Biosphere United Nations Educational, Scientific and Cultural Organisation (UNESCO) Reserve which is recognised as an internationally world class environment for people and nature. It has no specific ecological features.

Table 8.6 – Non-statutory Designated Sites for Nature Conservation

Site Name	Distance and Direction from Site	Description
Galloway and Southern Ayrshire Biosphere Reserve	Transition zone of reserve within the site boundary.	Multiple 'high focus' ecological features, including habitats and species, with the fundamental designation of the reserve for 'people' and 'nature'.
Straiton Hills pLWS	Within the site boundary.	A large and highly rated area of diverse upland and wetland habitats, including moor-grass grassland, blanket bog and rush pasture, with several lochs and wooded glens; all of botanical and ornithological interest.

River Stinchar (Milton to Black Hill) pLWS	625 m south.	A rich stretch of upland habitats which contains a number of scarce plants and breeding birds, with blanket bog occurring on higher ground, the Ferly Burn having botanical interest and Linfern Loch being important for wildlife.

Habitats and Vegetation

8.6.10 This section should be read with reference to Technical Appendix 8.4 and Figures 8.6 and 8.7. Further details on peatland and Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are provided in Chapter 9.

8.6.11 The north of the Study Area is bordered by the Palmullan Burn which joins the Girvan Water; the eastern side of the Study Area is flanked by Genoch Burn (G2.4). These watercourses have formed deep gullies which have facilitated the establishment of semi-natural broadleaved woodland (A1.1.1). The southern and western boundaries of the Study Area are bordered by mature dense Sitka spruce (*Picea sitchensis*) plantation woodland (A1.2.2).

8.6.12 The northern extent of the Study Area, in the vicinity of Linfairn Farm, is generally flat or gently sloping and primarily supports improved grassland pasture (B4). Through the central extent of the Study Area the land rises steeply, into a mix of bracken (*Pteridium aquilinum*) (C1) slopes, mosaics of acid grassland (B1) and marshy grassland (B5) until reaching an undulating plateau, punctuated by prominent small hilltops to a height of around 300 m. This southern extent of the Study Area supports a more complex mix of plant communities and which is a reflection in topography, and underlying drainage. Any low-lying or flat areas in this area have allowed peat to form blanket bogs (E1.6.1) or wet modified bog (E1.7). There are few drainage cuts and the whole area is heavily grazed by sheep and cattle.

8.6.13 Acid flushes and springs (E2.1) are scattered in several localities around the Study Area and an area of swamp (F1) is present in the south of the Study Area adjacent to a conifer plantation. Elsewhere, hollows on slopes or gullies and burn lines are rush dominated marshy grassland (B5), with patches of bracken (C1) on steeper slopes where the soil is shallow, and pockets of semi-improved (B1.2) or unimproved acid grassland (B1.1), usually on hill tops or steep slopes where the soils are shallow and drainage is good.

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

8.6.15 A summary of habitat types and communities and approximate areas is provided in Table 8.7. The total area of the site is 540 ha.

8.6.16 Priority habitats identified through NVC survey present on-site, and their likely groundwater dependency, are summarised in Table 8.8. NVC communities inconsequential in extent (i.e. very localised) are not included in Table 8.8.

Table 8.7 – Summary of Baseline Habitats and Vegetation Communities, Including Approximate Area and Relative Percentage Coverage Within the Site

Phase 1 Habitat Type	NVC Community/Sub-community	Extent (ha)	Relative Coverage (%)
Marshy grassland (B5)	M23, M23a and M23b	96.32	17.84

Phase 1 Habitat Type	NVC Community/Sub-community	Extent (ha)	Relative Coverage (%)
Semi-improved acid grassland (B1.2)/marshy grassland (B5)	N/A	93.84	17.38
Acid grassland (B1)	U1, U4a, U4b and U6	81.25	15.07
Improved grassland (B4)	N/A	58.20	10.78
Improved grassland (B4)/ Scrub (A2.2)	N/A	6.59	1.22
Blanket bogs (E1.6.1) and wet modified bogs (E1.7)	M17a, M25a and M25	48.46	8.97
Coniferous plantation woodland (A1.2.2)	N/A	51.62	9.56
Semi-improved acid grassland (B1.2)/wet modified bog (E1.7)	N/A	18.84	3.49
Marshy grassland (B5)/wet modified bog (E1.7)	N/A	18.57	3.44
Neutral grassland (B2)	MG1, MG6 and MG9a	13.66	2.53
Marshy grassland (B5)/Semi-improved acid grassland (B1.2)/wet modified bog (E1.7)	N/A	12.66	2.34
Broad-leaved semi-natural woodland (A1.1.1)	W1 and W9	8.1	1.50
Bracken (C1)	U20	7.14	1.32
Semi-improved acid grassland (B1.2)/blanket bog (E1.6.1)	N/A	4.2	0.78
Marshy grassland (B1)/neutral grassland (B2)	N/A	2.82	0.52
Broad-leaved plantation woodland (A1.1.2)	N/A	1.61	0.30
Marshy grassland (B5)/blanket bog (E1.6.1)	N/A	1.96	0.36
Hardstanding (J3)	N/A	1.29	0.24
Wet dwarf shrub heath (D5)/marshy grassland (B5)	N/A	1.72	0.32
Bracken (C1)/acid grassland (B1)	N/A	1.96	0.36
Unimproved acid grassland (B1.1)/Marshy grassland (B5)	N/A	1.09	0.20

Phase 1 Habitat Type	NVC Community/Sub-community	Extent (ha)	Relative Coverage (%)
Blanket bog (E1.6.1)/wet modified bog (E1.7)/marshy grassland (B5)	N/A	1.04	0.19
Unimproved acid grassland (B1.1)/bracken (C1)	N/A	0.82	0.15
Wet dwarf shrub heath (D5)	M15d	0.67	0.12
Marshy grassland (B5)/wet dwarf shrub heath (D5)	N/A	0.42	0.08
Unimproved acid grassland (B1.1)/scree (I2.1)	N/A	1.4	0.26
Dense scrub (A2)	N/A	0.17	0.03
Bare ground	N/A	3.56	0.66

Table 8.8 – Summary of Vegetation Communities

NVC Community	Principal Corresponding Habitats Directive Annex 1 Type(s)	Corresponding SBL Priority Habitat Type	Corresponding Ayrshire LBAP Habitat	*Likely Dependence of Community/ Habitat on Groundwater** 1=High 2=Moderate 3=Low
M15d *Scirpus cespitosus-Erica tetralix* wet heath, *Vaccinium myrtillus* sub-community	H4010 Northern Atlantic wet heaths with *Erica tetralix*	Upland Heathland	Upland Heath	2
M17a *Trichophorum cespitosum – Eriophorum vaginatum* blanket mire, *Dosera rotundifolia - Sphagnum spp*. sub-community.	H7130 Blanket bog	Blanket bog	Blanket bog	3
M25a *Molinia caerulea-Potentilla erecta* mire, *Erica*	H7130 Blanket bog	Blanket bog	Blanket bog	3 as on deep peat

tetralix sub-community				
M25 *Molinia caerulea-Potentilla erecta* mire.	H7130 Blanket bog (only where on deep peat)	Blanket bog (only where on deep peat)	Blanket bog (only where on deep peat)	2 3 where on deep peat
M23 *Juncus effusus/acutiflorus - Galium palustre* rush pasture.	-	-	-	1
M23a *Juncus effusus/acutiflorus - Galium palustre* rush pasture, *Juncus acutiflorus* sub-community	-	Upland flushes, fens and swamps	-	1
M23b *Juncus effusus/acutiflorus - Galium palustre* rush pasture, *Juncus effusus* sub-community	-	-	-	1
U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland	-	-	Acid grassland	3
U4a *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland, typical sub-community	-	-	Acid grassland	3
U4b *Festuca ovina - Agrostis capillaris - Galium saxatile* grassland, *Holcus lanatus -Trifolium* repens sub-community	-	-	Acid grassland	3
U6 *Juncus squarrosus - Festuca ovina* grassland	-	*Juncus squarrosus-Festuca ovina* grassland	Acid grassland	2
MG1 *Arrhenatherum elatius* grassland	-	-	-	3
MG6 *Lolium perenne-Cynosurus cristatus*	-	-	-	3

grassland (suggested community)				
MG9a *Holcus lanatus-Deschampsia cespitosa* grassland, *Poa trivialis* sub-community	-	-	-	2
M32 *Philonotis fontana – Saxifraga stellaris* spring (suggested community)	-	Upland flushes, fens and swamps	-	1
M4 *Carex rostrata – Sphagnum fallax* mire (suggested community)	H7140 Transition mires and quaking bogs	Upland flushes, fens and swamps	Blanket bog	3
S11 *Carex vesicaria* swamp (suggested community)	-	Upland flushes, fens and swamps	Blanket bog	1
U20 *Pteridium aquilinum – Galium saxatile* community	-	-	-	3
U20 *Pteridium aquilinum – Galium saxatile* community, *Anthoxanthum odoratum* sub – community (suggested community)	-	-	-	3
W1 *Salix cinerea-Galium palustre* woodland	-	Wet woodland	Wet woodland	2
W9 *Fraxinus excelsior – Sorbus aucuparia – Mercurialis perennis* woodland (suggested community)	-	Upland mixed ashwoods	Mixed ash wood	3
* As listed in Appendix 4 of SEPA (2014) LUPS Guidance Note 31. The categorisation of GWDTEs is preliminary and is based on vegetation communities present, and therefore confirmed GWDTE categorisation should be based on subsequent formal hydrological assessment (refer to Chapter 9).				

Terrestrial Mammals

8.6.17 This section should be read with reference to Technical Appendix 8.1 and Confidential Technical Appendix 8.2 and Figures 8.2 to 8.4. Baseline terrestrial mammal conditions are summarised in Table 8.9.

Table 8.9 – Summary of Terrestrial Mammal Survey Results

Terrestrial Mammal Species	Summary of Survey Results
Badger	Records of badger were identified during the surveys for Linfairn Wind Farm, including two outlier badger setts. Further evidence of badger was recorded within the site during the current field surveys including latrines signs of foraging, and evidence considered sensitive (see Confidential Technical Appendix 8.2).
Otter	Three otter records were returned from SWSEIC for within 2 km of the site and otter spraint was recorded on Palmullan Burn and the Water of Girvan during the Linfairn Wind Farm surveys. No signs of otter were recorded during the current field surveys but suitable habitat is present within and along the boundaries of the site.
Pine marten	No records of pine marten were returned from SWSEIC or in the Linfairn Wind Farm surveys. No signs indicative of the presence of pine marten were recorded during the current field surveys but the woodland habitats adjacent to the site provide opportunities for den creation and pockets of moorland and grassland provide some suitability for foraging.
Red squirrel	Records of red squirrel were returned from Saving Scotland's Red Squirrels website within 2 km of the Proposed Development. Squirrel feeding remains were found in woodland during the Linfairn surveys but this could not be differentiated between red or grey squirrel. No signs of red squirrel were recorded during the current surveys but the adjacent woodland is likely to support this species based on the desk study records returned.
Water vole	No records of water vole were returned from SWSEIC or in the Linfairn Wind Farm surveys. Evidence of water vole, including droppings, runs and a burrow, was identified in three locations in the south west part of the site with the network of watercourses on the site providing suitable habitat for the species.

Bats

8.6.18 This section should be read with reference to Technical Appendix 8.5 and Figures 8.8 and 8.9.

Desk Study

8.6.19 SWSEIC returned a total of 21 bat records from 2016 from within 10 km of the Proposed Development. Records were attributable to:

- common pipistrelle (*Pipistrellus pipistrellus*) (3 records);
- soprano pipistrelle (*Pipistrellus pygmaeus*) (3 records);
- Leisler's bat (*Nyctalus leislerii*) (2 records);
- Daubenton's bat (*Myotis daubentonii*) (3 records);
- Natterer's bat (*Myotis nattererii*) (3 records);
- whiskered bat (*Myotis mystacinus*) (1 record);
- pipistrellus bat species (*Pipistrellus* spp.) (3 records); and
- Myotis bat species (*Myotis* spp.) (3 records).

8.6.20 In review of the UK Habitats Directive Article 17 Report and in addition to the above species, the site is also considered to be within the range of brown long-eared bat.

Habitat Assessment

8.6.21 The habitats within the site are considered to be of low habitat risk for bats, in accordance with criteria presented in NatureScot guidance (SNH, 2019a).

8.6.22 The south of the site, where the proposed turbines are located, is dominated by marshy grassland and blanket bog. The southern and western boundaries of the site consist of commercially managed coniferous woodland. These offer relatively poor foraging opportunities for bats.

8.6.23 The north of the site, beyond the proposed turbine locations, offers higher value habitats for bats. Habitats consisted of improved grassland interspersed by a series of burns, including Palmullan Burn, edged by semi-natural broadleaved woodland. The improved grassland offers poor foraging opportunities, however the burns with woodland offers good foraging opportunities and also connectivity with potentially higher value habitats within the wider landscape.

Roosting Bats

8.6.24 As shown on Figure 8.9, there are two buildings within the site boundary (and one other building just outside the site boundary) which were identified to have negligible to low roosting suitability. Mature ash and oak trees located along Palmullan Burn were also identified to have low roost potential.

8.6.25 None of the trees or built structures within the site boundary are considered to be suitable for maternity or hibernation roosts.

Bat Activity

8.6.26 Common pipistrelle, soprano pipistrelle, noctule and Myotis bat species were recorded during the bat activity surveys.

8.6.27 Soprano pipistrelle was the most frequently recorded, representing 72.15% of all recordings. The species was recorded on 126 nights out of 422, representing 13.79 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) soprano pipistrelle activity was concluded to be moderate at the 45th percentile (further details are presented in Technical Appendix 8.5).

8.6.28 Common pipistrelle represented 15.25% of all recordings. The species was recorded on 105 nights out of 422, representing 2.91 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) common pipistrelle activity was concluded to be low at the 31st percentile.

8.6.29 Noctule represented 8% of all recordings. The species was recorded on 103 nights out of 422, representing 1.53 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) noctule activity was concluded to be moderate at the 31st percentile.

8.6.30 Myotis species represented 4.6% of all recordings. The species was recorded on 106 nights out of 422, representing 0.88 passes per night for the survey period. When compared with activity at other sites (Ecobat reference range and percentiles) Myotis species activity was concluded to be moderate at the 31st percentile.

8.6.31 In recognition of the Ecobat tool output but also considering the limitations of the tool and the numbers of nights excluded in the calculations which will inflate pass rates (nights when no bat passes are recorded are excluded), overall, it is concluded that activity of soprano and common pipistrelle is moderate and activity of all other species is low.

8.6.32 Bat activity was highest at LOC 6 with 50.3% of the bats recorded (as shown on Figure 8.8). This is located on the edge of plantation woodland on the east boundary in the southern part of the site with nearby blanket bog habitats. This is likely to offer increased foraging value compared to other locations.

8.6.33 There was no notable difference in temporal distribution with bat activity being largely consistent across the survey period.

8.6.34 Based on the Ecobat analysis, and the high frequency of nights when recorded, it is possible that a roost of Myotis species is located within proximity to LOC 3. Other roosts may be present within close proximity to the Study Area.

Fish

8.6.35 This section should be read with reference to Technical Appendix 8.3 and Figure 8.5.

8.6.36 Functional fish habitat within the Study Area is relatively restricted within watercourses of the Proposed Development, with the Palmullan Burn along the northern site boundary and the Water of Girvan, along the north-eastern site boundary providing the highest quality fish habitat.

8.6.37 Most of the watercourses flowing through the Proposed Development offer negligible fish habitat, with only restricted areas of suitable fish habitat within these on-site watercourses.

8.6.38 The Palmullan Burn and Water of Girvan, which flow along the periphery of the Proposed Development, offer suitable habitat for migratory and non-migratory salmonid species at all stages of their life, and the Palmullan Burn also supports some suitable lamprey spawning habitat. The Water of Girvan is known to support populations of Atlantic salmon and brown trout, and there are records of freshwater pearl mussel in the upper reaches of the Water of Girvan.

Future Baseline

8.6.39 In the absence of the Proposed Development, assuming a "do-nothing" scenario or gap between baseline surveys and the commencement of construction of the Proposed Development, substantial changes in baseline ecology conditions (i.e., distributions and populations) are unlikely to occur.

8.6.40 The Proposed Development is not subject to any other development pressures or management which would affect the habitats or species in such a way that the present baseline conditions presented here would become substantively different.

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

8.7 Standard Mitigation

Embedded Mitigation

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

8.7.2 Design considerations have been incorporated to avoid or minimise adverse effects upon ecological features, as set out below.

- The scheme design has strictly avoided the location of infrastructure within Straiton Hills pLWS, adopting a minimum 250 m buffer from the designation boundary for the purposes of siting any turbine foundations, tracks or ancillary infrastructure requiring excavations to avoid the potential for direct and/or indirect effects upon the designation's upland and wetland habitat qualifying interests.
- The track length and the number of watercourse crossings has been minimised as far as possible to minimise land take.
- The scheme design has avoided the location of infrastructure within areas of higher quality blanket bog and upland heath and in so far as has been possible avoiding areas of modified bog. It has however, not been possible to entirely avoid areas of wet modified bog habitats, due to the distribution of these habitat types within the site boundary. The layout of infrastructure (e.g., wind turbines, tracks and substation) has sought to avoid areas of deeper peat (refer to Figure 9.10), minimising the potential for impacts to habitat types with greater future restoration potential.
- A minimum 50 m buffer has been included around all mapped watercourses for turbine hardstanding and associated access tracks, except for watercourse crossings, for which the requirement has been minimised as part of sensitive scheme design.
- Design of new watercourse crossings will maintain hydraulic connectivity and allow the free passage of fish and other wildlife beneath. Watercourse crossings will also be of sufficient size so as not to restrict or concentrate flows downstream and to convey flows during periods of heavy rainfall (e.g., 1 in 200-year event plus climate change allowance).
- A minimum 108 m buffer between turbine locations and watercourses has additionally been included to achieve a minimum 50 m 'standoff' from bat habitat features (watercourses) and turbine blade tips in accordance with current good practice mitigation outlined in NatureScot guidance (SNH, 2019a).
- A minimum 115 m radius key-holing requirement around turbine locations has been incorporated into felling and restocking plans for the Proposed Development, to achieve a minimum 50 m 'standoff' from bat habitat features (woodland) and turbine blade tips in accordance with current good practice mitigation outlined in NatureScot guidance (SNH, 2019a).
- A minimum 50 m buffer (from blade tip) from all buildings has been maintained, in the event bat roost establishment may occur between baseline surveys and the commencement of operation.
- A minimum 30 m buffer between turbine locations and identified badger setts has been included in accordance with current good practice mitigation outlined in NatureScot guidance (SNH, 2019a).

Good Practice Measures

Mitigation Measures

8.7.3 Full details of construction phase mitigation measures for the Proposed Development will be contained within a CEMP (see Technical Appendix 3.1). The CEMP will include all good practice construction measures, pollution prevention controls and monitoring to be implemented over the

course of the construction and operation of the Proposed Development in line with current industry and statutory guidance.

8.7.4 Good practice measures in relation to pollution risk, sediment management, watercourse crossings and sensitive techniques with regards to construction in peatlands and near watercourses to be adopted during the construction and operation phases are detailed in Chapter 9.

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

8.7.6 Good practice measures to prevent harm to faunal species, will also include the careful storage of potentially dangerous substances or materials within construction compounds. Excavations will either be temporarily covered at night or designed to include a ramp.

8.7.7 Good practice habitat reinstatement measures will also be adopted and implemented, on areas subject to disturbance during construction works as soon as it is practical to do so. Further details of habitat reinstatement measures to be implemented are provided within Chapter 9 and within an outline HMP (Technical Appendix 8.6).

8.7.8 A fish monitoring plan will also be implemented to record pre-, during and post-construction fish populations in watercourses on and adjoining the site, with input from ART and River Girvan DSFB.

Pre-construction Surveys

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

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

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

Ecological Clerk of Works

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

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

8.8 Features Brought Forward for Assessment

8.8.1 The results of the desk study and field survey were used to inform the identification of important ecological features within the site.

8.8.2 Only those ecological features that it was considered could experience significant effects (e.g., affecting protected or notable habitats and species or biodiversity objectives or the favourable conservation status of a species' population), and which were identified as being of sufficient importance (informed also by professional judgement) to be material to decision making, have been identified for detailed assessment.

8.8.3 Table 8.9 presents the evaluation of ecological features and provides the rationale as to why individual features have been 'scoped in' or 'scoped out' of the detailed assessment. Following consultation with NatureScot (see Table 8.1) all nationally designated sites (e.g. SSSIs) with ecological interests were scoped out of assessment principally due to spatial segregation between the site and the designated sites so are not considered further in Table 8.9.

Table 8.9 – Importance of Ecological Features

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
Straiton Hills pLWS	Local	Located within the site. The Proposed Development has been designed to avoid this non-statutory designation and therefore no direct effects are anticipated. Embedded mitigation, including the implementation of good practice construction measures and pollution prevention controls (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse indirect effects upon Straiton Hills pLWS. **Scoped out of the assessment**
River Stinchar (Milton to Black Hill) pLWS	Local	Located over 500 m from the site and therefore no direct effects are anticipated. Embedded mitigation, including the implementation of good practice construction measures and pollution prevention controls (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse indirect effects upon River Stinchar (Milton to Black Hill) pLWS. **Scoped out of the assessment**
Blanket bog	Regional	Annex 1 habitat. The Proposed Development will result in the loss of some blanket bog habitat. **Scoped into the assessment**
Wet heath	Regional	Annex 1 habitat located along the permanent access road. The Proposed Development will result in the likely loss of some wet heath habitat. **Scoped into the assessment**

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
All other habitats and vegetation	Local	Common, widespread, outside the works area of the Proposed Development and/or of low ecological value. **Scoped out of the assessment**
Amphibians and Reptiles	Local	As outlined, NatureScot guidance (2020a) advises 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."* The guidance does however clarify that *"this advice is not likely to apply where the potentially affected species are European Protected Species (EPS), or where there could be effects on protected species that are interests/features of protected areas."* In accordance with NatureScot guidance (2020a) field surveys for reptiles and amphibians have not been undertaken. An existing record of common frog *Rana temporaria* was however identified during the desk study within 2 km of the site. No records of reptiles were returned in the desk study and no designated site for nature conservation, designated by virtue of its reptile or amphibian qualifying interests, is located within 2 km of the site. Embedded mitigation, including the implementation of good practice construction measures and RAMS (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse indirect effects upon amphibians and reptiles. **Scoped out of the assessment**
Invertebrates	Site	In accordance with NatureScot guidance (2020a) field surveys for invertebrates have not been undertaken. No designated site for nature conservation, designated by virtue of its invertebrate qualifying interests, is located within 2 km of the site and no existing records of any invertebrate species listed

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
		as an EPS or afforded special protection under the provisions of the Wildlife and Countryside Act 1981 (as amended) were identified during the desk study within 2 km of the site. **Scoped out of the assessment**
Fish	Local	No designated site for nature conservation, designated by virtue of its fish interests, is located within 2 km of the site and no records of fish were identified during the desk study within 2 km of the site. Functional fish habitat within the Study Area is relatively restricted within watercourses of the site, with the Palmullan Burn along the northern site boundary and the Water of Girvan, along the north eastern site boundary providing the highest quality fish habitat. Embedded mitigation, including the adoption of culverts which allow free passage, together with good practice construction measures, adoption of a fish monitoring plan and pollution prevention controls (as detailed within Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon local fish populations. **Scoped out of the assessment**
Bats - roosting	Local	No designated site for nature conservation, designated by virtue of its bat interests, is located within 2 km of the site. Records of bat species were returned within 2 km of the site in the desk study. None of the trees or built structures within the site are considered to be suitable for maternity or hibernation roosts. No bat roosts were confirmed within the site, but it is considered likely these may be present within the surrounding area. Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon roosting bats. **Scoped out of the assessment**

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
Bats – foraging and commuting	Local	No designated site for nature conservation, designated by virtue of its bat interests, is located within 2 km of the site. Records of bat species were returned within 2 km of the site in the desk study. Common pipistrelle, soprano pipistrelle, noctule and Myotis bat species were recorded during the bat activity surveys. Overall low to moderate levels of bat activity were recorded, which is considered representative of the low value of habitats within the site for bats and immediate surrounding area. Levels of activity recorded are also considered to be comparable to adjacent wind farm sites and concern a very narrow range of species. **Scoped into the assessment**
Badgers	Local	No designated site for nature conservation, designated by virtue of its terrestrial mammal interests, is located within 2 km of the site. Records of badger were identified during the desk study within 2 km of the site and during the Linfairn Wind Farm surveys. Field signs for badger were found in the site. The construction works will be located far beyond the minimum 30 m buffer required between badger setts and construction zones (NatureScot, 2020b). Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon badger. **Scoped out of the assessment**
Red Squirrel	Local	No designated site for nature conservation, designated by virtue of its terrestrial mammal interests, is located within 2 km of the site. Records of red squirrel were identified during the desk study within 2 km of the site. No field signs for red squirrel were found within the site. Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
		detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon red squirrel. **Scoped out of the assessment**
Pine Marten	Local	No designated site for nature conservation, designated by virtue of its terrestrial mammal interests, is located within 2 km of the site and no existing records of pine marten were identified during the desk study within 2 km of the site. No field signs for pine marten were found within the site. Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon pine marten. **Scoped out of the assessment**
Otter	Local	No designated site for nature conservation, designated by virtue of its terrestrial mammal interests, is located within 2 km of the site. Records of otter were identified during the desk study within 2 km of the site and otter spraint was recorded on Palmullan Burn and the Water of Girvan during the Linfairn Wind Farm surveys. No field signs for otter were found within the site. Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon otter. **Scoped out of the assessment**
Water Vole	Local	No designated site for nature conservation, designated by virtue of its terrestrial mammal interests, is located within 2 km of the site and no existing records of water vole were identified during the desk study within 2 km of the site. Field signs for water vole were found in three locations within the south western part of the site. No water crossings are proposed in this area of the site and construction works will be located far

Ecological Feature	Geographic Scale of Importance (see Table 8.2)	Potential Effect Pathways and Rationale for Selection of Features for Detailed Assessment
		beyond the minimum 5 m buffer required between watercourses and construction zones, with regard to water vole (NatureScot, 2020i). Embedded mitigation, including the implementation of good practice construction measures and pre-construction surveys (as detailed in Section 8.7) are considered adequate to avoid any potentially significant adverse effects upon water vole. **Scoped out of the assessment**

8.8.4 The site is within the Galloway and Southern Ayrshire Biosphere Reserve, which is partially designated for nature, but not specifically ecology. Embedded mitigation, including the implementation of good practice construction measures, pollution prevention controls and pre-construction surveys (as detailed in Section 8.7), and habitat enhancement measures (as detailed in the HMP (refer to Technical Appendix 8.6)) are considered adequate to avoid any potentially significant adverse indirect effects upon Galloway and Southern Ayrshire Biosphere Reserve and its qualifying interests. It is therefore scoped out of the assessment.

8.9 Potential Effects

8.9.1 This section presents an assessment of effects upon important ecological features (Table 8.9), both as a result of the Proposed Development alone, and cumulatively in-combination with other wind farm developments in the absence of additional mitigation.

8.9.2 The Proposed Development has been assessed for an operational life of 30 years.

Construction

8.9.3 Potential construction phase ecological effects associated with the Proposed Development are considered to relate to:

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

Habitats and Vegetation (blanket bog and wet heath)

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

- direct loss – the loss of habitats and vegetation under the footprint of the Proposed Development; and

- indirect loss – calculated for blanket bog, wet modified bog and wet dwarf shrub habitats which are located within 10 m of direct habitat loss areas, to account for potential changes in habitat vegetation structure due to drying effects as a result of construction works. For all other habitats a temporary loss is calculated within 2 m of direct habitat loss areas, to include for additional habitat disturbance during construction works.

8.9.5 For the purposes of assessment, a precautionary approach has been taken which assumes that direct habitat loss and indirect loss of blanket bog, wet modified bog and wet dwarf shrub heath habitats represents a permanent, irreversible adverse effect. In practice some areas indirectly/temporarily affected may be able to be restored i.e., during habitat reinstatement following construction in accordance with the outline CEMP (Technical Appendix 3.1).

8.9.6 Table 8.11 details the estimated direct and indirect/ temporary habitat losses as a result of the construction of the Proposed Development, and potential effects on blanket bog and wet heath communities. Many areas of the site comprise a mix of habitats which are too complex to separate into defined habitat types. These are shown on Figures 8.6 and 8.7, and are typically a mosaic of marshy grassland, acid grassland, and neutral grassland, within inconsequential extents of bog and wet heath habitats.

8.9.7 Total direct land take for the Proposed Development will be 16.57 ha, of which 0.55 ha are accounted for in Table 8.11. The remaining 16.02 ha of habitats to be directly lost comprise marshy grassland, acid grassland, neutral grassland, improved grassland, dense scrub, bracken, mosaic habitat and coniferous plantation woodland which have been scoped out of the assessment.

8.9.8 There will be a 1 % direct relative coverage loss of blanket bog habitat, and 12 % direct relative coverage loss of wet heath habitat from the Proposed Development, with the wet heath habitat restricted to isolated areas along the permanent access road.

Table 8.11 – Summary of Habitat Losses

Phase 1 Habitat Type	NVC Community/Sub-community	Total Area Within Site Boundary(ha)	Habitat Losses (ha)			Relative Coverage Lost (%)
			Direct	Indirect	Total	
Blanket bogs (E1.6.1) and wet modified bogs (E1.7)	M17a, M25a and M25	48.46	0.47	1.26	1.73	3.57
Wet dwarf shrub heath (D5)	M15d	0.67	0.08	0.24	0.32	47.76

8.9.9 The direct and indirect loss of the above habitats is considered to constitute an impact of **low/medium adverse magnitude**, resulting in an effect of **minor adverse significance**, and which is **not significant** in the context of the EIA Regulations.

Bats

8.9.10 Bat activity surveys have demonstrated that the turbine area of the Proposed Development is subject to low to moderate levels of bat usage and by a narrow range of species. The habitats across the site are predominantly open grassland and wetland areas which have lower value to foraging and commuting bats in comparison to areas of woodland and woodland edge habitats in the wider landscape.

8.9.11 Overall habitat losses for bats as a result of the Proposed Development are considered small relative to their suitability for bats and the availability of comparable habitats remaining within the site and surrounding areas. Potential impacts are therefore considered to be negligible, resulting in an effect of **negligible significance**, which is **not significant** in the context of the EIA Regulations.

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

8.9.13 Good practice construction measures will limit the potential for dust and contaminant generation within suitable bat habitats adjacent to construction areas. As such, any impact of onsite disturbance to bat species would be negligible, resulting in an effect of **negligible significance**, which is **not significant** in the context of the EIA Regulations.

Operation

8.9.14 Operational effects are defined as effects following the construction of the Proposed Development. Operational effects generally relate to disturbance of adjacent habitats or species, on either a temporary or permanent basis. Some effects may reduce with habituation or remain for the lifetime of the Proposed Development.

8.9.15 Potential operational effects are restricted to bats only. Direct effects for other sensitive ecological features (such as habitat loss and disturbance) are not anticipated to occur during the operational period.

8.9.16 Potential for impacts on surface water, groundwater, peat and GWDTEs are discussed separately in Chapter 9.

Bats

8.9.17 NatureScot guidance (SNH, 2019a) states that operational wind farms can affect bats in three ways:

- death or physical injury caused by interaction with operational wind turbines (e.g., collision or barotrauma);
- loss of, or damage to, commuting and foraging habitat; and
- displacement of individuals or populations from the area.

8.9.18 The assessment of operational effects is restricted to noctule, common and soprano pipistrelle species only, as they are categorised as of high risk of collision from wind turbine developments (SNH, 2019a) and were the three most commonly recorded species accounting for 95.4 % of all bat recordings.

8.9.19 Operational impacts on bats are difficult to characterise due to the limited evidence base; bat mortality in the UK is poorly understood and this prohibits mortality risks from being accurately quantified and predicted. Assessments are therefore undertaken based on current guidance (SNH, 2019a).

8.9.20 NatureScot guidance (SNH, 2019a) requires a two-stage site assessment approach, as follows:

- Stage 1 - gives an indication of the potential risk level of a site, based on consideration of habitat and development-related features; and
- Stage 2 – uses the output of stage 1 (i.e., the potential risk level of a site) to provide an overall risk assessment based on the activity level of high collision risk species.

8.9.21 Following the Site Risk Level matrix presented in Table 3a of the NatureScot (2019a) guidance for Stage 1, the Proposed Development is assessed as being of Low/Lowest Site Risk (Low Habitat Risk and Small Project Size).

8.9.22 Stage 2 of the assessment process has been informed by the output from Ecobat which provides a numerical comparative interpretation of bat activity at development sites (Lintott *et al*., 2018).

8.9.23 The evaluation of bat activity for Stage 2 is presented within Technical Appendix 8.5.

8.9.24 The Overall Risk Assessment for common pipistrelle and noctule is considered to fall under "Low Site Risk" and under "Low/Medium Site Risk" for soprano pipistrelle.

8.9.25 No maternity roosts and/or significant swarming or hibernation roosts for any bat species were confirmed within the site, and no potential for these to be present was identified.

8.9.26 NatureScot guidance (SNH, 2019a) advises that to reduce potential impacts upon bats, resulting from operational wind turbine development, a 50 m 'stand-off' distance should be maintained around bat habitat features, into which no part of the turbine intrudes. The guidance provides a formula for calculating this 'stand-off' distance.

8.9.27 The layout of the Proposed Development has adopted a minimum 108 m buffer distance between proposed turbine locations and all bat habitat features including woodland and watercourses, to maintain a 50 m stand-off distance in accordance with NatureScot guidance (SNH, 2019a).

8.9.28 The bat population on the site has been valued at a local level due to the species recorded being widespread and common. Based on activity levels recorded and subsequent analysis as outlined, mortality or injury levels for bat species are considered to be low. The Proposed Development is not considered to represent a site of concern for bat collision risks following the approach to assessment set out in NatureScot guidance (SNH, 2019a). It is however, acknowledged that low risk sites can still result in bat casualties, but for which embedded 'stand-off' distances from habitat features in accordance with NatureScot guidance (SNH, 2019a) is considered adequate mitigation to avoid potentially significant operational mortality risks to bats at most low-risk locations.

8.9.29 Impacts of bat collision risk mortality are subsequently considered to be of no more than a long-term, low magnitude impact, resulting in an effect of **minor adverse significance** and which is **not significant** in the context of the EIA Regulations.

Decommissioning

8.9.30 Potential decommissioning effects are considered to be similar to those identified for the construction phase (but limited to disturbance). Decommissioning effects are therefore not considered separately for each ecological feature.

8.9.31 In the absence of mitigation, decommissioning effects may result in the disturbance of protected and notable species, and indirect habitat disturbance.

8.9.32 The removal of infrastructure and potential pollution or acidification is considered further in Chapter 9.

8.9.33 A summary of effects is presented in Table 8.13.

8.10 Additional Mitigation and Enhancement

8.10.1 Embedded mitigation and good practice measures are detailed in Section 8.7, as well as in the outline CEMP (see Technical Appendix 3.1) and Chapter 9.

8.10.2 No significant adverse effects upon any important ecological feature are predicted as a result of the construction, operation or decommissioning of the Proposed Development and no additional mitigation measures are therefore required or proposed.

8.10.3 The HMP for the Proposed Development (Technical Appendix 8.6) details enhancement measures to compensate for the adverse effects of habitat loss associated with the Proposed Development. This includes riparian native tree plantingand grassland management.

8.11 Residual Effects

8.11.1 No significant residual effects are predicted to occur upon any important ecological feature as a result of the construction, operation or decommissioning of the Proposed Development.

8.11.2 A summary of residual effects is presented in Table 8.13.

8.12 Cumulative Assessment

8.12.1 Table 8.12 lists the wind farm developments which are within 10 km of the Proposed Development and therefore considered in the cumulative assessment. There is no publicly available documentation for Dersalloch or Hadyard Hill wind farms, reflecting the historic nature of these operational wind farms. As such, only documentation which supports the Carrick and Craiginmoddie wind farm applications is considered.

Table 8.12 – Operational and Scoped Developments within 10 km of the Proposed Development

Site	Status	Description of the Proposed Development	Approximate Distance and Direction from the Application Site
Dersalloch Wind Farm	Operational	Consent for 23 turbines at 125 m to tip.	3.5 km to the north east
Hadyard Hill Wind Farm	Operational	Consent for 52 turbines at 101 m to tip.	6.9 km to the west
Craiginmoddie Wind Farm	In planning	Application submitted in January 2021 for 14 turbines up to 200 m to tip.	3.5 km to the west
Carrick Wind Farm	Scoping	Application for up to 17 turbines, with tip height to 200 m. It is understood that the application is now likely to proceed with 13 turbines.	Adjacent to the site

Construction

8.12.2 Cumulative effects for construction are considered in relation to aquatic features only.

8.12.3 The only wind farm application within 2 km of the site is the Carrick Wind Farm which is at the scoping stage and is therefore still a potential application at the time of assessment. Review of the scoping documentation for the application revealed that impacts on freshwater invertebrates (including freshwater pearl mussel) and the designated sites Merrick Kells SAC and Auchalton SSSI can be scoped out due to lack of hydrological connectivity with these features.

8.12.4 It is considered that with standard mitigation detailed in this assessment, the potential for cumulative effects with Carrick Wind Farm to occur with regards to aquatic features is negligible and therefore **non-significant**.

8.12.5 The potential for cumulative pollution or acidification is considered further in Chapter 9 and in Technical Appendix 3.2.

8.12.6 Potential for construction cumulative effects on bats are considered highly unlikely to occur in recognition of the implementation of the 50 m 'stand-off distance' between blade tip and woodland

edge (and potential roost sites), in line with guidance, which is a key component in the design of the Proposed Development and the wind farms listed in Table 8.12.

Operation

8.12.7 Cumulative operational effects are considered in relation to bats only.

8.12.8 Bat collision impacts have been minimised through the sensitive and considered design of the Proposed Development and by implementation of standard good practice measures regarding buffer distances of turbines from woodland edges, commuting corridors and other bat features in order to minimise the potential for impacts on commuting and foraging bats and therefore the likelihood of cumulative operation impacts.

8.12.9 The implementation at other wind farm sites of standard good practice measures regarding buffer distances of turbines from forestry edges to minimise impacts on commuting and foraging bats, further minimises the likelihood of cumulative impacts.

8.12.10 Cumulative effects on bats are considered to be no more than long term, **minor adverse** and **non-significant** in the context of the EIA Regulations.

8.12.11 A summary of cumulative effects is presented in Table 8.14.

8.13 Summary

8.13.1 This assessment establishes the likely presence or likely absence of protected or notable ecological species, identifies statutory and non-statutory designated sites for nature conservation in the vicinity of the Proposed Development and evaluates the overall conservation status of the land within the site boundary. The potential for the Proposed Development to have an adverse effect on designated sites and protected and notable ecological species is discussed along with committed mitigation measures where applicable. Opportunities for biodiversity enhancement are also outlined.

8.13.2 The assessment was informed by a desk study, and an extended Phase 1 habitat survey, NVC surveys, terrestrial mammal surveys, fish surveys and bat surveys, enabling the determination of the likely ecological effects of the Proposed Development. The desk study consisted of data gathering from the biological records centre, publicly available online ecological information and a review of documentation which supported the previous Linfairn Wind Farm application.

8.13.3 Notable results consisted of the land within the site boundary:

- supporting some Annex 1 habitats (blanket bog and wet heath);
- supporting badger (including setts) and water vole;
- intersecting with watercourses with limited fish habitat, with the exception of the Palmullan Burn and the Water of Girvan along northern site boundaries; and
- supporting a bat community consisting of the main species, common pipistrelle, soprano pipistrelle and noctule; assessed as “Low Site Risk” for common pipistrelle and noctule, and “Low/Medium Site Risk” for soprano pipistrelle.

8.13.4 Embedded mitigation, in terms of scheme design to avoid those most ecologically valuable habitats and important habitat features (e.g. woodland edge and watercourses) and good practice measures, to include production of species protection plans (where required), production of a CEMP, pre-clearance surveys and the appointment of an ECoW, will be implemented. With adoption of this mitigation, no potentially significant adverse direct and/or indirect effects on ecological features are anticipated, including cumulative effects.

Table 8.13 – Summary of Effects

Description of Effect	Significance of Potential Effect		Mitigation Measure	Significance of Residual Effect	
	Significance	Beneficial/ Adverse		Significance	Beneficial/ Adverse
Construction					
Annex 1 habitat (direct loss and disturbance from runoff/pollution)	Minor (not significant)	Adverse	Avoidance of main areas of Annex 1 habitats via design, and protect Annex 1 habitats through good practice measures, such as pollution control measures and habitat restoration. HMP to include grassland management which will enhance grassland habitats on-site.	Minor (not significant)	Adverse
Bats (displacement/ disturbance)	Negligible (not significant)	Adverse	Mitigation by design included (buffers from bat features).	Negligible (not significant)	Adverse
Operation					
Bats (collision mortality)	Minor (not significant)	Adverse	Not required, mitigation by design included (buffers from bat features).	Minor (not significant)	Adverse
Decommissioning					
Annex 1 habitat (disturbance from runoff/pollution)	Minor (not significant)	Adverse	Embedded mitigation to avoid most Annex 1 as possible, and good practice measures (such as production of a CEMP to prevent run-off/pollution).	Minor (not significant)	Adverse
Bats (displacement/ disturbance)	Negligible (not significant)	Adverse	Mitigation by design included (buffers from bat features).	Negligible (not significant)	Adverse

Table 8.14 – Summary of Cumulative Effects

Receptor	Effect	Cumulative Developments	Significance of Cumulative Effect	
			Significance	Beneficial/ Adverse
Bats	Collision mortality during operation.	Carrick Wind Farm Craiginmoddie Wind Farm	Minor (not significant)	Adverse

8.14 References

Ayrshire Rivers Trust (Undated). *Fishery Management Plan*.

Chanin P (2003). *Monitoring the Otter Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10.

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