



Chapter 7

Ecology and Biodiversity

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- Technical Appendix 7.6 Bat Mitigation and Monitoring Plan
- Technical Appendix 7.7 Outline Habitat Management Plan

Chapter 7

Ecology and Biodiversity

7.1 Introduction

7.1.1 Chapter Objectives

1. This chapter reports the outcome of the assessment of likely significant biodiversity effects associated with the construction and operation of the Proposed Development. It should be read with reference to Chapter 3: Site Selection and Design and Chapter 4: Development Description as well as other chapters referenced throughout. Together with **Appendices 7.1 to 7.7** and **Chapter 8: Ornithology** this chapter completes the assessment of effects from the Proposed Development on ecology and biodiversity. The objectives of this chapter are to:
 - describe the ecological baseline and trends if the Proposed Development were not to go ahead;
 - describe the criteria used to evaluate important ecological features;
 - describe the criteria used to assess the significance of effects arising from the impacts of the Proposed Development;
 - identify and describe the potential effects, including direct, indirect and cumulative effects on important ecological features;
 - describe the embedded mitigation measures and project assumptions proposed to address likely significant effects;
 - assess the potentially significant effects remaining following the implementation of embedded mitigation measures and project assumptions and identify additional mitigation required;
 - assess the residual effects remaining following the implementation of additional mitigation; and
 - identify opportunities for enhancement.
2. Scientific plant and animal names are provided in the appendices following standard nomenclature. Scientific nomenclature for higher plant species (e.g. vascular, flowering plants) follows that provided in the latest edition of New Flora of the British Isles (Stace, 2019). Nomenclature for lower species follows that provided in Mosses and Liverworts of Britain and Ireland (British Bryological Society, 2010).
3. Issues relating to groundwater dependent terrestrial ecosystems (GWDTE) and peat are not included within this chapter unless relevant for nature conservation. Otherwise GWDTE are only included within **Chapter 6: Hydrology, Hydrogeology, Geology and Soils**.
4. The consent being sought for the Proposed Development is in-perpetuity. However, in the event that the turbines need to be decommissioned, prevailing guidance (including prevailing guidance on decommissioning and restoration from NatureScot¹) at that time will be followed. Therefore, the effects arising from the Decommissioning Phase are not addressed in this chapter. It is anticipated that in the event that the turbines are decommissioned, the effects would be less significant than construction phase effects discussed herein.

7.1.2 Supporting Documents

5. This chapter was informed by the following figures and appendices.

- Figure 7.1 Nature Conservation Designations
- Figure 7.2 Habitat Mapping
- Figure 7.3 Protected Species Survey Areas and Results
- Figure 7.4 Aquatic Ecology Survey Locations and Results
- Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report
- Appendix 7.2 Habitat Baseline Report
- Appendix 7.3 Aquatic Ecology Report
- Appendix 7.4 Confidential Badger Report
- Appendix 7.5 Bat Survey Report
- Appendix 7.6 Bat Mitigation and Monitoring Plan
- Appendix 7.7 Outline Habitat Management Plan

7.2 Legislation, Policy and Guidance

7.2.1 Legislation

6. The applicable legislative framework is as follows:
 - European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora 1992 (the Habitats Directive);
 - The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (the Habitats Regulations) which transposes requirements of the Habitats Directive;
 - The Wildlife and Countryside Act 1981 (as amended);
 - The Protection of Badgers Act 1992 (as amended);
 - The Wildlife and Natural Environment Act (Scotland) Act 2011 (as amended);
 - Nature Conservation (Scotland) Act 2004 (as amended);
 - Protection of Wild Mammals (Scotland) Act 2002;
 - The Water Environment (Controlled Activities) (Scotland) Regulations 2011(as amended); and
 - Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003.

7.2.2 Policy

7. The following policy documents have been considered in defining the scope of the assessment presented in this chapter. Further detail is provided in relevant appendices:
 - Scottish Planning Policy 2014 (SPP 14)²;
 - Scottish Planning Policy on Renewable Energy;
 - Dumfries and Galloway Local Development Plan 2 (Dumfries and Galloway Council, 2019);
 - Scottish Biodiversity Strategy (SBS) (Scottish Government 2004 and 2013) ³;
 - Scottish Biodiversity List (SBL) Scottish Government (2013);
 - Policy Statement No. 02/02; and
 - Dumfries and Galloway Local Biodiversity Action Plan (DGLBAP).

7.2.3 Guidance

8. The following guidance documents have been used during the preparation of this chapter:
 - British Standards Institute (BSI) (2013) 42020:2013 Biodiversity. Code of practice for planning and development;
 - Chartered Institute of Ecology and Environmental Management (CIEEM) (2013). Guidelines for Preliminary Ecological Appraisal (PEA).
 - CIEEM (2015). Guidelines for Ecological Report Writing.

¹ <https://www.nature.scot/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016>; and <https://www.nature.scot/naturescot-commissioned-report-591-research-and-guidance-restoration-and-decommissioning-onshore> [accessed 7/10/2020]

² It is anticipated that SPP 14 will be replaced by National Planning Framework 4 during 2021.

³ It is anticipated that the SBS will be updated during 2021.

- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater and Coastal.
 - CIEEM (2019). Advice Note on the Lifespan of Ecological Surveys and Reports. CIEEM, Winchester;
 - European Commission (2018). Managing Natura 2000 Sites, the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC;
 - Hill, D., Fasham, M., Tucker, G., Shewry, M. and Shaw, P. (2005). Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring;
 - Institute of Environmental Assessment (IEMA) (1993). Guidance Note Number 1;
 - IEMA (2015). Environmental Impact Assessment Guide to Shaping Quality Development;
 - Scottish Executive (2012) River crossings & migratory fish: Design guidance;
 - Scottish Natural Heritage (SNH) (2012). Assessing the Cumulative Impact of Onshore Wind Energy Developments;
 - SNH (2018). A Handbook on Environmental Impact Assessment; and
 - Scottish Renewables, SNH, Scottish Environment Protection Agency, Forestry Commission Scotland, Historic Environment Scotland, Marine Scotland Science and AEECoW (2019). Good Practice during Wind Farm Construction.
9. Construction Industry Research and Information Association (CIRIA) guidance has been referred to along with Scottish Environment Protection Agency (SEPA) (jointly with the Environment Agency and the Northern Ireland Environment Agency) Pollution Prevention Guidelines (PPG) and Guidance for Pollution Prevention (GPP). Detailed of the relevant CIRIA guidance, PPGs and GPPs are listed in **Chapter 6: Hydrology, Hydrogeology, Geology and Soils**.
10. Baseline surveys completed to inform this assessment have been carried out in accordance with good practice survey guidelines where applicable and are referenced within **Section 7.4** and the appendices.

7.3 Consultation

7.3.1 Scoping

11. To ensure a comprehensive understanding of the potential ecological issues associated with the Proposed Development and to inform survey methodology and assessment, various stakeholders were contacted for information and comment on the proposed scope of assessment through desk study consultations as well as a through an EIA Scoping Report as discussed in **Chapter 2: EIA Process and Methodology**. **Table 7.1** provides the results of the Scoping Opinion exercise and describes any subsequent responses or actions if required.

Consultee and Date of Response	Scoping Comment	Response/Action
		present and discussed and assesses the potential impacts and appropriate mitigation associated with felling operations. Refer to Appendix 7.3 Aquatic Ecology Report .
NatureScot (previously SNH) 13 May 2020	<p>The Scoping Report appears comprehensive in its approach to EIA, although does not include mention of a Habitat Management Plan (HMP) for the site.</p> <p>It is now usual for an applicant to propose some form of HMP in their EIA Report, briefly setting out broad measures for positive management and enhancement of habitats within the development site to benefit biodiversity. This is then worked-up, once permission is granted, into a more detailed plan to be implemented throughout the lifetime of the windfarm.</p> <p>This site is in the ownership of Forestry and Land Scotland (FLS) who have a conservation remit and biodiversity duty, as well as timber production. We would expect the HMP to build upon, and be additional to, work for conservation/biodiversity identified in the current Ae Composite Land Management Plan (LMP) under the UK Woodland Assurance Scheme. For example, the Scoping Report and LMP highlights small areas of semi-natural ancient woodland on the site, frequently close to watercourses. The HMP could propose the expansion of some or all of these and/or create new areas as permanent native woodland cover. Management to benefit red squirrels and black grouse are also possibilities.</p> <p>Such habitat improvements could also be linked to, encourage, and benefit recreational users of the multiple trails that exist both within and close to the site; including FLS's own trails, Core Paths, a Sustrans Route, and the Romans and Reivers Route, one of Scotland's Great Trails which also runs through the proposed site.</p>	Comments noted. An Outline Habitat Management Plan (OHMP) for the site is included as Appendix 7.7 Outline Habitat Management Plan .
NatureScot 13 May 2020	At this stage in our understanding of the proposal, we do not consider that this wind farm is likely to have an impact on any sites designated for their nature conservation interest.	Response noted supported by information set out in Sections 7.5 and 7.7 of this chapter and Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report .
NatureScot 13 May 2020	We note the scope of surveys proposed in the Scoping Report and consider them to be adequate for a development of this nature and scale at this location. Reference should be made to the guidance available on our website.	Response noted. NatureScot guidance has been used throughout the EIA Report to inform methodology and assessment. Where guidance has been used, a reference has been provided. Relevant information set out in Section 7.4 of this chapter and Appendix 7.1 Desk Data ,

Consultee and Date of Response	Scoping Comment	Response/Action
ECU 11 August 2020	In addition to identifying the main watercourses and waterbodies within and downstream of the proposed development area, developers should identify and consider, at this early stage, any areas of Special Areas of Conservation (SAC) where fish are a qualifying feature and proposed felling operations particularly in acid sensitive areas.	The ecology chapter has considered SACs with qualifying features for fish where present and acid sensitive areas. No such sensitivities were recorded during the desk study reported within Appendix 7.3 Aquatic Ecology Report .
ECU 11 August 2020	Marine Science Scotland also provide standing advice for onshore wind farms which outlines what information, relating to freshwater and diadromous fish and fisheries, is expected in the EIA Report.	The ecology chapter recognises this guidance and provides the information as appropriate, this includes species and density of fish

Consultee and Date of Response	Scoping Comment	Response/Action
		Arboreal and Riparian Mammals Report.
SEPA 13 May 2020	We can confirm that habitat survey information is not required for areas which are heavily forested or recently felled.	Response noted and incorporated within Appendix 7.2 Habitat Baseline Report.
Marine Scotland 6 May 2020	Marine Scotland recommends that the developer consults our generic scoping guidelines and carries out the following and presents the results in the EIA Report: <ul style="list-style-type: none"> site characterisation surveys of the water quality and fish populations of watercourses which could potentially be impacted as a result of the proposed development; considers the potential impact of any felling operations on the water quality and fish populations; considers the potential cumulative impact on the water quality and fish populations from wind farms with hydrological connectivity to the present development; and contacts, if not already done so, The River Annan Trust and District Salmon Fishery Board, for information on the local fish populations. 	The listed items are all included in this chapter and consultation has continued with the Galloway Fisheries Trust (GFT), who also represent the Annan District Salmon Fisheries Board (ADSFB). Refer to Appendix 7.3 Aquatic Ecology Report and Sections 7.5 to 7.9 of this chapter.
GFT / ADSFB 9 May 2020	Having read the Scoping Report, we are pleased to note that in 6.3 fish are identified as potential sensitive receptors and that GFT are detailed as to be approached to discuss fish data. It is important to recognise that large scale felling of conifers, which is presumably required for this development, often causes water quality and fisheries impacts especially where planting has occurred on peat. This will need to be considered fully in the EIA and a robust water quality monitoring programme put into place.	A Fish Monitoring Plan would be prepared post-consent, in consultation with GFT.
GFT / ADSFB 9 May 2020	Watercourses across the site, primarily the Water of Ae, Glenkiln Burn, Clachanbirnie Burn, Clatterstones Burn, Wreaths Burn, Davies Burn, Kirkland Burns and Kinnel Water catchment, all have the potential to support important fish populations (including salmonids). Fish may also be present in smaller, more minor tributaries of the above watercourses.	A Fish Habitat Walkover and electro fishing survey has been conducted. Refer to Appendix 7.3 Aquatic Ecology Report and Sections 7.5 to 7.9 of this chapter.
GFT / ADSFB 9 May 2020	We are aware that there were significant water quality and fisheries impacts associated with the construction of the nearby Harestanes Wind Farm a few years ago. It is essential that there is no repeat of these impacts.	Response noted. Water protection measures will be included in the Construction Environmental Management Plan (CEMP) and outline measures are set out in Appendix 4.1 Outline CEMP.
GFT / ADSFB 9 May 2020	We note that 'fish' were not included for baseline surveys under 6.7. It is usual practice to establish baseline data for fish populations within and downstream of construction developments. The status of these fish populations must be known so any potential impacts leading from construction can be measured. A properly designed fisheries survey, including electrofishing, should be undertaken prior to the construction of the development to	An Aquatic Ecologist (who has attended training on the Scottish Fisheries Coordination Centre (SFCC) Fish Habitat Survey methods) has undertaken a Fish Habitat Survey, which was used to inform the requirement for

Consultee and Date of Response	Scoping Comment	Response/Action
	establish a robust baseline. It would be prudent for this baseline to be established prior to the EIA being compiled so that information gained from these surveys can also feed into the planning and design process, such as micro-siting watercourse crossings and identifying specific mitigation measures to protect fish species and their habitats. We would expect that the presence of certain fish species across and downstream of the site will probably be assumed, and that it is likely that the EIA will identify that good practice guidelines are intended to be followed to limit potential impacts on fish species within the catchments, however this should be the case over and above the formation of an up to date, robust, baseline fisheries assessment. Following best practice guidelines to limit impacts on fish species is fully expected across such developments, but if there is no baseline upon which to measure an impact, the severity of any impact cannot be ascertained.	electrofishing surveys, which have since been undertaken where appropriate to do so. Refer to Appendix 7.3 Aquatic Ecology Report.
GFT / ADSFB 9 May 2020	Full details of a fish monitoring plan should be included in the EIA and/or should be included in a CEMP or equivalent. This should include during construction and post construction surveys (assuming the pre-construction surveys have already been completed), and electrofishing surveys must be undertaken to recognised standards, e.g. SFCC protocol, by an organisation experienced in monitoring developments such as wind farms. We would like to have the opportunity to provide comments and input on the fish monitoring programme to ensure it is suitable for this site and the proposed construction works. We would also be happy to input to the EIA process.	A Fish Monitoring Plan would be prepared post-consent, in consultation with GFT.
GFT / ADSFB 9 May 2020	The GFT / ADSFB requested that information pertaining to the following be included within this EIA Report: construction information; access track layout; watercourse crossings; turbine base locations and associated run off; peat information; borrow pits; forestry felling activities and forestry re-planting plans, particularly in riparian areas; changes to instream hydrological conditions and flush zones; issues relating to erosion, suspended silt during construction activities; water quality monitoring information; reduction in quantity and quality of instream habitat; direct mortality of fish species and mitigation measures to protect fish population and their habitats; timings of specific works; and mitigation measures to protect watercourses, fish and their habitats.	These issues are addressed in this chapter and throughout relevant sections of the EIA Report. Refer to Chapter 6: Hydrology, Hydrogeology, Geology and Soils, Appendix 7.3 Aquatic Ecology Report, and Appendix 4.1 Outline CEMP.

Table 7.1: Consultation Responses

7.4 Assessment Methodology and Significance Criteria

7.4.1 Method of Baseline Data Collection

12. Baseline data were collected across Survey Areas encompassing the ‘Ecological Zone of Influence’ (EZol) of the Proposed Development. The EZol for the Proposed Development is the area over which ecological features may be affected by biophysical changes as a result of the Proposed Development and associated activities. The EZol varies for different ecological features depending upon their sensitivity to an environmental change and informs the survey boundaries recommended in guidance documents cited in this chapter.

7.4.2 Ecological Desk Study

13. The desk study was undertaken as reported in relevant appendices and consisted of a review of existing ecological baseline information obtained from public domain and relevant third parties. Data pertaining to three existing windfarms, contained within the respective Environmental Statements (ESs) were also consulted:

- the operational Harestanes Windfarm within the Site and to the north (Scottish Power, 2004a and Scottish Power, 2004b);
- Minnycap Windfarm 1 kilometre (km) to the north west (Renewable Energy Systems (RES), 2009); and
- Dalswinton Windfarm 5km to the west south west (Airtricity Developments, 2003).

14. The following search areas were used:

- Statutory designated sites of European or international importance within at least a 10km radius⁴ of the Site, i.e. SACs, Ramsar sites.
- Statutory designated sites of national to local importance within at least a 2km radius⁵ of the Site. Sites of national importance include Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Local Nature Reserves (LNR).
- Records of legally protected and notable species within at least a 2km radius⁴ of the Site.
- Ancient woodlands within at least a 2km radius⁴ of the Site.

7.4.3 Field Studies

15. The Survey Areas were initially determined in response to the Preliminary Infrastructure Layout (described as Design Iteration C in **Chapter 3: Site Selection and Design**). The Survey Areas evolved in response to design iterations (after two design workshops), to ensure minimum survey areas, as defined by guidance documents cited within relevant sections of this chapter, were covered in relation to the Final Design (described as Design Iteration F in **Chapter 3: Site Selection and Design**). Hence, in the following sections, Survey Areas as presented as ‘a minimum distance’ from the Final Design rather than a maximum distance or a range of distances as follows. The cable route refers to underground electrical and communications cabling to the operational Harestanes Windfarm substation. The scale and location of the Proposed Developments are described in **Chapter 4: Development Description** and Survey Areas around proposed infrastructure was as follows:

16. Turbine locations (including locations of turbine foundations, crane hardstandings, and transformer / switchgear housings adjacent to turbines), borrow pit search areas, access tracks (new and existing which are proposed to be upgraded), permanent control building and temporary construction compound plus a minimum buffer of 100m where suitable habitat was present for notable and protected species; this was increased to a minimum 200m for riparian mammals and fish walkover surveys upstream and downstream of watercourse crossing points.

⁴ A range of 10km was determined to be the likely range of connectivity with the Site; however, statutory and non-statutory designated sites of European or international importance outside of this range were considered for potential connectivity with the Site to a maximum distance of 30km.

⁵ A range of 2km was determined to be the likely range of connectivity with the Site; however, statutory and non-statutory designated sites of national or local importance, ancient woodlands, and legally protected species apart from bats were considered for potential connectivity with the Site outside of this range to a maximum distance of 5km. This was extended to 20km for bats.

- For the cable route, a buffer of 50m was surveyed for fauna and habitats; this was increased to 100m for riparian mammals and the fish walkover.

17. The following surveys were conducted with detailed methodologies presented in relevant appendices:

- Protected Species Habitat Suitability Surveys;
- Phase 1 Habitat Survey (Phase 1) and National Vegetation Classification (NVC);
- Initial Aquatic Ecology Habitat Walkover and Electrofishing Surveys;
- Dedicated Badger, water vole, otter, red squirrel and pine marten surveys;
- Bats: Potential Roost Feature surveys, automated static detector surveys; and
- Incidental records of other notable or legally protected species were recorded as well as areas of habitat considered suitable to support them, e.g. reptiles, amphibians, deer, brown hare, mountain hare and West European hedgehog. Any evidence of INNS flora and fauna was recorded during all surveys conducted, e.g. grey squirrel.

18. All lead surveyors were members of CIEEM who were deemed to be at least ‘Capable’ in leading their survey element, according to CIEEM’s survey competency framework⁶ and held appropriate licences as required.

7.4.4 Evaluation Methods for Ecological Features

19. All ecological features recorded were assigned a level of importance for nature conservation in accordance with CIEEM guidelines (CIEEM, 2018). The ‘importance’ of all ecological features has been determined on a geographical scale using criteria and examples shown in **Table 7.2** (adapted from CIEEM, 2018).

Feature	Criteria/Examples Used to Determine Importance
International/ European	An internationally important site e.g. SAC, Biosphere Reserve (or a site proposed for, or considered worthy of such designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive), i.e. European Protected Species. Areas of internationally important habitats which are degraded but are considered readily restored. A regularly occurring population of an internationally important species, which is threatened or rare in the UK, i.e. an IUCN Red List species ⁷ .
National (i.e. Scotland)	A nationally designated site e.g. SSSI, or a site proposed for, or considered worthy of such designation. A viable area of a habitat type listed in Annex 1 of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on Schedules 5 & 8 of the Wildlife and Countryside Act (as amended). Areas of nationally important habitats which are degraded but are considered readily restored. A feature identified as a priority species/habitat in the SBL. A regularly occurring, locally significant population of a species listed as being nationally scarce (e.g. species recorded from 16-100 10x10km squares of the national grid). Any regularly occurring nationally significant population of a nationally important species which is threatened or rare in the UK.

⁶ CIEEM’s Competency for Species Survey Framework: <https://cieem.net/resource/competencies-for-species-survey-css/>
⁷ The official Red List for British Mammals produced by the Mammal Society was released in July 2020: <https://www.mammal.org.uk/science-research/red-list/>. Under the IUCN Red List criteria, each species is allocated to one of the following categories, relating to imminent risk of extinction: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD) and Not Assessed (NA).

Feature	Criteria/Examples Used to Determine Importance
Regional (i.e. Dumfries and Galloway)	Viable areas of priority habitat identified in the DGLBAP or smaller areas of such habitat which are essential to maintain the viability of a larger habitat as a whole. A local statutory designated site e.g. LNR. A site designated as a non-statutory designated site e.g. SINC, SWT Reserve, or an 'irreplaceable ⁸ woodland site listed on the Ancient Woodland Inventory. Areas of internationally or nationally important habitats which are degraded but are considered restored with substantial management. Any other non-statutory sites of importance for specific habitat, species or assemblage. A sustainable population of a nationally scarce species (e.g. species recorded from 16-100 10x10km squares of the national grid) including species listed on the SBL and DGLBAP.
Local (i.e. Site and its vicinity, including areas of habitats contiguous with or linked to those on Site)	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the local area, e.g. those listed as broad habitats on the DGLBAP. Species of international or national importance, but which are only present very infrequently or in very low numbers within the subject area
Site	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species.

Table 7.2: Importance Criteria for Ecological Features

20. In cases where the importance of an ecological feature varies and as such could be assigned to different geographical contexts, such as a habitat where a habitat is primarily a poor example but also contains areas of higher quality habitat, the phrase 'up to' has been applied.
21. For the purposes of this assessment, ecological features of:
- Local importance or higher are assessed as being Important Ecological Features (IEFs) and are scoped in to the impact assessment; and
 - Site importance are not assessed as being IEFs and are scoped out of the impact assessment.
22. In addition to the assessment of IEF, the impact assessment also considers legal protection of habitats and species, where relevant to the Proposed Development, whether they are an IEF or not.

7.4.5 Characterising Ecological Impacts and Effects

23. A following definitions are used for the terms 'impact' and 'effect' (with reference to CIEEM, 2018):
- Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a woodland.
 - Effect – Outcome to an ecological feature from an impact. For example, the effects on a red squirrel population from loss of a woodland.
24. The assessment of the significance of effects takes into account the following (with reference to CIEEM, 2018):
- Whether the impact has a beneficial or adverse effect in terms of nature conservation objectives and policy;
 - The size, importance and sensitivity of the feature;

⁸ Irreplaceable habitats are described in the in the England National Planning Policy Framework (2018) (<https://www.gov.uk/government/publications/national-planning-policy-framework--2>) as habitats which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen.

- The duration, magnitude and extent of the impacts;
- The timing and frequency of the impacts (e.g. whether the impacts occur at critical life stages); and
- The ability of the affected feature to recover from temporary impacts and likely timescale of recovery (i.e. reversibility).

25. For the purposes of the impact assessment, the magnitude of predicted impacts on a feature are categorised as high, medium, low or negligible as defined in **Table 7.3** and impact duration is defined in **Table 7.4**.

Level of Impact	Description
High	Major impact on the nature conservation status of the site, habitats or species, likely to threaten the long-term integrity of the system.
Medium	Moderate impact on the nature conservation status of the site, habitats or species, but would not threaten the long-term integrity of the system.
Low	Noticeable, but either of sufficiently small scale or short duration to cause no harm to the conservation status of the site, habitats or species.
Negligible	Not expected to affect the conservation status of the site, habitats or species under consideration in any way, therefore no noticeable effects on the ecological feature.

Table 7.3: Impact Magnitude

Impact Duration	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period.
Long-term	Approximately 15 - 25 years.
Medium-term	Approximately 5 – 15 years.
Short-term	Up to approximately 5 years.

Table 7.4: Impact Duration

7.4.6 Ecologically Significant Effects

26. In line with good practice guidance (CIEEM, 2018), effects are either defined as 'significant' or 'not significant'. A significant effect is described as "an effect that either supports or undermines biodiversity conservation objectives for" the relevant ecological feature or its integrity or conservation status⁹.
27. Where a potential effect upon an IEF has been identified, the significance of the effect is evaluated using the same geographical scale defined in **Table 7.2**. Where the scale of an effect upon an ecological feature is found to be of Site scale, it is then deemed likely that this will result an effect that is not significant.
28. The impact assessment considers the effects of the Proposed Development with the application of embedded mitigation (i.e. that is an inherent component of the design and includes the application of best practice measures,

⁹ Conservation status for habitats is determined by the sum of the influences acting on the habitat and its typical species that may affect its long-term distribution, structure and function as well as the long-term distribution and abundance of its population within a given geographical area. Conservation status for species is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its population within a given geographical area.

or 'project assumptions'). This gives an indication of the need for additional mitigation to be implemented. The likely effectiveness of that additional mitigation has then been considered, and a residual effect stated.

7.4.7 Limitations to the Assessment

29. Every effort has been made to provide a comprehensive description of the EZol, however, the following specific limitations apply to this assessment:

- NatureScot advises¹⁰ that 'species survey information needs to be sufficiently up to date when a planning application is submitted. Pre-application survey results normally remain valid for 2-3 years, or for two more survey periods after the survey was completed. If the application is going to be delayed beyond a third survey period, then it should be repeated in that third period to provide more recent information, unless it is reasonable to assume there has been no substantive change in number, distribution or activity of a species since the original survey'. Therefore, the ecological survey data presented herein will be valid until 2022-2023 unless otherwise agreed with NatureScot.
- Records held by local biological record centres and local recording groups are generally collected on a voluntary basis; therefore, the absence of records does not demonstrate the absence of species, it may simply indicate a gap in recording coverage.
- The data within this chapter and appendices represent an accurate assessment of mobile species' activity within the Survey Area at the time of the survey but there is potential for mobile species' baseline to change prior to the construction work.
- Areas of immature Sitka spruce plantation forest where the coverage was very dense and visibility poor were not accessed during the surveys. Instead surveyors walked around the edge of these areas using binoculars where appropriate and looked for paths for signs showing animals accessing the woodland, these areas were then investigated further. Additionally, during the habitat assessment indicative turbine locations within immature woodland were accessed. Therefore, this limitation is not considered to affect the validity of the data collected.
- Dense, continuous bracken was present on some steep slopes within the Survey Areas which made it difficult to view all areas of the slopes. Dense bracken can mask evidence of protected and notable species. However, these areas were traversed on numerous occasions during the habitat suitability surveys when bracken had not been a limitation. No evidence of protected species was recorded within these bracken areas during the habitat suitability survey.
- Areas of clear-fell can be difficult and dangerous to survey with log piles and hidden ditches. Every effort was made to cover areas of clear fell where the habitat was considered suitable to support pine marten such as in large log piles.
- Riparian surveys undertaken on the 22 July 2020 and 23 July 2020 were undertaken during periods of rain. The water levels were within the normal and field evidence of otter and water vole was still recorded during these surveys. Therefore, this limitation is not considered to affect the validity of the survey undertaken on these days.
- Water flows for all electrofishing surveys were above base flow levels. It is therefore likely that capture efficiency may be below what would have been obtained under optimum conditions.
- Low water conductivity is likely to result in the reduced electrofishing capture efficiency of small fish (<100mm in length). Therefore, the densities of juvenile fish may be underestimated under such conditions. Mitigation measures rest out in this chapter account for all life stages of brown trout being present in the watercourses where fish were recorded.
- The automated detectors were located as closely as possible to turbine locations. There were 15 proposed turbine locations and through following the guidance, only 12 detectors were required to be deployed, meaning not all proposed turbine locations were surveyed with a detector. Automated detectors were placed as close to turbine locations in the nearest suitable location, so they represented the habitats in which the turbines are proposed to be constructed.
- Locations of detectors moved slightly (within 100m) in the spring recording session due to ongoing forestry operations. This movement of the detectors was not of a distance substantial enough to affect the comparison of the automated detector locations results.

- Due to a defect within the coding for the online tool Ecobat^{11,12} (used for analysis of bat activity), not all bat passes were included within the final Ecobat analysis of factors that included times of emergence relative to sunset and median bat activity levels. The omitted bat passes represent less than 1% of all passes recorded throughout all automated detector surveys (spring, summer and autumn), and is considered not to represent a material impact upon on the overall assessment.
- Ecobat analysis of percentile data (on relative intensity of activity) covered 81% of all raw data rather than the whole dataset. It is, however, considered that this 81% is representative of the entire dataset; and in addition, the proposed mitigation is considered to be sufficiently robust to account for impacts on all bats recorded, regardless of the Ecobat output.
- Ecobat analysis has no allowance for entering nights where no bat passes are recorded, so the results of the analysis are based only on presence data. Automated bat detectors were deployed and recording on 1,220 nights but only recorded bats on 801 of these nights. As the Ecobat calculation is based only on these 801 nights, the level of bat activity is in reality lower than that indicated by the Ecobat analysis.
- Due to limitations within the species list that Ecobat provides, all possible Nathusius' pipistrelle *Pipistrellus nathusii* bat passes needed to be assigned to the *Pipistrellus nathusii* species tag. There were no categoric Nathusius' pipistrelle calls identified during the analysis process; therefore, any mention of Nathusius' pipistrelle passes within the report should be taken as a 'possible' Nathusius' pipistrelle pass.
- Trees assessed for bat suitability in November 2020, were undertaken outside the active bat season, and as such, finding evidence of roosting bats (including droppings) is less likely than if such surveys were undertaken at the optimal time of year. However, the interpretation of the results and the mitigation measures take this potential limitation into account by adopting a precautionary approach based on PRFs rather than presence or absence of bat signs.

30. These limitations are all detailed in the relevant appendices, where in each instance assurances are given as to how these limitations do not substantially affect the baseline data or the impact assessment presented in this chapter.

7.5 Baseline Conditions

7.5.1 Overview

31. In the following sections, the desk study and field survey components (where relevant) for each feature are presented together.

7.5.2 Designated Sites and Ancient Woodland

32. The desk study identified no statutory designated nature conservation sites within the search areas; the nearest being Black Loch SSSI (notified for basic fen habitat), located 3.2km south of the Site and not connected to the Site via hydrological or air-borne pathways.

33. Two non-statutory designated sites were recorded, one of which is located within the 2km search area (Priority area for grey squirrel control) and one of which is located 3.2km distant (Galloway and Southern Ayrshire Biosphere Reserve) but is included due to potential for connectivity with the Proposed Development. Several Ancient Woodland Inventory areas were also identified, including woodland immediately east of the access from the A701 road and approximately 250m north east of the proposed crane pad for Turbine 3. These sites are described in **Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report**, shown on **Figure 7.1** and summarised in **Table 7.5**.

¹⁰ Based on communication with Mike Shepherd, Casework Manager, NatureScot.

¹¹ To allow an objective assessment of bat activity, a measure of relative activity was obtained using the online tool Ecobat, which is hosted and developed by the Mammal Society (Lintott *et al.*, 2017).

¹² <http://www.ecobat.org.uk/>

Feature	Description
Designated site	
Galloway and Southern Ayrshire Biosphere Reserve (GSABR)	<p>The transition zone of the GSABR is located 3.2km west of the Site. “<i>Galloway and Southern Ayrshire Biosphere Reserve is comprised of a major bio-geographic region represented by an upland massif centered on the Merrick and the rivers that flow from this upland down through forests and farmland to the sea. Landscape mosaics in the area comprise uplands, moorlands, mires, woodlands and forests, farmland, river valleys, coast and shoreline. The Biosphere Reserve is working to demonstrate the importance of landscapes and ecosystems for the future of sustainable development in a region which is undergoing change in traditional livelihoods</i>”¹³.</p> <p>Surface area: 526,888 hectares (ha)</p> <ul style="list-style-type: none"> Core area(s): 10,658ha Buffer zone(s): 84,523ha Transition area(s): 431,707ha. <p>The biosphere programme¹⁴ identifies three main functions for the designated areas:</p> <ul style="list-style-type: none"> conservation; development; and logistical support.
Priority area for grey squirrel control	The Site is entirely within a priority area for grey squirrel control. It was previously selected as a Red Squirrel Priority Woodland (RSPW) using the Reynolds and Bentley selection criteria (Reynolds and Bentley, 2004), however this designation has been superseded.
Ancient Woodland Inventory	
Un-named woodland 1	Woodland within the south-western section of the Site; located 256m south-east of the proposed crane pad for Turbine 3. The woodland is ancient of semi-natural origin and is 1.84ha in extent.
Un-named woodland 2	Woodland north along the main access track, located to the east of the track, 10.19ha in extent. The Native Woodland Survey of Scotland (NWSS ¹⁵) data defines it as ‘a mosaic of non-native woodlands, upland oakwood, upland birchwood and lowland mixed deciduous woodland’.
Un-named woodland 3	Woodland directly east of the main access to the Site from the A701. The woodland is ancient of semi-natural origin and is 2.14ha in extent. The NWSS defines it as ‘lowland mixed deciduous woodland’.
Black Cleuch woodland	Woodland located along the Black Cleuch, 360m south of proposed borrow pit search area near Turbine 2. The woodland is ancient of semi-natural origin and is 1.87ha in extent.
All other ancient woodland parcels within 2km of the Proposed Development	All other ancient woodland parcels are either outside the Site and 1km from the nearest element of the Proposed Development.

Table 7.5: Baseline Conditions: Designated Sites and Ancient Woodland

7.5.3 Terrestrial Habitats

34. Baseline data for flora and habitats are described in **Appendix 7.2 Habitats Baseline Report** and plant communities are shown on **Figure 7.2**. All notable flora species records received by BSBI during the desk study consultation were noted to be outside the Site.

¹³ Taken from: <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/europe-north-america/united-kingdom-of-great-britain-and-northern-ireland/galloway-and-southern-ayrshire-biosphere/> [accessed 25/09/2020].

35. Based on habitat survey data, the Site comprises coniferous plantation forestry with narrow rides of heath, mire or grassland habitats. Large areas of recently clear-felled woodland present an intermediate, short-term succession of neutral damp vegetation or acidic and grassy heath on sloping aspects; clearly defined NVC communities have not yet established in most of these areas. With the Survey Area, approximately 19% represents recently felled woodland and approximately 66% is plantation woodland (either mature or immature coniferous, or immature broadleaved). Therefore, it is acknowledged that the habitats on Site have been heavily influenced by anthropogenic factors relating to forestry.
36. Semi-natural broadleaved woodlands are localised to valleys, forming riparian corridors along the Clachanbirnie Burn, Rough Cleugh, and Glenkiln Burn. Acidic heath and grassland habitats, and neutral rush pasture, occur in mosaic with these broadleaved woodlands.
37. Discrete sedge fens and swamps are localised in forestry rides in the west by Turbine 1, and to the north of Turbine 6. Bottle sedge invariably dominates, with associates ranging from marsh cinquefoil, marsh bedstraw, etc. to pond-weed, common sedge, common yellow sedge, etc.
38. The main habitats encountered are generally homogenous across the Site, with these discrete fens of relatively increased conservation interest in an otherwise modified landscape.
39. The existing access tracks proposed for upgrade are typically lined by a combination of tall herb vegetation (bracken, rosebay willowherb, foxglove), scrub (willow, bramble, raspberry), marshy grassland (soft and sharp-flowered rushes), and small forbs along the edges of gravel/ disturbed ground (common bird’s-foot-trefoil, common vetch, eyebright, white clover, selfheal). Where elevated verges extend alongside existing access tracks proposed for upgrade, these often support heath. Heath and dry bog habitats generally fringe areas of plantation and are likely to underpin extensive areas of plantation.
40. Two of the borrow pit search areas (2 and 3) will be located wholly within coniferous plantation and overlap forestry rides of dry heath (2). The other borrow pit search area (1) extends adjacent to the west of an existing quarried area. Again, coniferous plantation dominates the majority of this area, but a swathe of rush pasture and neutral grassland occurs through the southern extent.
41. **Table 7.6** presents all plant communities that have been identified at the Site, either as clearly defined stands or in mosaic with other communities.

Terrestrial Habitat	Description
Coniferous plantation (CP)	This habitat dominates the landscape; the Site is an actively managed forest. In areas of young plantation or clearings, an understory of dry heath or blanket bog is visible. The majority of stands are however formed of dense rows of Sitka spruce. Turbines 1, 2, 5, 6, 7 and 8 are mostly located amongst coniferous plantation; with slivers of semi-natural habitats occurring through forestry rides under the footprint.
Broadleaved plantation (BP)	Broadleaved plantation at the Site occurs at a couple of locations including by a quarry adjacent to Borrow Pit 1 and in the north of the Site in openings amongst coniferous plantation. All plantations were immature at the time of survey; tree guards were visible. Species appear to be native, including birch and rowan.
Felled plantation (FP)	Large blocks of felled woodland present a varied succession of grassy heath or neutral damp and tall herb vegetation. Clearly defined communities have not yet established here; but early succession is indicative of the aspects, geology/peat and typical distribution of habitats at the Site. Areas of felled plantation have been earmarked for Turbines 3 and 4, and the substation.

¹⁴ Taken from: <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/main-characteristics/functions/> [accessed 25/09/2020].

¹⁵ <https://forestry.gov.scot/forests-environment/biodiversity/native-woodlands/native-woodland-survey-of-scotland-nwss> [accessed 28/11/2020].

Terrestrial Habitat	Description
W7 <i>Alnus glutinosa</i> - <i>Fraxinus excelsior</i> - <i>Lysimachia nemorum</i> woodland	Larger components of this community at the Site extend through riparian valleys, in mosaic with and generally presenting an understory of M23 rush pasture. Other examples occur in clearings of forestry rides. Willow generally dominates; other species can include birch, rowan, alder, and hazel. This community is also mapped along existing tracks, but reflects more of a scrubby woodland in these instances.
W10 <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland ¹⁶	This habitat occurs within Un-named Ancient Woodland 3 and is directly adjacent to the main access to the Site from the A701. The woodland is ancient of semi-natural origin and is 1.44ha in extent. The canopy is dominated by oak and beech, the understory is predominantly elm, birch, and immature beech. The field layer is comprised of ferns, scattered bramble, woodrush, leaf litter, and scrub. It appears over 90% native with a few rhododendrons. There is an abundance of standing and fallen deadwood and no apparent signs of human or wildlife related damage as it is fenced off around its perimeter. This woodland is of Good Condition when assessed against relevant criteria in the Farm Environmental Plan (FEP) Manual (Natural England, 2010).
W24 <i>Rubus fruticosus</i> - <i>Holcus lanatus</i> underscrub	This community is mapped in mosaic with M23 rush pasture, W7 woodland and coniferous plantation adjacent to an existing forestry track subject to upgrade, in the centre of the Site (towards Turbine 6). At the Site, W24 represents areas of dense bramble with neutral associates including creeping buttercup, rushes, thistle, tufted hair-grass, and birds-foot-trefoil.
W25 <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> underscrub	Relatively small area of bracken and bramble underscrub which fringes an existing access track south of Borrow Pit 3. Bracken is abundant.
U4 <i>Festuca ovina</i> - <i>Agrostis capillaris</i> - <i>Galium saxatile</i> grassland	Relatively dry acid grassland that will be lost to the Proposed Development is localised to a linear strip on sloping ground surrounded by felled plantation (i.e. previous forestry ride), by Turbine 3. This is a typical example of U4 with no particular species/ assemblage of conservation interest. Occurs elsewhere at Site but relatively infrequently, amongst semi-natural mosaics through valleys and trackside.
U6 <i>Juncus squarrosus</i> - <i>Festuca ovina</i> grassland	Areas of this community reflect an acidic grassland/ heath-type vegetation which occurs in mosaic with M6 fen through a forestry ride now surrounded by felled plantation south of Turbine 4; and a forestry ride south of Turbine 2.
U20 <i>Pteridium aquilinum</i> - <i>Galium saxatile</i> community	Bracken dominated grassland which occurs in riparian valley areas at the Site and along existing tracks. Recognised as a community of low ecological value (Averis <i>et. al.</i> , 2004).
MG9 <i>Holcus lanatus</i> - <i>Deschampsia cespitosa</i> grassland	Areas of damp neutral grassland of low conservation interest; Yorkshire-fog dominates the sward with tufted hair-grass and typical neutral associates which occur frequently at the Site.
MG10 <i>Holcus lanatus</i> - <i>Juncus effusus</i> rush-pasture	Areas of damp neutral grassland of low conservation interest; Yorkshire-fog dominates the sward with soft rush and typical neutral associates which occur frequently at the Site.
M5 <i>Carex rostrata</i> - <i>Sphagnum squarrosum</i> mire	Discrete area of bottle sedge and Sphagnum fen at a series of pools in the upper reaches of a valley north of Turbine 6. Species-rich and sheltered area.
M6 <i>Carex echinata</i> - <i>Sphagnum recurvum</i> / <i>auriculatum</i> mire	This <i>Sphagnum</i> fen, typically with protruding soft rush, occurs in the fringes of heaths and mires and in forestry rides. The particular fen that will be lost to the footprint of the Proposed Development extends through a ride by Turbine 7. It is a typical example of M6c sub-community with <i>Sphagnum fallax</i> , soft rush, <i>Polytrichum</i>

¹⁶ This habitat description is not included within Appendix 7:2 as it was surveyed after the main habitat surveys were conducted.

Terrestrial Habitat	Description
	<i>commune</i> ; species tolerant of disturbance and established in relatively quick succession.
M9 <i>Carex rostrata</i> - <i>Calliergon cuspidatum</i> / <i>giganteum</i> mire	This fen occurs occasionally amongst forestry rides and wet mire habitats; bottle sedge is abundant and associates vary from bedstraw, forget-me-not, creeping buttercup, and marsh cinquefoil. The community is relatively distinct and scarce across the Brittish uplands (Averis <i>et. al.</i> , 2004).
M19 <i>Calluna vulgaris</i> - <i>Eriophorum vaginatum</i> blanket mire	Extents of M19 mapped near proposed turbines are relatively small and therefore unlikely to align with 7130 Blanket bogs (*if active); "active" meaning still supporting a significant area of vegetation that is normally peat forming.
M23 <i>Juncus effusus</i> / <i>acutiflorus</i> - <i>Galium palustre</i> rush-pasture	This rush dominated community occurs regularly at the Site; both sub-communities (M23a <i>Juncus acutiflorus</i> sub-community and M23b <i>Juncus effusus</i> sub-community) are well represented. Examples of similar habitats are abundant across the region. The new access track to Turbine 1 will cross two forestry rides dominated by a wet rush mire M23 variant which occurs in mosaic with discrete sedge mires and heath (heath fringes the forestry edge). Rush pasture also extends through a forestry ride earmarked for Turbine 8. Ground is relatively damp there; soft rush and sharp-flowered rush dominate with few associates (marsh bedstraw, marsh thistle, tormentil, tufted hair-grass). Rushes disperse amongst purple moor-grass and Yorkshire-fog in distinct parts of the ride. Whilst there are no species of conservation interest associated with this widespread habitat, rush pasture, in particular of the M23a <i>Juncus acutiflorus</i> sub-community, adds structural diversity, provides resources for nesting birds and invertebrates (Averis <i>et. al.</i> , 2004), and is a regularly occurring mosaic component at the Site.
M15 <i>Trichophorum germanicum</i> - <i>Erica tetralix</i> wet heath	Wet heath extends through forestry rides at the Site, including at Turbines 2 and 7. Areas of M15 reflect a typical composition of species including abundant tussocks of purple moor-grass, sporadic heather and bilberry shrubs, heath rush, tormentil, and cross-leaved heath.
H12 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> heath	Dry heath occurs in dense stands frequently at the Site, generally fringing plantation woodland. Some areas of felled plantation show a succession of grassy heath; most <i>Vaccinium-Calluna</i> heaths are derived from woodland clearance (Averis <i>et. al.</i> , 2004). The particular area of well-established H12 that will be lost to the footprint of the Proposed Development extends through a west-sloping forestry ride earmarked for Borrow Pit 2 and comprises mature shrubs of heather and bilberry. The surrounding coniferous planation has a heath understory.
H21 <i>Calluna vulgaris</i> - <i>Vaccinium myrtillus</i> - <i>Sphagnum capillifolium</i> heath	This community is relatively distinct from other heaths at the Site by an abundance of <i>Sphagnum</i> carpeting a low cover of heather and bilberry shrubs. It fringes coniferous plantation and extends in clearings of forestry rides, specifically by the new access track to Turbine 1.
S9 <i>Carex rostrata</i> swamp	Discrete area of emergent bottle sedge at a series of pools in the upper reaches of a valley north of Turbine 6. Species-rich and sheltered area, offering optimal resource for invertebrates.
S10 <i>Equisetum fluviatile</i> swamp	A relatively small patch of swamp adjacent to an existing track in the centre of the Site, dominated by water horsetail. Surrounded by a wider area of marshy grassland now established in the bowl of a historic quarry.
OV25 <i>Urtica dioica</i> - <i>Cirsium arvense</i> community.	Open vegetation community dominated by undesirable species including common nettle. Relatively small stands of trackside vegetation. Regularly occurring at the Site.

Terrestrial Habitat	Description
OV27 <i>Epilobium angustifolium</i> community	Tall herb community of rosebay willowherb. Relatively small stands of trackside vegetation. Regularly occurring at the Site.

Table 7.6: Baseline Conditions: Terrestrial Habitats

7.5.4 Aquatic Habitats

42. The running water features are described and illustrated within Appendix 7.3 Aquatic Ecology Report and Chapter 6: Hydrology, Hydrogeology, Geology and Soils and Figure 7.4 Aquatic Ecology Survey Locations and Results. Fifteen watercourses were assessed during the Initial Aquatic Habitat Walkover Surveys. Four of these watercourses were identified for electrofishing surveys (with two electrofishing sites being on the same watercourse; Glenkiln Burn upstream and downstream). These watercourses were assessed as having potential suitability to support populations of juvenile and adult salmonids and were a representation of the types of watercourse present throughout the Site.
43. No substantial standing water bodies are present within the Site. Minister’s Moss is a small water body located within 10m of the Site in the southern extent. The Moss is located upstream of the Site and is therefore not hydrologically connected to it. Cran Loch is located 700m north of the Site. A pond that has infilled a borrow pit from the construction of the operational Harestanes Windfarm is located beside a track that is ear-marked for installation of cabling (**Figure 7.2**). Smaller areas of standing water are also distributed throughout the Site.

7.5.5 Protected and Notable Fauna
7.5.5.1 Fish and other Aquatic Features

44. **Appendix 7.3 Aquatic Ecology Report** and **Figure 7.4 Aquatic Ecology Survey Locations and Results** provide the detail on these surveys. Data from two electrofishing survey sites in watercourses that were within or as close as possible downstream of the Site were obtained from SPR from previous monitoring surveys carried out for the operational Harestanes Windfarm site on Garrel Water and Glenkiln Burn (data from 2015 and 2016). Salmon fry and parr were absent at each location. At Glenkiln Burn trout fry densities were classed as very poor in 2015 and fair in 2016; trout parr densities were classed as very poor in 2015 and poor in 2016. At Garrel Water trout fry densities were good in 2015 and very poor in 2016; trout parr densities were very poor in 2015 and fair in 2016.
45. During the Initial Aquatic Habitat Walkover Surveys five watercourses were identified as having potential suitability to support populations of juvenile and adult salmonids and were assessed as accessible for fish survey: Glenkiln Burn – Upstream; Glenkiln Burn – Downstream; Rough Cleugh; Clachanbirnie Burn and Yellowtree Grain.
46. Electrofishing surveys found a good density of brown trout parr were present at the Rough Cleuch survey location. A poor density of trout fry were also present at this location. Poor densities of brown trout parr were found to be present at the Glenkiln Burn – Upstream and Glenkiln Burn – Downstream survey locations.
47. No brown trout fry were caught during electrofishing surveys of Glenkiln Burn. It is possible this is a result of low water conductivity and of small fish not being effectively immobilised. Two of the sections of watercourses surveyed were found to contain no fish, these being Clachanbirnie Burn and Yellowtree Grain Burn.
48. There have been no recent records of freshwater pearl mussel (FWPM) within the Annan catchment. During the initial aquatic ecology walkover habitat survey watercourse suitability in terms of supporting FWPM was also assessed. No FWPM or their shells were observed and there are no known records for the species across the wider catchment. The prevailing habitat across the Site was considered sub-optimal in terms of supporting FWPM; particularly in the larger watercourses that drain the Site, namely Glenkiln Burn. While suitable substrates, including localised areas of stabilized gravel, were available, this watercourse appeared subject to fluctuating water levels and velocity, reducing the overall stability of substrates which FWPM require to colonise. There were also low densities of trout (as the host species) within the surveyed areas. In the smaller tributaries and headwaters that were surveyed, habitat requirements for FWPM were not met due to absence of suitable substrates, acidity of watercourse, historic evidence of in-stream disturbance (culverting, bankside modification and alignment) and the absence of salmonids as a host species for FWPM.

7.5.5.2 Amphibians

49. South West Scotland Environmental Information Centre (SWSEIC) returned seven records of common amphibians within 5km of the Site. Records include adult and frogspawn for common frog and one adult smooth newt sightings around Loch Ettrick and Forest of Ae. The ESs for the operational Harestanes Windfarm, Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of common amphibians within their Sites. No common amphibians were recorded during walkover surveys of the Site; however, the Site provides a mosaic of habitats with suitability to support amphibians including areas of standing water, riparian habitats and unmanaged surrounding terrestrial habitats.

7.5.5.3 Reptiles

50. **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results** provide the detail on reptile baseline at the Site. SWSEIC six returned records of reptiles within 5km of the Site. A single record of common lizard was returned for Edgemoor, one adder at Duncow Common and four records of slow worm in Forest of Ae and Dalswinton Estate. The ESs for the operational Harestanes Windfarm, Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of reptiles within their sites.
51. Six records of common lizard were recorded incidentally during walkover surveys of the Site. The records were recorded throughout the Site in areas of clear fell, rides and immature plantation. Mosaics of habitats with suitability to support basking and foraging reptiles were recorded throughout the Site (e.g. heath, scrub, and relatively unimproved grasslands). Several dry-stone walls bisecting the landscape and woodland edge habitats offer suitable reptile features for sheltering.

7.5.5.4 Badger

Technical Appendix 7.4 Confidential Badger Report provides the detail on badger baseline at the Site. Twenty-nine records of badger were returned between 2010 and 2020, within 5km of the Site. These records include twelve road casualties along the A701 road south of the Site, and eight casualties on the A75, east of the Site (SWSEIC, 2020). The existing operational Harestanes Windfarm ES found no evidence of badger and concluded that the habitat around the windfarm lacked suitable foraging habitat to support a badger population. Both Minnygap Windfarm and Dalswinton Windfarm ES surveys found no conclusive evidence of badger within their respective sites. Six records of badger setts located within the Site were provided by FLS.

52. The habitat suitability assessment highlighted five areas of moderate suitability for badger, with some small sections within three of the five areas marked as high suitability specifically around the access in the south east, at Glenkiln Burn and the north east of the Site. The rest of the Site was considered low suitability for badger. No setts were identified within the Survey Area however abundant evidence of badger’s presence was recorded outside the Site to the south and south east.

7.5.5.5 Otter

53. **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results** provide the detail on otter baseline at the Site. Records of two dead otters were recorded at Whiteknowe Head Burn, east of the Site and the other record, a road casualty on the south of the A701, to the south of the Site. A third record was of a large otter, crossing the road at St Ann’s Bridge. (SWSEIC, 2020). The operational Harestanes Windfarm ES surveys recorded spraints within the valleys of the Water of Ae, Capel Water and Glenkiln Burn. The ES survey for Minnygap Windfarm recorded limited evidence of otter in the form of spraints within the Site, with the ES surveys for Dalswinton Windfarm recorded foraging and sprainting activity within the Site.
54. The habitat suitability assessment highlighted several burns across the Site as moderate and low suitability, no areas were recorded marked as high value otter habitat. Areas considered to provide moderate habitat including tributaries of Glenkiln Burn, Clachanbirnie Burn, Cat Cleuch and Black Linn. One holt (Target Note (TN) 10, 260m south west of T03) and one potential holt (TN8, 200m north west of existing forestry track to be upgraded) was recorded on Glenkiln Burn as well as footprints on a run (TN9) and a spraint (TN11) recorded on a tributary. On Deer Burn, four spraints were recorded under the cable bridge and one under the track bridge (TN12). This appears

to be a well-used location, however, no covered cavities suitable for holts was recorded, however above-ground resting site habitat was recorded on banks and boulders under bridges. A spraint was also recorded on Yellowtree Grain Burn in the north east of the Site (TN7). Three above-ground otter resting sites (hovers¹⁷) were identified along the Garrel Burn to the south east of the Site (TN14, 15 and 16) along with spraints at several locations along the surveyed reach of the burn. All of these resting sites are located over 45m from the existing site access track off the A701 which is to be upgraded.

7.5.5.6 Water Vole

55. **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results** provide the detail on water vole baseline at the Site. SWSEIC provided no records of water vole within 5km of the Site (SWSEIC, 2020). The operational Harestanes Windfarm ES surveys found no definitive evidence of water vole with field vole common in the area. However, it was assumed that water vole was present on the very west periphery of the Site. The ES surveys for both Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of water vole.
56. The habitat suitability assessment highlighted one area as high suitability for water vole in the north east of the Site on a tributary of Glenkiln Burn. Other areas across the Site were considered moderate suitability including tributaries of Glenkiln Burn, Clachanbirnie Burn, Cat Cleuch and Black Linn. The field survey found evidence of water vole including burrows, runs, latrines and feeding signs in the north east of the Site on the Glenkiln Burn (TN3-6, 90+m upstream of cable route crossing point over Glenkiln burn) and on tributary of Garrell Water (TN1, 100m north of T06), additionally a nest in rush was present on Auchencaigroch Burn with feeding evidence below (TN2, 5m north of existing construction compound/hardstanding).

7.5.5.7 Red Squirrel

57. **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results** provide the detail on red squirrel baseline at the Site. A large number of records (434) were provided for the Survey Area from a range of sources (SWSEIC, iRecord, Glasgow Museum Biological Record Centre (GMBRC), Scottish Wildlife Trust (SWT) - The Scottish Squirrel Database) for the period 2010-2020. A number of the records are from Edwardsrig Plantation north east of the Site. Other records included live sightings at Forest of Ae and crossing the road near St Ann's. SWSEIC stated that red squirrel is widespread throughout Dumfries and Galloway and the region is thought to hold up to 20% of the Scottish population. The operational Harestanes Windfarm ES surveys concluded a very high level of presence of red squirrel in suitable habitat at Forest of Ae mainly in the north and south. The ES surveys for Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of red squirrels within their sites.
58. The habitat suitability assessment showed moderate to high suitability across a large portion of the Site. However, some areas were negligible or low suitability where trees were too immature, or the area had been clear felled. Potential squirrel foraging field signs were recorded during the surveys in the Survey Area which included piles of chewed cones and a drey, although none could be attributed to red squirrel. No sightings of red squirrel were made and the drey was located over 30m from the existing Site access track off the A701 which is to be upgraded.

7.5.5.8 Pine Marten

59. **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results** provide the detail on pine marten baseline at the Site. SWSEIC provided no records of pine marten within 5km of the Site. The Harestanes ES surveys found pine marten likely present in low numbers in the Forest of Ae, with no evidence found during surveys but a few historic records (pre 2010) were present. The ES surveys for Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of red squirrels within their sites (SWSEIC, 2020).
60. The habitat suitability assessment found no areas within the Site had high suitability, but large portions of the west, northeast and access track in the south east were moderate suitability habitat. The majority of the rest of the habitat

was considered low suitability. Five potential denning locations were recorded across the Survey Area as follows: TN22, 30m east of proposed borrow pit search area BP03 and 100m south of T02; TN27, 70m north east of proposed crane pad for T01; TN34, 500m south of proposed crane pad for T03; TN35, 450m south of proposed crane pad for T03; and TN36, 450m south west of the proposed crane pad for T03. No definitive signs were observed to confirm pine marten presence; however, these are notable since they provide suitable pine marten den habitat within an area where such habitat is scarce. Numerous potential pine marten scats were recorded throughout the Survey Area.

7.5.5.9 Brown hare

61. All records of brown hare are outside the Site, with sightings recorded at Netherhill (south east of the Site) and areas to the north east of the Site (see **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report** and **Figure 7.3 Protected Species Survey Areas and Results**). The ESs for the operational Harestanes Windfarm, Minnygap Windfarm and Dalswinton Windfarm Minnygap Windfarm and Dalswinton Windfarm recorded no evidence of brown hare within their sites. Incidental sightings of brown hare were recorded at TN44 (directly east of an access track to be upgraded) and TN45 (directly north of an existing area of hardstanding / proposed construction compound).

7.5.5.10 Mountain Hare

62. All records of mountain hare are outside the Site, with sightings recorded at Netherhill (south east of the Site) and areas to the north east of the Site (see **Technical Appendix 7.1 Desk Data, Arboreal and Riparian Mammals Report**). The ES surveys for Harestanes, Minnygap Windfarm and Dalswinton Windfarm (Airtricity Developments, 2003), recorded no evidence of mountain hare within their Sites. No sightings or signs of mountain hare were recorded during field surveys.

7.5.5.11 Bats

63. **Technical Appendix 7.5 Desk Data, Bat Survey Report** and **Figures 7.5.1 – 7.5.8 Bat Survey Areas and Results** provide the detail on bat baseline at the Site. SWSEIC returned 785 records¹⁸ between 2009 and 2020 which included records for all ten Scottish bat species.
64. Two dead Scots pine trees (Tree 1 – NY 02505 93977, Tree 2 – NY 02607 94077) were identified as having moderate suitability for roosting bats. Both trees had various features surrounding the trees.
65. Two activity surveys of the trees were undertaken to further survey them for the presence of roosting bats (one dusk survey in August and one dawn survey in September). A small number of bat passes were recorded on each of the surveys, but no roosting bats were observed emerging or re-entering either tree.
66. A further 27 trees were identified as having suitability to support roosting bats in November 2020 (**Figure 7.5.2 Appendix 7.5**) at the south of the Site adjacent to the access route. Three trees had low suitability, 21 had moderate suitability and three had high suitability for roosting bats. Details of the trees, PRFs and recommended further surveys for each individual tree can be found in **Technical Appendix 7.5**. To record bat activity across the wider Site, twelve detectors were deployed throughout the Site over three survey seasons which amounted to 1,220 nights of recording time (384 nights in spring, 419 nights in summer and 417 nights in autumn). The location of the detectors is shown in **Figure 7.5.1, Appendix 7.5**.
67. Throughout these three seasons, six species (or genera in difficult to identify species) were recorded: soprano pipistrelle *Pipistrellus pygmaeus*, common pipistrelle, Nathusius' pipistrelle, *Myotis* species, *Nyctalus* species and brown long-eared bat *Plecotus auritus*. The most widely recorded species was common pipistrelle (57.7% of all bat passes; **Table 7.7**), followed by soprano pipistrelle (28.2% of all bat passes) with detectors SMM04, SMM09 and SMM10 recording the most passes. Data analysed though Ecobat shows the recorded data in relation to the

¹⁷ A 'hover' is an above-ground resting site that provides temporary shelter to an otter but does not extend into a holt, e.g. under tree roots or a ledge. It differs from an otter 'couch', in that couches tend to be above-ground in more open areas, such as flattened areas of grass, heather or rushes.

¹⁸ Records provided by South West Scotland Environmental Information Centre (SWSEIC)

standard roost emergence times (Russ, 2012). The results of this analysis would indicate that the following detectors may be located within close proximity to roost locations that are just outside the Survey Area.

Species	Passes (No.)	Percentage of total (%)
Pipistrelle sp.	5,501	8.4
Common pipistrelle	37,843	57.7
Soprano pipistrelle	18,512	28.2
Nathusius' pipistrelle	1,570	2.4
Myotis sp.	643	1.0
Nyctalus sp.	206	0.3
Brown long-eared	1,309	2.0
Total	65,584	100

Table 7.7 – Total bat passes recorded for each species

The median nightly pass rate of each species at each detector is show in **Table 7.8**. The highest median pass rates for each detector are in blue and the lowest in red. Nathusius' pipistrelle had the highest median pass rate of all species at detector SMM01.

Species	Detector	Median Pass Rate (bat passes per hour, per night)	Species	Detector	Median Pass Rate (bat passes per hour, per night)
Pipistrellus sp.	SMM01	0.6	Common pipistrelle	SMM01	0.3
	SMM02	0.5		SMM02	0.4
	SMM03	0.2		SMM03	0.4
	SMM04	0.4		SMM04	0.3
	SMM05	0.2		SMM05	0.5
	SMM06	0.3		SMM06	0.3
	SMM07	0.3		SMM07	0.4
	SMM08	0.2		SMM08	0.3
	SMM09	0.3		SMM09	0.3
	SMM10	0.3		SMM10	0.4
	SMM11	0.2		SMM11	0.3
	SMM12	0.7		SMM12	0.3
Soprano pipistrelle	SMM01	0.3	Nathusius' pipistrelle	SMM01	1.5
	SMM02	0.4		SMM02	0.3
	SMM03	0.3		SMM03	0.6
	SMM04	0.3		SMM04	0.3
	SMM05	0.6		SMM05	0.6
	SMM06	0.5		SMM06	0.3
	SMM07	0.4		SMM07	0.3
	SMM08	0.3		SMM08	0.2
	SMM09	0.3		SMM09	0.4
	SMM10	0.4		SMM10	0.3
	SMM11	0.2		SMM11	0.2

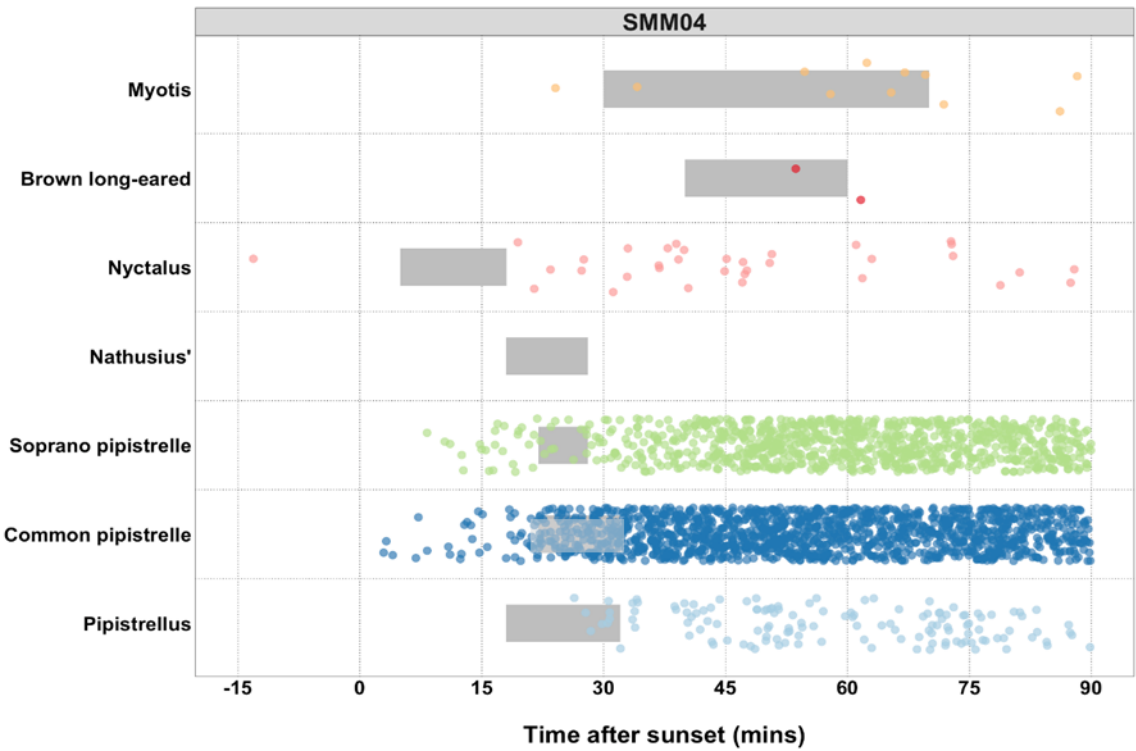
Species	Detector	Median Pass Rate (bat passes per hour, per night)	Species	Detector	Median Pass Rate (bat passes per hour, per night)
Myotis sp.	SMM12	0.3	Nyctalus sp.	SMM12	0.6
	SMM01	0.1		SMM01	0.3
	SMM02	0.3		SMM02	0.3
	SMM03	0.2		SMM03	0.4
	SMM04	0.4		SMM04	0.3
	SMM05	0.3		SMM05	0.2
	SMM06	0.3		SMM06	0.3
	SMM07	0.2		SMM07	0.3
	SMM08	0.2		SMM08	0.4
	SMM09	0.1		SMM09	0.4
	SMM10	0.2		SMM10	0.3
	SMM11	0.2		SMM11	0.2
Brown long-eared	SMM12	0.2		SMM12	0.3
	SMM01	0.8			
	SMM02	0.2			
	SMM03	1.1			
	SMM04	0.3			
	SMM05	1.4			
	SMM06	0.2			
	SMM07	0.3			
	SMM08	0.4			
	SMM09	0.4			
	SMM10	0.5			
	SMM11	0.2			
	SMM12	0.1			

Table 7.8 - Median bat passes per detector (bat passes per hour, per night)

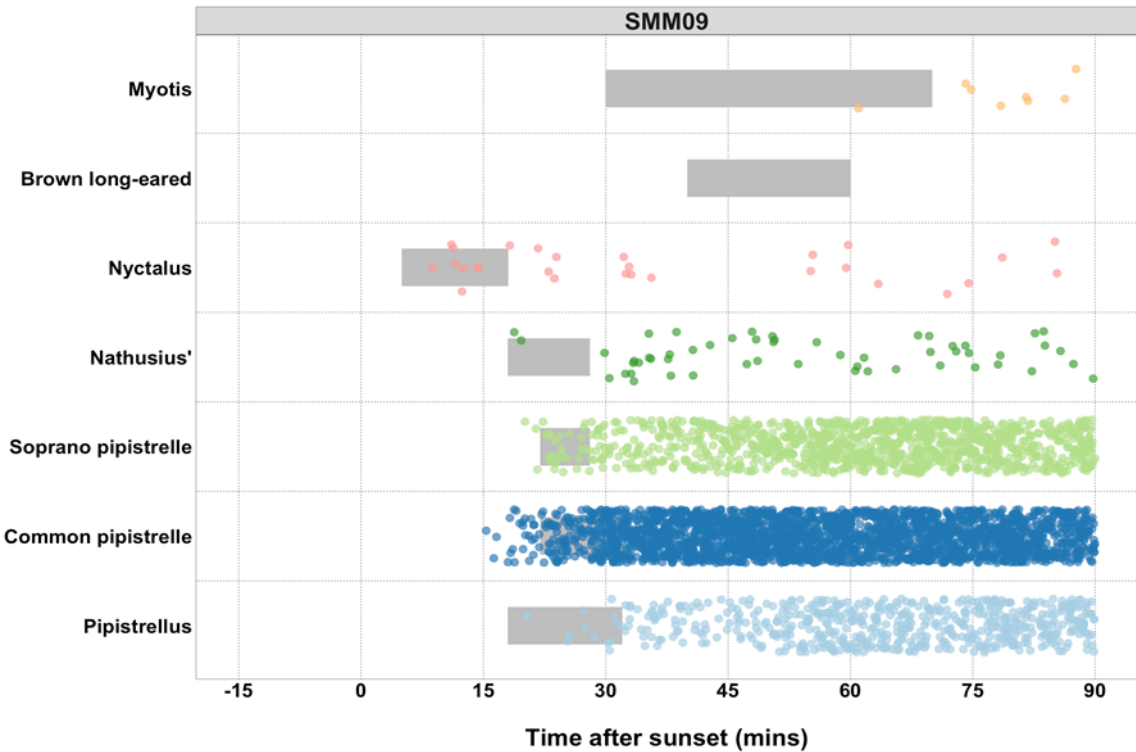
68.
- Data analysed though Ecobat shows the recorded data in relation to the standard roost emergence times (Russ, 2012). The results of this analysis would indicate that the following detectors (**Table 7.9**) may be located within close proximity to a roost location, albeit those roosts would be outside the Survey Area.

Location	Species	Figure
SMM04	Common pipistrelle	Graph 7.1
SMM09	Soprano/ common pipistrelle	Graph 7.2
SMM10	Soprano/common pipistrelle <i>Pipistrellus sp.</i>	Graph 7.3
There were other passes recorded on other detectors close to the species-specific emergence times although the numbers were not considered high enough to indicate the proximity of a roost.		

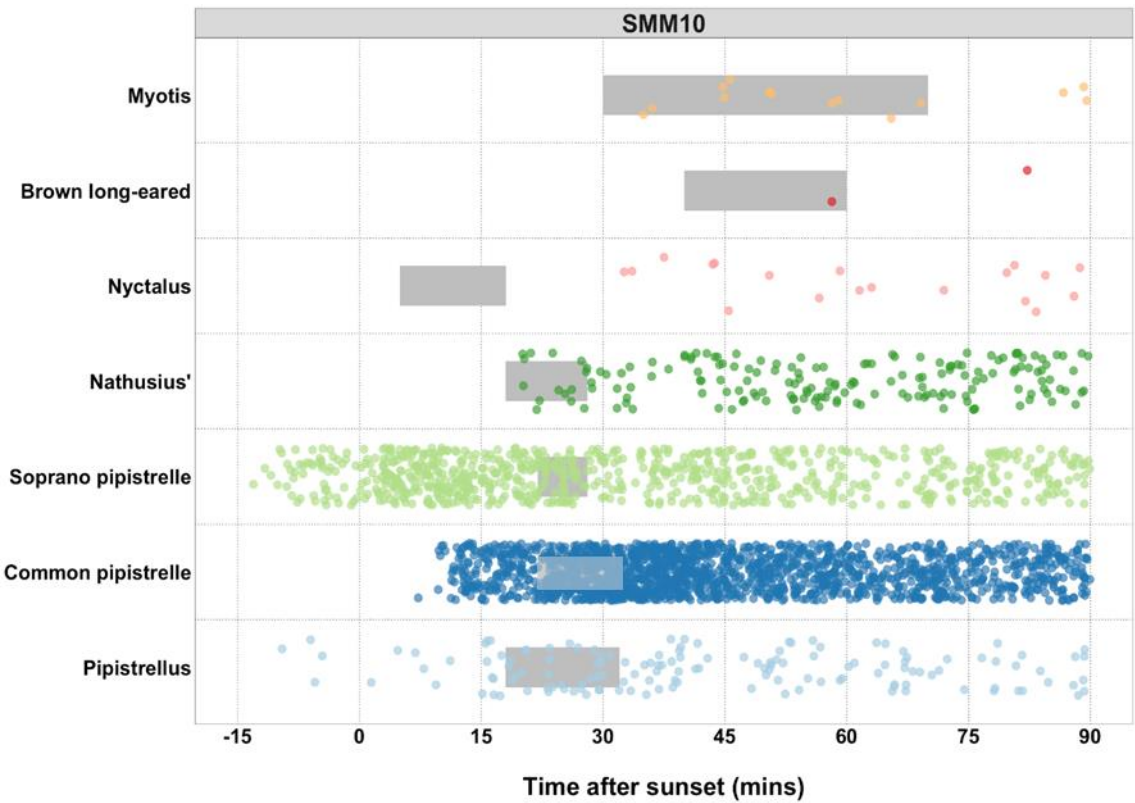
Table 7.9 – Locations with bat passes indicating roosts nearby



Graph 7.1 – SMM04 species-specific emergence times. Coloured dots show the time of the recorded passes in relation to the emergence time window (grey bar).



Graph 7.2 - SMM09 species-specific emergence times. Coloured dots show the time of the recorded passes in relation to the emergence time window (grey bar).



Graph 7.3 – SMM10 species-specific emergence times. Coloured dots show the time of the recorded passes in relation to the emergence time window (grey bar).

69. The relative activity levels of bats recorded in the Site can be compared with values within the Ecobat reference database. This allows the bat activity data to be given a percentile. The bat activity level is categorised using the percentiles as follows:
- low activity: 0 to 20th percentile;
 - low/moderate activity: 21st to 40th percentile;
 - moderate activity: 41st to 60th percentile;
 - moderate/high activity: 61st to 80th percentile; and
 - high activity: 81st to 100th percentile.
70. Activity levels for each species per month were then calculated with the median and maximum percentile being examined. Examining this data allows any seasonal variations to be seen (**Table 7.10**). The highest activity levels are highlighted in red and the lowest in blue.

Species	Month	Median Percentile	Activity Level	95% Cis ¹⁹	Max Percentile	Activity Level	Nights recorded
Myotis sp.	May	0	Low	62.5 - 62.5	75	Moderate/high	92
	Jun	40	Low/moderate	62.5 - 62.5	78	Moderate/high	7
	Jul	0	Low	62.5 - 62.5	88	High	59
	Aug	0	Low	62.5 - 62.5	79	Moderate/high	128
	Sep	0	Low	62.5 - 62.5	87	High	107
Nyctalus sp.	May	0	Low	37 - 68	56	Moderate	8
	Jul	0	Low	44.5 - 71	85	High	63

¹⁹ Confidence Interval (CI)

Species	Month	Median Percentile	Activity Level	95% Cis ¹⁹	Max Percentile	Activity Level	Nights recorded
	Aug	37	Low	44.5 - 71	74	Moderate/high	126
	Sep	0	Low	44.5 - 71	71	Moderate/high	57
<i>Pipistrellus</i> sp.	May	87	High	91.5 - 95.5	100	High	61
	Jun	98	High	91.5 - 95.5	100	High	6
	Jul	85	High	91.5 - 95.5	99	High	33
	Aug	89	High	91.5 - 95.5	100	High	145
	Sep	86	High	91.5 - 95.5	100	High	114
Nathusius' pipistrelle	Jul	51	Moderate	61.5 - 76.5	87	High	33
	Aug	0	Low	76.5 - 76.5	99	High	89
	Sep	37	Low/moderate	76.5 - 76.5	93	High	79
Common pipistrelle	May	56	Moderate	78.5 - 87.5	100	High	159
	Jun	91	High	78.5 - 87.5	100	High	10
	Jul	58	Moderate	78.5 - 87.5	98	High	131
	Aug	74	Moderate/high	78.5 - 87.5	100	High	202
	Sep	74	Moderate/high	78.5 - 87.5	100	High	151
Soprano pipistrelle	Apr	0	Low	71 - 80	0	Low	1
	May	0	Low	81 - 93.5	96	High	142
	Jun	80	High	81 - 93.5	97	High	11
	Jul	37	Low/moderate	81 - 93.5	98	High	102
	Aug	71	Moderate/high	81 - 93.5	100	High	195
	Sep	64	Moderate/high	81 - 93.5	99	High	153
Brown long-eared	May	0	Low	37 - 48	56	Moderate	19
	Jun	0	Low	0 - 0	0	Low	4
	Jul	0	Low	0 - 0	37	Low/moderate	8
	Aug	0	Low	37 - 48	37	Low/moderate	69
	Sep	0	Low	37 - 48	37	Low/moderate	47

Table 7.10 Summary table showing metrics for each species within each month

71. The automated detectors recorded bat passes at all detector locations at varying levels. Out of the species recorded on site *Pipistrellus* sp. (including common, soprano and Nathusius' pipistrelle) and *Nyctalus* sp. (Leisler's and noctule) fall into the high risk of turbine impact category (SNH, 2019).
72. Common pipistrelle had the highest level of bat activity across all seasons accounting for 57.7% of all the bat passes. Locations SMM04, SMM09, SMM10 all recorded bat passes at times that would indicate roosts nearby for both common and soprano pipistrelle. SMM10 is closest to the nearest possible roosting location which is a set of buildings around 425m south of the detector location. SMM04 and SMM09 have no known roosting locations or any known suitable roosting features nearby.
73. As per the **Appendix 7.5** the overall assessment of potential risk of the Site for high collision risk bat populations is medium.

7.5.6 Predicted Future Baseline

74. No changes, such as other developments, are anticipated between the time of producing this report and the anticipated commencement of construction (planned for 2022) and operation duration of the Proposed Development (operation planned to start 2023). The Site is managed as a commercial forest by FLS and there is

no anticipated change in this management. Forestry felling and replanting will continue as per the current Forest Plan. Climate change is predicted to result in an increased frequency of storm events and associated flooding, whilst there expected to be a shift towards (average) drier and warmer summers and milder and wetter winters. Climate change may therefore lead to changes in the structure and functioning of habitats within the Site, although any such changes are not expected to significantly alter the importance of the ecological features that make up the current baseline.

7.5.7 Design Layout Considerations - Embedded Mitigation

75. Detailed constraints advice was provided during the iterative layout design process for the turbines and associated infrastructure features (discussed further in **Chapter 3: Site Selection and Design**). At various stages during the design stage, desk studies and fieldwork were undertaken to provide feedback to the design team. This approach identified site constraints in order to minimise a number of potential effects as follows:

- The construction compound utilises an existing area of hard-standing, and access tracks have utilised existing windfarm and forestry tracks as much as possible to minimise the footprint of the Proposed Development. The main site access would utilise the existing access from the A701 to the operational Harestanes Windfarm, thus minimising the amount of new track required.
- The control building has been located on land which avoids sensitive habitats areas and deep peat.
- The internal site grid connection cables would run alongside new and existing tracks within the Site from each turbine directly to the operational Harestanes Windfarm substation.
- A 50m buffer zone has been applied around all watercourses which traverse the Site. These buffers were used to ensure that turbines and infrastructure, other than tracks, were not located in close proximity to hydrological features. This reduces the risk of run off and water pollution into existing watercourses.
- Watercourse and ditch crossings have been avoided in the design of the access track layout as far as possible. Where access necessitates watercourse crossings, construction features have been limited and utilised existing watercourse crossings as far as possible. For example, the access to Turbine 1 was moved to avoid a new watercourse crossing of the Clachanbirnie Burn.
- This approach has resulted in ten watercourse crossing locations, all of which are upgrades to existing crossings, mapped on OS 1:50,000 scale map and therefore subject to the Controlled Activities Regulations (further discussed in **Chapter 6: Hydrology, Hydrogeology, Geology and Soils**).
- Where watercourses are crossed, clear-span bridges are the preferred solution to minimise ecological effects and allow safe passage of otters, fish, water voles. Where culverts are required, they have been designed to be as short as possible and allow as much light penetration as possible at the culvert inlets and outlets to encourage use by fish and otters.
- All crossings of watercourses which have been confirmed to support fish (or potentially support fish) will be designed to ensure the free movement of fish past them (WC in brackets relates to reference numbers within **Chapter 6: Hydrology, Hydrogeology, Geology and Soils**), i.e. Kilyminshaw Burn, Deer Burn (WC10), Rough Cleugh (WC05), Clachanbirnie Burn (WC06) and Yellowtree Grain (WC07), in accordance with 'River crossings & migratory fish: Design guidance' (Scottish Executive, 2012). Where provision is required for fish, the priority is that natural channel substrate is retained, which may be accomplished using depressed invert culverts.
- Built structures and boundary features (such as the remnant wall noted as TN38 on **Figure 7.3 Protected Species Survey Areas and Results**) would be retained where possible. These features contain crevices and provide habitat for invertebrates, reptiles, pine marten, amphibians and plants.
- Operational lighting would be limited to aircraft warning thus minimising light-related impacts on nocturnal or crepuscular species such as, bats, badgers and otters.
- Turbine 7 was moved to avoid a potential bat roost site and Turbine 5 was moved to improve its position in relation to mire habitat.
- Turbines have been 'keyholed' into the existing forestry where feasible, so that only the trees required for the infrastructure and its associated buffer zones would be cleared.
- Turbine locations avoid areas of deeper peat (typically greater than 1.5m) generally associated with ecological important bog habitat.
- In order to be able to address any localised environmental sensitivities, a 50m micro-siting allowance is proposed around windfarm infrastructure.

7.5.8 Scoped-Out Ecological Features

76. Taking into account the baseline data and design layout considerations, and using both professional judgement and available guidance, a number of ecological features can be scoped out of the impact assessment. The following sections detail the ecological features scoped out of further consideration.

7.5.8.1 Designated Sites and Ancient Woodland

77. GSABR: Habitats and species documented within the GSABR Natural Heritage Management Plan (GSAB, 2018) have been considered; the Proposed Development is not considered to compromise the integrity of the Biosphere Reserve. The Proposed Development is considered to complement the Development function of this non-statutory designated site and with the edge of the transition zone being over 3.2km from the Site, the Proposed Development is not considered to have potentially significant effects on this designation, and it is therefore scoped out of further consideration.
78. Ancient Woodland Inventory: Un-named woodland 1: This woodland is within the south-western section of the Site; located 256m south east of a proposed crane pad (the nearest infrastructure element). Although Un-named woodland 1 overlaps with the Site, it is not anticipated that any indirect surface water or airborne impacts would cause potentially significant effects over a distance of 256m¹¹. Un-named woodland 1 is therefore scoped out of further assessment.
79. Ancient Woodland Inventory: Un-named woodland 2: This woodland is within the south of the Site 55m to the east of the main access from the A701. It is not anticipated that any indirect surface water or airborne impacts would cause potentially significant effects over this distance considering the very localised nature of any access track widening activities. Un-named woodland 2 is therefore scoped out of further assessment.
80. Ancient Woodland Inventory: Black Cleuch woodland: This woodland is located along the Black Cleuch, 360m south of proposed borrow pit near Turbine 2. It is not anticipated that any indirect surface water or airborne impacts would cause potentially significant effects on Black Cleuch woodland over a distance of 360m. Black Cleuch woodland is therefore scoped out of further assessment.

7.5.8.2 Terrestrial Habitats

81. Coniferous plantation and felled plantation: Mature coniferous plantation can provide foraging resource and shelter for protected and notable fauna (e.g. pine marten, red squirrel, badger) but is of little intrinsic ecological importance. Felled plantation areas provide open habitat for protected and notable fauna (e.g. pine marten, reptiles) and in many areas on Site, succession towards grassy heath or neutral damp and tall herb vegetation is apparent. Both standing coniferous plantation and felled plantation are considered to be Site importance and are therefore scoped out of further assessment.
82. Broadleaved plantation: Broadleaved plantation at the Site occurs by a quarry adjacent to borrow pit search area BP01 and in the north of the Site in openings amongst coniferous plantation. All plantations were immature at the time of survey; tree guards were visible. Species appear to be native, including birch and rowan. Broadleaved plantation is considered to be Site importance, as it lacks clear affiliations with Annex 1, SBL or DGLBAP habitats and is therefore scoped out of further assessment.
83. W7 woodland: Larger components of this community at the Site extend through riparian valleys, in mosaic with and generally presenting an understory of M23 rush pasture. Other examples occur in clearings of forestry rides. Willow generally dominates; other species can include birch, rowan, alder, and hazel. This community is also mapped along existing tracks but reflects more of a scrubby woodland in these instances. W7 is affiliated with SBL habitat: lowland mixed deciduous woodland and DGLBAP: native wet woods. This habitat is under the Proposed Development footprint; however, this mainly relates to cut and fill upgrades to existing tracks and woodlands here are relatively scrubby rather than a distinct canopy of woodland and established understory.
84. In view of design layout considerations reducing the amount of native woodlands be directly affected, utilising existing tracks where possible, and the application of standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in **Section 7.6.2**), the potential for indirect airborne and hydrology derived

construction effects have been managed. In addition, standard construction phase measures of demarcating sensitive habitats would further reduce any risk of accidental impingement towards this site. W7 is therefore scoped out of further assessment.

85. Underscrub: W24 is mapped on Site within a mosaic with M23 rush pasture, W7 woodland and coniferous plantation and is typified by dense bramble. W25 on Site comprises dense bramble and bracken scrub. W24 and W25 are considered to be Site importance, as they lack clear affiliations with Annex 1, SBL or DGLBAP habitats and are therefore scoped out of further assessment.
86. Acid grasslands: U4 on site is a typical example with no particular species/ assemblage of conservation interest. It occurs elsewhere at Site in a mosaic with U6. The area that will be lost to the Proposed Development is localised to a linear strip on sloping ground surrounded by felled plantation (i.e. previous forestry ride), by Turbine 3 and relatively infrequently, amongst semi-natural mosaics through valleys and trackside. U6 reflects an acidic grassland/ heath-type vegetation which occurs in mosaic with M6 fen through a forestry ride surrounded by felled plantation south of Turbine 4; and a forestry ride south of Turbine 2. U4 and U6 overlap with DGLBAP: Acid Grasslands Priority Habitat but are modified, less notable examples, owing to the influence from the prevailing land use and its fragmented nature on Site. U4 and U6 are considered to be Site importance, they lack nature conservation interest, apart from some affiliation with the DBLBAP Priority Habitat, and are therefore scoped out of further assessment.
87. Marshy grasslands: MG9 and MG10 represent areas of damp neutral grassland of low conservation interest which occur frequently at the Site. MG9 and MG10 overlap with DGLBAP: Neutral Grasslands Priority Habitat but are modified, less notable examples, owing to the influence from the prevailing land use and its fragmented nature on Site. U4 and U6 are considered to be Site importance, they lack nature conservation interest, apart from some affiliation with the DBLBAP Priority Habitat, and are therefore scoped out of further assessment.
88. M23 is a rush-dominated community that occurs regularly at the Site; both sub-communities (M23a and M23b) were recorded. M23 is considered 'wide-spread through the west of Britain from Devon and Cornwall to Skye and Caithness' (Elkington *et al.* 2001). There are no species of conservation interest associated with this widespread habitat, however, rush pasture, in particular M23a sub-community, adds structural diversity, provides resources for nesting birds and invertebrates (Averis *et al.*, 2004). It is affiliated with the SBL habitat: upland flushes, fens and swamps and DGLBAP habitat: fens. In view of its low intrinsic importance, it is considered to be of Site importance and is therefore scoped out of further assessment.
89. Tall herb and fern: U20 represents bracken-dominated grassland which occurs in riparian valley areas at the Site and along existing tracks. It is recognised as a community of low ecological value (Averis *et al.*, 2004). U20 is considered to be Site importance as it lacks clear affiliations with Annex 1, SBL or DGLBAP and is therefore scoped out of further assessment.
90. Mire: M5 is present within an area of bottle sedge and *Sphagnum* fen at a series of pools in the upper reaches of a valley over 100m north of Turbine 6 with mature coniferous plantation in between. Oligotrophic water-land interfaces with *Carex rostrata* are included in this habitat type. It aligns with Annex 1 habitat: 7140 Transition mires and quaking bogs. It is also affiliated with the SBL Habitat: upland flushes, fens and swamps and DGLBAP: marshes; fens. The M5 on Site is buffered by mature coniferous plantation, and 100m away from the nearest new infrastructure/ upgrade works and likely to be already influenced by forestry drainage. M5 is therefore scoped out of further assessment.
91. Fen/Flush: M6 *Sphagnum* fen, typically with protruding soft rush, occurs in the fringes of heaths and mires at Site and in forestry rides. The particular fen that would be lost to the footprint of the Proposed Development extends through a ride by Turbine 7. It is a typical example of M6c sub-community with *Sphagnum fallax*, soft rush, *Polytrichum commune*; these are species tolerant of disturbance and established in quick succession. It is affiliated with SBL habitat: upland flushes, fens and swamps and DGLBAP: fens, however, Elkington *et al.* (2002) describe it as 'is ubiquitous in the upland fringes of Britain' and as such is not considered notable. In view of the application of standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in Section 7.6.2),

the potential for significant construction effects on M6 have been managed. M6 is therefore scoped out of further assessment.

92. **Swamp:** S9 is a discrete area of emergent bottle sedge at a series of pools in the upper reaches of a valley north over 100m north of Turbine 6 with mature coniferous plantation in between. This community is species-rich and located within a sheltered area, offering optimal resource for invertebrates. It aligns with Annex 1 habitat: 7140 Transition mires and quaking bogs. Oligotrophic water-land interfaces with *Carex rostrata* are included in this habitat type. It is also affiliated with the SBL Habitat: upland flushes, fens and swamps and DGLBAP: marshes; fens. The community on Site is buffered from the Proposed Development by mature coniferous plantation and is over 100m from nearest element of the Proposed development.
93. A relatively small patch of S10 is adjacent to an existing track in the centre of the Site, dominated by water horsetail and surrounded by a wider area of marshy grassland now established in the bowl of a historic quarry. It is affiliated with SBL habitat: upland flushes, fens and swamps and DGLBAP: marshes. The community on Site is located adjacent to an existing track proposed for localised upgrades; however, no cut and fill/ reprofiling works are anticipated here.
94. In view of design layout considerations and the application of standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in **Section 7.6.2**), the potential for indirect airborne and hydrology derived construction effects on S9 and S10 have been managed. In addition, standard construction phase measures of demarcating sensitive habitats would further reduce any risk of accidental impingement towards this site. S9 and S10 are therefore scoped out of further assessment.
95. **Open habitats:** OV25 and OV27 are open vegetation communities dominated by undesirable species including common nettle and pioneering species such as rosebay willowherb which regularly occur throughout the Site. OV25 and OV27 are considered to be of Site importance as they lack clear affiliations with Annex 1, SBL or DGLBAP and are therefore scoped out of further assessment.

7.5.8.3 Running and Standing Water habitats

96. **Standing Water:** Standing water is a priority SBL habitat (Ponds) and a priority DGLBAP habitat (Forest Ponds). Minister's Moss is located 10m upstream of the Site and will therefore not receive any impacts from the Proposed Development. A pond that has infilled a borrow pit used during the construction of the operational Harestanes Windfarm, is located beside a track that is ear-marked for installation of cabling and smaller areas of standing water areas are also distributed throughout the Site; these are all heavily influenced by the surrounding land use. In view of the fact none of these waterbodies would be directly affected and with the application of standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in **Section 7.6.2**), the potential for construction effects has been managed. Standing water is therefore scoped out of further assessment.
97. **Running water:** Running water is a priority SBL habitat (Rivers) and a priority DGLBAP habitat (River Headwaters). Numerous watercourses are found within the Site and several of these would be crossed by or near to new tracks or tracks proposed to be widened or upgraded as well as in the vicinity of other proposed infrastructure, including turbines, borrow pits and cabling. The Deer Burn, Rough Cleugh, Clachanbirnie Burn, Yellowtree Grain and Killyminshaw Burn are all considered to provide suitable fish habitat, and all watercourse crossings would be in accordance with River Crossings & Migratory Fish: Design Guidance (Scottish Executive, 2012) to ensure fish access were preserved. With the exception of crossing points, a 50m buffer has been applied to safeguard the watercourses from indirect effects arising from the Proposed Development. In view of design layout considerations and the application of standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in **Section 7.6.2**), the potential for construction effects has been managed. Running water is therefore scoped out of further assessment.

7.5.8.4 Protected and Notable Species

98. **Brown trout:** Five watercourses were identified as having potential suitability to support populations of juvenile and adult salmonids within the Site: Glenkiln Burn – Upstream; Glenkiln Burn – Downstream; Rough Cleugh; Clachanbirnie Burn and Yellowtree Grain. Electrofishing surveys found a good density of brown trout parr were

present at the Rough Cleuch survey location. A poor density of trout fry were also present at this location. Poor densities of brown trout parr were found to be present at the Glenkiln Burn – Upstream and Glenkiln Burn – Downstream survey locations. No brown trout fry were caught during electrofishing surveys of Glenkiln Burn. It is possible this is a result of low water conductivity and of small fish not being effectively immobilised. Two of the sections of watercourses surveyed were found to contain no fish, these being Clachanbirnie Burn and Yellowtree Grain Burn.

99. Brown trout are listed as Priority Species on the SBL and are legally protected by the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Design layout considerations (including watercourse buffers and culvert design) ensure fish passage would be maintained. With the exception of crossing points, a 50m buffer has been applied to safeguard the watercourses from indirect effects arising from the Proposed Development. Standard best practice measures defined by SEPA and CIRIA (i.e. project assumptions set out in **Section 7.6.2**), would be applied and pre-construction and post-construction monitoring would be conducted, secured via a Fish Management Plan. Therefore, the potential for construction effects has been managed. Brown trout are therefore scoped out of further assessment.
100. **Amphibians:** Although the Site provides a mosaic of habitats with suitability to support amphibians including areas of standing water, riparian habitats and unmanaged surrounding terrestrial habitats, no amphibians were incidentally recorded during site surveys. Great crested newt surveys were not conducted due to the habitat present on the Site being predominantly coniferous woodland producing an acidic aquatic environment which is considered unsuitable to support the species. Extensive tracts of long-established and/or recently clear-felled coniferous plantation forestry are typically recognised as being unsuitable as a terrestrial-phase habitat for great crested newts (Langton et al., 2001). The Site is not located in an area of the species' known UK distribution (Baker et al. 2011). The Site is located in an 'unsuitable area' for supporting great crested newts (Amphibian and Reptile Groups of the United Kingdom (ARG UK) (2010). Only one record of great crested newts was identified in the desk study which was over 5km from the Site. It is therefore considered unlikely that the species will be present within the Site and this was supported through Scoping Opinion responses received.
101. Common amphibian species are likely to occur regularly within the suitable habitats found throughout the Site and are considered to enrich these resources at a Site level only. All amphibians native to Scotland (except great crested newt) receive limited protection under the Wildlife and Countryside Act 1981 (as amended), but only against trade (i.e. sale, barter, exchange, transport for sale, or advertise for sale or to buy). Common toad is an SBL species; other amphibians (except great crested newt) are not on the SBL. In view of the information presented above, amphibians are assessed as being Site importance and are therefore scoped out of further assessment.
102. **Reptiles:** Six records of common lizard were recorded throughout the Site in areas of clear fell, rides and immature plantation. Mosaics of habitats with suitability to support basking and foraging reptiles have been recorded throughout the Site (e.g. heath, scrub, and relatively unimproved grasslands). Several dry-stone walls bisecting the landscape and woodland edge habitats offer suitable reptile features for sheltering; including potential hibernacula. Adder is described as 'widespread and common' in Dumfries and Galloway; common lizard is described as 'common and widespread in suitable habitat' in south-western regions of mainland Scotland; and slow-worm distribution is described as 'patchy with concentrations in the south and west' (McInerney and Minting, 2016).
103. All reptiles native to Scotland are SBL species and receive limited protection under the Wildlife and Countryside Act 1981 (as amended), against intentional or reckless killing and injury and trade. Adder is a DGLBAP Priority Species. In view of design layout considerations and the application of standard best practice measures defined by NatureScot and secured within a Site Species Protection Plan (SPP), including pre-construction checks of stored materials, and hibernacula (i.e. project assumptions set out in **Section 7.6.2**), the potential for construction effects has been managed. Reptiles are therefore scoped out of further assessment.
104. **Badger:** No badger setts were recorded within the Site; however, evidence of badger presence was recorded outside the Site to the south and south east including signs of foraging and latrines. It is assumed the Site is within at least one badger clan's territory. In Scotland badgers can be found in almost any type of habitat but typically

setts are dug into sloping ground in dry ‘diggable’ soil frequently near the boundary of a wood (Scottish Badgers, 2018), therefore the dense close canopy plantation typical of the Site is not considered to be optimal for the species. In Scotland it is thought that there are between 20,000 to 25,000 animals ranging in varying densities from the North coast through to the border with England. Therefore, the species is not considered rare or with a restricted distribution. Badgers can quickly establish new outlier or subsidiary setts therefore there is the possibility of badger setts being constructed within the Site in the future.

105. The species’ Red List Status in Scotland is LC; the population, range and habitat are all stable (Mathews *et al.*, 2018). The species is legally protected though the Protection of Badgers Act 1992 (as amended); their level of legal protection has been derived from their persecution rather than nature conservation importance. In view of design layout considerations and the application of standard best practice measures (i.e. project assumptions set out in **Section 7.6.2**), defined by NatureScot (2020a) and secured within a Site SPP, including pre-construction checks for setts, checking of stored materials prior to use, providing a means of escape from excavations, the potential for construction effects has been managed. Badgers are therefore scoped out of further assessment.
106. Water Vole: The field survey found evidence of water vole including burrows, runs, latrines and feeding signs in the north east of the Site on the Glenkiln Burn (TN3-6, 90+m upstream of cable route crossing point over Glenkiln burn) and on tributary of Garrell Water (TN1, 100m north of T06), additionally a nest in rush was present on Auchencaigroch Burn with feeding evidence below (TN2, 5m north of existing construction compound / hardstanding). No evidence was recorded elsewhere on Site.
107. The species’ Red List Status in Scotland is LC; the population is increasing, range is declining, and habitat is stable (Mathews *et al.*, 2018). This species receives partial protection in Scotland under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) whereby burrows are protected but the species is not. Water vole is an SBL and DGLBAP Priority Species. Design layout considerations (including watercourse buffers) ensure no known burrows would be directly impacted. With the adoption of standard best practice measures (i.e. project assumptions set out in **Section 7.6.2**), defined by NatureScot (2020b) and secured within a Site SPP, including pre-construction checks for burrows, checking of stored materials prior to use, providing a means of escape from excavations, the potential for construction effects has been managed. Water voles are therefore scoped out of further assessment.
108. Otter: One holt (TN10, 260m south west of T03) and one potential holt (TN8, 200m north west of existing forestry track to be upgraded) were recorded on Glenkiln Burn as well as footprints on a run (TN9) and a spraint (TN11) recorded on a tributary. On Deer Burn, four spraints were recorded under the cable bridge and one under the track bridge (TN12). This appears to be a well-used location, however, no covered cavities suitable for holts was recorded, however above-ground resting site habitat was recorded on banks and boulders under bridges. A spraint was also recorded on Yellowtree Grain Burn in the north east of the Site (TN7). Three above-ground resting sites (hovers) were identified along the Garrel Burn to the south east of the Site (TN14, 15 and 16), all of which are located over 45m from the existing site access track off the A701 which is to be upgraded. In freshwaters, otters feed mainly on fish such as trout, salmon and eels. In the spring spawning frogs and toads become important prey. Mammals and birds are also taken occasionally. In freshwater habitats such as the Site, otters are largely (but not exclusively) nocturnal and occupy very large home ranges (around 32km for males and 20km for females (SNH, 2013). Only two of the watercourses which flow through the Site were recorded as supporting brown trout; the Glenkiln Burn (where holts were recorded; one confirmed and one potential) and Rough Cleugh. It is likely that the Site forms a relatively small proportion of an otter territory and given the relatively low level of activity and food availability within the Site, it is reasonable to assume it is not an integral part of the overall otter territory and otters using the Site would be relatively resilient to changes within it.
109. The species’ Red List Status in Scotland is VU; the population is increasing, range is increasing, and the habitat is stable (Mathews *et al.*, 2018). Since the 1990s, otters have been considered widespread throughout Scotland. The most recently reported national survey results (2011-12) (Findlay *et al.* 2015) recorded otter presence at approximately 80% of sampled sites (which included all 44 SACs designated for otter in Scotland and other random sites across the countryside); this is slightly decreased since the previous national survey in 2003-04 (Strachan, 2007) but could be due to factors affecting detectability such as weather. Otter is protected as a European Protected Species under the Habitats Regulations. Otter is also an SBL and DGLBAP Priority Species. Design layout

considerations (including watercourse buffers and culvert design) ensure no known holts would be directly affected. With the adoption of standard best practice measures (i.e. project assumptions set out in **Section 7.6.2**), defined by NatureScot (2020c) and secured within a Site SPP, including pre-construction checks for holts, checking of stored materials prior to use, providing a means of escape from excavations, the potential for construction effects has been managed. Otter are therefore scoped out of further assessment.

110. Brown hare: Incidental sightings of brown hare were recorded at TN44 (directly east of an access track to be upgraded) and TN45 (directly north of an existing area of hardstanding / proposed construction compound) and the Site provides a mosaic of habitats with suitability to support brown hare including areas along access routes, wayleaves and areas of clear fell. The species is thought to have been introduced into the UK in Roman times (or even earlier), but the species is now considered naturalised. It is most common in grassland habitats and at woodland edges, favouring a mosaic of arable fields, grasses and hedgerows. Accordingly, the Site habitats, dominated by coniferous plantation, are not considered optimal for the species. The species’ Red List Status in Scotland is NA; the population, range and habitat are stable (Mathews *et al.*, 2018). Brown hare is an SBL and DGLBAP Priority Species. The species is likely to occur in low numbers within the suitable habitats found throughout the Site and are a highly mobile species which enables them to move away from construction activities. In view of design layout considerations and the application of standard best practice measures secured within a Site SPP (i.e. project assumptions set out in **Section 7.6.2**) including pre- checking of stored materials prior to use, providing a means of escape from excavations, the potential for construction effects has been managed. Brown hare are therefore scoped out of further assessment.
111. Mountain hare: No evidence of mountain hare was recorded on Site. The species lives in upland areas and is most common on heathland, where it grazes on vegetation and the bark of young trees and bushes. Accordingly, the Site habitats, dominated by coniferous plantation, are not considered optimal for the species. The species’ Red List Status in Scotland is NT; the population is declining, range is stable, and habitat is declining (Mathews *et al.*, 2018). Mountain hare is an SBL and DGLBAP Priority Species. The species is likely to occur in very low numbers within the suitable habitats found throughout the Site; they are a highly mobile species which enables them to move away from construction activities. In view of design layout considerations and the application of standard best practice measures (i.e. project assumptions set out in **Section 7.6.2**), secured within a Site SPP, including pre- checking of stored materials prior to use, providing a means of escape from excavations, the potential for construction effects has been managed. Mountain hare are therefore scoped out of further assessment.

7.5.9 Scoped-In Ecological Features

112. The assessment of likely effects will be applied to those ‘scoped-in’ IEFs of local or above importance that are known to be within the EZol as confirmed though desk study, field survey and consultations outlined above). These are set out in **Table 7.11**.

IEF	Importance	Justification
Ancient Woodland Inventory: Un-named woodland 3: W10	Regional	This woodland (NVC community W10) is directly adjacent to the main access to the Site from the A701. It is listed as an ancient semi-natural woodland covering 2.14ha. The edge of the woodland, along the east of the access road, will be directly lost to widen the existing access and facilitate turbine delivery. The area lost is 0.43ha which is 20% of Un-named woodland 3. This woodland is classified as Regional as it is considered irreplaceable, listed on the Ancient Woodland Inventory.
Fen and flush: M9	Regional	This fen occurs occasionally amongst forestry rides and wet mire habitats; bottle sedge is abundant, and associates vary from bedstraw, forget-me-not, creeping buttercup, and marsh cinquefoil. The community is relatively distinct and scarce

IEF	Importance	Justification
		across the British uplands (Averis <i>et al.</i> , 2004). It is an Annex I habitat ²⁰ : 7140 Transition mires and quaking bogs. Oligotrophic water-land interfaces with <i>Carex rostrata</i> are included in this habitat type (Averis <i>et al.</i> , 2004). It is also an SBL Priority Habitat: upland flushes, fens and swamps and DGLBAP Priority Habitat: fens. It is located adjacent to new access track associated with Turbine 1; connected via surface water and potentially ground water. It is classified as Regional as it is an internationally important habitat which is degraded but considered able to be restored with substantial management.
Blanket bog: M19	Regional	Extents of M19 mapped near proposed turbines are relatively small and therefore unlikely to align with Annex 1 habitat: 7130 Blanket bogs (*if active); "active" meaning still supporting a significant area of vegetation that is normally peat forming. It is an SBL Priority Habitat: blanket bog and a DGLBAP Priority Habitat: blanket bogs. It is classified as Regional as it is an internationally important habitat which is degraded but considered able to be restored with substantial management.
Wet heath: M15	Regional	Areas of M15 reflect a typical composition of species including abundant tussocks of purple moor-grass, sporadic heather and bilberry shrubs, heath rush, tormentil, and cross-leaved heath. M15 is located under the footprint of the Proposed Development, alone and in mosaic with M6 fen or M19 blanket bog. This is contained in Annex I habitat: 4010 Northern Atlantic wet heaths with <i>Erica tetralix</i> and overlaps with Annex 1 habitat 7150 Depressions on peat substrates and Annex 1 habitat 7130 Blanket bog. Humid, peaty or semi-peaty heaths, other than blanket bogs, of the Atlantic and sub-Atlantic domains with <i>Erica tetralix</i> , and is also an SBL Priority Habitat. It is classified as Regional as it is an internationally important habitat which is degraded but considered able to be restored with substantial management.
Dry heath: H12	Regional	Dry heath occurs in dense stands frequently at the Site, generally fringing plantation woodland. It is located under the footprint alone and in mosaic with M23 rush pasture. Annex I habitat: 4030 European dry heaths; 31.21 – Sub-montane <i>Vaccinium</i> - <i>Calluna</i> heaths. Heaths rich in <i>Vaccinium</i> species, usually with <i>Calluna vulgaris</i> , of the northern and western British Isles. It is also an SBL Priority Habitat: upland heathland and DGLBAP Priority Habitat: upland heaths. It is classified as Regional as it is an internationally important habitat which is degraded but considered able to be restored with substantial management.
Dry heath: H21	Regional	This community is relatively distinct from other heaths at the Site by an abundance of <i>Sphagnum</i> carpeting a low cover of heather and bilberry shrubs. It fringes coniferous plantation and extends in clearings of forestry rides, specifically by the new access track to Turbine 1. It is an Annex I habitat: 4030 European dry heaths; 31.21 – Sub-montane <i>Vaccinium</i> - <i>Calluna</i> heaths. Heaths rich in <i>Vaccinium</i> species, usually with <i>Calluna vulgaris</i> , of the northern and western British Isles. It is also an SBL Priority Habitat: upland heathland and DGLBAP Priority Habitat: upland heaths. It is classified as Regional as it is an internationally important habitat which is degraded but considered able to be restored with substantial management.
Pine marten	Regional	Field signs indicate that pine marten are abundant throughout the Site with several areas having potential denning locations. Evidence of pine marten was concentrated along the wayleaves and access routes through the coniferous plantation. The species has a Mammal Society Red List Status in Scotland of LC. The population is increasing, the range is increasing, and the habitat is stable (Mathews <i>et al.</i> , 2018). The Mammal Society reports that here has been a continuous expansion in Scotland over the last 20 years, predicted to continue increasing (Mathews <i>et al.</i> , 2018). This species receives full protection under Schedule 5 of the Wildlife and Countryside Act

²⁰ Correspondences between NVC communities and Annex 1 habitats have been informed by Averis *et al.*, 2004 and JNCC' Spreadsheet of habitat Correspondences(2008) <https://hub.jncc.gov.uk/assets/9e70531b-5467-4136-88f6-3b3dd905b56d> [accessed 08/10/2020]

IEF	Importance	Justification
		1981 (as amended); and certain methods of killing or taking pine martens are illegal under the Habitats Regulations. Pine marten is also an SBL Priority Species but not a DGLBAP Priority Species. This species has been valued at a Regional level due to the factors stated above and in recognition of the importance of the Forest of Ae to the conservation of the species in a regional (Scotland) context.
Red squirrel	Regional	The red squirrel habitat suitability assessment showed moderate to high suitability across a large portion of the Site; potential squirrel foraging field signs were recorded but no dreys were recorded. The locality is recognised as being of importance for red squirrel, supported by the historic RSPW designation. Scotland supports an estimated 75% of the UK red squirrel population ²¹ . SWSEIC states that red squirrel is widespread throughout Dumfries and Galloway and the region is thought to hold up to 20% of the Scottish population ²² . Red squirrel has a Mammal Society Red List Status in Scotland of NT. The population is stable; range is in decline and the habitat is stable (Mathews <i>et al.</i> , 2018). Red squirrels and their dreys (resting places) receive full protection under Schedules 5 and 6 of the Wildlife and Countryside Act 1981 (as amended) and they are an SBL and DGLBAP Priority Species. This species has been valued at a Regional level due to the factors stated above and in recognition of the importance of the Forest of Ae to the conservation of the species in a regional (Scotland) context.
Bat species	Regional	All bat species in the UK are afforded full statutory protection as European protected species listed on Schedule 2 of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended), which transpose the European Community Habitats Directive (92/43/EEC) into Scottish Law. With reference to those species identified within the Site; Soprano and common pipistrelle bats, brown long-eared bat, Daubenton's <i>Myotis daubentonii</i> and Natterer's bat <i>Myotis nattereri</i> Red List Status is considered to be LC. Nathusius' pipistrelle, whiskered, Brandt's <i>Myotis brandtii</i> and <i>Nyctalus</i> bats are considered DD and are known to be present within the Dumfries and Galloway area.

Table 7.11: Scoped-In IEFs

7.6 Potential Effects

7.6.1 Introduction

113. The following sections provide an assessment of the likely effects of the Proposed Development on the scoped-in IEFs. This assessment is based on the Proposed Development described in **Chapter 4: Development Description** and covers construction, operational and cumulative effects.

7.6.2 Project Assumptions - Embedded Mitigation

114. In conducting the assessment, in addition to the project design considerations set out in **Section 7.5.7**, the following embedded project assumptions have been made:

- Construction Environmental Management Plan (CEMP):** A CEMP would be produced and implemented by the Principal Contractor building upon the outline principles set out in **Appendix 4.1 Outline Construction Environmental Management Plan**. The CEMP and associated documents would be subject to written approval from NatureScot, Dumfries and Galloway Council and SEPA.
- Environmental Clerk of Works (ECOW):** A suitably qualified experienced Environmental Clerk of Works would be appointed by the Principal Contractor prior to and for the duration of the construction period. The Applicant's ECOW will observe that the Contractors ECOW/s are suitably qualified to undertake their role and

²¹ <https://forestry.gov.scot/forests-environment/biodiversity/conserving-scotlands-red-squirrels> [accessed 27/09/2020]

²² <https://swseic.org.uk/what-to-see/dumfries-galloway/species/terrestrial-mammals/> [accessed 27/09/2020]

would audit the contractual obligations with regards to the environmental safeguarding and mitigation requirements. Tool Box Talks would be delivered to all construction staff by the Principal Contractor's ECoW. The ECoW would be qualified and experienced with regard to environmental and ecological construction issues and ideally be an AECOW²³ member (or equivalent).

- **General Construction Measures:** Construction compounds and on-site working areas would be sited away from ancient woodlands, fen, bog and mire habitat, running and standing water; to minimise the risk of polluted run-off/ waste water or chemicals entering these habitats and dust deposition. Appropriate signage will be used to clearly identify these areas to avoid accidental encroachment. Construction methods will follow relevant best environmental practice to eliminate or reduce the potential for adverse effects on the water environment through a Pollution Prevention Plan (PPP). Construction will comply with the best practice construction methodologies outlined by SEPA in 'Engineering in the Water Environment Good Practice Guide: temporary construction methods' (SEPA, 2009) and in CIRIA, 2015. The PPP will include water protection measures specified in **Chapter 6: Hydrology, Hydrogeology, Geology and Soils**. These include implementation of pollution prevention measures, dust control, and buffer zones around sensitive features; use of check dams, silt fencing etc.
- **Working hours:** These will be agreed by the appointed Principal Contractor, the Applicant and Dumfries and Galloway Council prior to works commencing. However, standard construction working hours are assumed to be Monday to Friday 07:00 to 19:00 and weekends 07:00 to 16:00; or as agreed with the Dumfries and Galloway Council's Environmental Health Officer, reducing the level of disturbance to nocturnal and crepuscular species, such as badgers, bats and otters.
- **Air Quality Management and Dust Deposition:** Measures for the control of air quality and emissions (including dust management measures) will be included within the CEMP and will include protection measures specified in **Appendix: 4.1 Outline Construction Environmental Management Plan**.
- **Noise and Vibration Management:** Measures for the control of noise and vibration will be included within the CEMP to manage noise and vibration impacts on sensitive ecological features. This will include selection of appropriate quiet plant to reduce noise emissions; noisy plant will be kept as far away as possible from any sensitive features recorded during pre-construction surveys (i.e. bat roosts, badger setts, bird nesting areas, brown trout spawning habitat, as directed by the ECoW).
- **Site Species SPP:** A Site Species SPP will cover the following species/species groups as a minimum: fish, herpetofauna (amphibians and reptiles), bats, birds, badger, otter, pine marten, red squirrel. Pre-construction surveys will be conducted according to standard guidance. Pre-construction surveys include densely forested areas (e.g. thicket stage) that were inaccessible in the surveys reported herein, due to close nature of planting; if these are inaccessible for pre-construction survey, an ECoW will directly supervise all felling within these inaccessible areas. Pre-construction surveys will be conducted by suitably qualified and licensed ecologists. The results will be interpreted and used to provide the specifics within the SPP. Requirements for buffer zones will be identified within the SPP (complying with legal and guidance requirements) and will be enforced on Site by the ECoW and informed to the workforce via Tool Box Talks and appropriate fencing and signage. Where it is identified that construction works will result in the loss of trees with bat roosting features, badger setts, red squirrel dreys, pine marten dens, otter holts, water vole burrows etc; these will be excluded according to the terms of any derogation licenses. The SPP will also specify measures to be put in place to ensure works will minimise the risk of disturbance, killing, or injuring of species, such as: avoiding working at night where possible to minimise disturbance to nocturnal / crepuscular species; pre-checking of stored materials prior to use; covering and capping excavations or pipes when not in use; providing a means of escape from excavations; direction of site lighting away from sensitive features for protected species; site speed limit of no greater than 15mph.
- **Bat section of the SPP:** Pre-construction bat surveys will be conducted by licensed bat specialists for any trees to be affected by the development and results will be interpreted and used to update the specifics within the Site SPP. Licensing requirements will be included within the Site SPP. If evidence of a bat roost(s), or a roosting bat(s) is identified, a NatureScot derogation licence will be secured in advance of felling the tree(s). Conditions of any such licence may include the provision of compensatory roost features prior to felling the tree. Opportunities for re-use of PRFs after tree-felling will be explored and implemented where possible by attaching to neighbouring trees. Where trees identified as suitable for roosting bats are to be retained, suitable buffer zones will be established around such features during construction where works are not to

take place to avoid disturbance to any bats roosts. These will be a minimum of 30m, increasing to 100m for pile driving works.

- **Fish / aquatic ecology section of the SPP:** This would include for timing of instream construction works within watercourses confirmed to support fish (or potentially support fish), i.e. Deer Burn, Blenoch Burn, Glenkiln Burn, Rough Cleugh, Clachanbirnie Burn, Yellowtree Grain, Castletrough Burn, Killyminshaw Burn and Garrel Water, to be planned to avoid the sensitive lifecycle stages of the fish present, i.e. to avoid November to April inclusive (brown trout spawning takes place between November and January with eggs likely to remain in April). The Aquatic Ecology SPP will address sensitivity (including to noise and vibration) of those fish species present (brown trout) and ensure that appropriate construction methods will be implemented to minimise and avoid disturbance or avoidance behaviour during critical life stages. Should any part of a watercourse containing fish need to be impounded during the works, a fish translocation would be carried out to remove fish from the impoundment. Fish translocation operations require authorisation from Marine Scotland, ADSFB and the relevant landowner, therefore, such operations would be planned well in advance. In order to help maintain baseline fish populations a Fish Monitoring Programme will be implemented that compares changes in densities pre-construction, during construction and post-wind farm construction with the baseline.
- **Herpetofauna section of the SPP:** Reptiles are active during the warmer months and hibernate in winter, often in the sheltered crevices of rubble piles. The greatest potential for injury or killing is during the winter hibernation period when they would be unable to move safely away from construction machinery if resting within dense clumps of vegetation, upturned tree roots, stone walls or construction materials. The herpetofauna section of the SPP will set out measures to reduce potential for injury or killing where appropriate. For example, the ECoW will check existing piles of spoil (brush, logs or rocks) for resting/hibernating reptiles prior to clearance and any excavations which are left open overnight will be inspected for reptiles prior to in-filling, if dug during the reptiles' active period (generally accepted as being late March until the end of October). Any reptiles found will be removed and placed in suitable reptile habitat away from the Proposed Development.
- **Outline Habitat Management Plan:** An Outline Habitat Management Plan (OHMP) has been included as **Appendix 7.7**. A detailed HMP will be prepared, building upon the outline principles set out in the OHMP, detailing areas of habitat creation/restoration, management, and monitoring required as part of the Proposed Development, in consultation with NatureScot and other key consultees.

7.6.3 Potential Construction Effects

115. This section provides the assessment of likely construction effects of the Proposed Development on the scoped-in IEFs, assuming the adoption of design layout considerations and project assumptions.

7.6.3.1 Ancient Woodland

116. **Impact:** Direct loss of ancient semi-natural woodland associated with Un-named woodland 3, as a result of essential widening of the main access from the A701 road to facilitate turbine delivery; identified through swept-path analysis. Un-named woodland 3 covers 2.14ha and comprises a canopy of oak and beech. It is estimated that 0.43ha will be directly removed, equating to approximately 20% of the woodland. The direct loss will be limited to the edge of this woodland. This area of tree loss includes a 10m buffer from the area where there will be direct losses to include for indirect effects during construction, for example, via hydrological or airborne pathways or effects to tree roots.
117. **Importance:** As stated in Table 7.11, Un-named woodland 3 is assessed of Regional importance. It is assessed as being in Good Condition according to FEP criteria further supporting the assessed Regional level of importance.
118. **Magnitude:** It is estimated that 0.43ha will be directly removed, equating to approximately 20% of the woodland. When considering direct effects, the impact within the Regional context is considered to be low, adverse, long-term and permanent.

²³ AECOW is the qualifying body for Environmental Clerks of Works (ECoW). AECOW has been developed to raise professional standards amongst those providing ECoW services.

119. Project assumptions relating to the protection of ancient woodland from indirect effects include signage to identify the sensitive areas and guidance of an experienced ECoW. When considering indirect effects, the impact within the Regional context is considered to be adverse, negligible and short-term.

120. **Significance of Effect:** The level of direct effects would be at a Regional level and therefore **significant**.

121. The level of indirect effects would be at a Site level. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.2 Habitats

122. In order to provide wider contextual data regarding IEF habitat loss, all terrestrial habitats that are located under the footprint of the Proposed Development are presented in **Table 7.12**. These measurements do not include areas to be felled/removed adjacent to the cable route since these areas will primarily be coniferous plantation of Site importance and other degraded habitats of Site importance, having already been influenced by the existing access track. Key-hole areas are also excluded since the effects would be on coniferous plantation of Site importance only.

Habitat	Area (ha) Lost to Proposed Development					Relative to Site and Proposed Development		
	Access Track (Cut & Fill)	Borrow Pits	Control Building	Crane Pad (Cut & Fill)	Met Mast (Cut & Fill)	Total area loss (ha)	Total area mapped at Site (ha)	% loss relative to Proposed Development
CP	3.39	7.60	0.00	4.27	0.10	15.35	538.42	79.86
FP	1.02	0.00	0.06	1.12	0.00	2.20	157.40	11.45
W7	0.10	0.00	0.00	0.00	0.00	0.10	6.61	0.52
W10	0.43	0.00	0.00	0.00	0.00	0.43	2.14	2.24
M15	0.00	0.00	0.00	0.00	0.00	0.00	3.68	0.00
M15/M19	0.12	0.00	0.00	0.00	0.00	0.12	2.80	0.62
M15/M6	0.01	0.00	0.00	0.00	0.00	0.01	0.29	0.05
H21	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00
H12	0.00	0.10	0.00	0.03	0.00	0.13	6.20	0.68
H12/M23a	0.01	0.00	0.00	0.00	0.00	0.01	0.87	0.05
M23	0.08	0.04	0.00	0.06	0.00	0.18	17.17	0.94
M23/CP/W24/W7	0.13	0.00	0.00	0.00	0.00	0.13	0.96	0.68
M23/U20/M15/W7	0.02	0.00	0.00	0.00	0.00	0.02	2.21	0.10
M23/MG9	0.16	0.00	0.00	0.00	0.00	0.16	3.21	0.83

Habitat	Area (ha) Lost to Proposed Development					Relative to Site and Proposed Development		
	Access Track (Cut & Fill)	Borrow Pits	Control Building	Crane Pad (Cut & Fill)	Met Mast (Cut & Fill)	Total area loss (ha)	Total area mapped at Site (ha)	% loss relative to Proposed Development
M23/MG10	0.01	0.00	0.00	0.11	0.00	0.12	2.87	0.62
MG9	0.00	0.13	0.00	0.00	0.00	0.13	2.44	0.68
MG10	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00
U4	0.01	0.00	0.00	0.12	0.00	0.13	1.30	0.68
Total						19.22	749.52	100

Table 7.12: Terrestrial Habitats Lost to Proposed Development Footprint

7.6.3.2.1 Fen and Flush

123. **Impact:** Effects on M9 during construction would involve indirect habitat degradation within proximity to construction areas, rather than direct loss. The habitat is located close to the new access track associated with Turbine 1; connected via surface water and potentially ground water.

124. **Importance:** As stated in **Table 7.11**, M9 is assessed to be of Regional importance, owing to its affiliation with Annex 1, SBL and DGLBAP Priorities. In the UK, the range of Annex 1 H7140 - Transition mires and quaking bogs is favourable, area is unknown, specific structures and functions is unfavourable, future prospects is unfavourable and the overall trend on conservation status is stable (JNCC, 2019a).

125. **Magnitude:** In Scotland the area assessed as being in good condition is 1,400ha. The short-term trend in favourable extent is 'stable' (JNCC, 2019b). There is no direct loss of M9 proposed; however, indirect effects may be encountered, due to localised de-watering and associated drying of M9 in proximity to construction activities.

126. Project assumptions relating to the protection of M9 including drainage control, signage to identify fen and flush habitats, the guidance of an experienced ECoW. When considering indirect effects, the impact within the Regional context is considered to be adverse, low and long-term.

127. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.2.2 Blanket bog

128. **Impact:** Effects on M19 during construction would involve habitat loss through de-vegetation and removal of areas to accommodate access tracks (i.e. cut and fill). Indirect degradation and drying effects would also potentially affect M19 within 10m of construction areas. The only areas of M19 to be affected are in a mosaic with M15; with M15 being the dominant community.

129. **Importance:** As stated in **Table 7.11**, blanket bog:M19 is assessed of Regional importance, owing to its affiliation with Annex 1, SBL and DGLBAP Priorities. In the UK, the range of Annex 1 H7130 - Blanket bogs is favourable, area is unfavourable, specific structures and functions is unfavourable, future prospects is unfavourable and the overall trend on conservation status is stable (JNCC, 2019c).

130. **Magnitude:** In Scotland the area assessed as being in good condition was 21300ha and the area where condition was unknown was a maximum of 1542500ha. The overall trend in favourable extent was reported as 'stable'. (JNCC, 2019d). Direct loss of blanket bog (within an M15-dominated mosaic) is 0.12ha which is an over estimate due to inclusion of mosaic and potential double counting, as this habitat loss is also covered with M15 in the following section. Some indirect effects outside of this area will also be encountered due to drying (approximately 0.15ha based on an assumption of drying effects to a maximum 10m radius, although again this will be an over-estimate due to the community's presence within mosaic communities). This is a very small area in the context of the habitat elsewhere in Scotland.

131. Project assumptions relating to the protection of M19 including drainage control, signage to identify M19 areas, the guidance of an experienced ECoW. When considering direct and indirect effects, the impact within the Regional context is considered to be adverse, low and long-term.

132. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.2.3 Wet heath

133. **Impact:** Effects on M15 during construction would involve habitat loss through de-vegetation and removal of areas to accommodate access tracks (i.e. cut and fill). Indirect degradation and drying effects would also potentially affect M15 within 10m of construction areas.

134. **Importance:** As stated in **Table 7.11**, wet heath:M15 is assessed as being of Regional importance, owing to its affiliation with Annex 1, SBL and DGLBAP Priorities. In the UK, the range of Annex 1 H4010 - Northern Atlantic wet heaths with *Erica tetralix* is favourable, area is unfavourable, specific structures and functions is unfavourable, future prospects is unfavourable and the overall trend on conservation status is deteriorating (JNCC, 2019e).

135. **Magnitude:** In Scotland the area assessed as being in good condition was 6,300ha and the area where condition was unknown was a maximum of 332,400ha. The overall trend in favourable extent was reported as 'declining'. (JNCC, 2019f). Direct loss of wet heath (including M15 within mosaics) under the Proposed Development Footprint is 0.15ha which is an over-estimate due to inclusion of mosaics. Some indirect effects outside of this area will also be encountered due to drying (approximately 0.34ha, although again this will be a significant over-estimate due to the community's prevalence within mosaic communities). This is a very small area in the context of the habitat elsewhere in Scotland.

136. Project assumptions relating to the protection of M15 including drainage control, signage to identify M15 areas, the guidance of an experienced ECoW. When considering direct and indirect effects, the impact within the Regional context is considered to be adverse, low and long-term.

137. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of this effect is below Local it is deemed to have **no significant effect**.

7.6.3.2.4 Dry heath

138. **Impact:** Effects during construction would involve habitat loss through de-vegetation and removal of H12 and H21 areas to accommodate access tracks (i.e. H21 due to cut and fill) and borrow pit and crane pads (H12). The area lost to borrow pits is likely to be substantially lower than reported herein, since the area represents a 'borrow pit search area' rather than the exact locality. Indirect degradation and drying effects are not anticipated to affect dry heath.

139. **Importance:** As stated in **Table 7.11**, H12 and H21 are assessed as Regional importance, owing to its affiliation with Annex 1, SBL and DBLBAP Priorities. In the UK, the range of Annex 1 H4030 - European dry heaths is favourable, area is favourable, specific structures and functions is unfavourable, future prospects is unfavourable and the overall trend on conservation status is improving (JNCC, 2019g).

140. **Magnitude:** In Scotland the area assessed as being in good condition was 9200ha and the area where condition was unknown was a maximum of 428,900ha. The overall trend in favourable extent was reported as 'stable'. (JNCC, 2019h). Direct loss of wet heath (H12 and H21 combined) is 0.14ha which is an over estimate due to inclusion of the borrow pit search area described above.

141. Project assumptions relating to the protection of dry heath include signage to identify dry heath areas, the guidance of an experienced ECoW. When considering direct effects, the impact within the Regional context is considered to be adverse, low and long-term.

142. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.3 Species

7.6.3.3.1 Red Squirrel

143. **Impact:** Construction activity including vehicle movement, vegetation clearance, and storage of construction materials, could result in injury or mortality of individuals from destruction of unidentified dreys, collisions or entrapment in uncovered holes, pipes or machinery.

144. Noise, vibration and light spill associated with construction activities could result in the temporary disturbance or displacement of red squirrel, leading to avoidance of key foraging, commuting or dreys or regularly used feeding station sites. Temporary effects arising during construction include disturbance through site clearance, pile driving, excavation works and widening/construction of new access routes (including the removal of trees along existing access routes). On-site lighting and noise (from explosions used to excavate borrow pits) may also result in the disturbance of red squirrel continuing to forage in habitats surrounding the Site.

145. Loss of suitable red squirrel habitat to accommodate the Proposed Development could result in fragmentation through temporary loss of functional habitat. A temporary habitat loss will result from the installation of turbines, crane pads and widening/installation of existing/new access routes within the forested areas of the Site. These construction activities have the potential to temporarily displace red squirrels from optimal habitat (for feeding, drey-building) to sub-optimal or unsuitable areas.

146. **Importance:** The habitat suitability assessment showed moderate to high suitability across a large portion of the Site. However, some areas were negligible or low suitability where trees were too immature, or the area had been clear-felled. Potential squirrel foraging field signs were recorded which included piles of chewed cones. No sightings were made and no dreys recorded. As stated in **Table 7.11**, red squirrel are assessed to be of Regional importance, owing to affiliation with SBL and DGLBAP Priorities and the importance of the Forest of Ae to red squirrel conservation in Scotland.

147. **Magnitude:** The Red List for British Mammals (Mammal Society, 2020) cites the central population estimate as 239,000 individuals in Scotland (95% confident limit range is 181,000-444,000). Squirrel pox virus and other disease outbreaks are known to cause high mortality and are implicated in local extinctions and ongoing population declines. The area of occupancy is reported to have declined by 4% over three generations (i.e. 13.3 years). Population declines within Scottish strongholds in the future are inferred from the continued expansion of grey squirrel population and the lack of progress with combatting disease threats. Robust data on the extent of previous and continuing declines are not available but this could plausibly amount to a 20% decline over three generations (Mammal Society, 2020).

148. Data from various Scotland sites reports an average of 0.003-0.8 red squirrels per ha in coniferous areas (Harris and Yalden, 2008). Home range size is stated to be highly variable, dependent upon quality of the habitat, but vary between 2.8 and 6.8ha for deciduous woods, and between 7 and 23ha for coniferous woodland. Therefore, it is probable that the Site provides only part of the breeding territory of one pair of red squirrels.

149. Best practice measures will be implemented (i.e. project assumptions set out in **Section 7.6.2**), defined by NatureScot (2020d). This will include pre-construction red squirrel surveys to ensure any new red squirrel dreys and/or well-used feeding areas are recorded and can be protected (including within areas that were inaccessible during the surveys reported herein, i.e. very dense thicket stage coniferous plantation). If the pre-construction surveys identify that construction works will result in the loss of red squirrel dreys, and there is no alternative approach available, the Site SPP will provide details for compensatory measures to be adopted (including installation of artificial dreys). In addition, construction activities may result in the killing or injuring of red squirrels that may become trapped in exposed excavations or through direct interactions with plant. However, it is expected that measures included in the Site SPP, including the delivery of a Tool Box Talk to alert site personnel to red squirrel presence will reduce or eliminate this risk. Habitat loss effects will be mitigated through design considerations and project assumptions set out in preceding sections and through key-hole design of the Proposed Development, minimising direct habitat loss and severance of commuting routes, and through the replanting of cleared sections (including areas over 50m from turbines).
150. When considering direct injury or mortality effects, the impact within the Regional context is considered to be adverse, low and short-term.
151. When considering indirect disturbance or displacement effects, and loss of habitat, the impact within the Regional context is considered to be adverse, negligible and short-term.
152. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.3.2 Pine marten

153. **Impact:** Construction activity including vehicle movement, vegetation clearance, and storage of construction materials, could result in injury or mortality of individuals from destruction of unidentified dens, collisions or entrapment in uncovered holes, pipes or machinery.
154. Noise, vibration and light spill associated with construction activities could result in the temporary disturbance or displacement of pine marten, leading to avoidance of key foraging, commuting areas or dens. Temporary effects arising during construction include disturbance through site clearance, pile driving, excavation works and widening/construction of new access routes (including the removal of trees along existing access routes). On-site lighting and noise (from explosions used to excavate borrow pits) may also result in the disturbance of pine marten continuing to forage in habitats surrounding the Site.
155. Habitat loss or degradation: Loss of suitable pine marten habitat to accommodate the Proposed Development could result in fragmentation through temporary loss of functional habitat. Habitat loss will result from the installation of turbines, crane pads, construction compounds and widening/installation of existing/new access routes within the Site.
156. **Importance:** The habitat suitability assessment found no areas within the Site had high suitability, but large portions of the west, north east and the access track in the south east had moderate suitability habitat. The majority of the rest of the habitat was considered low suitability. Five potential denning locations were recorded across the Site, but no definitive signs were observed to confirm pine marten presence; however, these are notable since they provide suitable pine marten den habitat within an area where such habitat is scarce. Numerous potential pine marten scats were recorded throughout the Survey Area. As stated in **Table 7.11**, pine marten are assessed to be of Regional importance, owing to affiliation with SBL Priorities.
157. **Magnitude:** Geographical range has increased in the last 10 years (Croose *et al.* 2013), which infers an increase in population size. The Red List for British Mammals (Mammal Society, 2020) cites the central population estimate as 3700 individuals in Scotland (95% confident limit range is 1600-8900). Data from Galloway Forest upland spruce plantation habitat reports an average of 0.12 pine marten per km² (Harris and Yalden, 2008). Home range size is stated to be highly variable, dependent upon quality of the habitat, but it is reported than in Scotland that an average

territory for one breeding pair ranges from 194 to 274ha (Harris and Yalden, 2008). Therefore, it is probable that the Site provides only part of the breeding territory of one pair of pine marten.

158. Dense coniferous plantation is sub-optimal for pine marten denning and foraging. Opening up of areas around turbines will provide opportunities for grassland and tall herbs to provide habitat for field vole; potentially improving the habitat quality for pine martens in the longer term. Best practice measures will be implemented (i.e. project assumptions set out in **Section 7.6.2**), defined by NatureScot (2020). This will include pre-construction pine marten surveys will ensure any additional/new pine marten dens and/or well-used feeding areas are recorded and can be protected (including within areas that were inaccessible during the surveys reported herein). If the pre-construction surveys identify that construction works will result in the loss of pine marten dens, the Site SPP will provide details for compensatory measures to be adopted (including installation of artificial dens). Temporary impacts arising during construction from site activities may result in the killing or injuring of pine martens that may become trapped in exposed excavations or through direct interactions with plant, although it is expected that measures included in the SPP, including restriction on night-time working, will reduce or eliminate this risk. The workforce will be alerted to potential pine marten presence via Toolbox talks delivered by the ECoW.
159. When considering direct injury or mortality effects, the impact within the Regional context is considered to be adverse, low and short-term.
160. When considering indirect disturbance or displacement effects, and loss of habitat, the impact within the Regional context is considered to be adverse, negligible and short-term.
161. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.3.3.3 Bats

162. **Impact:** Direct mortality of bats during removal of roosting habitat and temporary loss of roosting bat habitat through removal of trees with PRFs (within Un-named woodland 3). The trees to be potentially directly affected are 0083, 0084, 0085 (all moderate potential for roosting bats) and trees 0080, 0081, 0082 (all negligible potential for roosting bats).
163. Noise, vibration and light spill associated with construction activities could result in the temporary disturbance or displacement of bat species, leading to avoidance of key foraging, commuting areas or roosts. Temporary effects arising during construction include disturbance through site clearance, pile driving, excavation works and widening/construction of new access routes (including the removal of trees along existing access routes). On-site lighting and noise (from explosions used to excavate borrow pits) may also result in the disturbance of bat species continuing to forage in habitats surrounding the Site. Trees 0086 (moderate) and 0087 (low) are within a distance where indirect disturbance could potentially occur, within un-named woodland 3.
164. Habitat loss or degradation: Loss of suitable foraging, shelter and commuting habitat to accommodate the Proposed Development could result in fragmentation through temporary loss of functional habitat. Habitat loss will result from the installation of turbines, crane pads, construction compounds and widening/installation of existing/new access routes within the Site.
165. **Importance:** Important species of the genera *Myotis*, *Nyctalus* and *Pipistrellus* and brown long-eared bat utilise the Development Footprint for foraging, commuting and shelter. A number of trees providing potential roost features are located within the southern section of the Site adjacent to the main access route.
166. **Magnitude:** The Site SPP will cover all activities that will potentially directly affect bats as stated in section 7.5.7. The use of artificial lighting has the potential to impact bats through disturbance, creating barrier effects and reducing foraging capabilities and opportunities. However, through to the implementation of the Site SPP and standard good practice guideline such as those outlined within Bats and artificial lighting in the UK (BCT, 2018), these effects are considered to be mitigated.

167. Although the Development Footprint is considered to contain suitable foraging and commuting habitat for bats, the removal of plantation habitat is unlikely to have an adverse effect on these species of bat due to the creation of new edge habitat through key-holing, albeit this positive effect is unlikely to be significant.
168. When considering direct injury or mortality effects, the impact within the Regional context is considered to be adverse, low and short-term.
169. When considering indirect disturbance or displacement effects, and loss of habitat, the impact within the Regional context is considered to be adverse, negligible and short-term.
170. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.4 Potential Operational Effects

171. This section provides the assessment of likely operational effects of the Proposed Development on the scoped-in IEFs, assuming the adoption of design layout considerations and project assumptions.

7.6.4.1 Habitats

172. All potential direct and indirect effects on fen and flush (M6 and M9), blanket bog (M19), wet heath (M15) and dry heath (H12 and H21) have been considered under construction phase effects described above. No additional operational effects on habitats are anticipated.

7.6.4.2 Species

7.6.4.2.1 Red Squirrel and Pine Marten

173. All potential direct and indirect effects on red squirrel and pine marten have been considered under construction phase effects described above. The effects arising from the operational phase (involving maintenance and repair activities) are considered to be the same or less significant than those arising from the construction phase within the incorporation of best practice mitigation during operation. The best practice measures will ensure that the Proposed Development operates in accordance with European and national legal requirements as well as best practice documents. Such measures include additional surveys, sensitive timing of maintenance works, adherence to SPPs.
174. When considering indirect disturbance or displacement effects that may occur during operation, the impact within the Regional context is considered to be adverse, negligible and short-term.
175. **Significance of Effect:** The level of effect would be Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.4.2.2 Bats

176. **Impact:** Direct collision mortality, barotrauma and other injuries caused by operational turbines. Areas of plantation woodland will be altered through key-holing in order to accommodate the Proposed Development which has the potential to increase exposure to turbines by creating new edge habitat, particularly to those Scottish species recognised as having high collision risks due to their flight behaviour (with relevance to the Site: Nathusius', common and soprano pipistrelle, noctule bat and Leisler's bat [SNH, 2019]).
177. Indirect impacts caused through the use of operational and maintenance lighting which include the displacement of commuting and foraging bats, altering the distribution of insect prey; and barrier and displacement effects caused by the windfarm due to avoidance behaviour from local populations and migratory species.
178. **Importance:** The population size and range of *Nyctalus* bats is currently unknown within Scotland due to the absence of sufficient data. Notwithstanding, a recent study conducted to survey high risk bat species across

Scotland was undertaken in 2017 which suggests that the minimum population sizes for Leisler's and noctule bats are 'in the thousands' and there is a clear west (Leisler's bat) / east (noctule) distribution split (Newson *et al.*, 2017). *Nyctalus* bats in Scotland are considered to be at high risk of collision with turbines and also have a high population vulnerability (SNH, 2019). As south west Scotland is a key area for Leisler's bat distribution and this species is at high risk of collision with wind turbines and has a high population vulnerability, together with the legal protection afforded to bats in the UK, this species is considered further in the Regional context.

179. Common and soprano pipistrelle bats have a medium population vulnerability but high collision risk with wind turbines. With reference to Mathews *et al.* (2018), both soprano pipistrelle and common pipistrelle have a Red List Status of LC, however insufficient data to assess the range status of both species. JNCC documentation²⁴ suggests that the likely minimum estimate of soprano pipistrelle bats in Scotland was in the region of 512,000 individuals (2016 – 2017). Common pipistrelle bats are estimated in the region of 285,000 individuals (2016 – 2017). Due to the high volume of pipistrelle (common and soprano)²⁵ activity recorded in association with the Proposed Development together with being a high-risk bat species and the legal protection afforded to bats in the UK, this species group is considered further in the Regional context.

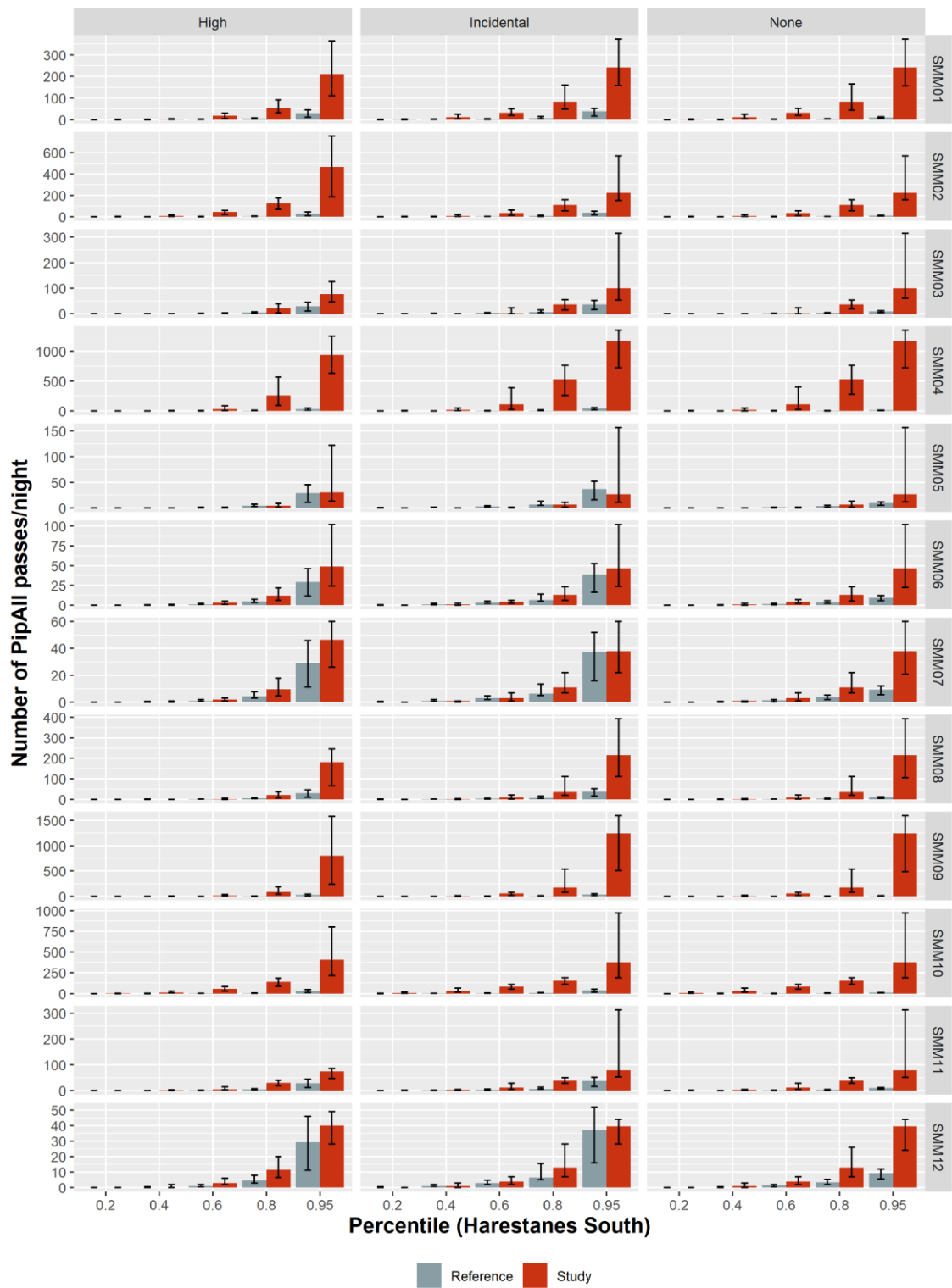
180. **Magnitude:** **Graphs 7.4 and 7.5** show the number of pipistrelle and *Nyctalus* bat passes respectively per location per night at different percentiles compared to the same values derived from operational projects with different categories of bat fatality. From these data, it is predicted that the bat activity within the Development Footprint would generate fatality rates classified as per **Table 7.13** below. These predictions were made using data obtained through a comparative assessment undertaken by SPR in the same region (south west Scotland). This dataset is used as a reference for new projects by providing a comparison of bat activity within a region in a similar manner to EcoBat, but in addition it can benchmark activity rates for new projects against activity rates of sites with a known rate of bat fatality. For further details, refer to **Appendix 7.6 Bat Mitigation and Monitoring Plan**.

Detector location	Pipistrelle fatality rate	Nyctalus fatality rate
SM01	High	None-high
SM02	High	None-high
SM03	High	High
SM04	High	None-high
SM05	None-high	None-high
SM06	None-high	None-high
SM07	None-high	None-high
SM08	High	High
SM09	High	High
SM10	High	High
SM11	High	High
SM12	None-high	None
Key: High =>2 fatalities/turbine/year. Incidental =<2 fatalities/turbine/year. None = 0 fatalities/turbine/year.		

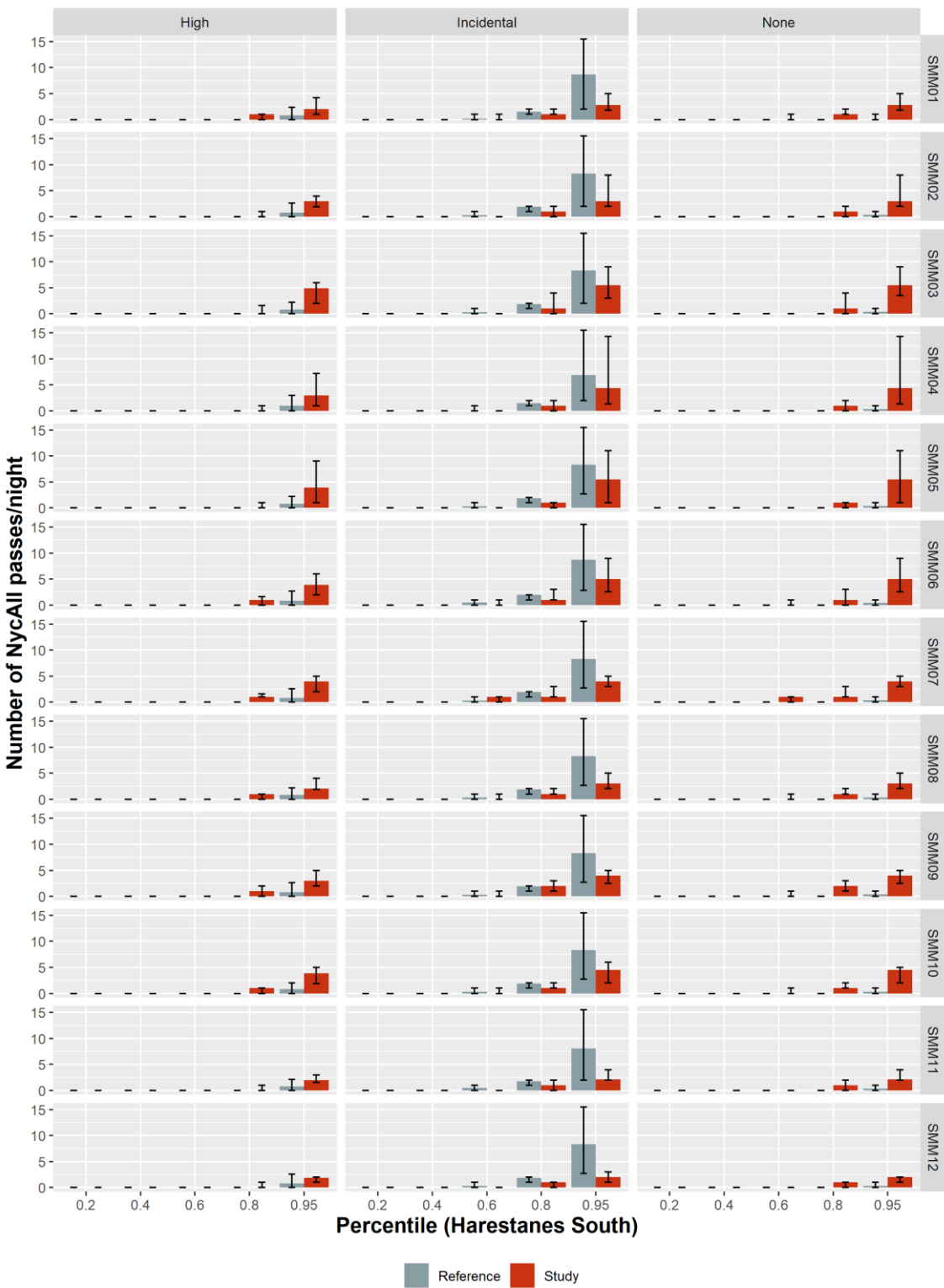
Table 7.13 Predicted bat fatality rates for each detector location in the absence of mitigation.

²⁴ <https://jncc.gov.uk/jncc-assets/Art17/S1309-SC-Habitats-Directive-Art17-2019.pdf> (accessed November 2020)

²⁵ There was a low level of potential Nathusius' pipistrelle activity also, but not categorically confirmed as this species



Graph 7.4 – Number of pipistrelle bat passes per night per location at different percentiles compared to operational projects with a known category of bat fatality. Error bars are 95% confidence intervals derived using bootstrap methods due to non-normal distribution of the datasets. Key: High =>2 fatalities/turbine/year. Incidental =<2 fatalities/turbine/year. None = 0 fatalities/turbine/ year.



Graph 7.5 – Number of *Nyctalus* bat passes per night per location at different percentiles compared to operational projects with a known category of bat fatality. Error bars are 95% confidence intervals derived using bootstrap methods due to non-normal distribution of the datasets. Key: High =>2 fatalities/turbine/year. Incidental =<2 fatalities/turbine/year. None = 0 fatalities/turbine/ year.

181. The direct bat fatality rate at most locations has the potential to be high for either one or both key bat genera. With reference to a study completed to determine the responses of bats to clear-fell harvesting in coniferous plantations (Kirkpatrick *et al.*, 2017), it was noted, in summary, that *Nyctalus* activity levels were 23 times higher in areas which

had been recently felled and overall bat activity for all species was found to increase greatest in felled areas of woodland less than 5ha. With the increase in structural diversity creating suitable niches for terrestrial invertebrates and potential prey for *Nyctalus spp.* it is therefore considered, that in addition to the findings of the surveys, it is concluded that key-holing may increase the risk of collision with turbines, assessed to be adverse, high magnitude, long-term and irreversible. The level of effect would be at the Regional level and therefore be **significant**.

182. In terms of indirect bat displacement and disturbance effects, these are considered to be mitigated through project assumptions detailed within **Section 7.5.7** such as sensitive placement of lighting and the application of good practice guidelines with regards to bats and lighting (ILP, 2018). The level of effect would be adverse, negligible and long-term.
183. Significance of Effects: In terms of direct effects, the level of effect would be at the Regional level and therefore be **significant**.
184. In terms of indirect displacement effects, these are considered to occur at Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.6.5 Assessment Against Future Baseline

185. The conclusions of the impact assessment remain unchanged when considered against the future predicted baseline.

7.7 Mitigation

7.7.1 Construction

186. Woodland and tree felling (outside coniferous plantation areas) has been minimised. Woodland on the Ancient Woodland Inventory has been avoided where possible, with the exception of a small area (0.43ha) of ancient semi-natural woodland at the main access from the A701 road (Un-named woodland 3) which will be lost to accommodate widening of the existing access road and for which no suitable alternative exists. The area of 0.43ha is the maximum extent that may be affected; it includes a 10m buffer from the edge of all construction areas and also includes areas within the very periphery of the ancient woodland block, beside the existing access track. Prior to felling any trees in this area, an arboricultural survey will be carried out to ensure tree felling is minimised and appropriate tree root protection areas are protected. In order to compensate specifically for the loss of this ancient woodland, new areas of tree planting will be incorporated into the Compensatory Planting proposals as set out in **Chapter 4: Development Description**. In addition, this area of ancient woodland will be subject to positive management measures to improve or maintain its current value. The specifics of such management measures will be agreed post-consent.
187. In terms of direct effects on ancient woodland, with the incorporation of additional mitigation, these are considered to occur at Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.
188. No further additional mitigation is required during construction since residual effects are assessed as not significant. However, enhancements as described in section 7.10 and in the OHMP will also reduce the scale of some residual effects in the long term.

7.7.2 Operation

189. Due to the predicted fatality rates of pipistrelle and *Nyctalus* bats, additional mitigation measures will comprise curtailment of the operation of all wind turbines during certain weather conditions. The curtailment would apply between 30 minutes post-sunset and 40 minutes pre-sunrise between 1 April until 31 October each year for the

lifetime of the Proposed Development. The curtailment strategy would be complemented by a monitoring programme to determine whether the curtailment was effective or whether the curtailment parameters could be modified at all. These measures are further detailed in **Appendix 7.6 Bat Mitigation Plan**.

7.7.3 Operational Phase: Residual Effects

190. The maximum increase to natural mortality due to bat fatalities which is considered unlikely to have a significant impact on bat populations, and therefore deemed 'incidental', is considered to be two bat fatalities per turbine per year. This is based on fatality thresholds applied at German windfarm sites (irrespective of species present) and is achievable without excessive losses in power production (yield) (Behr, 2015)²⁶. Due to the limited data available on bat populations and bat ecology in Scotland it is not possible to predict exact impacts on bat populations, therefore applying a fatality value from within a European context is the best currently available method of establishing a threshold. With the application of additional mitigation together with ongoing monitoring, it is predicted that bat fatalities will be equal to or less than two bats per turbine per year. In instances where this is not the case, amendments to the curtailment parameters will be applied. However, as amendments to mitigation measures are iterative, a precautionary approach has been taken and therefore residual effects on bat populations are considered to be **adverse** at a **low magnitude, short-term** (i.e. the population would likely recover over a single breeding season) and **reversible**.
191. In terms of direct effects, with the incorporation of additional mitigation, these are considered to occur at Site level and not at a level that will alter the Regional level of importance for nature conservation. As the scale of these effects is below Local it is deemed to have **no significant effect**.

7.8 Residual Effects

192. **Table 7.14** provides a summary of the findings of the assessment and states whether the significance of effect is Significant (S) or Not Significant (NS).

Feature	Importance	Description of Effects – incorporating Design Layout Considerations and Project Assumptions	Impact Magnitude - – incorporating Design Layout Considerations and Project Assumptions	Significance and Nature of Effects Prior to Additional Mitigation	Significance and Nature of Residual Effects
Construction					
IEF Ancient Woodland Inventory: Un-named woodland 3	Regional	Habitat loss and/or degradation	Negligible (indirect) Low (direct)	Site level - NS Regional - S	Site level - NS Site level - NS
Terrestrial Habitat IEFs: Fen and flush: M9 Blanket bog: M19 Wet heath: M15 Dry heath: H12, H21	Regional	Habitat loss and/or degradation	Low	Site level - NS	Site level - NS
IEF Fauna: Red squirrel	Regional	Injury or mortality; disturbance or displacement;	Low	Site level - NS	Site level - NS

²⁶ http://www.windbat.techfak.fau.de/tools/index_en.shtml ProBat tool used in Germany to help select curtailment parameters to achieve <2 fatalities / turbine / year

Feature	Importance	Description of Effects – incorporating Design Layout Considerations and Project Assumptions	Impact Magnitude - – incorporating Design Layout Considerations and Project Assumptions	Significance and Nature of Effects Prior to Additional Mitigation	Significance and Nature of Residual Effects
		habitat loss or degradation			
IEF fauna: Pine marten	Regional	Injury or mortality; disturbance or displacement; habitat loss or degradation	Negligible	Site level - NS	Site level - NS
IEF Fauna: Bats	Regional	Injury or mortality; disturbance or displacement; habitat loss or degradation	Negligible (indirect) Low (direct)	Site level - NS	Site level - NS
Operation					
Terrestrial Habitat IEFs: Fen and flush: M9 Blanket bog: M19 Wet heath: M15 Dry heath: H12, H21	Local	Habitat degradation	N/A	Site level - NS	Site level - NS
IEF Fauna: Red squirrel, pine marten)	Regional	Injury or mortality; disturbance or displacement	Negligible	Site level - NS	Site level - NS
IEF Fauna: Bats	Regional	Injury or mortality	High	Regional - S	Site level - NS
		Disturbance and/or displacement	Negligible	Site level - NS	Site level - NS

Table 7.14: Summary of Effects for Biodiversity

7.9 Cumulative Assessment

7.9.1 Introduction

193. The above sections have considered the implications of the Proposed Development on IEFs in isolation from potential effects of other projects and activities. However, the EIA Regulations also require the potential for cumulative effects to be assessed. Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Different types of actions can cause cumulative impacts and effects (taken from CIEEM, 2018). The cumulative effects considered here are ‘additive/incremental’. This is defined as multiple activities/projects (each with potentially insignificant effects) added together to give rise to a significant effect due to their proximity in time and space. The effect may be additive (1+1 = 2) or synergistic (1+1 = 3).

194. Other projects to be considered would include the following types of future development within the same EZoI (taken from CIEEM, 2018):

- proposals for which consent has been applied which are awaiting determination in any regulatory process (not necessarily limited to planning permission);
- projects which have been granted consent (not limited to planning permissions) but which have not yet been started or which have been started but are not yet completed (i.e. under construction);
- proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined to the extent that their details are in the public domain, proposed projects that will be implemented by a public body but for which no consent is needed from a competent authority.

195. In some situations, it may be necessary to also consider constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline (CIEEM, 2018).

7.9.2 Construction

196. It is not considered that there are any projects or developments proposed for construction that overlap spatially or temporally with the construction phase of the Proposed Development.

7.9.3 Operation

197. Cumulative operational effects are only considered for bats; the cumulative effects may be additive or synergistic. Based on a spatial range of assessment of 5km, the following three windfarm sites have been scoped into this operational cumulative impact assessment, with regard to potential cumulative effects on bats:

- operational Harestanes Windfarm within the Site and to the north;
- Minnygap Windfarm 1km to the north west; and
- Dalswinton Windfarm 5km to the west south west.

7.9.3.1 Bats

198. Of the EcIA reports made available, Minnygap and Dalswinton Windfarm had reported negligible residual impacts to bats. Due to the proximity of operational Harestanes Windfarm which runs with operational curtailment in place, the cumulative effects on bat populations are therefore considered to be **adverse** at a **low magnitude, short-term** (i.e. the population would likely recover over a single breeding season) and **reversible** and not **significant**.

7.10 Summary

199. The scope of the ecological assessment was determined through a combination of a desk study to identify existing biological data relating to the Site and surrounding area, site survey, and consultation with relevant stakeholders. A desk-study exercise was conducted to determine the statutory designated sites, non-statutory designated sites and ancient woodland sites that would be potentially significantly affected by the Proposed Development. Phase 1 and National Vegetation Classification habitat surveys were completed to assess the importance of the flora and habitats across the Site. Habitat suitability assessment surveys were undertaken for fish, otter, water vole, red squirrel, pine marten and badger which were followed by dedicated surveys for these species focusing on areas of relative greater suitability.

200. The desk study identified no statutory designated nature conservation sites within the search areas; the nearest being Black Loch SSSI (notified for basic fen habitat), located 3.2km south of the Site and not connected to the Application Site via hydrological or air-borne pathways. Two non-statutory designated sites were recorded, one of which is located within the 2km search area and one of which is located 3.2km distant (Galloway and Southern Ayrshire Biosphere Reserve). Several Ancient Woodland Inventory areas were also recorded, the closest being adjacent to the existing access from the A701 road. The Proposed Development was concluded not to have potential to result in significant effects on these designated sites and ancient woodland.

201. The habitat surveys concluded that the Site is dominated by habitats of 'Site-Regional' importance, principally dense conifer plantation, woodland and grassland communities traversed by numerous watercourses and drainage features. All habitats on Site have been modified and influenced by the prevailing commercial forestry land use causing fragmentation of these semi-natural habitats and degradation through drying effects. The design of the Proposed Development has taken the most valuable areas of habitat into consideration, such as mire communities, and the proposed embedded mitigation is primarily in the form of minimising the risks of potential disruption to important terrestrial habitats and watercourses by design and during construction through implementation of best practice measures.
202. Surveys of fauna concluded that the Site supports populations of herpetofauna, otter, water vole, red squirrel, pine marten and brown trout of Site to Regional importance. The design of the Proposed Development and embedded mitigation measures have focused on avoiding important habitat for the species, minimising potential for injury and killing, disturbance and displacement. Measures include the completion of pre-construction surveys for otter, water vole, pine marten, red squirrel and bats to determine whether further measures would be required to avoid disturbing these species.
203. No significant effects on important ecological features are considered likely when the Proposed Development is considered alone, or in combination with other plans and projects, with the incorporation of embedded and additional mitigation.
204. An OHMP for the project has been produced to provide a framework for the delivery of habitat restoration.

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