

## 8 ECOLOGY

### 8.1 Introduction

This Chapter of the Environmental Impact Assessment Report ('EIA Report') evaluates the potential effects of the Ladyfield Renewable Energy Park ('the Development') on ecological features, which include designated sites, terrestrial and aquatic habitats, and protected species. This assessment was undertaken by MacArthur Green. All staff contributing to this Chapter have professional experience in ecological impact assessment and ecological surveys.

The chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects;
- Mitigation and Residual Effects;
- Cumulative Effect Assessment;
- Summary of Effects; and
- Statement of Significance.

This Chapter of the EIA Report is supported by the following Technical Appendices provided in Volume 3:

- 8.1: National Vegetation Classification & Habitats Survey;
- 8.2: Protected Species Survey Report;
- 8.3: Bat Survey Report; and
- 8.4: Outline Biodiversity Enhancement Management Plan.

This Chapter of the EIA Report is supported by the following Figures provided in Volume 2a:

- Figure 8.1: Ecological Designated Sites and Ancient Woodland within 5 km;
- Figure 8.2: Carbon and Peatland Map;
- Figure 8.3: National Vegetation Classification (NVC) Study Area and Survey Results;
- Figure 8.4: Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE) Study Area and Survey Results;
- Figure 8.5: Protected Species Survey Results;
- Figure 8.6: Fish Surveys and Habitat Suitability Survey Points;
- Figure 8.7: Bat Survey Area and Detector Locations 2021;
- Figure 8.8: Preliminary Bat Roost Assessment Survey Area & Results;
- Figure 8.9: Overall Median Risk Assessment (May - September) - Common Pipistrelle;
- Figure 8.10: Overall Median Risk Assessment (May - September) - Soprano Pipistrelle; and
- Figure 8.11: Outline Biodiversity Enhancement Management Plan Areas.

### 8.2 Legislation & Regulations, Policy and Guidance

The following legislation (which has been amended as a consequence of EU exit (Scottish Government, 2019<sup>156</sup>; 2020<sup>157</sup>)), policy and guidance sources have been considered in carrying out this assessment:

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<sup>156</sup> Scottish Government (2019). The Town and Country Planning and Electricity Works (EU Exit) (Scotland) (Miscellaneous Amendments) Regulations 2019. Available at:

<https://www.legislation.gov.uk/ssi/2019/80/introduction/made>. Accessed August 2023.

<sup>157</sup> Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland. Available at:

<https://www.gov.scot/publications/eu-exit-habitats-regulations-scotland-2/>. Accessed August 2023.

## 8.2.1 Legislation & Regulations

- European Union Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora ('Habitats Directive')<sup>158</sup>;
- European Union Council Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy ('Water Framework Directive')<sup>159</sup>;
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>160</sup>;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) ('the Habitats Regulations')<sup>161</sup>;
- The Water Environment and Water Services (Scotland) Act 2003 (WEWS)<sup>162</sup>;
- Nature Conservation (Scotland) Act 2004 (as amended)<sup>163</sup>;
- Wildlife and Natural Environment (Scotland) Act 2011 (WANE)<sup>164</sup>;
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011<sup>165</sup>;
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003<sup>166</sup>
- Wildlife and Countryside Act 1981 (as amended)<sup>167</sup>; and
- Protection of Badgers Act 1992<sup>168</sup>.

## 8.2.2 Planning Policy

- National Planning Framework 4<sup>169</sup>;
- Scottish Planning Policy<sup>170</sup>;
- UK Post-2010 Biodiversity Framework (2012)<sup>171</sup>;
- Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland (2022)<sup>172</sup>;
- Scottish Government Onshore Wind Policy Statement 2022<sup>173</sup>;
- Argyll and Bute Local Biodiversity Action Plan (2016)<sup>174</sup>; and

<sup>158</sup> Scottish Government (1992). Council Directive 92/43/EEC. Available at: <https://www.legislation.gov.uk/eudr/1992/43/contents>. Accessed 28.09.23.

<sup>159</sup> Scottish Government (2000). Directive 2000/60/EC of the European Parliament and of the Council. Available at: <https://www.legislation.gov.uk/eudr/2000/60/contents>. Accessed 28.09.23

<sup>160</sup> Scottish Government (2017). The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/101/contents>. Accessed 28.09.23

<sup>161</sup> Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994. Available at: <https://www.legislation.gov.uk/uksi/1994/2716/contents>. Accessed 28.09.23

<sup>162</sup> Scottish Government (2003). Water Environment and Water Services (Scotland) Act 2003. Available at: <https://www.legislation.gov.uk/asp/2003/3/contents>. Accessed 28.09.23

<sup>163</sup> Scottish Government (2004). Nature Conservation (Scotland) Act 2004. Available at: <https://www.legislation.gov.uk/asp/2004/6/contents>. Accessed 28.09.23

<sup>164</sup> Scottish Government (2011). Wildlife and Natural Environment (Scotland) Act 2011. Available at: <https://www.legislation.gov.uk/asp/2011/6/contents/enacted>. Accessed 28.09.23

<sup>165</sup> Scottish Government (2011). The Water Environment (Controlled Activities) (Scotland) Regulations 2011. Available at: <https://www.legislation.gov.uk/ssi/2011/209/contents/made>. Accessed 28.09.23

<sup>166</sup> Scottish Government (2003). Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Available at: <https://www.legislation.gov.uk/asp/2003/15/contents>. Accessed 28.09.23

<sup>167</sup> Scottish Government (1981). Wildlife and Countryside Act 1981. Available at: <https://www.legislation.gov.uk/ukpga/1981/69>. Accessed 28.09.23.

<sup>168</sup> Scottish Government (1992). Protection of Badgers Act 1992. Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents>. Accessed 28.09.23.

<sup>169</sup> Scottish Government (2022). National Planning Framework 4 Available at: <https://www.gov.scot/publications/national-planning-framework-4/>. Accessed 28.09.23.

<sup>170</sup> Scottish Government (2014). Scottish Planning Policy. Scottish Government, Edinburgh.

<sup>171</sup> JNCC and Defra (on behalf of the Four Countries' Biodiversity Group) (2012). UK Post-2010 Biodiversity Framework. JNCC, Peterborough.

<sup>172</sup> Scottish Government (2022). Scottish Biodiversity Strategy to 2045. Tackling the Nature Emergency in Scotland. Scottish Government, Edinburgh.

<sup>173</sup> Scottish Government (2022). *Onshore Wind Policy Statement 2022*. Scottish Government, Edinburgh.

<sup>174</sup> Argyll and Bute Council Local Biodiversity Action Plan 2010-2015. Available at [https://www.argyll-bute.gov.uk/sites/default/files/migrated\\_files/argyll\\_and\\_bute\\_local\\_biodiversity\\_action\\_plan\\_monitoring\\_report\\_jun\\_2020\\_version\\_5.0.pdf](https://www.argyll-bute.gov.uk/sites/default/files/migrated_files/argyll_and_bute_local_biodiversity_action_plan_monitoring_report_jun_2020_version_5.0.pdf) Accessed 28.09.23.

- Argyll and Bute Planning Service Biodiversity Technical Note (2017)<sup>175</sup>.

### 8.2.3 Guidance

- Chartered Institute for Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland<sup>176</sup>;
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edition)<sup>177</sup>;
- Wind Energy Developments and Natura 2000<sup>178</sup>;
- General Pre-application and Scoping Advice for Onshore Wind Farms<sup>179</sup>;
- Joint Nature Conservation Committee (JNCC) Guidelines for selection of biological Sites of Special Scientific Interest (SSSI)<sup>180</sup>;
- Scottish Badgers Good Practice Guidelines<sup>181</sup>;
- SEPA Land Use Planning System Guidance Note 4<sup>182</sup>;
- SEPA Land Use Planning System Guidance Note 31<sup>183</sup>;
- Marine Science Scotland (MSS) guidance: Monitoring watercourses in relation to onshore wind farm developments<sup>184</sup>
- Fisheries Management Scotland Advice to Boards/Trusts on engaging with the planning process for terrestrial wind farms<sup>185</sup>
- Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives')<sup>186</sup>;
- European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements<sup>187</sup>;
- Draft Peatland and Energy Policy Statement<sup>188</sup>;
- Planning Advice Note 1/2013 – Environmental Impact Assessment, Revision 1.0<sup>189</sup>;

<sup>175</sup> Argyll and Bute Planning Service (2017). A Biodiversity Technical Note for Planners and Developers. Argyll and Bute Council.

<sup>176</sup> CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

<sup>177</sup> Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edition). Bat Conservation Trust.

<sup>178</sup> European Commission, Directorate-General for Environment (2010). Wind energy developments and Natura 2000: guidance document.

<sup>179</sup> NatureScot (2020). General pre-application and scoping advice for onshore wind farms. [Online] Available at: <https://www.nature.scot/doc/general-pre-application-and-scoping-advice-onshore-wind-farms>. Accessed 28.09.23.

<sup>180</sup> JNCC (2019). Guidelines for selection of biological SSSIs. [Online] Available at: <https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssi/>. Accessed 28.09.23.

<sup>181</sup> Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1.

<sup>182</sup> SEPA (2017). Land Use Planning System Guidance Note 4 – Planning guidance on on-shore windfarm developments.

<sup>183</sup> SEPA (2017). Land Use Planning System Guidance Note 31 – Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystem. Version 3.

<sup>184</sup> Marine Scotland Science (2021). Monitoring watercourses in relation to onshore wind farm developments: generic monitoring programme. Available at: <https://www.gov.scot/publications/monitoring-watercourses-in-relation-to-onshore-wind-farm-developments-generic-monitoring-programme/> Accessed 28.09.23.

<sup>185</sup> Fisheries Management Scotland (2017). Advice to Boards/Trusts on engaging with the planning process for terrestrial wind farms. Available at: <https://fms.scot/wp-content/uploads/2017/04/170412-Guidance-Terrestrial-windfarms.pdf>. Accessed 28.09.23.

<sup>186</sup> Scottish Executive (2000). Nature conservation: implementation in Scotland of EC Directives on the conservation of natural habitats and of wild flora and fauna and the conservation of wild birds ('The Habitats and Birds Directives'). Revised guidance updating Scottish Office Circular no. 6/1995.

<sup>187</sup> SERAD (2001). European Protected Species, Development Sites and the Planning Systems: Interim guidance for local authorities on licensing arrangements.

<sup>188</sup> Scottish Government (2016). Draft Peatland and Energy Policy Statement. Scottish Government, Edinburgh.

<sup>189</sup> Scottish Government (2017). Planning Advice Note 1/2013 – Environmental Impact Assessment, Revision 1.0. Scottish Government, Edinburgh.

- Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>190</sup>;
- Peatland Survey – Guidance on Developments on Peatland<sup>191</sup>;
- The Scottish Forestry Strategy (SFS)<sup>192</sup>;
- EU Exit: The Habitat Regulations in Scotland.<sup>193</sup>
- Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update<sup>194</sup>;
- Update to the Climate Change Plan 2018-2032<sup>195</sup>;
- Freshwater and diadromous fish and fisheries associated with onshore wind farm and transmission line developments: generic scoping guidelines<sup>196</sup>.
- Scotland’s National Peatland Plan<sup>197</sup>;
- Decommissioning and Restoration Plans for wind farms<sup>198</sup>;
- Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2)<sup>199</sup>;
- Planning for Development: What to consider and include in Habitat Management Plans. Version 2<sup>200</sup>;
- Advising on carbon-rich soils, deep peat and priority peatland habitat in development management<sup>201</sup>;
- SNH Environmental Impact Assessment Handbook – Version 5<sup>202</sup>;
- Good Practice During Windfarm Construction (4<sup>th</sup> Edition)<sup>203</sup>; and
- Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation<sup>204</sup>.

## 8.3 Assessment Methodology and Significance Criteria

### 8.3.1 Scoping Responses and Consultations

Consultation for ecological matters was undertaken as part of the EIA process with the organisations shown in Table 8.1, with specific consultee comments addressed accordingly.

<sup>190</sup> Scottish Government (2017). Planning Circular 1/2017: Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017. Scottish Government, Edinburgh.

<sup>191</sup> Scottish Government, SNH, SEPA (2017). Peatland Survey. Guidance on Developments on Peatland.

<sup>192</sup> Scottish Government (2019). The Scottish Forestry Strategy 2019-2029. Scottish Government, Edinburgh.

<sup>193</sup> Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland. Scottish Government, Edinburgh.

<sup>194</sup> Scottish Government (2020). Securing a green recovery on a path to net zero: climate change plan 2018–2032 – update. Scottish Government, Edinburgh.

<sup>195</sup> Scottish Government (2020). Update to the Climate Change Plan 2018-2032. Scottish Government, Edinburgh.

<sup>196</sup> Scottish Government (2021). <https://www.gov.scot/publications/freshwater-and-diadromous-fish-and-fisheries-associated-with-onshore-wind-farm-and-transmission-line-developments-generic-scoping-guidelines/> Accessed 28.09.23.

<sup>197</sup> SNH (2015). Scotland’s National Peatland Plan. [Online] Available at: <https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future>. Accessed 28.09.23.

<sup>198</sup> SNH (2016). Decommissioning and Restoration Plans for wind farms.

<sup>199</sup> SNH (2016). Planning for Development: What to consider and include in deer assessments and management at development sites (Version 2).

<sup>200</sup> SNH (2016). Planning for Development: What to consider and include in Habitat Management Plans. Version 2.

<sup>201</sup> SNH (2018). Advising on carbon-rich soils, deep peat and priority peatland habitat in development management. [Online] Available at: <https://www.nature.scot/doc/advising-carbon-rich-soils-deep-peat-and-priority-peatland-habitat-development-management>. Accessed 28.09.23.

<sup>202</sup> SNH (2018). Environmental Impact Assessment Handbook – Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.

<sup>203</sup> Scottish Renewables, SNH, SEPA, Forestry Commission (Scotland), Historic Environment Scotland & AEECoW (2019). Good Practice During Windfarm Construction (4<sup>th</sup> Edition).

<sup>204</sup> NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019, with minor updates 2021). Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation. [Online] Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation>. Accessed 28.09.23.

**Table 8.1: Consultation Responses**

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
NatureScot	Pre-scoping advice meeting on survey programme 10 <sup>th</sup> March 2020	If new access tracks are required as part of the Development, the EIA Report will need to assess the environmental impacts of this i.e., by undertaking habitat and protected species surveys of the access route.	Baseline habitat and protected species covered proposed new access routes within the Site (see Figures 8.3 to 8.5) and impacts due to construction and operation have been considered in section 8.5.
NatureScot	Scoping Response, 31/08/2021	The proposed scope of surveys and assessment of the key ecological features identified in the Scoping Request should adequately assess the overall ecological impacts. Any deviations from guidance should be explained in the EIA Report.	The scope of surveys, assessment and any limitations experienced are outlined in Sections 8.3.5 to 8.3.7, with further detail in Appendices 8.1-8.3. All surveys followed standard guidance, and data collected were considered sufficient and appropriate for conducting a robust impact assessment.
		We are not aware of any other relevant consultees who should be contacted with respect to the ecological assessment and scope of baseline information gathering.  We agree with the list of sensitive habitats and species scoped into the EIA.	Noted.
		We agree that there is no potential connectivity between the Development and Glen Shira Special Area of Conservation. As such, no further consideration of this designation is required.	Noted.
		Any new tracks should be subject to appropriate ecological surveys and assessment. If track widening works are required then ecological surveys should also be conducted in those areas if there is a possibility of protected species or habitats being present.	All proposed infrastructure has been covered by the surveys outlined in the sections referenced above and included in the assessment (Section 8.5).
Fisheries Management Scotland (FMS)	Scoping Response, 22/07/2021	The proposed development falls within the Argyll District Salmon Fishery Board district, and the catchment relating to the Argyll Fisheries Trust. It is important that the proposals are conducted in full consultation with these organisations.	Scoping consultation was undertaken with The Argyll District Salmon Fishery Board (see below).  Published electrofishing survey data from the Argyll Fisheries Trust for the River Aray were reviewed as part of the desk study (see Section 8.4.1.5).
		Due to the potential for such developments to impact on migratory fish species and the fisheries they support, FMS have developed, in conjunction with Marine Scotland Science, advice for DSFBs [District Salmon Fishery Boards] and Trusts in dealing with planning applications. We would strongly recommend that these	The advice provided by FMS and Marine Scotland Science <sup>184</sup> has been considered in this assessment (section 8.2.3).

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		guidelines are fully considered throughout the planning, construction and monitoring phases of the Development.	
Argyll District Salmon Fishery Board	Scoping Response, 11/08/2021	We highlight that fish are not discussed in the Scoping Request. We know that Atlantic salmon, Brown trout (including sea trout) and European eels are present in the River Aray and the River Shira catchments and have the potential to be impacted by this development.	Noted. Published electrofishing survey data from the Argyll Fisheries Trust for the River Aray were reviewed as part of the desk study (see Section 8.4.1.5). The Development falls within the River Aray catchment only. Fish are included within the Baseline Conditions section 8.4.
		Stream crossings have the potential to fragment fish habitats and consideration should be given to the design, construction and mitigation of drainage of the site and specifically the infrastructure that has potential to affect water quality and fish habitat within and downstream of the site.	An assessment along watercourses of existing crossings and barriers to fish migration between the River Aray and the Site was carried out, with results detailed in Section 8.4.2.3. As detailed in Section 8.3.8, pre-construction surveys, implementation of a Construction Environmental Management Plan (CEMP), presence of and Ecological Clerk of Works and restriction of in-stream works during key spawning times have all been considered, with consideration given to watercourse crossings in Chapter 10: Hydrology & Hydrogeology.
		Fish habitat and fish population surveys should be undertaken prior to the development to inform the design and construction phases of the project as well as post construction surveys to ensure that there is no significant impact on fish populations or their habitats. Argyll Fisheries Trust hold historical data on fish populations and habitat in the Rivers Aray and Shira which may be of importance to this assessment.	Published electrofishing survey data from the Argyll Fisheries Trust for the River Aray were reviewed as part of the desk study (see Section 8.4.1.5). An assessment along watercourses of existing crossings and barriers to fish migration between the River Aray and the Site was carried out, with results detailed in Section 8.4.2.3. A programme of fish, macroinvertebrate and water quality monitoring surveys would be undertaken following MSS guidance, during pre-construction, construction and post-construction phases.
RSPB	Scoping Response, 09/08/2021	The EIAR should include a full survey, impact assessment and proposals for mitigation in relation to important habitats on this site. Mitigation should ideally minimise any impact and avoid areas of high-quality habitats found upon the site.	Results of the habitats surveys, detailed in Section 8.4.2.1 and Appendix 8.1, have informed the design layout process by avoiding sensitive habitats and potentially groundwater dependent ecosystems where possible. Proposals for mitigation in relation to ecological features are discussed in Sections 8.3.8 and 8.6.1.

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		Consideration should be given to mitigation in regard to lo0ss of further open ground habitat within this area which will result from the proposal directly from the turbines mentioned above and a barrier effect of the whole proposal. The EIAR should consider what mitigation measures are required to minimise the impact on important species and contain detailed ecological justification for any such proposals. Ideally, this should include relevant timeframes for mitigation in relation to site development.	Proposals for mitigation in relation to habitats are discussed in Sections 8.3.8 and 8.6.1. Further information including a programme of works can be found in the Outline Biodiversity Enhancement Management Plan (OBEMP) (Appendix 8.4).
SEPA	Scoping Response, 04/08/2021	Map and assessments of impacts upon Groundwater Dependent Terrestrial Ecosystems [GWDTEs] and buffers. Where it is clear that much of the site is likely to be peatland and/or wetland, we suggest you may wish to go straight to carrying out NVC survey without carrying out Phase 1 and Sniffer Assessments.	NVC surveys have been conducted for all areas within 300 m of all proposed turbine and infrastructure locations (see Appendix 8.1 and Figure 8.3).  The assessment of GWDTEs is carried out within Chapter 10: Hydrology & Hydrogeology. Figure 8.4 presents GWDTE habitats identified through NVC surveys.
		Clear felling may be acceptable only in cases where planting took place on deep peat and it is proposed through a Habitat Management Plan to reinstate peat-forming habitats.	An overview of the measures proposed to restore peat-forming habitats can be found in Section 8.6.1, in addition to within the OBEMP (Appendix 8.4).
Argyll and Bute Council	Scoping Response, 28/01/2022	Note that some species records exist for Atlantic salmon, European eel and red squirrel; in view of this ask that bat sp., otter badger and freshwater pearl mussel are considered in the ecological surveys.	Noted. The scope of protected species surveys, including fish, are detailed in Section 8.4.2.
		Ecological surveys – should include habitats mapped, European protected species and protected species.	Results of field surveys for habitats and protected species are detailed in Section 8.4.2, and in Appendices 8.1-8.3.
		Fish and freshwater pearl mussel surveys are required.	Electrofishing survey data from the Argyll Fisheries Trust was reviewed to inform the assessment (Section 8.4.1.5), and a survey of potential barriers to fish migration carried out (Section 8.4.2.3). Although salmonids are present within the River Aray catchment, barriers to migration were identified on watercourses between the Development and the River Aray, and as such it was considered that fully quantitative fisheries surveys of the watercourses on Site were not necessary, with the small watercourses on Site only likely to contain small resident brown trout populations.  No suitability for freshwater pearl mussel was noted in any watercourse (Appendix 8.2) and in their scoping response the Argyll District Salmon Fishery Board did not raise the possibility of

Consultee	Type and Date	Summary of Consultation Response	Response to Consultee
		<p>The applicant should include details of a CEMP and the employment of an Ecological Clerk of Works in order to ensure mitigation outlined in the above surveys and management plans are implemented.</p>	<p>the species being present locally. Should their presence be recorded during pre-construction surveys for construction work undertaken within and adjacent to the River Aray, then measures would be implemented to ensure their protection, as part of the Species Protection Plan (see Section 8.3.8.2) and CEMP.</p> <p>These measures are outlined in Section 8.3.8.</p>



### 8.3.2 Scope of Assessment

This Chapter considers the effects of construction, operation and decommissioning of the Development upon those ecological features identified during the review of desk-based information and field surveys. Impacts upon the following ecological features have been identified:

- designated nature conservation sites – impacts include direct (i.e., derived from land-take or disturbance to habitats or protected species) and indirect (i.e., habitat fragmentation and modification, including through changes caused by impacts to supporting systems such as groundwater or overland flow);
- terrestrial habitats – impacts include direct (i.e., derived from land-take) and indirect (i.e., habitat fragmentation and modification, including through changes caused by impacts to supporting systems such as groundwater or overland flow);
- aquatic habitats – impacts are limited to the ecological changes in water conditions through potential pollution effects (hydrological effects are considered in Chapter 10: Hydrology and Hydrogeology); and
- protected species – impacts considered include direct (i.e., loss of life as a result of the Development; loss of key habitat; displacement from key habitat; barrier effects preventing movement to/from key habitats; and general disturbance) and indirect (i.e., loss/changes of/to food resources; population fragmentation; degradation of key habitat e.g., as a result of pollution).

### 8.3.3 Elements Scoped Out of Assessment

On the basis of the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees (e.g., see Table 8.1), the following ecological features were scoped out of baseline surveys and assessment:

- Generally common and widely distributed habitats or species which do not fall within the following categories were scoped out of the detailed assessment:
  - Habitats listed in Annex I to the Habitats Directive, and species listed in Annex II to the Habitats Directive;
  - Biodiversity Action Plan (UKBAP) or Scottish Biodiversity List (SBL) Priority Habitats; or
  - Habitats or species protected by other legislation such as The Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 (as amended), or The Protection of Badgers Act 1992.
- Protected species: beaver (*Castor fiber*), great crested newt (*Triturus cristatus*) and European wildcat (*Felis silvestris*) were scoped out of field surveys due to the absence of suitable habitat or the Site being located outside of the known range or distribution of these species.

Further ecological features and impacts have been scoped out of the detailed assessment based on the results of the desk-based study and survey work undertaken for the Development, due to a lack of potential significant effect at a relevant species population or habitat extent scale. Details of ecological features and effects scoped out after further data searches and post-survey are provided in Section 8.5.1.

### 8.3.4 Study Area / Survey Area

The spatial extents to which the desk-based research, field surveys and assessments are undertaken vary depending on the ecological feature and its behaviour/requirements. Details of the extents are described in Section 8.4 of this Chapter and associated Technical Appendices 8.1-8.3 and are shown on their respective Figures. Hereafter in this Chapter, the areas covered by field surveys are termed the 'Survey Area' and the areas which are considered as part of the assessment process are referred to as the 'Study Area'.

### 8.3.5 Baseline Survey Methodology

#### 8.3.5.1 Desk Study

A desk study was undertaken to collate available ecological information in relation to the Site and surrounding environment. This comprised a search of available online datasets and desk study resources and consultation with conservation organisations. The following data sources were considered as part of the determination of scope of baseline surveys and assessment:

- National Biodiversity Network (NBN) Atlas Scotland<sup>205</sup> for protected or notable species records within 5 km of the Site Boundary from the last 15 years (i.e., 2008 and onwards) (see Table 8.2 for data sources and associated license for usage. CC-BY = Creative Commons with Attribution; OGL = Open Government License);
- NatureScot Sitelink<sup>206</sup> for designated site information within 5 km of the Site Boundary;
- Ancient Woodland Inventory (AWI) (Scotland)<sup>207</sup> for ancient woodland sites within 5 km of the Site Boundary;
- Scotland’s Environment Map<sup>208</sup> for the Carbon Peatland Map 2016 peatland classification system;
- SEPA Water Environment Hub<sup>209</sup> for watercourse classification;
- Argyll and Bute Local Biodiversity Action Plan (2016)<sup>174</sup>;
- Saving Scotland’s Red Squirrels<sup>210</sup> website for local species records and Priority Areas for Red Squirrel Conservation;
- Deer Distribution Survey results by the British Deer Society<sup>211</sup>;
- Deer survey results by the Inveraray & Tyndrum Deer Management Group<sup>212</sup>;
- Argyll Fisheries Trust for fish population information<sup>213</sup>; and
- Relevant scientific literature on protected species, habitats distribution and conservation status.

**Table 8.2: Data Providers and Licences for NBN Atlas Scotland Records Used**

Species	Data Provider (Recorder)	Licence
Badger	Argyll Biological Records Centre	CC-BY <sup>214</sup>
	The Mammal Society	CC-BY
Common Lizard	Argyll Biological Records Centre	CC-BY
Otter	Argyll Biological Records Centre	CC-BY
	Highland Biological Recording Group	CC-BY
	Wild Surveys	CC-BY

<sup>205</sup> National Biodiversity Network (2022). Available at: <https://scotland.nbnatlas.org> Accessed 18 August 2022.

<sup>206</sup> NatureScot (2022). SiteLink. Available at: <https://sitelink.nature.scot/map> Accessed 18 August 2022.

<sup>207</sup> Scottish Government (2022). Ancient Woodland Inventory. Available at: <https://data.gov.uk/dataset/c2f57ed9-5601-4864-af5f-a6e73e977f54/ancient-woodland-inventory-scotland> Accessed 18 August 2022.

<sup>208</sup> Scottish Government (2022). Scotland’s Soils. Available at: [https://map.environment.gov.scot/Soil\\_maps/?layer=10](https://map.environment.gov.scot/Soil_maps/?layer=10) Accessed 18 August 2022.

<sup>209</sup> [www.sepa.org.uk/data-visualisation/water-environment-hub/](http://www.sepa.org.uk/data-visualisation/water-environment-hub/) [Accessed February 2022]

<sup>210</sup> Saving Scotland’s Red Squirrels (2022). Available at: <https://scottishsquirrels.org.uk/squirrel-sightings/> Accessed 18 August 2022.

<sup>211</sup> BDS (2022). Deer Distribution Survey. Available at: [www.bds.org.uk/index.php/research/deer-distribution-survey](http://www.bds.org.uk/index.php/research/deer-distribution-survey) Accessed 18 August 2022.

<sup>212</sup> Inveraray and Tyndrum DMG. Deer Management Plan: Working Plan 2015-2025 (2021). Available at: <https://inverarayandyndrumdmg.deer-management.co.uk/wp-content/uploads/2021/11/ITDMG-DMP-Working-Plan-Apr-2021.pdf> Accessed 18 August 2022.

<sup>213</sup> Argyll Fisheries Trust (2020). Fish Population survey on behalf of the Loch Fyne Rivers Improvement Association, 2020.

<sup>214</sup> Creative Commons with Attribution 4.0 (CC-BY). Available at: <https://creativecommons.org/licenses/by/4.0/>. Accessed January 2023.

Species	Data Provider (Recorder)	Licence
	NatureScot	OGL <sup>215</sup>
Palmate Newt	Argyll Biological Records Centre	CC-BY
Pine Marten	Argyll Biological Records Centre	CC-BY
	The Mammal Society	CC-BY
Red Squirrel	Argyll Biological Records Centre	CC-BY
	Scottish Wildlife Trust	CC-BY
	The Mammal Society	CC-BY
	British Trust for Ornithology	OGL
Slow worm	Argyll Biological Records Centre	CC-BY
Daubenton's Bat	NatureScot	OGL
Red Deer	Argyll Biological Records Centre	CC-BY
	The Mammal Society	CC-BY
	British Trust for Ornithology	OGL
Roe Deer	Argyll Biological Records Centre	CC-BY
	The Mammal Society	CC-BY
Sika Deer	Argyll Biological Records Centre	CC-BY
American Skunk Cabbage	Argyll Biological Records Centre	CC-BY
	Biological Records Centre	CC-BY
	Botanical Society of Britain & Ireland	CC-BY
Himalayan Balsam	Argyll Biological Records Centre	CC-BY
Japanese Knotweed	Argyll Biological Records Centre	CC-BY
Rhododendron	Argyll Biological Records Centre	CC-BY

### 8.3.5.2 Field Surveys

The following field surveys were undertaken to further establish the baseline ecological conditions at the Site (plus appropriate buffers) to inform the assessment, and were undertaken in line with standard methodologies and best practice guidance (results are shown in Figures 8.3 to 8.10). Surveys were initially conducted in 2021, within survey areas based on a preliminary layout. Upon design revision, where survey gaps emerged, further survey visits were undertaken in 2021 and 2022 to ensure the final infrastructure layout was sufficiently covered, as indicated below:

- NVC surveys, incorporating Phase 1 habitat characterisation (May 2021, July 2021 and September 2022);
- protected species surveys (May 2021, September 2022) focusing on badger (*Meles meles*), red squirrel (*Sciurus vulgaris*), water vole (*Arvicola amphibius*), otter (*Lutra lutra*), and pine marten (*Martes martes*);
- preliminary bat roost assessments (May 2021, September 2022);
- bat automated detector activity surveys (May to September 2021 inclusive);
- fish habitat suitability surveys (August 2022);
- incidental records of other protected species such as signs or potential features (e.g. potential signs of wildcat (*Felis silvestris*), or potential hibernacula for reptiles), notable species, or invasive non-native species, were also recorded during field surveys.

<sup>215</sup> Open Government Licence (OGL). Available at: <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>. Accessed 28.09.23.

The full details of survey methods, species-specific legislation and results are provided within Appendices 8.1 – 8.3.

### **8.3.6 Methodology for the Assessment of Effects**

The significance of the potential effects of the Development have been classified by professional consideration of the sensitivity of the ecological feature and the magnitude of the potential impact.

The assessment method is based on guidance in The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017<sup>160</sup>, CIEEM (2018<sup>176</sup>) and guidance on the implementation of the EU Habitats Directive (SERAD, 2001<sup>187</sup>).

The assessment involves the following process:

- identification of the potential ecological impacts of the Development on ecological features, including both positive and negative;
- considering the likelihood of occurrence of potential impacts;
- defining the nature conservation value and conservation status of the ecological feature to determine overall sensitivity;
- establishing the magnitude of impact associated with the potential impact (both spatial and temporal);
- based on the above information, making a professional judgement as to whether or not the resultant effect is significant in terms of the EIA Regulations;
- if a potential effect is determined to be significant, measures to avoid, reduce, mitigate or compensate for the effect are suggested where required;
- considering opportunities for biodiversity enhancement where appropriate; and
- confirming residual effects after mitigation and enhancement are considered.

#### **8.3.6.1 Sensitivity of Ecological Features**

The nature conservation value of ecological features is defined on the basis of the geographic context given in Table 8.3 which follows CIEEM (2018<sup>176</sup>) guidance. For example, a SAC designated under the Habitats Directive is implicitly of European (International) importance. In the case of protected species, contextual information about distribution and abundance is fundamental, including trends based on historical records. This means that even though a species may be protected through legislation at a national or international level, the relative value of the population onsite may be quite different (e.g., the Site population may consist of a single transitory animal, which within the context of a thriving local/regional/national population of a species, is therefore of local or regional value rather than national or international).

Determination of the conservation value of ecosystems, habitats and species is therefore based on professional judgement and a combination of factors, such as level of protection, rarity, conservation status, population trends, and quality/extent of the feature on Site. Published evaluation criteria (e.g., the SBL, JNCC guidance on selection of biological SSSIs<sup>180</sup>) are used where relevant.

As per CIEEM (2018<sup>176</sup>) guidance, it is not necessary to carry out detailed assessment on features that are sufficiently widespread, unthreatened, and resilient to impacts of the Development. Those ecological features affected by the Development and deemed to be of at least local importance are termed Important Ecological Features (IEFs) and are taken forward for assessment.

**Table 8.3: Approach to Valuing Ecological Features<sup>216</sup>**

Importance of Feature in Geographical Context	Description
International/European	An internationally designated site (e.g., SAC) or undesignated areas that meet the criteria for international designations, or qualifying species whose presence contributes to the maintenance of such a site.
	Species present in internationally important numbers (>1% of biogeographic populations).
National (UK)	A nationally designated site (SSSI, or a National Nature Reserve (NNR)), or sites meeting the criteria for national designation or qualifying species whose presence contributes to the maintenance of such a site.
	Species present in nationally important numbers (>1% UK population).
Regional (Natural Heritage Zone or other distinct ecological area)	Regionally significant and viable areas of key habitat identified in a Regional BAP.
	Species present in regionally important numbers (>1% of Natural Heritage Zone population).
	Areas of key habitat falling below criteria for selection as a SSSI (e.g., areas of semi-natural ancient woodland larger than 0.25 hectares (ha)).
Local	A site within the local area designated for nature conservation (e.g., Local Nature Reserves (LNRs)).
	Areas of semi-natural ancient woodland smaller than 0.25 ha.
	Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g., species-rich flushes or hedgerows.
Negligible	Usually widespread and common habitats and species that do not meet the above criteria. Features falling below local value are not considered in detail in the assessment process.

### 8.3.6.2 Magnitude of Impact

Impact magnitude refers to changes in the extent and integrity of an ecological feature. A suitable definition of ecological 'integrity' is found within Scottish Executive circular 6/1995 updated by Scottish Executive (2000<sup>186</sup>) which states that "*The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*". Although this definition is used specifically regarding European level designated sites (e.g., an SAC), it is applied to wider countryside habitats and species for the purposes of this assessment.

The magnitude of potential impacts will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, how the ecological features are likely to respond to the Development, the duration, likelihood of occurrence and reversibility of an effect and professional judgement, best practice guidance and legislation.

Impacts are determined in terms of magnitude in space and time. There are five levels of spatial impacts and five levels of temporal impacts as described in Table 8.4 and Table 8.5.

**Table 8.4: Definition of Spatial Impact Magnitude upon the IEFs**

Magnitude of Impact	Definition
Very High	Would cause the loss of the majority of a feature (>80%) or would be sufficient to damage a feature sufficient to immediately affect its viability.

<sup>216</sup> Adapted from Hill, D., Fasham, M., Tucker, G., Shewry, M and Shaw, P. (2005). Handbook of Biodiversity Methods – Survey, Evaluation and Monitoring. Cambridge University Press, Cambridge.

Magnitude of Impact	Definition
High	Would have a major effect on the feature or its viability. For example, more than 20% habitat loss or damage.
Medium	Would have a moderate effect on the feature or its viability. For example, between 10 – 20% habitat loss or damage.
Low	Would have a minor effect upon the feature or its viability. For example, less than 10% habitat loss or damage.
Negligible	Minimal change on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.

**Table 8.5: Definition of Temporal Impact Magnitude upon the IEFs**

Magnitude of Effects	Definition
Permanent	Impacts continuing indefinitely beyond the span of one human generation (taken here as 30+ years), except where there is likely to be substantial improvement after this period in which case the category Long Term may be more appropriate.
Long term	Between 15 years up to (and including) 30 years.
Medium term	Between 5 years up to (but not including) 15 years.
Short term	Up to (but not including) 5 years.
Negligible	No measurable impact.

### 8.3.6.3 Cumulative Assessment

Cumulative effects require the assessment of impacts of the Development in combination with other projects. In the interests of focusing on the potential for significant effects, this assessment considers the potential for cumulative effects with other onshore wind farm and utilities EIA developments, which are most likely to have similar impacts on similar ecological features.

The context in which these cumulative effects are considered is heavily dependent on the ecology of the feature assessed. For example, for water voles it may be appropriate to consider impacts specific to individual catchments, should the distance between neighbouring catchments be sufficient to assume no movement of animals between them, whereas for blanket bog the Natural Heritage Zone (NHZ) may be the relevant spatial scale. Therefore, where it is considered necessary, an assessment of cumulative effects will be made for each feature, appropriate to its ecology.

### 8.3.6.4 Significance of Effect

The significance of potential effects is determined through a standard method of assessment based on professional judgement and available evidence, considering the sensitivity (nature conservation value and conservation status) of the IEF and the magnitude of impact, in a reasoned way.

A significant effect is an effect that either supports or undermines the conservation status of a habitat or population. Significant effects include those which result from impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution) (CIEEM, 2018<sup>176</sup>).

Table 8.6 details the significance criteria that have been used in assessing the effects of the Development.

**Table 8.6: Significance Criteria**

Significance of Effect	Description
Major	Significant effect, as the effect is likely to result in a long term significant adverse effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitat and species.

Significance of Effect	Description
Moderate	Significant effect, as the effect is likely to result in a medium term or partially significant adverse effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species.
Minor	The effect is likely to adversely affect the feature at an insignificant level by virtue of its limited duration and/or extent, but there will probably be no effect on the structure and function of defined sites, habitats or ecosystems or on the conservation status of habitats and species. The level of effect would be Minor and Not Significant.
Negligible	No material effect. The effect is assessed to be Not Significant.

Using these definitions, it must be decided whether there will be any effects which will be sufficient to adversely affect the IEF to the extent that its conservation status deteriorates from that which would be expected should baseline conditions remain (i.e., the 'do nothing' scenario).

Major and moderate effects are considered to be significant within the context of the EIA Regulations.

Where significant effects are identified, mitigation and/or compensation is required to reduce or offset effects where possible. Effects that are not significant would be expected to be avoided or reduced through compliance with best practice guidance and protected species legislation.

Residual effects are characterised as either adverse, neutral or beneficial and either significant or not significant, taking account of mitigation proposals.

### 8.3.7 Assessment Limitations

Limitations exist regarding the scientific knowledge base on how some species, and the populations to which they belong, react to impacts associated with Wind Farms. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The ecological surveys undertaken to support the Development have not therefore produced a complete list of plants and animals and the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

The whole Site Boundary was not surveyed, but instead baseline surveys were conducted within appropriate survey areas based on the location and extent of proposed infrastructure and appropriate study areas (see section 8.3.4). The survey coverage was generally within a larger area than required for the final infrastructure layout and is therefore considered sufficient for a robust impact assessment.

No notable limitations were experienced with regards to habitats, protected species, bats or fisheries field surveys (see Appendices 8.1-8.3 for survey details). It is considered that there is sufficient information to enable a robust assessment to be taken in relation to the identification and assessment of potential significant effects on ecological features.

### 8.3.8 Embedded Mitigation

#### 8.3.8.1 Iterative Design Process

As part of the iterative design process for the Development, ecological constraints identified through baseline survey results were considered to avoid or reduce adverse impacts on ecological features where possible (see Chapter 3: Site Selection and Design). This includes:

- Where possible, locating Wind Turbines and other infrastructure in areas where habitat types are currently of low conservation value (i.e., conifer plantation or recent clearfell) and utilising existing forestry infrastructure;
- Where possible, a minimum 50 m buffer for any infrastructure or construction activity around all watercourses, except where a minimum number of watercourse crossings are required (see Chapter 10: Hydrology & Hydrogeology). This will minimise effects on associated habitats and protected species;
- A minimum 300 m buffer for any infrastructure from the Glen Etive & Glen Fyne Special Protection Area (SPA), designated for golden eagle, which is adjacent to the east and north of the Site (see Figure 7.2). Although primarily enforced in order to avoid effective loss of habitat through displacement of golden eagles within the SPA (see Chapter 7: Ornithology), this buffer ensures that there will be no indirect adverse effects on SPA habitats during construction or operation of the Development.
- Where possible, the track length and alignment has been designed to reduce the extent of new track and number of watercourse crossings required;
- Avoidance of deeper peatland (>1 m), blanket bog and wet modified bog, and potential high GWDTEs, for the location of turbines and other infrastructure as far as practicable; and
- A degree of forest felling will be required to accommodate access track and Wind Turbine infrastructure, and as bats can utilise edge habitat such as plantation edges for foraging and commuting, this felling will create a small amount of new edge habitats for bats. Relevant NatureScot (SNH *et al.* 2019; updated 2021<sup>204</sup>) guidance recommends a minimum 50 m buffer from Wind Turbine blade tip to edge habitats should be established across the Site to safeguard bats. Buffer distances can be calculated to determine the distance between the turbine base and these edge features using the following formula provided in the guidance. In this case, a minimum set-back distance of 80 m would be used.

### **8.3.8.2 Pre-construction & Construction**

The assessment in this EIA Report has been undertaken on the basis that all works would be carried out in accordance with industry good practice construction measures, guidance and legislation.

There would be a contractual management requirement for the successful Principal Contractor to develop and implement a comprehensive and Site-specific robust Construction Environmental Management Plan (CEMP – see outline plan in Technical Appendix 11.4) in consultation with SEPA and the planning authority. This document would detail how the successful Principal Contractor would manage the works in accordance with all commitments and mitigation detailed in the EIA Report, statutory consents and authorisations, and industry good practice and guidance for environmental management, including implementation of appropriate pollution prevention (particularly in relation to watercourses).

To ensure all reasonable precautions are taken to avoid adverse effects on habitats, protected species and aquatic interests, the following measures would be employed as part of, or complimentary to the CEMP:

- A suitably qualified Ecological Clerk of Works (ECoW) will be appointed prior to the commencement of construction (including felling as part of the Development) to advise the Applicant and the Principal Contractor on all ecological matters. The ECoW will be required to be present onsite during the construction phase and will carry out monitoring of works and briefings with regards to any ecological sensitivities on the Site to the relevant staff of the Principal Contractor and subcontractors.
- A Species Protection Plan (SPP) would be implemented during the construction phase (including felling as part of the Development). The SPP details measures to safeguard protected species known or likely to be in the area. The SPP includes pre-construction surveys, including bat roost checks if required, and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new protected species presence in the vicinity of the construction works.



- Any micrositing of infrastructure will be based on a review of existing ecological data and the completion of pre-construction surveys, to take into consideration the potential for direct encroachment onto protected species features, sensitive habitats or GWDTEs, or indirect alteration of hydrological flows supporting sensitive habitats or GWDTEs. Any micrositing will also take consideration of any buffer distances on protected features identified, as detailed within the SPP.
- Construction work would be undertaken during daylight hours, where possible, in order to prevent disturbance to protected species. A start-up and close down period for up to an hour before and after the core working hours is proposed. This does not include the operation of plant or machinery that may cause a disturbance.
- If construction work is to be undertaken outside of daylight hours, lighting would be used for the works areas only and would not be allowed to spill onto nearby protected species habitats. Quieter construction activities at this time would be undertaken to reduce disturbance. All construction lighting will be deployed in accordance with the following recommendations to reduce or remove impacts on protected species:
  - The use of lighting will be minimised to that required for safe site operations;
  - Lighting will utilise directional fittings to minimise outward light spill and glare (e.g., via the use of light hoods/cowls which direct light below the horizontal plane, preferably at an angle greater than 20° from horizontal); and
  - Lighting will be directed towards the centre of the Site rather than towards the boundaries.
- Under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, Section 23<sup>166</sup>, it is an offence to: injure or destroy and smolt, parr, salmon fry or alevin; injure or disturb any salmon spawn or disturb and spawning bed or any bank or shallow in which the spawn of salmon may be; or obstruct or impede salmon in their passage to any such bed, bank or shallow during the annual close season (October to February inclusive). As such, it is assumed that no instream works will occur between October and the end of May on any watercourse containing suitable fish spawning substrates within the vicinity of any watercourse crossing locations without further survey and assessment by the ECoW in advance of works.

### **8.3.8.3 Operation**

In line with best practice guidance on bats (SNH *et al.* 2019; updated 2021<sup>204</sup>) the Development will utilise the method of reduced rotation speed whilst idling by feathering, at all turbines, to reduce collision risks to bats during the bat active period (April to October). The guidance notes that, "*The reduction in speed resulting from feathering compared with normal idling may reduce fatality rates by up to 50%*". Given the known presence of high collision risk bat species onsite, this measure will be put in place from the start of the operational period of the Development. This mitigation measure does not result in any loss of output for the Development.

## **8.4 Baseline Conditions**

This Section details the results of the desk study and field surveys, providing the ecological baseline for the Site and Study Areas, and includes:

- statutory nature conservation designated sites with ecological features;
- habitats and vegetation; and
- protected or notable species.

### **8.4.1 Desk Study**

#### **8.4.1.1 Designated Sites**

There are no statutory designated sites within the Site. There is one designated site within 5 km that contains ecological qualifying interests: Glen Shira SAC. Details of the site are listed in Table 8.7 and location is shown in Figure 8.1.

**Table 8.7: Ecological Designated Sites within 5 km of the Site**

Site Name	Distance to Site Boundary (excluding access)	Qualifying Interests	Condition & Last Assessed Date
Glen Shira SAC	2.0 km	Western acidic oak woodland	Unfavourable No Change 20 Feb 2018

#### **8.4.1.2 Ancient Woodland**

There are some areas of tree cover categorised as ancient woodland within the Site, including adjacent to the existing forestry track leading from the south of the Site, and adjacent to an area where a stretch of new track is proposed, to the northwest of Wind Turbine T11 (see Figures 8.1 and 8.3). Scottish planning policy NPF 4 identifies ancient woodland as an important national resource that should be protected and enhanced.

#### **8.4.1.3 Habitats**

##### *Peatland*

The Carbon and Peatland Map 2016 was consulted to determine likely peatland classes present (see Figure 8.2). The map is a predictive tool that provides an indication of the likely presence of peat at a coarse scale. It identifies areas of “*nationally important carbon-rich soils, deep peat and priority peatland habitat*<sup>217</sup>” which are categorised as Class 1 and Class 2 peatlands.

As much of the Site is forested, it has been categorised as Class 5 (no peatland vegetation). However, as evidenced from baseline habitat surveys (see section 8.4.2.1), peat or peaty soils do exist within the Site, and large extents of conifer forest in the east have checked growth, being planted on wetter ground conditions. Most of the area surrounding the Site is classified as Class 2 peatland, and as such this is also likely to be reflective of open areas of habitat within parts of the Site, and indicative of historic conditions prior to afforestation.

As the Carbon and Peatland Map is a high-level tool, detailed habitat and peat depth surveys have been carried out across the Site to inform siting, design and mitigation and the detailed Site assessment on peatland and associated habitats (see Chapter 11: Geology, Soils and Peat, and Section 8.4.2.1 of this chapter).

##### *Aquatic Habitats*

The Site includes several watercourses which fall within the Loch Fyne Coastal catchment (see also Chapter 10: Hydrology & Hydrogeology). The watercourses on Site feed into the River Aray to the west. The River Aray was assessed by SEPA as part of their Water Framework Directive (WFD) Classification as having Good water quality and High accessibility for fish migration in 2014<sup>218</sup>.

#### **8.4.1.4 Protected Species**

Data from the NBN Atlas Scotland<sup>205</sup> obtained as part of the desk study indicated that the following protected or notable species have been recorded within 5 km of the Site within the last 15 years (i.e., 2008 and onwards):

- Badger;
- Common lizard (*Zootoca vivipara*);
- Otter;
- Palmate newt (*Lissotriton helveticus*);
- Pine marten;
- Red squirrel: records also from Scotland’s Red Squirrels<sup>210</sup>;
- Slow-worm (*Anguis fragilis*); and

<sup>217</sup> Scotland’s Soil (2017). Carbon and peatland 2016 map. Available at: <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>. Accessed 28.09.23

<sup>218</sup> SEPA (2020). Water Classification Hub. Available at: <https://www.sepa.org.uk/data-visualisation/water-classification-hub/>. Accessed 28.09.23

- Daubenton's bat (*Myotis daubentonii*).

The species records from the NBN Atlas Scotland were provided by the sources listed in Table 8.2.

The Site is located within a region identified by Scottish Forestry as a red squirrel stronghold area<sup>219</sup>.

#### **8.4.1.5 Fish**

The Argyll Fisheries Trust has conducted salmonid population electrofishing surveys of the River Aray since 2003, and in a report of surveys in 2020<sup>213</sup>, four sample locations adjacent to the Site were surveyed (Figure 8.6). It was stated in the report that the habitats found in the River Aray are generally productive for fish with diverse riparian habitat compared to the base poor geology and low diversity of riparian habitat found in the upper reaches of the catchment.

In 2020, Atlantic salmon (*Salmo salar*) fry were recorded at all four sample locations close to the Site, with minimum density ranging from 0.8 to 24.8 fry per 100 m<sup>2</sup>. Classification of fry density was high at one of the four sample points, moderate at one and low at the other two. Estimates of older salmon (parr) densities found at six sites ranged from 0 to 4.6 parr per 100 m<sup>2</sup>.

Trout (*Salmo trutta*) fry were also recorded at all four sample points, with minimum density ranging from 2.3 to 20.0 fry per 100 m<sup>2</sup>. Estimates of older trout densities ranged from 0 to 3.2 parr per 100 m<sup>2</sup>.

The report stated that trout fry densities were expected to be higher in tributary stream sites (including Allt a Mhagarain, draining eastwards from the west of Glen Aray at 208611,714263) when compared to main river sites, which are usually inhabited mostly by juvenile salmon. The Argyll Fisheries Trust's historical data from 2003 to 2020 found varied densities of trout fry in tributaries. Higher densities of fry were found at Allt a Mhagarain in 2011, 2016 and 2017 but fry density was low at this site 2020.

During the Applicant's discussions with the factor, it was noted that salmon are known to spawn within the stretch of the River Aray where the water crossing associated with the northern access route would be located (near sample point 9a shown on Figure 8.6). This sensitivity has been specifically accounted for via the embedded mitigation outlined in section 8.3.8.2.

#### **8.4.1.6 Other Species**

##### *Deer*

Deer are not included in the assessment from a nature conservation perspective but are considered due to potential welfare issues and to inform the assessment on habitats and potential habitat management options.

The results of the 2016 Deer Distribution Survey (DDS)<sup>211</sup>, information from the NBN Atlas<sup>205</sup>, and information from the Inveraray and Tyndrum Deer Management Group (DMG)<sup>212</sup> indicate the following species in the general area where the Site is located:

- Red deer (*Cervus elaphus*): recorded by the DDS in 2007 and/or 2011 and reconfirmed in 2016, records also from NBN Atlas and included in Inveraray and Tyndrum DMG deer statistics;
- Roe deer (*Capreolus capreolus*): recorded by the DDS in 2007 and/or 2011 and reconfirmed in 2016, records also from NBN Atlas and included in Inveraray and Tyndrum DMG deer statistics;
- Sika deer (*Cervus nippon*): recorded by the DDS in 2007 and/or 2011 and reconfirmed in 2016, records also from NBN Atlas and included in Inveraray and Tyndrum DMG deer statistics;

<sup>219</sup> Scottish Forestry (2010). Map of Red Squirrel Stronghold Areas. Available at: <https://forestry.gov.scot/publications/21-map-of-red-squirrel-stronghold-areas> Accessed 28.09.23.

- Fallow deer (*Dama dama*): recorded by the DDS in 2007 and/or 2011 but unconfirmed in 2016.

The latest Deer Working Group report from 2020<sup>220</sup> indicates approximate densities of red deer across 53 management areas. According to the report, the Site lies within an area with an estimated red deer density of 8.1 – 11 deer per km<sup>2</sup>.

#### *Invasive Non-Native Species (INNS)*

INNS are a threat to biodiversity and there is a legal obligation to control their spread. Records of the following INNS have been identified during the desk study within 5 km of the site in the last 15 years (records from NBN Atlas<sup>205</sup>):

- American skunk-cabbage (*Lysichiton americanus*);
- Himalayan balsam (*Impatiens glandulifera*);
- Japanese knotweed (*Fallopia japonica*); and
- Rhododendron (*Rhododendron ponticum*).

### **8.4.2 Field Surveys**

Details regarding field survey methodologies, survey timings, survey area extents, and results are included within Technical Appendices 8.1 – 8.3. The following Sections summarise the baseline conditions as identified during these surveys.

#### **8.4.2.1 Habitats**

##### *NVC and Phase 1*

The habitats survey results are shown in Figure 8.3. The NVC survey data were cross-referenced to the Phase 1 Habitat Survey Classification<sup>221</sup> to allow a broader characterisation of habitats. The extent of Phase 1 habitat types within the Site was calculated using a correlation of NVC communities to their respective Phase 1 types (see Table 8.8 and Appendix 8.3 for details of NVC and non-NVC communities) and their extents mapped within GIS, including within mosaic areas (Figure 8.3). Some parts of the Site (distant from infrastructure) were not surveyed during site visits but instead were mapped to Phase 1 level based on adjacent surveyed habitats and aerial imagery. In Table 8.8 these are shown as “NSA” (Non-surveyed Area) with corresponding Phase 1 code.

In general, much of the Site comprises mature Sitka spruce (*Picea sitchensis*) conifer plantation, with large extents of recently clear-felled forest and recent restock. Towards the eastern half of the Site on higher ground, the density of plantation coverage thins, likely due to underlying wetter, peaty conditions, and heath and mire habitats are present, albeit mainly in a heavily modified and degraded state.

Outside of the forested areas there are extents of open moorland, comprising a mixture of wet heath on slopes and more rocky areas, and bog habitats on flatter ground.

Semi-natural woodland on Site is largely confined to watercourse margins, with a larger extent along the River Aray at the start of the southern access route.

A brief description of these main habitats is provided below, with more detailed information of NVC and non-NVC communities provided in Appendix 8.1.

<sup>220</sup> Deer Working Group (2020). The Management of Wild Deer in Scotland: Deer Working Group Report. Scottish Government, Edinburgh.

<sup>221</sup> Joint Nature Conservancy Council (2010). Handbook for phase 1 habitat survey – a technique for environmental audit. JNCC, Peterborough.

**Table 8.8: NVC and Phase 1 Habitat Types within the Site**

Phase 1 Habitat Descriptions (Code)	Corresponding NVC Types & Other Habitats Recorded	NVC Area (ha)	Phase 1 Area (ha)
Broad-Leaved Semi-Natural Woodland (A1.1.1)	W4b	3.097	18.941
	W17	0.400	
	W11	0.152	
	NSA_A1.1.1	15.291	
Coniferous Plantation Woodland (A1.2.2)	CP	399.167	442.627
	NSA_A1.2.2	43.459	
Recently Felled Coniferous Woodland (A4.2)	CF	73.195	119.770
	NSA_A4.2	46.575	
Unimproved Acid Grassland (B1.1)	U5	1.242	2.511
	U4	0.046	
	U5b	0.796	
	U6	0.123	
	U4d	0.275	
	NSA_B1.1	0.029	
Marsh/Marshy Grassland (B5)	M25b	36.773	46.327
	M23b	0.992	
	M23a	2.017	
	Je	0.683	
	MG10	0.306	
	NSA_B5	5.557	
Continuous Bracken (C1.1)	U20	1.985	8.489
	U20a	2.389	
	NSA_C1.1	4.115	
Tall Ruderal (C3.1)	W24	0.050	0.050
Acid Dry Dwarf Shrub Heath (D1.1)	H12	0.042	0.042
Wet Dwarf Shrub Heath (D2)	M15b	12.522	33.288
	M15	2.938	
	M15c	4.742	
	M15a	1.414	
	M15d	0.000	
	NSA_D2	11.670	
Blanket Bog (E1.6.1)	M17a	12.085	44.664
	M17b	8.518	
	M17c	11.522	
	M18b	3.696	
	M3	1.993	

Phase 1 Habitat Descriptions (Code)	Corresponding NVC Types & Other Habitats Recorded	NVC Area (ha)	Phase 1 Area (ha)
	NSA_E1.6.1	6.851	
Wet Modified Bog (E1.7)	M25a	26.367	59.202
	M25	15.883	
	M20	6.050	
	M20b	4.784	
	M20a	0.574	
	NSA_E1.7	5.545	
Acid Neutral Flush (E2.1)	M6c	2.991	3.171
	M6	0.181	
Standing Water (G1)	SW	0.097	0.097
Running Water (G2)	RW	0.259	0.357
	NSA_G2	0.098	
Quarry (I2.1)	NSA_I2.1	0.171	0.171
Bare Ground (J4)	BG	4.261	4.315
	NSA_J4	0.054	
<b>TOTAL</b>			784.021

The sensitivity and conservation importance of NVC communities and non-NVC types recorded within the Site are shown in Table 8.9. Further details on these categories of conservation are provided in Appendix 8.1.

**Table 8.9: Summary of NVC Communities and Sensitivities / Conservation Importance Recorded within the Site**

NVC Community Code and Name	Potential Groundwater Dependency	Annex I Habitat Type	SBL Priority Habitat
<b>Mires &amp; Wet Heath</b>			
M3	High	7130 Blanket bogs (examples associated with M17-M20)	Blanket bog
M6, M6c	High	-	Upland flushes, fens and swamps
M15, M15a, M15b, M15c, M15d	-	4010 Northern Atlantic wet heaths with Erica tetralix	Upland heathland
M17a, M17b, M17c	-	7130 Blanket bogs	Blanket bog
M18b	-	7130 Blanket bogs	Blanket bog
M20, M20a, M20b	High	-	-
M23a, M23b	Moderate	-	Upland flushes, fens and swamps (applies to M23a only)
M25, M25a, M25b	-	-	-
<b>Dry Heaths</b>			
H12	-	4030 European dry heaths	Upland heathland
<b>Calcifugous Grasslands</b>			

NVC Community Code and Name	Potential Groundwater Dependency	Annex I Habitat Type	SBL Priority Habitat
U4, U4d	-	-	-
U5, U5b	-	-	-
U6	Moderate	-	-
U20, U20a	-	-	-
<b>Woodland &amp; Scrub</b>			
W4b	High		
W11	-	-	Upland birchwoods
W17	-	91A0 Old Sessile Oakwoods	Upland birchwoods
<b>Non-NVC Types</b>			
BG	-	-	-
CF	-	-	-
CP	-	-	-
Je ( <i>Juncus effusus</i> rushes)	Moderate	-	-
RW	-	-	-
SW	-	-	-

### Coniferous Plantation Woodland

The majority of the study area is made up of densely planted commercial coniferous plantation woodland. These plantation woodlands are mostly dominated by Sitka spruce, integrated with the occasional scattered trees of Scots pine (*Pinus sylvestris*). Within areas where the canopy is more open this woodland type can be found forming mosaics with other mire communities.

These types of plantation woodlands are of negligible botanical value due to over-shading and loss of the field flora; patchy areas of moss, cottongrass and/or purple moorgrass (*Molinia caerulea*) are therefore generally all that persists beneath the deep shade and the litter shed by the conifers. At the time of study, the field layer had not re-established itself within clear-felled areas which meant much of the area was devoid of NVC community vegetation.

### Semi-natural Woodland

Broadleaved semi-natural woodland is mostly present as small, scattered patches within the study area, the largest of which follows a section of the Allt a' Mhadaidh burn, flowing westwards into the River Aray (Figure 8.3). These woodland areas are either classified as Ancient Woodland or are adjacent to mapped ancient woodland extents as part of the AWI (Figure 8.1).

The canopy in the study area is often composed of well established, mature, semi-natural tree species. This habitat varies in nature, containing the following NVC communities; W4 *Betula pubescens* – *Molinia caerulea* woodland, W11 *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* woodland and W17 *Quercus petraea* – *Betula pubescens* – *Dicranum majus* woodland.

The W17 community was recorded adjacent to the southern access route along the River Aray, being the community most closely referable to this mixed mature canopy of birch, oak, ash, alder, rowan and occasional Scots pine. This area is categorised as Ancient Woodland (of semi-natural origin), but lacks veteran trees, and in general is dominated by thin birch, with a species-poor ground layer of bramble, ferns, wood sorrel with some deadwood.

## Mire

Wet modified bog encompasses M25 *Molinia caerulea* – *Potentilla erecta* mire and M20 *Eriophorum vaginatum* blanket mire. This habitat features strongly across the study area including the more open areas within the conifer plantation to the north.

Within the study area, M20 wet modified bog is most abundant across level to gently sloping peat and was often found in mosaics with other bog communities. It appears to have been derived from blanket bog through grazing that has led to the scarcity or absence of heather (*Calluna vulgaris*) in the sward. This community has been classified as wet modified bog rather than blanket bog due to the community's lower relative quality as a result of likely historical habitat alteration or modification through a long history of grazing.

The abundant M25 mire areas were identified due to *Molinia* overwhelmingly dominating the sward. This community was identified at community level and in the form of the M25a *Erica tetralix* sub-community and the M25b *Anthoxanthum odoratum* sub-community when categorised as wet modified bog. This flora can have much in common with M15 wet heath, and the M25a here might well be derived from previous wet heath as a result of grazing and burning, both of which can lead to increases of *Molinia* and corresponding decreases of dwarf shrubs.

The M25b was dominated by *Molinia caerulea* in at times a tussocky sward and was found to form mosaics with the other bog, marshy grassland and woodland communities. The M25b sub-community can be classified as marshy grassland where these areas are more dominated by grassland species. In this instance, this sub-community has been classified as wet modified bog due to its close association with other bog related communities and within areas where it is surround by bog communities.

## Wet Heath

Wet dwarf shrub heath is found scattered across the study area. It is entirely made up of the M15 *Trichophorum germanicum* – *Erica tetralix* wet heath NVC community, being recorded at community level along with all sub-communities.

On several occasions the M15a sub-community appears within mosaics with other bog communities, often identified as an area subject to water run-off and containing a large proportion of sedges.

Based on the above information, the broad habitat types that are scoped-in to the assessment of effects due to their extent on Site and their higher nature conservation value are: semi-natural broadleaved woodland (including Ancient Woodland), blanket bog, wet modified bog and wet dwarf shrub heath.

## *Invasive Non-Native Species*

A small stand of giant rhubarb (*Gunnera manicata*) was recorded alongside a watercourse at NN09260,14586.

## *Groundwater Dependent Terrestrial Ecosystems (GWDTEs)*

The NVC results were referenced against SEPA guidance<sup>182,183</sup> to identify those habitats which may be classified, depending on the hydrogeological setting, as being potentially groundwater dependent. Potential GWDTE NVC communities recorded within the Site are identified in Table 8.9 and shown in Figure 8.4.

Within Figure 8.4, the potential GWDTE sensitivity of each polygon containing a potential GWDTE community was classified on a four-tier approach as follows:

- 'Highly – dominant' where potential high GWDTE(s) dominate the polygon;
- 'Highly – sub-dominant' where potential high GWDTE(s) make up a sub-dominant percentage cover of the polygon;
- 'Moderately – dominant' where potential moderate GWDTE(s) dominate the polygon and no potential high GWDTEs are present; and



- Moderately – sub-dominant’ where potential moderate GWDTE(s) make up a sub-dominant percentage cover of the polygon and no high GWDTEs are present.

Where a potential high GWDTE exists in a polygon, it outranks any potential moderate GWDTE communities within that same polygon.

GWDTE sensitivity has been assigned solely on the SEPA listings. However, many of the NVC communities on the list are common habitat types across Scotland and generally of low nature conservation value. Furthermore, depending on several factors such as geology, superficial geology, presence of peat and topography, many of the potential GWDTE communities recorded may in fact be only partially groundwater fed or not dependant on groundwater. Because designation as a potential GWDTE is related to groundwater dependency and not nature conservation value, GWDTE status has not been used as criteria to determine a habitat’s nature conservation value. There is however a statutory requirement to consider GWDTEs and the data gathered during the NVC surveys has been used to inform this assessment in Chapter 10: Hydrology & Hydrogeology.

#### **8.4.22 Protected Species**

This section outlines the results from the protected species surveys. Detailed methodologies, survey timings, and results, including the legal status of each species, are included within Appendix 8.2. Results are presented in Figure 8.5.

##### *Badger*

No confirmed evidence of badger usage was recorded within the Site. Two badger setts were recorded around 500 m from the eastern Site boundary. A mammal track with potential badger feedings signs was recorded in plantation in the middle of the Site, but no further evidence was present.

Some areas of the Site offer suitable habitat for badger, with some areas of mineral soil offering drier and more suitable substrate for building setts than the surrounding peat. There are varied foraging opportunities across the Site, with good connectivity between the woodland and more open habitat types.

##### *Otter*

One spraint was recorded by the Allt a’ Mhadaidh burn in the middle of the Site. The numerous minor watercourses on the Site provide relatively limited foraging resources but do offer suitable commuting routes for otter within the wider area and provide connectivity between the River Aray in the west and water bodies such as Lochan Mhadaidh to the east.

##### *Water Vole*

Four burrows of a size and position suitable for water vole were recorded in areas over 400 m from the south of the Site boundary, with an old latrine found close to one of the burrow entrances. One upland location with two burrows of water vole size was recorded within the Site, but no definitive signs were observed. Watercourses within the Site are generally steep, fast flowing, and offer limited suitability for the species.

##### *Pine Marten*

Several potential scats were recorded across the survey area. The mixed-age conifer forestry and rocky outcrops offer potential shelter for pine marten, with area of more open land for hunting available nearby. A deceased individual was noted during a site visit in September 2022, on the A819 road which runs adjacent to the western Site Boundary, supporting the assumption that pine martens are present in the Site.

##### *Red Squirrel*

No evidence of squirrel usage was recorded within the Site. One feeding station potentially attributable to red squirrel was recorded during surveys in the wider area, within semi-natural

woodland around 2km south of the Site. The coniferous forestry within the Site offers some suitability for foraging and drey building, with mature trees of cone-bearing age able to be utilised by red squirrels. Smaller areas of broadleaved woodland in the central and southern sections of the Site may also be utilised.

### Reptiles

Two common lizard sightings were recorded during surveys. A number of features with the potential to act as hibernacula for reptiles within the Site, including dry stone walls and rock piles, were also noted.

### 8.4.23 Bats

#### Automated Detector Activity Surveys

Static bat detectors were deployed at 14 locations on site between May and September 2021 over a total period of 46 days, covering spring, summer and autumn and up to a maximum of 14 consecutive nights per season. A total of 625 data recording nights were achieved.

Bats were detected on all 46 nights between May and September, with five bat species and one genus-level classification recorded: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auratus*), *Myotis* spp., Daubenton's and Natterer's (*Myotis nattereri*) bat (Table 8.10).

**Table 8.10: Total Number of Bat Passes for Each Species Across All Locations**

Species/Species Group	No. of Registrations	Percentage of Total (%) <sup>222</sup>
Common pipistrelle	1,551	20
Soprano pipistrelle	5,722	74
Brown long-eared bat	89	1.2
<i>Myotis</i> spp.	30	0.4
Daubenton's	317	4.1
Natterer's	28	0.4
<b>Total</b>	<b>7,737</b>	<b>100</b>

#### Quantifying Activity

The bat data were analysed using Ecobat software<sup>223</sup> to gain estimates of relative bat activity levels within the Site. The data were then evaluated in accordance with NatureScot *et al.* (2019; updated 2021<sup>204, 224</sup>) guidance tables to determine overall Site risk level for each species. The guidance explains that: "The tool compares data entered by the user with bat survey information collected from similar areas at the same time of year...Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain".

Data from the Site were compared with data within a range of 100 km of the Development and within 30 days of the survey date from all years. The full Ecobat Report is provided in Appendix 8.3.

Table 8.11 presents the summary results of the Ecobat analysis for the Site. The percentile rank is attributed to one of the following five bat activity categories as defined within the guidance: Low

<sup>222</sup> The 'Total' percentage may not be exactly 100% due to the rounding of the percentages per species – output is taken directly from the Ecobat Report – see Annex F (Table 14) of Appendix 8.3.

<sup>223</sup> Mammal Society (2017). Ecobat. Available at: <http://www.mammal.org.uk/science-research/ecostat/>. Accessed 28.09.23.

<sup>224</sup> <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> Accessed 28.09.23.

(0-20%), Low-Moderate (20-40%), Moderate (40-60%), Moderate-High (60-80%) and High (80-100%). The median percentile represents the most frequent activity category and the 'typical' bat activity levels in the Site, the maximum percentile can be used to help interpret if there are unusually high levels or important peaks of bat activity. The reference range is the number of nights for each species that the data was compared to (a reference range of 200+ is recommended to be confident in the relative activity level).

**Table 8.11: Summary of Ecobat Analysis**

Species / Group	Median Percentile	Activity Level Category	95% Confidence Intervals	Maximum Percentile	Activity Level Category	Nights Recorded (out of 625)	Reference Range
Myotis spp.	38	Low – Moderate	54.5 - 54.5	71	Moderate – High	14	1817
Daubenton's bat	3	Low	3 - 45	83	High	159	384
Natterer's bat	3	Low	3 - 3	52	Moderate	23	258
Common pipistrelle	38	Low – Moderate	47 - 79	99	High	217	4134
Soprano pipistrelle	61	Moderate – High	74 – 89.5	99	High	372	5366
Brown long-eared bat	3	Low	3 – 52	66	Moderate – High	59	533

### Assessing Potential Risk

As detailed in Appendix 8.3, the Site risk level is determined by project size and habitat risk. The Development consists of 13 wind turbines that are over 50 m in height, and so falls within the 'Medium' project size using NatureScot *et al.* (SNH, 2019; updated 2021<sup>224</sup>) guidance.

In terms of habitat risk for bats, there are no buildings, structures, or trees with moderate and/or high bat roosting potential within the main Site (excluding access routes). Foraging habitat quality and connectivity is moderate with conifer forestry, small upland burns and open areas of heath, blanket bog and marshy grassland habitats present, resulting in a habitat risk classification of 'Moderate'.

High collision risk species (as per SNH *et al.* 2019; updated 2021, guidance<sup>224</sup>) recorded within the Study Area comprise common and soprano pipistrelle. All other bat species recorded are categorised as low collision risk and of low population vulnerability in line with the same guidance. Combining site risk level with the Ecobat activity output allows the determination of the overall site risk score for each high collision risk species, which is summarised in Table 8.12.

**Table 8.12 Risk Assessment Scores Based on Median and Maximum Percentiles for High Collision Risk Species**

Species	Risk Assessment Score based on Median Percentile	Risk Assessment Score based on Maximum Percentile
Common pipistrelle	Medium (6)	High (15)
Soprano pipistrelle	Medium (12)	High (12)

Figures 8.9 and 8.10 further illustrate the results of the median monthly risk assessment scores for high collision risk bat species recorded in the Study Area at each survey location and per month<sup>225</sup>.

#### Preliminary Bat Roost Assessment

No roost sites were observed during surveys. A small number of tree features with moderate potential to support roosting bats were identified from surveys in the wider area – all being over 400 m from the southern Site boundary. The majority of the trees were single isolated individuals or within a small cluster. A small number of trees offering low bat roost potential were recorded within the Site along the Allt a' Mhadaidh burn (Figure 8.8). The semi-natural woodland area adjacent to the River Aray at the start of the southern access route offers some low to moderate roost potential, with some standing deadwood of high suitability.

The Ecobat output also includes an analysis of bat activity data at sample locations referenced against the known roost emergence times for each high collision risk bat species during the maternity season (15<sup>th</sup> June to 30<sup>th</sup> July). This indicates whether a roost site may be present in close proximity to the sample location. Bat activity indicated the potential for nearby roost sites at detector locations 1, 2, 3, 5, 6, 7 and 12, which recorded *Pipistrellus* species during their known emergence time ranges. Locations 3 and 5 included registrations within the maternity roost season.

#### **8.4.24 Fish**

An assessment of fish habitat suitability and barriers to migration was carried out along watercourses within the Site that drain into the River Aray (Figure 8.6). All but one of the surveyed watercourses (a total of 15 from within the central portion of the Site) were noted to have culverts installed under forestry tracks, with up to nine of these noted to be potentially impassable to fish (culverts being up to 2 m in height above downstream watercourse). Based on the results of surveys carried out along the River Aray by the Argyll Fisheries Trust (section 8.3.5.1) and Site conditions, it is possible that a small population of brown trout may be present on some larger watercourses, particularly in the western half of the Site, but other target species, including freshwater pearl mussels, are likely to be absent.

#### **8.4.25 Other Species**

A disused mammal hole was identified in the course of the surveys which was of a size and shape with potential for supporting protected species; there were no field signs of any protected species at these features and their use by a protected species was not confirmed. Such features may be used by other mammal species survey as red fox (*Vulpes vulpes*) which was recorded on Site.

### **8.4.3 The Do-Nothing Scenario**

In the absence of the Development, it is likely that the IEFs would generally remain as they are at present, although the commercial forestry present across much of the Site would continue to mature and be felled in line with the felling plan<sup>226</sup>, which may create temporary localised changes in distribution and abundance until replanting and canopy closure. Vegetation and habitat composition and extents in the Study Area may also fluctuate marginally in the long-term in line with climate change and variations in deer numbers.

## **8.5 Assessment of Potential Effects**

This Section provides an assessment of the likely effects of the Development on the IEFs identified in Section 8.5.2. The assessment of effects is based on the project description outlined in Chapter 2: Development Description, and is structured as follows:

- Construction effects;

<sup>225</sup> Risk assessment scores are displayed per month rather than per season due to the format and nature of the Ecobat outputs.

<sup>226</sup> Fyne Forestry Ltd. (2013). Ladyfield Forest Management Plan 2014 to 2033.

- Operational effects; and
- Decommissioning effects.

## **8.5.1 Ecological Features Scoped-out of the Assessment**

### ***8.5.1.1 Designated Sites and Ancient Woodland***

It is considered that there is no connectivity between the Site and any ecologically designated site. Glen Shira SAC and Ardchyline Wood SSSI are designated for woodland habitat and given the distance from these designations to the Site (Table 8.7), and their location within separate watersheds, it is considered that there is no connectivity. Potential effects on these, and all other designated sites can therefore be scoped out of the assessment (with no likely significant effects predicted for any European site within a Habitats Regulations Appraisal context). NatureScot agreed in their scoping opinion that there is no potential connectivity between the Development and Glen Shira SAC (Table 8.1).

### ***8.5.1.2 Terrestrial Habitats***

As per Section 8.3.3, habitats that are considered to be of low conservation value and are very common habitat types locally and regionally are scoped-out of the assessment. Also scoped out are habitats that may be of higher conservation value, but are of very limited extent and/or are not located near any planned infrastructure (see Section 8.4.2.1 and extents in Table 8.8).

### ***8.5.1.3 Aquatic Habitats and Species***

Effects on aquatic habitats including standing water, running water and fish are scoped out of the assessment. Whilst the River Aray is known to support salmonid populations, barriers to migration exist on the majority of watercourses, precluding migratory salmonids accessing much of the Site. Whilst there is still hydrological connectivity between the Development and watercourses that are used by migratory salmonids, it is considered that the embedded mitigation measures during construction, as detailed in Section 8.3.8 and the outline CEMP (Technical Appendix 11.4) would prevent potential significant effects on fisheries.

To avoid direct or indirect impacts on water quality and hydrogeomorphology a minimum 50 m buffer distance between infrastructure and watercourses has been adhered to where possible (see Chapter 10: Hydrology & Hydrogeology). All Wind Turbines are outside of this buffer.

The design of permanent and temporary access track water crossings would comply with SEPA good practice guidance to minimise impacts on fish and their habitat. As detailed in Section 8.3.8, the embedded mitigation includes that construction work would comply with a CEMP developed by the Principal Contractor (see outline in Technical Appendix 11.4), which would be monitored by a suitably experienced ECoW. The CEMP would include good practice mitigation for effective silt and pollution prevention and undertaking works in accordance with SEPA best practice guidance.

It is assumed that due to the potential for fish spawning activities, no instream construction works in the River Aray will occur between October and the end of May, without further survey and assessment by the ECoW for suitably qualified fisheries consultant in advance of works. A monitoring programme covering the immediate pre-construction (including felling for the Development), during-construction and post-construction periods would also be implemented, following Marine Scotland (2021<sup>227</sup>) guidance on monitoring watercourses at wind farms.

With this embedded mitigation in place, water pollution impacts and associated potential significant effects associated with the Development on watercourses and aquatic ecology, including fish, are considered unlikely and therefore these features are scoped out of further assessment.

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<sup>227</sup> <https://www.gov.scot/publications/monitoring-watercourses-in-relation-to-onshore-wind-farm-developments-generic-monitoring-programme/> Accessed 28.09.23.

### 8.5.1.4 Protected Species

All protected species have been scoped out, with the exception of commuting/foraging pipistrelle bats during the operational period, due to a lack of confirmed protected features (e.g. setts, dens, holt, bat roosts), absence or very low frequency of signs, and general low suitability of the Site. The SPP and the CEMP (see Embedded Mitigation, Section 8.3.8 and Technical Appendix 11.4 for outline CEMP) will ensure that all reasonably practicable measures are taken during construction so that provisions of the relevant wildlife legislation are complied with in relation to all protected species, including roosting bats, should any evidence be found during pre-construction surveys. Bats, red squirrel and pine marten have been taken into consideration as part of biodiversity enhancement measures within the OBEMP (Appendix 8.4).

### 8.5.2 Important Ecological Features

A summary of the Nature Conservation Value of the remaining IEFs identified within the Site and surrounding area (as confirmed through survey results and consultation outlined above) which have been scoped-in to the assessment is given in Table 8.13 below, together with the justification for inclusion.

**Table 8.13 Nature Conservation Value of Scoped-in IEFs**

IEF	Nature Conservation Value	Justification
Blanket Bog and Wet Modified Bog	Local	Annex 1 habitat but of limited extent and degraded condition.
Wet Dwarf Shrub Heath	Local	Annex 1 habitat but of limited extent and degraded condition.
Semi-natural broadleaved woodland	Regional	Likely ancient woodland in origin (but not AWI designated), of greater than 0.25 ha within the Site.
<i>Pipistrelle spp.</i> bats (operational period only)	Local	European protected species determined to be of high collision risk. No evidence of roosting on Site.

### 8.5.3 Construction Effects

This Section provides an assessment of the likely effects of the construction of the Development upon the scoped-in IEFs.

#### 8.5.3.1 Assumptions of the Assessment

The following assumptions are included in the assessment of otherwise unmitigated effects on IEFs:

- A construction period which would last for up to 24 months, comprising civil works (18 months), Wind Turbine delivery and erection (three months) and Wind Turbine commissioning and site reinstatement (three months).
- Development infrastructure will include Wind Turbines, turbine foundations, crane hardstanding, upgrades to existing access tracks, new access tracks, underground cabling, on-site substation and battery energy storage system and maintenance building, temporary construction compound and laydown area.
- Existing access roads will be reused where possible.
- All electrical cabling between the Wind Turbines and the associated infrastructure would be underground in shallow trenches which would be reinstated post-construction and, in all cases, follow the access tracks.
- Any temporary infrastructure areas, and disturbance areas around permanent infrastructure during construction would be reinstated or restored before the construction phase ends.
- The embedded pre-construction and construction phase mitigation described in Section 8.3.8 above will be fully applied e.g., the presence of an ECoW, adherence to the SPP and CEMP.

- All new tracks constructed would be permanent and would remain in place beyond the 40-year consent period for other land uses, in particular commercial forestry.

### 8.5.3.2 Habitats

The most tangible impact during construction of the Development would be direct habitat loss due to the construction of infrastructure such as new access tracks, turbines, hardstandings, substation and battery energy storage system. Much of this infrastructure would be permanent, however the temporary construction compounds and borrow pit would be restored at the end of construction.

There may also be some indirect habitat losses to wetland habitats due to drainage impacts associated with permanent infrastructure. For the purpose of this assessment, it is assumed that wetland habitat losses due to indirect drainage effects may extend out to 10 m from permanent infrastructure (i.e., in keeping with standard indirect drainage assumptions within carbon calculator guidance). It is expected that any indirect drainage impacts would only affect wetland habitats such as blanket bog, wet modified bog, wet heath, flushes etc. No indirect drainage effects are expected to impact or alter the quality or composition of non-wetland habitats, such as dry heath, bracken, acid grassland etc. as such only direct habitat loss applies to those habitats.

Table 8.14 details the estimated relative losses expected to occur, by habitat type, for all new permanent infrastructure.

Temporary direct habitat losses due to the creation of temporary construction compounds and a borrow pit have been calculated separately and are detailed in Table 8.15. Additionally, the extent of woodland habitats to be felled to create a corridor adjacent to existing tracks for construction access is included. This is considered to be temporary loss, as it is assumed these areas would be replanted.

**Table 8.14 Estimated Loss of Habitat for Permanent Infrastructure**

Phase 1 Habitat Type	Phase 1 Site Extent (ha)	NVC Community Code or Habitat Type <sup>228</sup>	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of NVC Type in Site	Direct & Indirect Habitat Loss (ha)	Direct & Indirect Habitat Loss as a % of NVC Type in Site
Broad-Leaved Semi-Natural Woodland (A1.1.1)	22.221	W4b	0.061	1.98%	0.281	9.08%
		W17	0.129	32.35%	n/a	n/a
		W11	0.028	18.37%	n/a	n/a
		NSA_A1.1.1	0.029	0.19%	0.433	2.83%
Coniferous Plantation Woodland (A1.2.2)	446.803	CP	8.693	2.18%	n/a	n/a
		NSA_A1.2.2	0.001	0.00%	n/a	n/a
Recently Felled Coniferous Woodland (A4.2)	129.749	CF	0.474	0.65%	n/a	n/a
		NSA_A4.2	0.154	0.33%	n/a	n/a
Unimproved Acid Grassland (B1.1)	16.255	U4	0.004	7.79%	n/a	n/a
Marsh/Marshy Grassland (B5)	78.523	M25b	0.393	1.07%	1.440	3.92%
		Je	0.012	1.76%	0.096	14.12%

<sup>228</sup> Only specific habitats, communities or features subject to habitat losses are presented within this table. Any habitats or communities not listed here are not subject to any predicted direct or indirect habitat losses.

Phase 1 Habitat Type	Phase 1 Site Extent (ha)	NVC Community Code or Habitat Type <sup>228</sup>	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of NVC Type in Site	Direct & Indirect Habitat Loss (ha)	Direct & Indirect Habitat Loss as a % of NVC Type in Site
		MG10	0.012	3.98%	0.031	10.16%
Continuous Bracken (C1.1)	14.760	U20	0.114	5.73%	n/a	n/a
Tall Ruderal (C3.1)	0.088	W24	0.011	22.12%	n/a	n/a
Wet Dwarf Shrub Heath (D2)	94.098	M15b	0.225	1.80%	0.720	5.75%
		M15	0.049	1.68%	0.200	6.82%
		M15c	0.059	1.25%	0.243	5.11%
		M15a	0.061	4.30%	0.216	15.29%
		NSA_D2	0.007	0.06%	0.305	2.61%
Blanket Bog (E1.6.1)	66.176	M17a	0.025	0.21%	0.097	0.81%
		M17b	0.023	0.27%	0.092	1.08%
		M17c	0.072	0.62%	0.219	1.90%
		M3	0.032	1.62%	0.095	4.78%
Wet Modified Bog (E1.7)	149.066	M25a	0.485	1.84%	1.554	5.89%
		M25	0.319	2.01%	1.331	8.38%
		M20	0.217	3.59%	0.929	15.35%
		M20a	0.010	1.81%	0.015	2.54%
Acid Neutral Flush (E2.1)	8.752	M6c	0.096	3.21%	0.324	10.84%
Running Water (G2)	1.333	RW	0.021	8.05%	n/a	n/a
Quarry (I2.1)	0.171	NSA_I2.1	0.108	63.11%	n/a	n/a
Bare Ground (J4)	4.464	BG	1.753	41.14%	n/a	n/a



**Table 8.15 Estimated Temporary Loss of Habitat**

Phase 1 Habitat Type	Phase 1 Site Extent (ha)	NVC Community Code or Habitat Type <sup>229</sup>	Temporary Construction Compounds and Bridge working area		Woodland removal corridor	
			Direct Habitat Loss (ha)	Direct Habitat Loss as a % of NVC Type in Site	Direct Habitat Loss (ha)	Direct Habitat Loss as a % of NVC Type in Site
Broad-Leaved Semi-Natural Woodland (A1.1.1)	22.221	W4b	0.000	0.00%	0.077	2.48%
		W17	0.072	17.89%	0.019	4.72%
		W11	0.000	0.00%	0.011	7.17%
		NSA_A1.1.1	0.167	1.09%	-	-
Coniferous Plantation Woodland (A1.2.2)	446.803	CP	0.134	0.03%	5.965	1.49%
Recently Felled Coniferous Woodland (A4.2)	129.749	CF	0.034	0.05%	-	-
Tall Ruderal (C3.1)	0.088	W24	0.026	51.09%	-	-
		NSA_D2	0.061	0.52%	-	-
Running Water (G2)	1.333	RW	0.028	10.89%	-	-
		NSA_G2	0.014	13.81%	-	-
Quarry (I2.1)	0.171	NSA_I2.1	0.010	5.81%	-	-
Bare Ground (J4)	4.464	BG	0.050	1.17%	-	-

The following sections assess the impact of these losses for each habitat IEF.

*Blanket Bog and Wet Modified Bog*

Impact: impacts upon wet modified and blanket bog habitats will be direct (through permanent and temporary habitat loss) and indirect (through potential drying effects upon neighbouring bog habitats) occurring from the construction period into the operation period. Direct loss would occur in areas where permanent infrastructure such as access tracks, turbine foundations, and hardstandings are sited on these habitat types. The excavation of these habitat types for temporary infrastructure would also lead to the losses of blanket bog and wet modified bog due to the long-term effect on the ecological and hydrological structure and function of these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure (up to 10 m from infrastructure is assumed) and disruption to hydrological flows.

<sup>229</sup> Only specific habitats, communities or features subject to habitat losses are presented within this table. Any habitats or communities not listed here are not subject to any predicted direct or indirect habitat losses.

Sensitivity: The Nature Conservation Value of these habitats has been categorised as Local (as detailed in Table 8.13). The Conservation Status of these habitats assessed by JNCC (2019<sup>230</sup>) is 'Unfavourable-Bad' with a 'Stable' trend at the UK level.

Magnitude of impact: A total of approximately 0.1 ha of M17 and M3 blanket bog habitats would be directly lost due to permanent infrastructure, possibly extending out to 0.5 ha when considering indirect impacts. For M20 and M25 wet modified bog, the predicted direct and indirect losses would be 1.0 and up to 3.8 ha respectively. This gives a total indirect habitat loss of 1.2 ha and an indirect habitat loss of up to 4.3 ha for bog and wet modified bog combined.

The UK has an estimated 2,182,200 ha of blanket bog<sup>230</sup> of which around 1,759,000 to 1,800,000 ha is in Scotland<sup>231</sup> (approximately 23% of the land area)<sup>232</sup>. In Argyll, bog and wet modified bog habitats are widely distributed (as per distribution map in JNCC, 2019a) and can be extensive in open areas. Figure 8.2 suggests from the Carbon & Peatland map, that modified bog in particular is relatively common in the local area, being classified as Class 2 peatland. Within a local context, direct and indirect losses are predicted to result in no more than a low, long-term impact magnitude.

Significance of Effect: Given the above consideration of sensitivity and magnitude, the effect of direct habitat loss on blanket bog and wet modified bog is considered to be minor adverse and **not significant** in the context of the EIA Regulations.

#### *Wet Dwarf Shrub Heath*

Impact: impacts upon wet dwarf shrub heath habitats will be direct (through permanent and temporary habitat loss) and indirect (through potential drying effects upon neighbouring wet heath habitats) occurring from the construction period into the operation period. Direct loss would occur in areas where permanent infrastructure such as access tracks, turbine foundations, and hardstandings are sited on these habitat types. The excavation of these habitat types for temporary infrastructure would also lead to the losses of wet heath due to the long-term effect on the ecological and hydrological structure and function of these habitat types. In addition, there may be indirect losses as a result of drainage around infrastructure (up to 10 m from infrastructure is assumed) and disruption to hydrological flows.

Sensitivity: The Nature Conservation Value of these habitats has been categorised as Local (Table 8.13). The Conservation Status of these habitats assessed by JNCC (2019b<sup>233</sup>) is 'Unfavourable-Bad' with a 'Deteriorating' trend at the UK level.

Magnitude of impact: A total of approximately 0.4 ha of M15 wet heat habitats would be directly lost due to permanent infrastructure, possibly extending out to 1.7 ha when considering indirect impacts.

The UK has an estimated 508,817 ha of wet heath<sup>233</sup> of which around 340,000 and 400,000 ha is in Scotland (approximately 5% of the land area)<sup>233</sup>. In Argyll, wet heath is widely distributed (see distribution map in JNCC, 2019b) and can be extensive in open areas. The habitat is common locally on slopes and on soils outside of forested areas. Within a local context, no more than a low, long-term impact magnitude is predicted due to habitat loss.

Significance of Effect: Given the above consideration of sensitivity and magnitude, the effect of direct habitat loss on wet heath is considered to be minor adverse and **not significant** in the context of the EIA Regulations.

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<sup>230</sup> JNCC (2019). Conservation status assessment for the habitat: H7130 - Blanket bogs <https://jncc.gov.uk/jncc-assets/Art17/H7130-UK-Habitats-Directive-Art17-2019.pdf> Accessed 28.09.23.

<sup>231</sup> <https://jncc.gov.uk/jncc-assets/Art17/H7130-SC-Habitats-Directive-Art17-2019.pdf> Accessed 28.09.23.

<sup>232</sup> <https://www.nature.scot/landscapes-habitats-and-ecosystems/habitat-types/mountains-heaths-and-bogs/blanket-bog> Accessed 28.09.23.

<sup>233</sup> JNCC (2019b). Conservation status assessment for the habitat: H4010 - Northern Atlantic wet heaths with Erica tetralix. <https://jncc.gov.uk/jncc-assets/Art17/H4010-UK-Habitats-Directive-Art17-2019.pdf> Accessed 28.09.23.

### *Semi-natural Broadleaved Woodland (including Ancient Woodland)*

Impact: impacts upon semi-natural broadleaved woodland due to permanent and temporary habitat loss would occur from the construction period into the operation period.

Sensitivity: The Nature Conservation Value of these habitats within the Site has been categorised as Regional, being over 0.25 ha in extent when including indirect impacts (Table 8.13), and mainly ancient in origin (either AWI designated or adjacent to AWI designated woodland). The Conservation Status of these habitats is considered to be unfavourable.

Magnitude of impact: An estimated 0.0714 ha of direct habitat loss of W4b woodland is predicted to occur due to clearing for a section of access track near T11 (0.06 ha being for permanent infrastructure, and 0.08 ha due to felling of adjacent trees for access). As noted above in Section 8.5.1, measures would be in place as part of the CEMP to avoid indirect effects such as pollution incidents on wet habitats such as W4b semi-natural broadleaved woodland, and so only direct loss requires consideration here (with losses due to access tracks rather than turbines with foundations).

A very small area of low quality W11 woodland (0.05ha) adjacent to the main road and conifer plantation would be lost due to construction of the northern access route.

At the start point of the southern access route, an area of 0.15 ha of W17 woodland included under the AWI would be permanently lost due to construction of a bell-mouth junction, with an additional 0.24 ha lost due to the requirement of a temporary working area.

Although relatively uncommon within the Site, semi-natural woodland of ancient origin is more widespread in the local area, particularly along Glen Aray and Glen Shira (see Figure 8.1 for distribution of AWI woodland as an example). The condition of the AWI-classified woodland within the Site is generally relatively poor, with some areas now conifer plantation. At the southern access point, the woodland is dominated by thin birch trees and the ground flora is relatively impoverished due to the presence of a historic metalled road in that location, now encroached by woodland. Within a local and regional context, no more than a low, long-term impact magnitude is therefore predicted.

Significance of Effect: Given the above considerations of sensitivity and magnitude, as well as condition of woodland, the effect of direct habitat loss on semi-natural broadleaved woodland is considered to be minor adverse and **not significant** in the context of the EIA Regulations.

## **8.5.4 Operational Effects**

This Section provides and assessment of the likely effects of the operation of the Development upon scoped-in IEFs.

### **8.5.4.1 Habitats**

All likely direct and indirect effects on habitats have been considered in the Construction Effects section above.

Although the majority of habitat loss is associated with infrastructure required for the operation of the Development (rather than temporary construction infrastructure), the physical loss of habitat would occur during the construction stage and is therefore considered within Section 8.5.3.2.

Indirect effects on wetland habitats would largely occur during the operational phase as potential drying effects become established. However, for ease and clarity assessing effects on habitats, these are considered within Section 8.5.3.2.

### **8.5.4.2 Pipistrelle Bats**

Impact: During the operational phase, there is a potential collision risk to commuting and foraging bat species, together with the risk that bats may be affected by barotrauma when flying in close proximity to moving turbine blades. For the purposes of this assessment, the potential impacts from barotrauma are assumed to be the same as for collision risk. This is due to the lack of

published empirical evidence in causes of bat fatalities around wind farms and the difficulties in determining whether bat fatalities are due to collisions or barotrauma.

Research by DEFRA (2016<sup>234</sup>) found that most bat fatalities at UK wind farms have been common pipistrelle, soprano pipistrelle and noctule bats. Further work by Richardson *et al.* (2021<sup>235</sup>) found that common pipistrelle activity rates were higher at Wind Turbine locations than at control locations in similar habitat, suggesting that this species may be at particular risk. In the same study soprano pipistrelle activity was comparable between sites with no attraction or repulsion by Wind Turbines. It is suggested the observed higher levels of activity could be because there are more individual bats around turbines, or because bats spend more time in these locations relative to controls, even if the number of individual bats remains the same; however, it is not possible to distinguish between these possibilities using acoustic bat data.

Because the proposed turbines have a blade tip height of 180 m, they will require red aviation warning lights. A five-year study by Spoelstra *et al.* (2017<sup>236</sup>) concluded that foraging bats are not attracted to red lighting. The reason for this is that white and green spectrum lights attract foraging insects whilst red lights do not. Based on this, the authors advised that *"...in order to limit the negative impact of light at night on bats, white and green light should be avoided in or close to natural habitat, but red lights may be used if illumination is needed"*. A study by Voight *et al.* (2018<sup>237</sup>) found evidence of attraction of migratory soprano pipistrelle to red lighting. Soprano pipistrelles do not migrate in the UK as they do in continental Europe, so this finding is not relevant to the Development. The explanation for contrasting findings by Spoelstra *et al.* (2017<sup>236</sup>) was that *"migratory bats may be more susceptible to light sources of specific wavelength spectra because vision may play a more dominant role than echolocation during migration. Non-migratory bats might use orientation cues that are more involved during general hunting behaviour, for example, echoes reflected from local landmarks, instead of cues from natural or artificial light sources"*.

Sensitivity: the Nature Conservation Value of pipistrelle bats is considered to be Local (Table 8.13). Both common and soprano pipistrelle are widespread in southern Scotland. Common pipistrelle is assessed in the JNCC (2019c<sup>238</sup>) report as 'Favourable' and 'Improving' conservation status at the UK level and soprano pipistrelle is assessed as 'Favourable' and 'Stable' at the UK level (JNCC, 2019d<sup>239</sup>). Overall sensitivity is therefore considered to be medium for both pipistrelle species.

Magnitude of impact: Following NatureScot (SNH *et al.* 2019; updated 2021) guidance, evaluating the vulnerability of a bat population to wind farms is based on three factors: (i) activity level recorded, (ii) population vulnerability (determined by collision risk of species and population size) and (iii) site risk level. These factors are multiplied to generate an overall risk assessment score per species of either Low (0-4), Moderate (5-12) or High (15-25). Appendix 8.3 Bat Survey Report presents the results of this risk assessment for pipistrelle species and provides detailed results from the Ecobat software analysis. Figures 8.9 and 8.10 also present the spatial and temporal risk categories for both pipistrelle species, based on the results of the monitoring undertaken at locations across the site in 2021. A summary is provided below to inform the assessment.

(i) The following average annual site activity levels (median and maximum percentiles) were recorded in 2021:

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<sup>234</sup> DEFRA (2016). Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management. University of Exeter.

<sup>235</sup> Richardson, S.M., Lintott, P.R., Hosken, D.J., Economou, T and Mathews, F. (2021). Peaks in bat activity at turbines and the implications for mitigating the impact of wind energy developments on bats. *Sci Rep.* 11, 3636.

<sup>236</sup> Spoelstra, K., van Grunsven, R. H. A., Ramakers, J. J. C., Ferguson, K. B., Raap, T., Donners, M., Visser, M. E. (2017). Response of bats to light with different spectra: Light-shy and agile bat presence is affected by white and green, but not red light. *Proceedings Royal Publishing B*, 284, 20170075. <https://doi.org/10.1098/rspb.2017.0075>

<sup>237</sup> Voigt, C.C., Rehnig, K., Lindecke, O., Pētersons, G. (2018) Migratory bats are attracted by red light but not by warm white light: Implications for the protection of nocturnal migrants. *Ecology and Evolution*. 2018;8:9353–9361.

<sup>238</sup> <https://jncc.gov.uk/jncc-assets/Art17/S1309-UK-Habitats-Directive-Art17-2019.pdf> Accessed 28.09.23.

<sup>239</sup> <https://jncc.gov.uk/jncc-assets/Art17/S5009-UK-Habitats-Directive-Art17-2019.pdf> Accessed 28.09.23.

- common pipistrelle: Low-moderate (median) to High (maximum); and
- Soprano pipistrelle: Moderate-high (median) to High (maximum).

(ii) Due to having a 'high' collision risk and a 'common' population abundance rating, common and soprano pipistrelle bat are classified as having 'medium' population vulnerability.

(iii) The Site has been categorised as a 'Moderate' (level 3) site risk to bats due to its 'Medium' project size and 'Moderate' habitat risk (see Appendix 8.3: Bat Survey Report).

The following overall risk assessment score for 'Median' and 'Maximum' percentiles was therefore obtained for the two bat species:

- common pipistrelle: Medium (6) (median) to High (15) (maximum); and
- soprano pipistrelle: Medium (12) (median) to High (15) (maximum).

To provide an indication of how activity varies spatially and temporally by species, Figures 8.9 and 8.10 show the overall median monthly risk assessment scores (low to high) for pipistrelle species at the various sample locations. Table 6-5 of Technical Appendix 8.3 additionally presents the percentage of sample locations in each survey month where a median and maximum percentile 'High' risk assessment score was recorded.

In general, clearfell and plantation edge habitats are likely to provide suitable foraging or commuting habitat for pipistrelles, and it is evident that much of the Site is used by both species, albeit mainly in relatively low numbers. Overall, most median risk levels per survey at sample locations for both pipistrelle species were rated as low or medium throughout the survey season, with no obvious seasonal peaks. There were only three detector location which recorded high levels of risk for common pipistrelle (locations 3, 6 and 7) with only location 3 (which is over 1 km from the nearest Wind Turbine) having a high rating in more than one month.

For soprano pipistrelle, four detector locations recorded high risk levels in any month, but only in two (both over 1 km from the nearest Wind Turbine) was this in more than one month.

Thus, for both species, the typical median risk scores (considered in this case more relevant than maximum risk scores due to a lack of seasonal peaks) based on those detectors in areas close to the proposed Wind Turbines would likely be lower than the scores for the overall Site.

As outlined in section 8.3.8, Embedded Mitigation, a minimum tree set-back distance of 80 m from turbine blade-tip is considered to reduce collision risks to pipistrelle bats by creating sufficient distance to commuting and foraging edge features and reducing activity levels in those areas compared to baseline results. In addition, the Development will utilise the method of reduced rotation speed whilst idling by feathering, at all turbines, to reduce collision risks to bats from April to October. Together, these two measures are predicted to reduce the overall median risk assessment of 'medium' for common pipistrelle towards a 'low' score and also reduce the risk to soprano pipistrelle.

Overall, with medium risks to the two species (likely to be reduced when excluding data from detectors >1 km from Wind Turbines and embedded mitigation), within a population context the impact is considered to be no more than long-term, low magnitude for both species.

Significance of Effect: Given the above consideration of Nature Conservation Value, Conservation Status and Magnitude, the effect significance of collision risk on pipistrelle bat species recorded at the Site is considered to be minor adverse and **not significant** in the context of the EIA Regulations.

### 8.5.5 Decommissioning Effects

Due to the distant time frame until their occurrence decommissioning effects are difficult to predict with confidence. In general decommissioning effects are usually considered for the purposes of assessment to be similar to (or likely less than) those of construction effects in nature and are likely to be of shorter duration. A method statement would be prepared and agreed with the

relevant statutory consultees prior to decommissioning of the Development which would include the need for pre-works surveys.

Decommissioning of the Development would involve the removal of Wind Turbines and associated infrastructure (see Chapter 2: Development Description), however access tracks would be left in situ. Any restoration of habitats due to infrastructure removal would seek to return areas to their pre-construction habitat type, or as similar as feasible depending on local substrates, topography, hydrology etc. As a result, decommissioning will not lead to any further direct or indirect habitat losses, rather, it is predicted that due to restoration of upland habitats in these areas, there would be a small net positive effect.

## **8.6 Mitigation and Residual Effects**

### **8.6.1 Mitigation**

#### ***8.6.1.1 Construction Phase***

No significant effects were predicted for any IEF, and therefore no specific mitigation other than the embedded mitigation outlined in section 8.3.8 (SPP, ECoW, pre-construction surveys) and outline CEMP (Appendix 11.4) is required.

#### ***8.6.1.2 Operational Phase***

No significant effects were predicted for any habitat. A suite of enhancement measures would however be implemented as part of an BEMP (see OBEMP in Appendix 8.4), consistent with the requirements of Policy 3 of NPF4 for developments to “conserve, restore and enhance biodiversity”, by benefiting a wide range of ecological (and ornithological) features. This would include:

- Removal of conifer woodland/ scattered conifer trees and restore ground to natural mire/heath habitats;
- Peatland restoration in open moorland near the summit of Stùc Scardan;
- Enhancing the condition of semi-natural woodland within the Site;
- Planting riparian broadleaved woodland connected to existing semi-natural woodland designated as ancient in origin;
- Planting of small, discrete areas of native broadleaved/mixed woodland, subject to an evaluation of ground conditions for suitability; and
- Erection of bat, red squirrel and pine marten boxes in suitable locations within the Site.

A Biodiversity Net Gain (BNG) Assessment (see Appendix 8.3: Outline Biodiversity Enhancement Management Plan) has been undertaken using the SSER biodiversity toolkit<sup>240</sup> to quantify the biodiversity value of the Site based upon the habitats present and to demonstrate how the Development would achieve biodiversity enhancement in line with NPF4 Policy 3 requirements, compared to baseline conditions. The assessment shows that the planned habitat enhancement measures presented in the OBEMP would result in an increase of 316 Biodiversity Units (BUs) which is a net gain for biodiversity of +10 % over and above the baseline value (despite a loss of 57 BUs due to Development infrastructure, which would mainly be located within existing conifer forestry).

No significant effects were predicted for pipistrelle bat species, and therefore no specific mitigation other than the embedded mitigation outlined in section 8.3.8 (seasonal feathering of Wind Turbines, set-back distances of Wind Turbines from forest edges) is required.

#### ***8.6.1.3 Decommissioning Phase***

No significant effects were predicted for any IEF, and therefore no specific mitigation other than the embedded mitigation outlined in section 8.3.8 (equivalent of CEMP, SPP, ECoW and pre-construction surveys) is required.

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<sup>240</sup> <https://www.sserenewables.com/sustainability/biodiversity-net-gain/> Accessed 28.09.23.

## 8.6.2 Residual Effects

Based on the above enhancement measures, the residual effect of the Development on blanket bog, wet modified bog and wet heath habitats is considered to be minor beneficial and **not significant**. For semi-natural broadleaved woodland, the long-term residual effect can be reduced to negligible (beneficial) and **not significant**.

For pipistrelle bats, the bat boxes and woodland planting within the Site may provide opportunities for roosting and so the residual effects can be reduced to negligible and **not significant**.

## 8.7 Cumulative Effect Assessment

The primary concern regarding the assessment of cumulative effects is to identify situations where effects on habitats or species populations that may be non-significant from individual developments, are judged to be significant when combined with nearby existing or proposed projects that are subject to an EIA process. In the interests of focusing on the potential for similar significant effects, this assessment considers the potential for cumulative effects with other wind farms or utilities projects, including those that are operational, under construction, consented or at application stage. Projects at scoping stage have been scoped out of the cumulative assessment because they generally do not have sufficient information on potential effects to be included, as the baseline survey period is ongoing, or results have not been published. Projects that have been refused or withdrawn have also been scoped out.

From the information collected for the cumulative assessment, the projects within around 5-6 km of the Site are:

- The consented Blarghour Wind Farm (consented for 17 Wind Turbines, in application for variation for 14 Wind Turbines), 4.5 km to the west of the Site;
- The proposed An Carr Dubh Wind Farm (in application for 13 Wind Turbines), 5.0 km to the southwest of the Site;
- The installed Inveraray to Crossaig Overhead Line (OHL) reinforcement, directly to the south of the Site; and
- The proposed Creag Dhubh to Inveraray 275 kV OHL directly to the west of the Site along Glen Aray.

With projects further afield being within different watersheds (see Figure 8.6), this is considered to be an appropriate area to assess IEFs.

### 8.7.1 Habitats

#### 8.7.1.1 *Blanket bog, wet modified bog and wet heath*

It is considered unlikely that any significant adverse cumulative effects at a local level would arise on blanket bog, wet modified bog and wet heath as a consequence of the Development adding to habitat loss associated with other projects. This is due to the residual overall beneficial significance of effect due to the BEMP associated with the Development, as outlined above, and peatland restoration work planned for Blarghour and An Carr Dubh likely resulting in a similar outcome. The OHL projects are located on similar habitats common to the area, and with relatively low permanent footprints, no significant cumulative effects are predicted for these habitats, particularly when restoration or enhancement are considered (a cumulative effect of **minor adverse** and **not significant** within a local context).

#### 8.7.1.2 *Semi-natural broadleaved woodland*

On Site, an estimated 0.6 ha of direct habitat loss of semi-natural broadleaved woodland is predicted to occur (permanent and temporary). This amount can be compared with other local projects.

- Blarghour Wind Farm: 0.85 ha of semi-natural broadleaved woodland predicted to be lost along the access track. To mitigate for this, there is currently 115 ha of mixed broadleaved woodland in the wider area, which is planned to be increased to 211.5 ha through an HMP.
- An Carr Dubh Wind Farm: no loss of semi-natural woodland.
- Inveraray to Crossaig OHL: Approximately 57 km of the development area is located within semi-natural woodland and approximately 7.2 km is within areas noted on the AWI. The assessment predicted a loss of c.33 ha of semi-natural woodland. To mitigate for this, the applicant has committed to retaining scrub/understorey layers where possible, further detailed surveys to microsite infrastructure, encourage a native scrub vegetation and restocking of the vacated operational corridor of the existing OHL.
- Creag Dhubh to Inveraray 275 kV OHL: up to 4.7 ha of semi-natural broadleaved woodland predicted to be lost. Woodland enhancement and creation measures are committed to in an HMP.

A long-term loss of semi-natural broadleaved woodland, including of ancient origin, is therefore likely to occur due to the cumulative impacts of these projects. When taking into account the various mitigation and enhancement measures and noting that ancient woodland cannot be directly replaced within a project’s timeframe, the residual effect of loss is considered to be minor adverse and **not significant** within a regional context, of which the Development would contribute a negligible amount to.

### 8.7.2 Pipistrelle Bats

During the operational period, no adverse effects are likely to occur due the two OHL projects, as collision risk is considered to be very low. At Blarghour, small or very small numbers of common pipistrelle and soprano pipistrelle were recorded, and the study area was assessed as having low bat habitat suitability. Overall collision risks are likely to be negligible within a population context, and bats are likely to be aided by woodland creation as part of the BEMP. There are therefore no additional cumulative effects on bats over and above those predicted for the Development alone (minor adverse and **not significant**).

## 8.8 Summary of Effects

Table 8.16 provides a summary of the effects detailed within this chapter.

**Table 8.16 Predicted Summary of Effects**

IEF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
<b>Construction Phase</b>				
Blanket bog	Direct and indirect habitat loss	Minor adverse	BEMP restoration	Minor beneficial
Wet modified bog		Minor adverse	BEMP restoration	Minor beneficial
Wet heath		Minor adverse	BEMP restoration	Minor beneficial
Semi-natural broadleaved woodland		Minor adverse	BEMP woodland planting	Negligible beneficial
<b>Operation Phase</b>				
Pipistrelle bats	Collision risk	Minor adverse	Bat boxes BEMP woodland planting	Negligible
<b>Cumulative effects</b>				
Blanket bog	Direct and indirect habitat loss	Minor adverse	None required (in addition to the above mitigation for Development alone).	Minor adverse
Wet modified bog		Minor adverse		Minor adverse
Wet heath		Minor adverse		Minor adverse



IEF	Potential Effect	Significance of Effect	Mitigation Proposed	Residual Effect
Semi-natural broadleaved woodland		Minor adverse		Minor adverse
Pipistrelle bats	Collision risk	Minor adverse		Minor adverse
<b>Decommissioning Phase</b>				
As per construction phase				

## 8.9 Statement of Significance

For all IEFs, the predicted levels of significance of effects during the construction, operational and decommissioning stages of the Development are considered to be no more than of minor adverse and therefore **not significant**, when taking into consideration embedded mitigation measures. Accounting for enhancement measures as part of the BEMP, the residual effects on all IEFs are considered to be minor beneficial for habitats and negligible for pipistrelle bats, and therefore **not significant**. Non-significant cumulative effects were also predicted for all IEFs, when including mitigation and enhancement measures for other projects.