10 ECOLOGY

10.1 Introduction

10.1.1 This Chapter of the Environmental Impact Assessment Report (EIA Report) evaluates the potential effects of the Torrance Wind Farm Extension II (the Proposed Development) on important ecological features. This assessment was undertaken by Arcus Consultancy Services Limited (Arcus), an ERM Group company.

10.1.2 This Chapter is supported by the following figures, provided in **Volume 2 Figures**:

- Figure 10.1: Phase 1 Habitat Survey Results;
- Figure 10.2: NVC Habitat Survey Results;
- Figure 10.3: Statutory Designated Sites;
- Figure 10.4: Non-Statutory Designated Sites;
- Figure 10.5: Protected Species Survey Results;
- Figure 10.6: Bat Survey Area and RSSLs;
- Figure 10.7: Fish Habitat Survey Locations; and
- Figure 10.8: Outline Habitat Management Plan, Indicative Management Areas.

10.1.3 This Chapter is supported by the following Technical Appendix (TA) documents provided in **Volume 4 Appendices**:

- Technical Appendix 10.1: Habitat Surveys;
- Technical Appendix 10.2: Protected Species Surveys;
- Technical Appendix 10.3: Bat Surveys;
- Technical Appendix 10.4: Fish Habitat Surveys; and
- Technical Appendix 10.5: Outline Habitat Management Plan.

10.1.4 This Chapter is supported by Confidential Annex: Badger and **Figure 10.9**: Confidential Badger Survey Results, provided in **Volume 5 Confidential Appendices**.

10.1.5 This Chapter is structured as follows:

- Legislation, Policy and Guidance;
- Scoping Responses and Consultation;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Ecological Importance;
- Embedded Mitigation;
- Assessment of Potential Effects; and
- Statement of Significance.

10.2 Legislation, Policy and Guidance

10.2.1 The following guidance, legislation, policy and information sources have been considered in carrying out this assessment.

Legislation

- The Ramsar Convention on Wetlands of International Importance (the 'Ramsar Convention')[1];
- Council Directive 92/43/EEC (the 'Habitats Directive')[2];
- Council Directive 2000/60/EC ('Water Framework Directive')[3];
- Conservation (Natural Habitats, & c) Regulations (as amended) 1994 (the 'Habitats Regulations')[4];
- Wildlife and Countryside Act 1981 (as amended)[5];
- Wildlife and Natural Environment (Scotland) Act 2011[6];
- Protection of Badgers Act 1992[7];
- Nature Conservation (Scotland) Act 2004[8]; and
- Salmon and Freshwater Fisheries (Scotland) Act 2003[9].

Policy and Guidance

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine[10];
- General Pre-application/ Scoping Advice to Developers of Onshore Wind Farms[11];
- Decommissioning and Restoration Plans for wind farms[12];
- Good Practice During Wind Farm Construction[13];

[1] JNCC (2019). The Ramsar Convention. Available at: https://jncc.gov.uk/our-work/ramsar-convention/. Accessed on: November 2022.
[2] European Commission (1992) Council Directive 92/43/EEC the Conservation of Natural Habitats and of Wild Fauna and Flora. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN. Accessed on: November 2022.
[3] European Commission (2000) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 Establishing a Framework for Community Action in the Field of Water Policy. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF. Accessed on: November 2022.
[4] Scottish Government (1994) The Conservation (Natural Habitats, &c.) Regulations 1994. Available at: http://www.legislation.gov.uk/uksi/1994/2716/contents/made. Accessed on: November 2022.
[5] UK Government (1981) Wildlife and Countryside Act 1981, Chapter 69. Part 1. Available at: http://www.legislation.gov.uk/ukpga/1981/69/section/1. Accessed on: November 2022.
[6] Scottish Government (2011) Wildlife and Natural Environment (Scotland) Act 2011. Available at: http://www.legislation.gov.uk/asp/2011/6/contents/enacted. Accessed on: November 2022.
[7] UK Government (1992) Protection of Badger Act 1992. Available at: http://www.legislation.gov.uk/ukpga/1992/51/contents. Accessed on: November 2022.
[8] Scottish Government (2014) Nature Conservation (Scotland) Act 2004. Available at: http://www.legislation.gov.uk/asp/2004/6/contents. Accessed on: November 2022.
[9] Scottish Government (2003) Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Available at: http://www.legislation.gov.uk/asp/2003/15/contents. Accessed on: November 2022.
[10] CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Available at: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-Sept-2019.pdf. Accessed on: November 2022.
[11] NatureScot (2020) General pre-application/ scoping advice to developers of onshore wind farms. Available at: https://www.nature.scot/general-pre-application-and-scoping-advice-onshore-wind-farms. Accessed on: November 2022.
[12] NatureScot (2016) Decommissioning and Restoration Plans for Wind Farms. Available at: https://www.nature.scot/guidance-decommissioning-and-restoration-plans-wind-farms-february-2016. Accessed on November 2022.
[13] Scottish Renewables, NatureScot, SEPA, Forestry Commission Scotland, Historic Environment Scotland (2019). Good Practice during Wind Farm Construction. Available at: https://www.nature.scot/guidance-good-practice-during-wind-farm-construction. Accessed on: November 2022.

- Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[14],
- Planning Guidance on On-shore Windfarm Developments[15];
- Guidance on Advising on carbon-rich soils, deep peat and priority peatland habitat in development management[16];
- European Union (EU) Biodiversity Strategy[17];
- 2020 Challenge for Scotland's Biodiversity[18];
- Scottish Biodiversity List (SBL)[19]; and
- North Lanarkshire Council Biodiversity Action Plan[20].

10.2.2 In addition, guidance relating to the ecology of species and habitats and to survey and assessment methods are cited in full, where appropriate, in the relevant parts of this Chapter and associated Technical Appendices. An assessment of potential effects on important ornithological features is covered in Chapter 11 and an assessment of Groundwater Dependant Terrestrial Ecosystems (GWDTE) is covered in Chapter 14.

10.2.3 Work has been carried out in accordance with BS 42020:2013 Biodiversity – Code of Practice for Planning and Development[21] by ecologists working to the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct[22].

10.3 Scoping Responses and Consultation

10.3.1 Consultation with NatureScot was undertaken in 2020. A summary of their scoping response, as well as a reference to where these comments are addressed the Chapter, are presented in Table 10.1.

[14] SEPA (2017) Guidance on Assessing the Impacts of Windfarm Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems. Land Use Planning System SEPA Guidance Note 31. Version 3. Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf. Accessed on: November 2022.
[15] SEPA (2014) Planning guidance on on-shore windfarm developments. Land Use Planning System SEPA Guidance Note 4. Version 9. Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf. Accessed on: November 2022.
[16] NatureScot (2020) Advising on carbon-rich soils, deep peat and priority peatland habitat in development management. Available at: https://www.nature.scot/advising-carbon-rich-soils-deep-peat-and-priority-peatland-habitat-development-management. Accessed on: November 2022.
[17] European Commission (2011) EU Biodiversity Strategy. Available at: http://ec.europa.eu/environment/nature/biodiversity/strategy/index_en.htm. Accessed on: November 2022.
[18] Scottish Government (2015) Scotland's Biodiversity, a Route Map to 2020. Available at: https://www.gov.scot/publications/scotlands-biodiversity-route-map-2020/ Accessed on: November 2022.
[19] Scottish Government (2020) Scottish Biodiversity List. Available at: https://www.nature.scot/doc/scottish-biodiversity-list. Accessed on: November 2022.
[20] North Lanarkshire Council (2014) Local Biodiversity Action Plan. Available at: https://www.northlanarkshire.gov.uk/leisure-parks-and-culture/countryside-and-parks/countryside-management-and-biodiversity-0/our-local-biodiversity Accessed on: November 2022.
[21] BSI Group (2013). BS 42020:2013 – a code of practice for biodiversity in planning and development. BSI.
[22] CIEEM (2019). Code of Professional Conduct. Available at: https://cieem.net/resource/code-of-conduct/ Accessed on: November 2022.

Table 10.1: Consultation Response

Consultee	Details	Response	Where addressed in EIA Report
NatureScot	Scoping Response; 17/12/20	If the survey work finds that protected species could be affected by the proposal a species protection plan (or plans) should be prepared. If the implementation of the mitigation measures detailed within any such plan will not be sufficient to avoid offences under protected species legislation, a licence will be required from NatureScot before the works can proceed.	Baseline information is reported in Section 10.5. Mitigation and potential effects are described in Section 10.7 and Section 10.8 respectively.
		Noted the presence of Ancient Woodland within close proximity to the proposed Development. The Environmental Statement should set out the measures by which this habitat will be protected during development.	Mitigation and potential effects are described in Section 10.7 and Section 10.8 respectively.

10.4 Assessment Methodology and Significance Criteria

Scope of Assessment

10.4.1 The scope of the Ecological Impact Assessment (EcIA) follows current good practice guidance[10] and includes the following elements:

- Identification of designated sites of nature conservation interest;
- Identification of protected or priority habitats and species;
- Consideration of the likely significant effects on important ecological features arising due to the Proposed Development;
- Description of measures required to mitigate adverse effects on ecological features within or adjacent to the site, with the aim to avoid, reduce or compensate for the effect, or offer an opportunity for enhancement; and
- Identification of residual effects on ecological features, including those considered to be significant, taking into account the above mitigation.

The principal ecological issues considered in this EcIA include:

- Potential effects on sites designated for nature conservation;
- The harm and disturbance, both direct and indirect, to habitats and species arising from the construction, operation and decommissioning of the Proposed Development; and
- The potential legal implications of the above impacts.

Desk Study

10.4.2 A desk study was conducted to obtain information about relevant designated nature conservation sites and records of habitats and species. The desk study searched for records of statutory and non-statutory sites of nature conservation,

protected species, and priority habitats and species for nature conservation listed in the LBAP[20] and the SBL[19]. The **Desk Study Area (DSA)** is defined as:

- Statutory Designated Sites within and up to 5 km from the site;
- Non-statutory Designated Sites within and up to 1 km from the site, including Ancient Woodland Inventory (AWI) sites; and
- Records of protected and priority species (as well as invasive non-native species) within and up to 5 km from the site.

10.4.3 Information was requested from both The Wildlife Information Centre (TWIC)[23] and North Lanarkshire Biological Records Centre[24], with additional information obtained from publicly available sources, as cited in the relevant parts of this Chapter and Technical Appendices in Volume 4 of this EIA Report, where relevant**.**

Study Area

10.4.4 The zone of influence for ecological features varies depending on their sensitivity to change; as well as the scale, complexity and duration of potential impacts. Therefore, the study area has been determined using current best practice guidance[10] and professional judgement using the following ecological zones of influence:

- **Habitat Survey Area (HSA)**: accessible areas of land within and up to 200 metres (m) from the site, within which the Phase 1 Habitat Survey was carried out, including identification of NVC communities;
- **Ecology Survey Area (ESA)**: the land within which Protected Species Surveys (excluding bats) were undertaken, including all land within the site boundary (shown as the area in **Figure 10.5**) and species-specific zones of influence defined by NatureScot standing advice[11] (as described in paragraph 10.4.9);
- **Bat Survey Area (BSA)**: accessible areas of land within and up to 200 m plus rotor radius (estimated at 100 m[25]) (as defined for Roost Surveys in current NatureScot guidance[26]) from the turbine envelope that could support features utilised by roosting or swarming bats (as shown in **Figure 10.6**); and
- **Fish Habitat Survey Area (FHSA):** watercourses draining from the site; and sensitive downstream receptors (e.g. rivers).

Survey Methodology

10.4.5 Baseline ecology surveys were undertaken between April 2021 and November 2021. An overview of the survey methods is provided in Section 10.1 and full details are presented in **TA 10.1-10.4**, Volume 4 of this EIA Report.

Phase 1 Habitat Survey

10.4.6 A Phase 1 Habitat Survey encompassing all accessible land within the HSA was undertaken by Harding Ecology, on behalf of Arcus, in September and November

[23] The Wildlife Information Centre (2022). Available at http://www.wildlifeinformation.co.uk/. Accessed on: November 2022.
[24] The North Lanarkshire Biological Records Centre (2020). Available at https://www.northlanarkshire.gov.uk/leisure-parks-and-culture/countryside-and-parks/countryside-management-and-biodiversity-0/local. Accessed on: November 2022.
[25] At the time of the baseline bat surveys the final Development design was not known; therefore, rotor radius was conservatively estimated at 100 meters. Design finalisation would later confirm rotor radius to be 84 meters.
[26] NatureScot. (2021) Bats and Onshore Wind Turbines: Survey, Assessment And Mitigation [online]. Available at: <https://www.nature.scot/sites/default/files/2021-08/Bats%20and%20onshore%20wind%20turbines%20-%20survey%2C%20assessment%20and%20mitigation_0.pdf> (Accessed December 2022)

2021. The Phase 1 Habitat Survey followed standard Joint Nature Conservation Committee (JNCC) survey methods[27] (**Appendix 10.1**, Volume 4 of this EIA Report), which is a standard method for classifying and mapping British habitats.

10.4.7 In addition, the Phase 1 Habitat Survey aimed to identify wetland habitats in accordance with the habitat's descriptions given in 'A Functional Wetland Typology for Scotland' guidance[28]. Where wetland habitats were identified further, more detailed, surveys were undertaken for identification of vegetation communities with potential groundwater dependency in accordance with SEPA guidance[29]. Full survey methods are presented in **TA 10.1**, Volume 4 of this EIA Report.

National Vegetation Classification Survey

10.4.8 The National Vegetation Classification (NVC) Survey was undertaken on all wetlands and habitats of conservation value recorded during the Phase 1 Habitat Survey. The NVC Survey involved mapping distinct areas of homogenous vegetation and recording detailed descriptions of the vegetation communities, with reference to published community descriptions[30,31,32]. Full survey methods are presented in **TA 10.1**, Volume 4 of this EIA Report.

Protected Mammal Surveys (excluding bats)

10.4.9 In line with NatureScot guidance[33], Protected Mammal Surveys were carried out by Arcus between April and September 2021 (see **TA 10.2**, Volume 4 of this EIA Report). The zone of influence varies depending on a species ecology and sensitivity to environmental change; therefore, the ESA applied to the Protected Mammal Surveys was based on the following:

- Badger (*Meles meles*): Suitable habitats within the site and extending up to 100 m from the site;
- Otter (*Lutra lutra*): Suitable riparian habitats within the site and extending up to 200 m up and downstream of watercourses potentially impacted by the Proposed Development;
- Pine marten (*Martes martes*): Suitable habitats within the site and extending up to 250 m from the site; and
- Water vole (*Arvicola amphibius*): Suitable riparian habitats within the site and extending up to 50 m up and downstream of watercourses potentially impacted by the Proposed Development.

10.4.10 The Protected Mammal Surveys focused on species most likely to be encountered based on their current range[34], potential habitats, desktop records and professional judgement. Therefore, red squirrel, wildcat and beaver are not discussed in this

[27] JNCC (2010) Handbook for Phase 1 Habitat Survey: A technique for environmental audit. 5th Edition

[28] SNIFFER (2009) WFD95: A Functional Wetland Typology for Scotland – Field Survey Manual. Version 1.

[29] SEPA (2009) Land Use Planning Systems SEPA Guidance Note 4 Planning Guidance on on-shore windfarms developments [Online] Available at: https://www.sepa.org.uk/media/136117/planning-guidance-on-on-shore-windfarms-developments.pdf. Accessed on: November 2022.

[30] Rodwell, J. S (ed.) (1991 *et seq.*). *British Plant Communities. Vol 1–5.* Cambridge University Press

[31] Elkington, T., Dayton, N., Jackson, D. L. and Strachan, I. M. (2001). *National Vegetation Classification: Field Guide to Mires and Heaths.* Joins Nature Conservation Committee, Peterborough

[32] Averis, B., Birks, J., Horsefield, D., Thompson, D. and Yeo, M. (2004). *An Illustrative Guide to British Upland Vegetation,* JNCC, Peterburgh

[33] NatureScot (2021) Protected Species Advice for Developers. Guidance on Planning and Protected Animals [Online] Available at: https://www.nature.scot/professional-advice/planning-and-development/planning-and-development-advice/planning-and-development-protected-species. Accessed on: November 2022.

[34] The Mammal Society (2020) *Atlas of the Mammals of Great Britain and Northern Ireland.* Exeter: Pelagic Publishing.

Chapter; and no incidental sightings of these species was recorded during the walkover surveys.

Herptofauna Surveys (excluding GCN)

10.4.11 Habitats within the ESA were surveyed for signs of reptiles and amphibians, and assessed for their suitability.

Great Crested Newt (GCN) Surveys

10.4.12 In line with NatureScot guidance[35], Arcus completed a desktop review in March 2021 of Ordnance Survey (OS) mapping and freely available aerial imagery to identify waterbodies within and up to 500 m from the site, which could be utilised by GCN. Whilst this species tends to utilise suitable terrestrial habitat features within approximately 500 m from a breeding site (e.g. a suitable waterbody), the abundance of GCN has been found to reduce beyond distances of 200-250 m from breeding sites[36].

10.4.13 In accordance with current Amphibian and Reptile Group United Kingdom (ARG UK) guidance[37], Arcus completed a Habitat Suitability Index (HSI) assessment of one accessible pond ('Pond A', shown in **Figure 10.5**) within, and up to 250 m from, the site on 9th April 2021. HSI was developed by Oldham *et al*. (2000)[38], and is a quantitative assessment to identify the suitability of waterbodies for breeding GCN (**TA 10.2**, Volume 4 of this EIA Report).

10.4.14 Environmental Deoxyribonucleic Acid (eDNA) Analysis is then used to determine the presence or likely absence of GCN within a waterbody. Water samples were taken from Pond A on 12th April 2021, in accordance with Department for Environment, Food and Rural Affairs (DEFRA) technical advice note[39], and were analysed by SureScreen Scientifics in accordance with eDNA analytical protocols.

Bat Surveys

10.4.15 Bat Surveys were carried out with reference to NatureScot guidelines published in 2021[26] between April and October 2021 (the Bat Survey Season), with all survey work undertaken by Arcus.

Remote Static Surveys

10.4.16 The Survey Season comprises of the following three seasonal Survey Sessions, which current NatureScot guidance[26] defined as follows:

- Survey Session 1: April/May (Spring);

[35] NatureScot. (2021) Standing advice for planning consultations - Great Crested Newts [online]. Nature Scot. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-great-crested-newts. Accessed on: November 2022.
[36] Natural England (2004) An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt (ENRR576). http://publications.naturalengland.org.uk/publication/134002.
[37] ARG UK. (2010) *Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Group United Kingdom: Advice Note 5* [online]. Available at: <https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file> (accessed December 2022).
[38] Oldham, R.S., Keeble, J., and Swan, M.J.S, Jeffcote, M. (2000) Evaluating the suitability of habitat for the great crested newt (Triturus cristatus). Herpetological Journal, 10(4):143-155.
[39] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P, and Dunn F (2014) *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

- Survey Session 2: June-mid-August (Summer); and,
- Survey Session 3: Mid-August-October (Autumn).

10.4.17 A total of ten full spectrum Anabat Swift bat detectors (hereby referred to as Anabats), were deployed at ground level (detectors secured to 1 m high posts) for a minimum of ten consecutive nights each season across a range of habitat types, as per NatureScot guidance[26] (see **Figure 10.6**, Volume 2 of this EIA Report). The Anabats were set to record from approximately half an hour before sunset until approximately half an hour after sunrise.

10.4.18 In order to collect comparative data, Anabats were deployed at the same ten Remote Static Survey Locations (RSSLs) across the three Survey Sessions. Anabats were also located to allow for comparisons in recorded bat activity between two broad dominant habitat types; these are defined as open (i.e., open areas lacking high value linear habitat features with 50 m), or edge (i.e., within 50 m of woodland edges, or a linear feature such as a hedgerow or watercourse). Full survey details are provided in **TA 10.3**, Volume 4 of this EIA Report.

10.4.19 To correct for temporal bias in levels of bat activity, all bat Remote Static Survey data was interpreted using the Bat Activity Index (BAI).

10.4.20 BAI was calculated for each RSSL by dividing the number of recorded Anabat files by the total number of sampling hours (between 0.5 hours before sunset to 0.5 hours after sunrise), to provide the mean number of bat passes per hour (pph).

10.4.21 The mean BAI for each Survey Session recorded across all RSSL was calculated by dividing the number of recorded Anabat files by the total number of detector hours per session (total session sampling hours multiplied by number of detectors).

10.4.22 The mean BAI across the Survey Season, for example BAI per species, was calculated by dividing the number of recorded Anabat files across the Survey Season per species, by the total number of detector hours across the total Survey Season (sampling hours multiplied by number of detectors).

Roost Surveys

10.4.23 No Roost Surveys were carried out as woodland areas within the site, which are dominated by conifer plantation, are considered to be of extremely limited suitability for roosting bats. In addition, no buildings within the BSA will be affected by the Proposed Development, which are located within operational farms and the Heart of Scotland Services and situated more than 50 m from any Development infrastructure. For full details, refer to **TA 10.3**, Section 2.4.

Fish Habitat Survey

10.4.24 A Fish Habitat Survey (FHS) was carried out in June 2021 by Mhor Environmental Ltd. The FHS was carried out to determine the potential of watercourses to support sensitive fish species including such as Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), lamprey species and European eel (*Anguilla anguilla*).

10.4.25 Surveys were carried out across a total of 12 Survey Locations (see **Figure 10.7**, Volume 2 of this EIA Report) including the How Burn, its associated tributaries and field drains, and the River Almond.

10.4.26 The FHS was carried out using a 'combined' survey methodology incorporating several widely used survey and assessment methods to characterise in-stream

habitats for potentially sensitive species, including SFCC (2007[40]) walkover protocols, methods developed by Hendry and Cragg-Hine[41] and those developed for the river/fisheries habitat surveying[42] to determine the Fish Utilisation Potential (FUP) and Fish Habitat Quality (FHQ) of watercourses that may be impacted by the Proposed Development. Full survey methods are described in **TA 10.4**, Volume 4 of this EIA Report.

10.4.27 To determine FUP, various habitat criteria detailed within the methodology were considered, including, but not limited to, cover provided by habitat, barriers to fish migration, channel modifications, and point & diffuse pollution. To determine FHQ, flow and substrate types were considered to determine the value of each instream habitat for fish species of consideration concern, considering the habitat requirement for various life stages.

Limitations

10.4.28 Due to the dense nature of the plantation forestry, surveyors could not access the full extent of the woodland. Therefore, there is potential for signs of protected species activity to have been missed in these areas. However, inaccessible areas were generally small in scale and the perimeter around inaccessible areas was surveyed to identify any mammal paths; with binoculars used to visually scan for field signs. In addition, underlying conditions within the plantation woodland are waterlogged; therefore, it is generally unsuitable for ground dwelling species such as badger. Furthermore, trees are generally between pre-thicket and thicket-stage and not of a size and nature for the root plates of fallen trees, or ground crevices, to be suitable for pine marten denning. The plantation woodland also lacked any mature trees with crevices for pine marten denning.

10.4.29 Ecology surveys were originally based on a greater number of proposed turbines and a more extensive site boundary. Through design development, the number of proposed turbines was reduced from ten to four and the site boundary also reduced to reflect these changes.

10.4.30 The Protected Species Surveys were not adversely affected by these changes, with the ESA based on the more extensive site boundary and thus a greater area than needed was surveyed.

10.4.31 The Remote Static Survey for bats was based on an indicative site layout comprising ten proposed turbines, with a total of ten bat acoustic detectors were located as close as possible to each proposed turbine locations. Where possible, detectors were situated close to habitat features of value to foraging/commuting bats to help provide a representative sample of bat activity. As a result of design development, some proposed turbine locations have been micro-sited a small distance away from the bat acoustic detectors. However, proposed turbine locations remain in close proximity to habitat features that the position of bat acoustic detectors was also referenced against (e.g. woodland edges, lines of trees, field margins, etc.). In addition, all available information collected during the automated static survey has been used to help fully characterise bat activity at, or in close proximity to, each proposed turbine location. Therefore, minor changes in proposed turbine location are not considered to present a significant limitation.

[40] SFCC (2007) - Fisheries Management SVQ – Habitat Surveys Training Course Manual.
[41] Hendry K, Cragg-Hine D (1997) - A Guidance Manual. APEM Ltd, Fisheries Technical Manual 4, R & D Technical Report W44, Version 1.0/07-97. R & D Project 603.
[42] Environment Agency (2003) - River Habitat Survey in Britain and Ireland. Field Survey Guidance Manual: Environment Agency, Bristol.

10.4.32 It is noted that a small area of the site boundary extends into the Heart of Scotland Services, close to the eastbound off-slip from the M8 motorway. Ecology surveys were not undertaken within this small part of Heart of Scotland Services, which comprises hard-standing and maintained grassland verges. Survey areas are also clipped to the north of the M8, with the high-speed motorway likely presenting a significant barrier to animal dispersal, and fragmenting habitats within the site boundary from areas to the south of the major road corridor. These areas are subject to high levels of disturbance from regular vehicle usage and, as such, not likely to support any protected or priority habitats or species. Therefore, this is not considered to be a significant limitation.

Assessment Methodology

10.4.33 The approach taken to impact assessment follows guidance for EcIA[12] which sets out the process for assessment through the following stages:

- Determining importance of ecological features (species, habitats and designated sites), including identification of Important Ecological Features (IEFs);
- Identification and characterisation of ecological effects;
- Incorporation of measures to mitigate identified effects;
- Assessment of significance of residual effects following mitigation;
- Identification of appropriate compensation to offset significant residual effects; and
- Identification of opportunities for biodiversity enhancement.

Determining Importance

10.4.34 One of the key challenges in EcIA is to establish which ecological features are important and should be subject to detailed assessment. In EcIA, 'importance' of an ecological feature is a synonymous with 'sensitivity' within a geographical context. Therefore, important ecological features (IEFs) will be those that are considered to be of higher sensitivity and that could be significantly affected by the Proposed Development, both negatively and positively.

10.4.35 In accordance with CIEEM guidance[10], the importance of an ecological feature was considered within a defined geographical context from International to Site level. In this EcIA, only ecological features considered to be of regional importance and above (see Table 10.2) are considered sufficiently sensitive to be determined as IEFs, and only these IEFs required assessment for potential significant effects.

10.4.36 Habitats and species of nature conservation importance are identified through policies and legislation. For example, habitats and species of international importance are listed on Annex I of the Habitats Directive. Where these are considered of principal importance for the conservation of biodiversity in Scotland, within the meaning of the Nature Conservation (Scotland) Act 2004, these are described in the Scottish Biodiversity List[19]. Other important features may be listed within Local Biodiversity Action Plans (LBAPs). These elements provided a crucial starting point for the identification of IEFs requiring consideration in EcIA, however they did not solely determine the level of importance assigned (with the exception of designed sites, in compliance with CIEEM guidelines[10]).

10.4.37 Expert judgement was applied to determine the level of importance and to identify IEFs. When determining the importance in the context of EcIA, contextual information regarding distribution and abundance of a given species was essential and included population trends based on historical records. The scale within which

importance is determined may also relate to a particular population and thus was considered when determining importance. Additionally, in accordance with CIEEM guidance[10], where a legally protected species was present within the zone of influence and there is potential for a breach of legislation, such species was considered to be an IEF.

Table 10.2: Geographic Context of Important Ecological Features

Level of Importance/ Sensitivity	Examples of Definitions
International	The population has little or no ability to absorb change without fundamentally altering its present character (e.g. a rare and sensitive species in substantial decline). An internationally designated site (e.g. a Special Area of Conservation (SAC)) or a site meeting criterion for international designations. Species in internationally important numbers (> 1 % of biogeographic populations).
National (i.e. Scotland)	The population has low ability to absorb change without fundamentally altering its present character (e.g. an uncommon or rare species in decline, or a common species in substantial decline). A nationally designated site (e.g. a Site of Special Scientific Interest (SSSI)) or a site meeting criterion for national designations. Species present in nationally important numbers (> 1 % UK population). Large areas of priority habitats listed on Annex I of the Habitats Directive and smaller areas of such habitats that are essential to maintain the viability of that ecological resource.
Regional (i.e. North Lanarkshire)	The population has moderate capacity to absorb change without significantly altering its present character (e.g. an uncommon or rare but stable species, or a common/widespread but declining species). A regionally important site (e.g. SINC) or a site meeting criterion for regional designations. Species present in regionally important numbers (> 1 % Scottish population). Sites not meeting criteria for SAC/SSSI selection but of greater than the Local criteria below. Priorities within the Local Biodiversity Action Plans (LBAP), where they occur in sufficient abundance to maintain the local resource.
Local (i.e. Harthill & Eastfield)	The population is tolerant of change without detriment to its character (a common/widespread species with a stable population status, or an uncommon species with an improving status). Scottish Wildlife Trust (SWT) Reserves and Local Nature Reserves (LNRs). Sites where there is no significant connectivity to international, national or regional designations or a site not meeting criterion for such a designation. Areas of habitat or species considered to enrich the ecological resource within the area local to the site.

Level of Importance/ Sensitivity	Examples of Definitions
Less than Local (site wide)	The population is resistant to change (e.g. a common/widespread species that is improving its range and abundance). Usually widespread and common habitats and species. Loss of such a species from the site would not be detrimental to the ecology of the local area.

Characterising Potential Effects

In line with the CIEEM EcIA guidance, consideration is given to the following characteristics when identifying potential effects of the Proposed Development on IEFs:

- **Nature of effect**: whether it is positive (beneficial) to IEFs, e.g. by increasing species diversity or extending habitat; or negative (detrimental), e.g. by loss of, or displacement from, suitable habitat;
- **Extent**: the spatial or geographical area over which the impact may occur;
- **Duration**: defined in relation to ecological characteristics in addition to human timeframes. Impacts may be described as short-, medium-, long-term, permanent or temporary;
- **Frequency and timing**: this will take into account the number of times an activity will occur in a defined time period that may influence the resulting impact. The timing and frequency of an activity or change may result in an impact if it coincides with seasonal ecological elements (such as a protected species' breeding season); and
- **Reversibility**: an irreversible impact is one from which recovery is not possible within a reasonable timescale, or there is no reasonable chance of action being taken to reverse it. A reversible impact is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

10.4.38 The magnitude of potential effects will be identified through consideration of the effect characteristics, to determine the degree of change to baseline conditions predicted as a result of the Proposed Development. The criteria for assessing the magnitude of a potential effect are defined as follows:

- **High**: A fundamental change to the baseline condition of the IEF, leading to total loss or major alteration of character/population;
- **Medium**: A material change to the baseline condition of the IEF, leading to partial loss or alteration of character/population;
- **Low**: A slight, detectable, alteration of the baseline condition of the IEF; and **Negligible**: A barely distinguishable change from baseline conditions.

Significance of Effect

10.4.39 Current CIEEM guidance[10] discourages use of the matrix approach to determine significance and recommends describing effects as either 'significant' or 'not significant'.

10.4.40 For the purposes of EcIA, a 'significant effect' is defined as an effect that either supports or undermines biodiversity conservation objectives for IEFs, or for biodiversity in general. Conservation objectives may be specific, broad or wide-ranging; therefore, effects can be considered as significant at a wide range of scales from international (major) to local (negligible). Significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems, and the conservation status of habitats and species, including their distribution and abundance.

10.4.41 Where identified, significant effects were qualified with reference to an appropriate geographic scale. It is important to note that the scale of the significance of an effect, may not be the same as the geographical context in which the feature is considered important. This enables consistency in scale when determining appropriate mitigation or compensation solutions.

10.4.42 For defined sites or ecosystems, significant effects encompass impacts on the structure and function of such systems. For designated sites, it is necessary to assess whether or not an impact will affect the integrity of a site or ecosystem (and is therefore significant). This is achieved through understanding whether the changes arising from the Proposed Development are likely to move the baseline conditions closer to, or further from, the condition which constitutes integrity for that specific system.

10.4.43 For habitats and species, consideration of conservation status is required to determine whether or not an effect on a habitat or species is likely to be significant. For habitats, conservation status is determined by the sum of influences acting on the habitat that may affect its extent, structure, and functions, in addition to its distribution and typical species composition within a given geographical area. For species, conservation status is determined by the sum of influences acting on the species concerned, which may affect its abundance and distribution within a given geographical area. When assessing potential effects on conservation status, the known or likely background trends and variations in status is taken into account. Estimation is also given to the level of ecological resilience or conditions that would allow the population of a species or area of habitat to continue to exist at a given level, such as to increase along an existing trend or to reduce a decreasing trend.

10.4.44 Within this assessment, the significance of the potential effects on each IEF is determined through professional judgement, by considering both the nature conservation value of the feature and the degree to which it may be affected (the effect magnitude) by the Proposed Development.

Cumulative Effects

10.4.45 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Within EcIA, cumulative effects are particularly important as many ecological features are exposed to background levels of threat or pressure and may be close to reaching critical thresholds where further impact could cause irreversible decline. It is recognised that different actions can cause cumulative effects as follows:

- Additive/incremental effects: multiple activities/projects may give rise to a significant effect due to their proximity in time and space. These may be additive or synergistic effects; and

- Ancillary: ancillary developments may include different aspects of the project which may be authorised under different consent processes, these will be included as part of the cumulative assessment.

Residual Impacts

10.4.46 Following the assessment of effects, including incorporation of embedded mitigation, all attempts will be made to avoid and mitigate significant effects. Where significant effects are predicted, further specific, applied mitigation is described. Follow the application of this mitigation, an assessment of residual effects will be undertaken to determine the significance of residual effects.

10.4.47 Where residual effects remain significant or require application of compensatory measures, these will be considered against the relevant policy and legal objectives to determine the outcome of the application.

10.5 Baseline Conditions

Desk Study

Statutory Designated Sites

10.5.1 Four statutory designated sites relevant to ecology were recorded within 5 km of the site; as shown in **Figure 10.3**, Volume 2 of this EIA Report. Information relating to these statutory designated sites is provided and summarised in Table 10.3.

Table 10.3: Statutory Designated Sites within 5 km

Name	Designation	Approximate Distance and Direction to Site	Relevant Designated Feature
Blawhorn Moss	SAC[43], NNR[44], SSSI[45]	1.8 km north	- Active raised bog - Degraded raised bog
Hassockrigg and North Shotts Mosses	SSSI[46]	2.1 km south-west	- Raised bog
North Shotts Moss	SAC[47]	2.6 km south-west	- Active raised bog - Degraded raised bog
Black Loch Moss	SAC[48] and SSSI[49]	4.6 km north-west	- Active raised bog

[43] Blawhorn Moss SAC. Available at: https://sitelink.nature.scot/site/8210. Accessed on: November 2022.
[44] Blawhorn Moss NNR. Available at: https://sitelink.nature.scot/site/5009. Accessed on: November 2022.
[45] Blawhorn Moss SSSI. Available at: https://sitelink.nature.scot/site/230. Accessed on: November 2022.
[46] Hassockrigg and North Shotts Mosses SSSI. Available at: https://sitelink.nature.scot/site/1690. Accessed on: November 2022.
[47] North Shotts Moss SAC. Available at: https://sitelink.nature.scot/site/8341. Accessed on: November 2022.
[48] Black Loch Moss SAC. Available at: https://sitelink.nature.scot/site/8208. Accessed on: November 2022.
[49] Black Loch Moss SSSI. Available at: https://sitelink.nature.scot/site/1661. Accessed on: November 2022.

Non-Statutory Sites

10.5.2 One Local Biodiversity Site (LBS) and eight Sites of Importance for Nature Conservation (SINCs) were found within 1 km of the site (see **Figure 10.4**, Volume 2 of this EIA Report). Details of these non-statutory designated sites is summarised in Table 10.4.

Table 10.4: Non-Statutory Designated Sites within 1 km

Name	Designation	Approximate Distance and Direction to Site	Relevant Features
Barblues Bing	SINC	In centre/west of the site	- Scrub, woodland and marsh habitats. - Badger, bullfinch (*Pyrrhula pyrrhula*), reed bunting (*Emberiza schoeniclus*).
Loan Birch Wood	SINC	Adjacent to north of Site	- Downy birch woodland - Brown hare (*Lepus europaeus*), reed bunting
Torrance Marshes	SINC	Adjacent to east of the site	- Wetland and open water habitat - Includes reed bed/sedge swamp - Brown hare, skylark (*Alauda arvensis*), reed bunting, small pearl-bordered fritillary (*Boloria selene*), emerald damselfly (*Lestes sponsa*), common frog
Eastfield Strip	SINC	50 m south of the site, over motorway	- Scrub habitat with sedge-rich pasture - Breeding birds; song thrush (*Turdus philomelos*), reed bunting
Harthill Bing	SINC	0.3 km south of the site	- No information found
Southrigg Bog	SINC	0.8 km north-east of the site	- Remnant bog and plantation; modified peatland, including pools (on pipeline route) - Reed bunting, common frog, small pearl-bordered fritillary, emerald damselfly
Polkemmet and River Almond to Greenrigg	LBS	0.8 km south-east of the site	- Broadleaved and mixed plantation woodland, unimproved neutral grassland and standing water.

Name	Designation	Approximate Distance and Direction to Site	Relevant Features
			- Otter, badger, bullfinch, starling (*Sturnus vulgaris*), song thrush, mistle thrush *(Turdus viscivorus)*
Forrestburn Bog	SINC	Approximately 1 km west of the site	- Modified intermediate bog
Forrestburn Water	SINC	Approximately 1 km north-west of the site	- No information found

10.5.3 There are no Ancient Woodland Inventory (AWI) sites within the site. A single AWI site[50] is located to the immediate north of the site at Loan Birch Wood, with a further three unnamed AWI sites present within 1 km, including one at Forrestburn Water, Treesbank Farm and one towards Greenrigg; as shown on **Figure 10.4**, Volume 2 of this EIA Report.

Protected and Priority Species

10.5.4 Records were obtained from The Wildlife Information Centre (TWIC) and The North Lanarkshire Biological Records Centre. Table 10.5 provides a summary of recent (last 20 years) records of protected or priority species identified within the DSA.

Table 10.5: Records of Protected and Priority Species within the DSA

Species	Conservation Status	Closest Record from Site	Year of Record(s)
Water vole	WCA[7], SBL[21], LBAP[20]	2 km south	2001-2020 (20 records)
Otter	HR[4], SBL, LBAP	0.9 km south-east	2003-2011 (6 records)
Badger	PB[7]	Adjacent to the site's western edge	2004-2017 (38 records)
Pine Marten	SBL, LBAP	Within middle of Site, on B718	2017 (1 record)
Common Pipistrelle (*Pipistrellus pipistrellus*)	HR, SBL, LBAP	0.2 km north-east	2005-2019 (56 records)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	HR, SBL, LBAP	0.2 km north-east	2008 – 2019 (56 records)
Natterer's Bat (*Myotis nattereri*)	HR, LBAP	0.2 km north-east	2010 (1 record)
Myotis sp.	HR, SBL, LBAP	0.2 km north-east	2007 – 2019 (12 records)
Pipistrellus sp.	HR, SBL, LBAP	0.2 km north-east	2007 – 2011 (29 records)
Brown Hare	SBL	2.5 km south-east	2009-2014 (5 records)

[50] NatureScot. A guide to understanding the Scottish Woodland Inventory (AWI) [Online] Available at: https://www.nature.scot/doc/guide-understanding-scottish-ancient-woodland-inventory-awi. Accessed on: November 2022.

Species	Conservation Status	Closest Record from Site	Year of Record(s)
West European Hedgehog (*Erinaceus europaeus*)	SBL	2.7 km north-east	2006 – 2019 (24 records)
Common Lizard (*Zootoca vivipara)*	WCA, SBL	2.2 km north	2003 (2 records)
Common Toad (*Bufo bufo)*	SBL	1 km south-east	2006-2020 (12 records)
Small pearl-bordered fritillary	SBL, LBAP	0.2 km north-east	Information on dates not given (7 records)
Grey Squirrel (*Sciurus carolinensis)*	INNS[51]	0.8 km south-east	2000-2013 (23 records)
Key: HR: The Conservation (Natural habitats, and c.) Regulations 1994; WCA: Wildlife and Countryside Act 1981; SBL: Scottish Biodiversity List; PB, Protection of Badgers Act 1992			

Baseline Surveys

Extended Phase 1 Habitat and NVC Survey

10.5.5 A summary of the Phase 1 habitats, and corresponding NVC communities, recorded within the HSA is provided in Table 10.6. **Figure 10.1**, Volume 2 of this EIA Report, shows the Phase 1 habitats recorded overlaid with the infrastructure of the Proposed Development and **Figure 10.2** shows the NVC communities of each habitat.

10.5.6 Improved grassland was the most extensive habitat recorded, covering approximately 91.2 ha (28.9%) of the HSA. Improved grassland was most extensive in north, north-east and west, where agricultural fields are largely managed as pasture. Semi-improved neutral grassland was also extensive in the HSA (54.1 ha, 17.1%), with the largest area located within the eastern extent of the HSA, where it is used as pasture. Marshy grassland was recorded in the wetter sections of the HSA (38.2 ha, 12.1%), typically in areas that adjoin more extensive areas of neutral grassland. Other grassland habitats recorded within the HSA, including unimproved neutral grassland (14.2 ha, 4.5%), unimproved acid (4.6 ha, 1.4%) and semi-improved acid grassland (3.5 ha, 1.1%), are typically small in scale.

10.5.7 Wetland habitats recorded within has HSA include small areas of wet modified bog (5.1 ha, 1.6%), which occur in low-lying areas adjoining a plantation woodland and area of scattered trees. There are three areas of swamp (2.1 ha, 0.7%) with the HSA, which occur in areas adjoining marshy grassland. Acid/neutral flushes (1.4 ha, 0.5%) are present in the HSA, the most extensive of which is within the western extent of the site.

10.5.8 Coniferous plantation woodland was dominant in the southern and south-east section of the HSA (49.6 ha, 15.7%). Other woodland areas are scattered throughout northern and southern parts of the HSA including broadleaved plantation woodland (17.4 ha, 5.5%), semi-natural broadleaved woodland (5.7 ha, 1.8%), mixed woodland (4.8 ha, 1.5%) and scattered broadleaved trees (3.6 ha,

[51] Scottish Government (2012). Non-native species: code of practice. Available at https://www.gov.scot/publications/non-native-species-code-practice/. Accessed on: November 2022.

1.1%). Several areas of species-poor hedgerow are found in the HSA also; including defunct hedges scattered throughout the ESA (1.4 ha, 0.4%), intact hedges along the B718 road in the north (0.5 ha, 0.1%) and trees in the northwest of the HSA (0.1 ha, <0.1%).

10.5.9 Other habitat types that are locally present within the HSA include arable land (1.8 ha, 0.6%), amenity grassland (1.1 ha, 0.4%), ephemeral/short perennial vegetation (0.1 ha, <0.1%), introduced scrub (0.1 ha, <0.1%), scattered scrub (2.6 ha, 0.8%), dense/continuous scrub (0.6 ha, 0.2%), tall ruderal (1.6 ha, 0.5%) and non-ruderal vegetation (<0.1 ha, <0.1%). Built up areas and roads (9.5 ha, 3%) were found across the HSA, with areas of bare ground in the west (0.9 ha, 0.3%).

Table 10.6: Summary of Habitats and their Absolute and Relative Areas within the HSA

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat	
			Absolute (ha)	Relative (%)
A1.1.1	Semi-natural broadleaved woodland was scarce in the HSA. There are strands of this woodland confined to the west of HSA, in the north of the HSA, consisting of W4 bog woodland, W4a, and W4c, where downy birch (*Betula pubescens*) was dominant, with scattered alder (*Alnus glutinosa*) and grey willow (*Salix cinerea*). Another area on low-lying ground south of Blairmuckhill Farm, west of the site, consisted of W11 and W7 NVC communities. The W11 strands were present on drier ground, with abundant downy birch, silver birch (*Betula pendula*), rowan (*Sorbus aucuparia*), goat willow (*Salix caprea*), and grey willow. The W7 strands were present on damper ground with the W7c sub-community present.	W4a, W4b, W4c, W7b, W7c, W11	5.7	1.8
A1.1.2	Broadleaved plantation was more frequent in the HSA compared to semi-natural woodland, with areas adjacent to the motorway services in the south, and in Nethaston Wood in the south-east of the HSA, with smaller strands planted around edges of large conifer blocks. More frequent species included sycamore (*Acer pseudoplatanus*), ash (*Fraxinus excelsior*), alder, rowan, and downy birch. Where these habitats exist in conifer blocks, the ground flora was generally species poor, corresponding with W7b/W7c.	Non-NVC, W3, W4, W7, W7c	17.4	5.5
A1.2.2	Coniferous plantation was the dominant habitat type within Netherton Wood in the center and south-east of the site. The plantation blocks consisted mainly of Sitka Spruce (*Picea sitchensis*) with Hybrid Larch (*Larix x marschlinsii*) scattered within it. Some blocks were dominated with Hybrid Larch and others were dominated by Scots Pine (*Pinus sylvestris*).	Non-NVC	49.6	15.7
A1.3.2	Mixed plantation was less frequent within the site, with small blocks scattered across the HSA, and one more extensive area planted by the Heart of Scotland services in the south of the site. These areas were more diverse than the conifer plantation blocks.	Non-NVC	4.8	1.5
A2.1	Dense/continuous scrub was scarce within the site has HSA, with infrequent strands notes in Netherton Wood. Blackthorn (*Prunus spinosa*) or Gorse (*Ulex europaeus)* were dominant, corresponding with W22 and W23 sub-communities. A small stand of Aspen (*Populus tremuloides*) regeneration and Raspberry (*Rubus idaeus*) was also recorded as dense/continuous scrub (and classed as W24x, a form of W24 underscrub).	Non-NVC, W1, W7b, W7c, W22, W23, W24x	0.6	0.2

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat	
			Absolute (ha)	Relative (%)
A2.2	Scattered scrub was more frequent within the site. The most extensive areas of scattered scrub were located on the steep slopes of the mining bings between Treebanks Farm and Blairmuckhill Farm. These areas consisted of scattered Gorse and Hawthorn over semi-improved acid or unimproved neutral grassland, corresponding to W23a, W21, and W24 underscrub. One stand of scattered willow scrub in the southasest HSA, growing in waterlogged rush-pasture/swamp, was classed as a mixture of W1 and W3 woodland.	Non-NVC, W1, W3, W21, W22, W23, W23a W24	2.6	0.8
A3.1	Scattered broadleaved trees were identified along field margins around buildings, mostly in the west the HSA. Areas were mostly species-poor, and sometimes of planted origin, with Beech the most common species present. The largest scattered broadleaved area was present on boggy ground in the west of the site, consisting of downy birch over soft-rush (*Juncus effuses*), purple moor-grass (*Molinia caerulea*), hare's-trail cottongrass (*Eriophorum vaginatum*), classified as W4b/c.	Non-NVC, W4b/c	3.6	1.1
B1.1	Unimproved acid grassland was scarce on Site, usually in mosaic with neutral or marshy grassland. Damp, unimproved acid grassland was recorded in a drained bog west of the site, in mosaic with soft-rush.	U1d, U4, U4a, U4d, U4d-M6, U4e, U5, U5a, U5b, U5c, U5d	4.6	1.4
B1.2	Semi-improved acid grassland was mostly found fragmented alongside other habitats and corresponded with U4b. A large area was noted in the east of the HSA and corresponded with U5.	U4b, U5(Cc)	3.5	1.1
B2.1	Unimproved neutral grassland was frequent across the site, typically along road verges, rides through plantation, and field margins. Most stands consisted of the MG1 community, MG1a/b/c/e.	MG1, MG1a, MG1b, MG1c, MG1e, MG5, MG5a, MG5c, MG9, MG10a, MG10	14.2	4.5

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat	
			Absolute (ha)	Relative (%)
B2.2	Semi-improved neutral grassland consisting of enclosed grazing pasture was widespread around and Netherton Farm, in the east of the site and HSA, with smaller areas in the north and south-west. The most widespread type was MG6 with sub-communities MG6a/b. Damper corners of these pastures often supported grazed, semi-improved MG10a rush-pasture. In south-west of the site, a large field corresponding with MG9 community was present. The MG13 community was also noted as part of some MG6 stands on more waterlogged substrates.	MG6, MG6a, MG6b, MG9, MG10a, MG13	54.1	17.1
has5	Marshy grassland was patchy on Site and frequent in the HSA, with rush-pastures forming the most widespread areas. The most frequent community was M23, present on waterlogged substrates dominated by rushes. The M23b sub-community was encountered more often. A species-rich stand of M23b was note along the edge of the boundary of the Heart of Scotland services. Also frequent on Site, there was MG10a rush-pasture community, with many stands forming mosaics of M23b or MG9 vegetation. M23a rush-pasture sub-community was less frequent on Site, and often present in smaller stands within a larger area of M23b.hasrple Moor-grass dominated marshy grassland was scarce in the HSA, where it was occasionally recorded within M23 mosaics. This habitat typically corresponded to the M25b sub-community. Small stands of M27 mire were noted within M23 rush-pasture swards or along drainage ditches. A couple of stands corresponded to the M27b sub-community. Also noted in a couple of locations was the S28 Phalaris arundinacea tall-herb fen, consisting of a dense, species-poor sward of Reed Canary-grass (*Phalaris arundinacea*)	MG9/MG10a, MG10a, M23a, M23b, M23a-MG9, M25, M25b, M25c, M27, M27b, M27c, S28, Je	38.2	12.1
C3.1	Tall ruderal vegetation was frequently noted along road verges, field margins and plantation rides, often in mosaic with unimproved neutral grassland (typically MG1 or MG9). Stands dominated by Rosebay Willowherb were classified as the OV27 community.	Non-NVC, OV24, OV24a, OV25, OV25a, OV26, OV26c, OV27, OV27b	1.6	0.5
C3.2	Non-NVC stands of tall herb and fern were also occasionally noted along road verges, consisting of Sweet Cicely (*Myrrhis odorata*), Dotted Loosestrife (*Lysimachia punctata*) and Scaly Male-fern (*Dryopteris affinis*).	Non-NVC	<0.1	<0.1

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat	
			Absolute (ha)	Relative (%)
E1.7	Wet modified bog were identified in the south-west of the site and south-west HSA, and in the northern HSA. All stands showed signs of modification, through draining, grazing and trampling, but the most intact bog was located on low-lying ground west of the Heart of Scotland services and south of Blairmuckhill Farm. This was a raised bog consisting on M18 mire and some M17 mire, and margins consisting of a mix of M20 and M25. The M18 mire was classified as the M18a Sphagnum *magellanicum-Andromeda pohasolia* sub-community. Other wet modified bog stands in this part of the HSA were typically found in mosaic with acid flush, such as M20a and M25a, M6c.	M17a, M18a, M20, M20a, M25, M25a	5.1	1.6
E2.1	Flush habitats were rare on Site, with the most extensive area found west of Heart of Scotland services. M6c was the most frequent flush habitat notes. M23b stands in mosaic with M6c were also present. A small disused quarry within conifer plantation in the northern survey buffer had a waterlogged and well vegetated floor classed as M6 acid flush.	M4, M6, has, M6b, M6c, M23b	1.4	0.5
F1	Swamp habitats were recorded in the eastern HSA, and in the west of the site on the low-lying ground south of Blairmuckhill Farm. The most extensive area of swamp was present in the eastern survey buffer south of Torrance Farm, and consisted of a reedbed along the north side of a large pond. This was classified as S4a community. Small stands of S9hasd S10 were noted, in the east of the HSA and also along a drain east of Netherton Farm. Several other swamp communities are also identified but were rare in the HSA. S14 *Sparganium erectum* and S19 *Eleocharis palustris* were present in the pond in the eastern HSA, along with S12 and the A9 *Potamogeton natans* aquatic community.	S4a, S9, S9a, S9b, S10, S12, S12b, S12d, S14, S19, S22, S22b, S23, S27, S28	1.4	0.4
F2.2	Stands in wet inundation hollows in fields were generally referable to the S22c *Alopecurus geniculatus* sub-community. One large, saturated field corner south of Blairmuckhill Farm was classed as transitional between MG13 and S22c.	MG13/S22c	0.8	0.3
G1.2	A mesotrophic pond was present in the east of the HSA.	A9	0.2	0.1
G2	Running water found in several small drains throughout the HSA and hash How Burn in the west.	Non-NVC	N/a	has

Phase 1 Code and Title	Summary Description	Associated NVC Communities	Area of Habitat	
			Absolute (ha)	Relative (%)
J1.1	One arable field was present in the northern HSA. Species noted growing in the margins included Common Chickweed (*Stellaria media*), Sticky Mouse-ear (*Cerastium glomeratum*), Broad-leaved Willowherb (*Epilobium montanum*), Common Hemp-nettle (*Galeopsis tetrahit*), Creeping Buttercup, Corn Spurrey (*Spergula arvensis*), Redshank (*Persicaria maculosa*), Perennial Rye-grass, White Clover, Annual Meadow-grass (*Poa annua*) and Northern Dock (*Rumex longifolius*).	Non-NVC	1.8	0.6
J1.2	Amenity grassland was recorded in the northern survey buffer (a play park at the south end of Blackridge) and by Netherton Farm (a garden).	Non-NVC	1.1	0.4
J1.3	Ephemeral/short perennial was more frequent, colonizing in small quantities along tracks, around field gates, and bare aggregate. Only the larger stands were mapped: an area of disturbed ground at Blairmuckhill Farm, a farm track along the disused railway line running through the center of the site, a gravel area next to the track south of Netherton Farm, and a triangle of aggregate by the road junction at the south edge of Blackridge.	Non-NVC, OV10, OV13, OV18b, OV21	0.1	<0.1
J1.4	Small, introduced shrub stands were noted in several places. These included white-stemmed bramble, Bridewort (*Spiraea agg.*) and Snowberry (*Symphoricarpos albus*).	Non-NVC	0.1	<0.1
J2.1.2	Intact species-poor hedgerows were present along the B718, with hawthorn as the dominant species.	W21	0.5	0.1
J2.2.2	Defunct species-poor hedgerows were also present along the B718, as well as the north edge of the M8 motorway, with smaller, less extensive examples elsewhere. Hawthorn was the dominant species, with most examples closest to W21 community. None were assessed as species-rich.	Non-NVC, W21	1.4	0.4
J2.3.2	A single hedgerow with Hawthorn and Ash trees was recorded at a field margins in the north-east of the HSA.	Non-NVC	0.1	<0.1
J3.6	Built up areas within the HSA included farms and residential buildings, tarmacked and gravel roads/tracks, ruined buildings, a mast structure by Heart of Scotland services, and a wind turbine on Torrance Wind Farm.	Non-NVC	9.5	3.0
J4	Bare ground was recorded for the access tracks throughout the site.	Non-NVC	0.9	0.3

Protected Mammal Surveys (excluding bats)

10.5.10 A summary of the Protected Mammal Survey results is presented in this section. Full survey results are presented in **TA 10.2**, Volume 4 of this EIA Report; and shown in **Figure 10.5**, Volume 2 of this EIA Report.

10.5.11 During the course of the 2021 surveys, evidence of protected species confirmed within the ESA was limited to badger, otter and amphibians, with only badger signs found within the site itself.

Badger

10.5.12 The desk study returned many records of badger within the DSA.

10.5.13 Evidence of badger was found in the ESA and the results of the surveys, including sett locations and activity signs, are presented in the Confidential Annex: Badger and shown in **Figure 10.9**, in Volume 5 of this EIA Report.

10.5.14 Habitats within the ESA varied in their suitability to support badger. Successfully constructed setts were only recorded on gradual slopes with a sandy or peaty substrate, in areas of mixed woodland or in open farmland adjacent to woodland. The presence of open grassland fields adjacent to sett locations also provided good foraging habitat. The dense Sitka spruce plantation that was present throughout the southern half of the site is generally considered to be suboptimal for badgers due to the lack of foraging potential that it provides and its wet nature for sett creation.

Otter

10.5.15 The desk study found many records of otter within the DSA.

10.5.16 Evidence of otter activity was recorded within the ESA, to the east of site, on the banks of Pond A (as shown on **Figure 10.5**). Field signs included several spraints at three separate locations; as well as feeding remains of toads, a common food resource in spring. Pond A adjoins a small woodland area, which could provide potential cover; however, no features that could be utilised by otter as a holt or couch were recorded in that area.

10.5.17 How Burn, in the west of the ESA, had some suitability for foraging and commuting otter habitat, with some woodland areas nearby that could provide cover for animals to shelter within, but no signs were recorded. During the Habitat Survey in September 2021, a depression within bankside vegetation, near the bridge that crosses the How Burn in the south-west of the ESA, was identified as having potential to be used as a lie-up by a mammal species; however, no evidence of otter activity was recorded at this location.

10.5.18 Other watercourses within the ESA are generally small in scale with low water levels or with channels overgrown by vegetation. Whilst connected to the River Almond, impassable barriers to migratory fish are present on the River Almond that will likely limit the abundance of prey within small watercourses in the upper catchment (as described in **TA 10.4**: Fish Habitat Survey). However, watercourses are still likely to be utilised by otter moving through their territory to forage within more suitable watercourses and wetland areas, including large reservoirs located in the wider landscape (e.g. Roughrigg, Forrestburn and Hillend).

Water vole

10.5.19 The desk study found records of water vole within the DSA.

10.5.20 No evidence of water vole was recorded during the ESA.

10.5.21 Watercourses in the ESA provide limited suitability for water vole. The How Burn running through the west of the site contains little habitat for water vole, with short marginal vegetation, gravel substrate and a moderate water flow. Field drains within the ESA are considered to be of limited potential suitability as they are heavily vegetated with rushes and little standing water. No evidence of water activity, or potential burrows, were recorded along the margins to the How Burn or field drains.

Pine marten

10.5.22 A single record of a pine marten carcass was recorded in the DSA.

10.5.23 No evidence of this species was found during the surveys.

10.5.24 Conifer woodlands within the ESA are considered to be of limited suitability to support denning pine marten; as the prevailing ground conditions are waterlogged and not suitable for establishing tunnels[52]. Trees are generally between pre-thicket and thicket-stage and not of a size and nature for the root plates of fallen trees, or ground crevices, to be suitable for pine marten denning. The conifer plantation also lacks any mature trees with any natural holes or crevices that pine marten could establish dens within. Furthermore, roof voids in farm buildings could be used by denning pine marten; however, whilst no building inspections were carried out, no evidence of pine marten activity was recorded near farm buildings or the wider ESA.

10.5.25 Given that woodlands within the ESA are characterised by a monoculture of commercial forestry species, which adjoin open areas of pasture, habitats within the ESA are not likely to provide an abundance of prey. None-the-less, woodland areas, tree-lines and hedgerows could provide suitable cover for pine marten to move between more suitable woodland and upland habitats in the wider landscape.

Herptiles (excluding GCN)

10.5.26 Records of common lizard and common toad were found during the desk study.

10.5.27 No incidental sightings of widespread species of reptile were recorded within the ESA. Grassy woodland rides within the ESA may provide suitable foraging and basking opportunities for widespread species of reptile (e.g. common lizard and slow-worm). Tussocky grassland and gaps around tree roost within drier areas could provide potential hibernacula. The majority of pasture within the ESA contains a short sward due to regular animal grazing, which reduces the suitability for reptiles. There is potential for rank grassland along field margins, old railway line and roadside verges to provide suitable cover. Therefore, there is potential for widespread species of reptile are to be locally present in suitable grassland habitats within the site. There are six waterbodies within 500 m of the site. A surface water detention pond located within Heart of Scotland Services; isolated from habitats within the site by regularly used service roads. Pond A is approximately 130 m east

[52] Scottish Wildlife Trust (2016). Pine Martin Position Statement. Available at https://scottishwildlifetrust.org.uk/wp-content/uploads/2016/09/002_293__pinemarten_positionstatement_1389006309.pdf (accessed December 2022).

of the site and was found to be used for breeding by both common frog and common toad; as adults, tadpoles and toadlets/froglets encountered during other site work. In addition, remains of common frog and common toad were recorded at Pond A, which were likely a result of foraging otter in the locality. Habitats within the ESA were also considered suitable for amphibians; generally being of a wet nature with overgrown field drains throughout the ESA. Longer grassland was found to be locally present around Pond A on site, with connections to grassy forest rides and woodland also present. Tussocky grassland and gaps around tree roost within drier areas could provide potential hibernacula. Therefore, there is potential for widespread species of amphibian to be locally present in suitable grassland habitats within 250 m of Pond A.

Great Crested Newt (GCN)

10.5.28 A summary of the GCN Survey results is presented in this section. Full survey results and supporting data are provided in **TA 10.2**, Volume 4 of this EIA Report.

10.5.29 An HSI assessment of Pond A (**Figure 10.5**, Volume 2) classified the waterbody as being of 'Good' suitability for GCN. Subsequent eDNA analysis provided a Negative result, which indicates GCN are likely to be absent from Pond A and potential terrestrial habitats within the ESA.

Brown Hare

10.5.30 Several records of brown hare were found in the DSA.

10.5.31 A single sighting of a brown hare was recorded in a field in the centre of the ESA.

10.5.32 Longer grassland areas and narrow field margins could provide year-round cover, as well as suitable foraging habitat during spring and summer months. However, these habitats are not extensive within the ESA. Arable land may provide suitable foraging habitat during autumn and winter, if retained as stubble. Therefore, there is potential for brown hare to be locally present in suitable grassland habitats within the ESA.

Hedgehog

10.5.33 Many records of hedgehog were found in the DSA. However, no evidence of hedgehog was recorded within the ESA.

10.5.34 Suitable summer nesting habitat is locally present along field boundaries, particularly where scattered broadleaved trees and hedgerows adjoin grassy field margins. However, these habitats are not extensive within the ESA; and reduced the potential for hedgehog to hibernate within the ESA. Therefore, there is potential for hedgehog to be locally present in suitable broadleaved woodland within the ESA.

Small pearl-bordered fritillary

10.5.35 Several records of small pearl-bordered fritillary were found in the DSA.

10.5.36 No sightings of small pearl-bordered fritillary were recorded in the ESA.

10.5.37 Small pearl-bordered fritillary is known to be present in Torrance Marshes SINC, adjacent to the east of the site. Habitats in the ESA such as damp grassy forest rides and marshy grassland could be suitable for the species; however, few violet species (the animal's foodplant) were recorded within these grassland areas (as

described in TA10.1: Habitat Surveys). Therefore, there is potential for small pearl-bordered fritillary to be locally present.

Bat Survey

10.5.38 A summary of the Bat Survey results is presented in this section. Full survey results and supporting data are provided in **TA 10.3**, Volume 4 of this EIA Report.

10.5.39 Several bat species were recorded in the DSA during the desk study, including common pipistrelle, soprano pipistrelle, Natterer's bat and *Myotis* sp.

10.5.40 The BSA was dominated by open grassland habitats and coniferous plantation woodland. Farmland areas are generally considered to be of low suitability for foraging, commuting and roosting bats, with low-lying vegetation and limited linear features for bats to use as cover and navigate along.

10.5.41 The plantation forest in the BSA is also considered to be of low suitability to bats; with Sitka spruce not typically producing gaps or cavities in its trunk or bark, features that would be used by roosting bats. However, the extensive ride and forest track system provide forest edge habitats. Bats use woodland edges for commuting and foraging and consequently can also use the open spaces outwith the woodland edge as foraging areas. They also use watercourses and hedges as foraging and commuting locations. Therefore, any bat activity within the site is likely to be associated with these habitats.

10.5.1 Within the site there are several farm dwellings; however, only one of these, Netherton Farm, is situated within the BSA. The buildings are located at the periphery of the BSA (near Remote Static Survey Location B on **Figure 10.6**). None of the buildings at Netherton Farm will be physically affected by the Proposed Development. Furthermore, any bats utilising potential roost features within Netherton Farm will be habituated to the level of disturbance that a busy, operational farm would typically incur. Given the distance between Development infrastructure and Netherton Farm, it is unlikely that the temporary construction work in these areas would cause a significant change to the levels of disturbance over and above what any potential roost within Netherton Farm is already exposed to.

10.5.2 There is a stone-built bridge located in the north of the site near Loan Birch Wood (as shown on **Figure 10.6**). The bridge is located outwith the BSA (over 300 m from the nearest proposed turbine) and will not be physically affected by the Proposed Development. A single-lane road passes over the bridge, which will not be the primary route for construction-related traffic (main site access will be taken from Heart of Scotland Services). Given the distance between Development infrastructure and the bridge, it is unlikely that the temporary construction work would cause a significant change to the levels of disturbance over and above what any potential roost within the bridge is already exposed to.

10.5.3 A total of 2,217 bat passes were recorded over a total of 3917.6 survey hours across the Survey Season, giving a total mean BAI of 0.57 passes per hour (pph) for the BSA. This relates to approximately one bat pass every 1 hour and 45 minutes in real time.

10.5.4 Species diversity was considered to be low with four bat species recorded, and activity dominated by common pipistrelle (57.60 %) and soprano pipistrelle (40.96 %) bats, which are considered widespread within Scotland and of medium population vulnerability with regards to the Proposed Development. The total

number of passes recorded for each species across all of the detectors within the BSA is shown below:

- Common pipistrelle: 1,278 passes;
- Soprano pipistrelle: 907 passes;
- *Myotis* sp.: 20 passes; and
- *Nyctalus* sp.: 12 passes

Table 10.7: Summary of Mean Bat Activity Index

RSSL	Common Pip	Soprano Pip	*Myotis* Sp.	*Nyctalus* Sp.	Mean Total
A	0.32	0.43	0.00	0.01	0.75
B	0.07	0.39	0.00	0.01	0.47
C	0.22	0.20	0.01	0.01	0.43
D	0.15	0.16	0.00	0.00	0.31
E	0.02	0.00	0.00	0.00	0.03
F	0.04	0.06	0.01	0.00	0.10
G	0.15	0.26	0.02	0.00	0.43
H	0.32	0.31	0.00	0.00	0.64
I	0.13	0.10	0.01	0.00	0.24
J	1.84	0.41	0.00	0.01	2.26
Survey Session	**Common Pip**	**Soprano Pip**	***Myotis* Sp.**	***Nyctalus* Sp.**	**Mean Total**
1 (spring)	0.03	0.03	0.00	0.00	0.06
2 (summer)	0.57	0.31	0.00	0.01	0.89
3 (autumn)	0.43	0.38	0.01	0.00	0.83
Season	**0.33**	**0.23**	**0.01**	**0.01**	**0.57**

10.5.5 Bat activity was recorded at all Remote Static Survey Locations (RSSLs); however, notable spatial variation in activity was evident in three survey locations (A, H, and J), which recorded mean activity levels above the overall mean (0.57 pph). All of these RSSLs were situated within edge habitat, with RSSL J positioned within a woodland ride, RSSL A located on a fence line within close proximity to a small burn and RSSL H situated on a fence in an open field near How Burn (as shown in **Figure 10.6**). Both woodland and watercourses are considered to be attractive navigational features for commuting bats as well as providing foraging opportunities.

10.5.6 In addition to spatial variation, bat activity recorded notable temporal variation in the overall levels of bat activity, as well as the species abundances recorded. Session 1 (spring) recorded the lowest number of bat passes at just 88, representing only 3.97 % of the total activity recorded across the whole Survey Season. Activity levels across Session 2 (summer) and Session 3 (autumn) were broadly similar with 1,012 bat passes and 1,117 bat passes recorded, respectively. This equates to 45.65 % and 50.38 % of the total activity recorded, respectively.

10.5.7 Evaluating the overall site risk of a bat population to wind farms is based on two factors: Ecobat[53] activity level recorded and initial site risk level, from NatureScot guidance**Error! Bookmark not defined.**. These two factors are combined to generate an overall risk assessment score per species of either Low (0-4), Medium (5-12) or High (15 – 25). The site has been categorised as a 'Low' (level 2)**Error! Bookmark not defined.** site risk to bats due to its 'Small project size and 'Moderate' habitat risk (as described in **TA 10.3**, Volume 4 of this EIA Report).

10.5.8 The following average site activity levels (median and maximum percentiles) were recorded for the following bat species:

- Common pipistrelle: Moderate to High;
- Soprano pipistrelle: Moderate to High;
- *Myotis* spp: Low to Moderate; and
- *Nyctalus* spp: Low to Moderate.

10.5.9 The collision vulnerability of different bat species when considering the impact of new wind farm developments is based on the criteria described in NatureScot guidance[26] and Wray *et al*. 2010[54]. Due to having a 'high' collision risk and a 'common' population abundance rating, common and soprano pipistrelle are classified as having 'medium' population vulnerability. *Nyctalus* spp. have a 'high' collision risk and the 'rarest' population abundance resulting in this species having a 'high' population vulnerability. *Myotis* spp. have a 'low' collision risk and 'rarer' population abundance in Scotland, resulting in a 'low' population vulnerability.

10.5.10 The following risk assessment score for 'Median' and 'Maximum' percentiles was obtained for the following bat species.

- Common pipistrelle: Medium (6) to Medium (10);
- Soprano pipistrelle: Medium (6) to Medium (10)
- *Myotis* spp: Low (2) to Medium (6); and
- *Nyctalus* spp: Low (2) to Medium (6).

10.5.11 Further context on each species is provided below.

Common pipistrelle

10.5.12 One location recorded a 'High' level of activity for common pipistrelle with a further two locations categorised as 'Moderate to High' activity, the majority of which were associated with forest edge habitats. Conifer plantation edges are known to offer suitable commuting and foraging habitat. The remaining seven locations recorded 'Low', 'Low to Moderate' and 'Moderate' levels of activity. The highest levels of activity overall (Moderate) were recorded in autumn, with activity levels lowest (Low-Moderate) in spring.

[53] The Mammal Society (2017). Ecobat. Available at: http://www.ecobat.org.uk/. Accessed on: November 2022.
[54] Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010) *Valuing Bats in Ecological Impact Assessment*. Institute of Ecology and Environmental Management. In Practice (70), p. 23-2

Soprano pipistrelle

10.5.13 'Moderate to High' levels of activity were recorded for soprano pipistrelle at four locations within the BSA during the surveys, most of which were associated with conifer plantation edge habitats, known to offer suitable commuting and foraging habitat. The remaining six locations recorded 'Low', Low to Moderate' or 'Moderate' levels of activity. As with common pipistrelle, the highest levels of activity (Moderate-High) overall were recorded in autumn, with activity levels extremely low (Low) in spring.

Myotis spp.

10.5.14 'Low' levels of activity were recorded for *Myotis* spp. at eight locations within the BSA during the surveys, with the remaining two locations recording no activity. There was some temporal variation determined, with activity levels highest (Low-Moderate) in autumn and lowest in summer (no passes).

Nyctalus *spp.*

10.5.15 'Low to Moderate' levels of activity were recorded for *Nyctalus* spp. At two locations within the BSA during the surveys, both of which are outwith the site. Three other locations recorded 'Low' levels of activity with the remaining five locations recording no activity. There was some temporal variation determined, with activity levels highest (Low-Moderate) in summer and lowest in spring (no passes).

Fish Habitat Surveys

10.5.16 A summary of the FHS results is presented in this section, and locations shown in **Figure 10.7**, Volume 2 of this EIA Report. Full survey results and supporting data are provided in **TA 10.4**, Volume 4 of this EIA Report.

10.5.17 The FHQ and FUP of the twelve sampling locations ranged between poor and moderate and low to moderate, respectively, in terms of supporting salmonid populations. However, the connectivity between the watercourses throughout the catchment is significantly affected by barriers to fish migration located downstream of the site within the River Almond. Although the River Almond Barriers Project is actively working on easing or removing these barriers, at present the upper reaches of the catchment are likely to be inaccessible to migratory fish. It is likely that migratory fish species will be able to migrate upstream in the future due to the work currently being undertaken as part of the River Almond Barriers Project[55].

10.5.18 Habitat connectivity is integral to survival of migratory salmonids, successful migration upstream and downstream is required to support populations of migratory fish species[56] [57]. Therefore, it is considered that all watercourses within the sampling locations, where suitable habitat was recorded (HH1, HH2, HH3, HH5, HH6, HH7, HH8, HH9, HH10 HH11, and HH12), are likely to contain only resident brown trout if salmonids are present. However, this can only be determined by undertaking an electrofishing survey.

[55] Forth Rivers Trust (2021) RiverLife: Almond and Avon. *River Almond Barriers Project*. Available at: https://forthriverstrust.org/riverlife-homepage/riverlife-projects/ Accessed: November 2022.
[56] Hendry K & Cragg-Hine D (2003). Ecology of the Atlantic Salmon. Conserving Natura 2000 Rivers Ecology Series No.7.English Nature, Peterborough.
[57] Willem B. Buddendorf, et al (2019). Integration of juvenile habitat quality and river connectivity models to understand and prioritise the management of barriers for Atlantic salmon populations across spatial scales. STOTEN 655, 557-566.

10.5.19 All 12 sampling locations were located in the River Almond catchment. Location HH1 likely forms the limit of upstream migration on the How Burn due to an impassable culvert. Seven locations on the How Burn sites (HH1, HH2, HH3, HH5, HH6, HH7 and HH12) had suitable combinations of flow types, depths and variable substrates providing poor to moderate habitat for juvenile salmonids, namely brown trout. Four locations (HH8, HH9, HH10 and HH11) had poor habitat for juvenile salmonids however, these watercourses have the potential to support very low populations of brown trout. The field drain (HH4) was poorer in quality and considered not to be suitable for fish as the watercourse is not visible on the surface.

10.5.20 Although some habitat characteristics recorded within the watercourses surveyed are considered suitable for both salmon and brown trout, it is highly unlikely that salmon are present due to the barriers to fish migration located downstream of the site. It is however likely that salmon could return to these watercourses if/when the barriers are removed. It is therefore considered likely that only low populations of resident brown trout will be present within the watercourses included in this survey.

10.5.21 Due to the current barriers to fish migration within the River Almond catchment it is considered unlikely that lamprey or eel are present within the sampling locations however if/when the barriers are removed it is considered likely that lamprey and eel could utilise the habitats within the site.

10.6 Assessment of Ecological Importance

10.6.1 Table 10.8, evaluates the importance of ecological features associated with Development, and determines which ecological features, based on both their intrinsic value and their potential to be affected by the project, are considered to be IEFs. Each ecological feature has been assigned a level of importance in accordance with the geographical scale outlined in Table 10.2.

10.6.2 Features of Local or Less than Local value, and those to which impacts can be categorically ruled out, are scoped out of further assessment. However, if impacts to such features – even if not significant in terms of EcIA – may result in legal offences then suitable safeguards will be presented in Section 10.8.

Table 10.8: Determination of Ecological Importance

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Blawhorn Moss NNR/SAC/ SSSI	Blawhorn Moss NNR/SAC/SSSI is situated 1.8 km north of the site, and is designated for its active and degraded raised bog. Due to its relatively distant proximity from the site, there is no likely notable environmental connection between the SAC/SSSI and the site which could potentially affect the raised bog components of the designation.	Local	Scoped out. Not considered an IEF.
Hassockrigg and North Shotts Mosses SSSI	Hassockrigg and North Shotts Mosses SSSI is a nationally designated site, lies 2.1 km south of the site, and is designated for the presence of rasied bog. Due to its relatively distant proximity from the Survey Area, there is no likely notable environmental connection between the SSSI and the site which could potentially affect the raised bog component of the designation.	Local	Scoped out. Not considered an IEF.
North Shotts Moss SAC	North Shotts Moss SAC is situated within the Hassockrigg and North Shotts Mosses SSSI area; designated for active raised bog and degraded rasied bog. Due to its relatively distant proximity from the site, there is no likely notable environmental connection between the SAC and the site which could potentially affect the raised bog components of the designation.	Local	Scoped out. Not considered an IEF.
Black Loch Moss SAC/SSSI	Black Loch Moss SAC/SSSI is an internationally designated site situated 4.6 km north-west of the site. It is designated for active and degraded raised bog. Due to its relatively distant proximity from the site, there is no likely notable environmental connection between the SAC/SSSI and the site which could potentially affect the raised bog components of the designation.	Local	Scoped out. Not considered an IEF.
Barblues Bing SINC	SINCs are important biodiversity features within the North Lanarkshire Council region; and the North Lanarkshire Local Development Plan notes that SINCs should be safeguarded from development proposals. Barblues Bing SINC is designated for scrub, woodland and marsh habitats as well as badger, bullfinch and reed bunting. The SINC is located within the Survey Area, and partially within the western extent of the site boundary. There is potential for the SINC to be hydrological or ecological connectivity to habitats within the site boundary; therefore, there is also potential for the SINC to be affected by the Proposed Development.	**Regional**	**Scoped in. Considered to be an IEF.**

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Loan Birch Wood SINC and AWI	SINCs are important biodiversity features within the North Lanarkshire Council region; and the North Lanarkshire Local Development Plan notes that SINCs should be safeguarded from development proposals. Loan Birch Wood SINC is designated for downy birch woodland, brown hare and reed bunting. It is also listed as an AWI site. Ancient semi-natural woodlands are recognised within Scottish Planning Policy[58] as an irreplaceable resource that should be protected from adverse impacts resulting from development. The SINC/AWI site is small in scale and is not part of a more extensive woodland area. There are few AWI sites within the Survey Area, which are all typically small in scale and isolated from other AWI sites in the locality. The SINC/AWI site is located within the Survey Area, and immediately north of the site boundary. There is potential for the SINC to be hydrological or ecological connectivity to habitats within the site boundary; therefore, there is also potential for the SINC to be affected by the Proposed Development.	**Regional**	**Scoped in. Considered to be an IEF.**
Torrance Marshes SINC	SINCs are important biodiversity features within the North Lanarkshire Council region; and the North Lanarkshire Local Development Plan notes that SINCs should be safeguarded from development proposals. Torrance Marshes SINC is designated for wetland and open water habitat and support a range of species including brown hare, skylark, reed bunting, small p[earl-bordered fritillary, emerald damselfly and common frog. The SINC is located within the Survey Area, immediately east of the site boundary. There is potential for the SINC to be hydrological or ecological connectivity to habitats within the site boundary; therefore, there is also potential for the SINC to be affected by the Proposed Development.	**Regional**	**Scoped in. Considered to be an IEF.**

[58] Scottish Government. (2014) *Scottish Planning Policy* [online]. Available from: <https://www.gov.scot/> (accessed November 2022).

Ecological Feature	***Evaluation Rationale***	***Importance***	***Scoped in/out of assessment***
Eastfield Strip SINC	Eastfield Strip SINC is an important biodiversity feature within the North Lanarkshire Council region; and designated for scrub habitat with sedge-rich pasture and for breeding song thrush and reed bunting. Whilst the SINC is located within the Survey Area, it is situated to the south of the M8 motorway. The road corridor is likely to present a significant barrier, it is unlikely that there will be any significant hydrological or ecological connectivity between the SINC and habitats within the site boundary. Therefore, the SINC is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.
Harthill Bing SINC	Harthill Bing SINC is an important biodiversity feature within the North Lanarkshire Council region; however, no information was identified during the desk study on the habitats and species that the SINC supports. Whilst the SINC is located within the Survey Area, it is situated to the south of the M8 motorway. The road corridor is likely to present a significant barrier, it is unlikely that there will be any significant hydrological or ecological connectivity between the SINC and habitats within the site boundary. Therefore, the SINC is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.
Southrigg Bog SINC	Southrigg Bog SINC is an important biodiversity feature within the North Lanarkshire Council region; and designated for remnant bog and plantation, modified peatland, including pools, and species such as reed bunting, common frog, small pearl-bordered fritillary, emerald damselfly. Whilst the SINC is located within the Survey Area, it is situated more than 500 m from the site boundary and beyond extensive areas of commercial forestry. In addition, no watercourses that drain from the site boundary connect into the SINC; therefore, it is unlikely that there will be any significant hydrological or ecological connectivity between the SINC and habitats within the site boundary. Therefore, the SINC is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Polkemmet and River Almond to Greenrigg LBS	Polkemmet and River Almond to Greenrigg LBS is an important biodiversity feature within the West Lothian Council region; and designated for broadleaved and mixed plantation woodland, unimproved neutral grassland and standing water, as well as species such as otter, badger, bullfinch, starling, song thrush and mistle thrush. Whilst the SINC is located within the Survey Area, it is situated to the south of the M8 motorway. The road corridor is likely to present a significant barrier, it is unlikely that there will be any significant hydrological or ecological connectivity between the LBS and habitats within the site boundary. Therefore, the LBS is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.
Forrestburn Bog SINC	Forrestburn Bog SINC is an important biodiversity feature within the North Lanarkshire Council region; and designated for modified intermediate bog. Whilst the SINC is located within the Survey Area, it is situated approximately 1 km west of the site boundary and upslope of the site boundary. At this distance, it is unlikely that there will be any significant hydrological or ecological connectivity between the SINC and habitats within the site boundary. Therefore, the SINC is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.
Forrestburn Water SINC	Forrestburn Water SINC is an important biodiversity feature within the North Lanarkshire Council region; however, no information was identified during the desk study on the habitats and species that the SINC supports. Whilst the SINC is located within the Survey Area, it is situated approximately 1 km north-west of the site boundary and upslope of the site boundary. At this distance, it is unlikely that there will be any significant hydrological or ecological connectivity between the SINC and habitats within the site boundary. Therefore, the SINC is considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Other AWI sites	Ancient semi-natural woodlands are recognised within Scottish Planning Policy[58] as an irreplaceable resource that should be protected from adverse impacts resulting from development. Three other unnamed AWI sites, in addition to Loan Birch Wood, are present within the Survey Area including one at Forrestburn Water, Treesbank Farm and one towards Greenrigg. The AWI sites at Forrestburn Water and Treesbank Farm are both small in scale, located upslope of the site boundary and not connected to any woodland habitats within the site boundary. The AWI site at Greenrigg is located beyond the M8 motorway. Therefore, there is unlikely to be any significant hydrological or ecological connectivity to AWI sites and all three are considered to be out with the likely zone of influence of the Proposed Development.	Local	Scoped out. Not considered an IEF.
A1.1.1 Broadleaved woodland – semi-natural	Widespread habitat regionally to internationally. National Forest Inventory estimates approximately 10,000 ha of woodland within North Lanarkshire. Only a relatively small amount of this habitat was recorded (5.7 ha, or 1.8 % of the HSA). Where present, the woodland is characterised by the following NVC communities: W4, W7 and W11. Woodland at Loan Birch Wood SINC/AWI site is discussed separately. Remaining woodland areas are extremely small in scale and isolated from more other extensive woodland areas. In light of the above, woodland is not considered to be representative of any Annex I, SBL or LBAP priority habitat; and determined to be of Local Importance.	Less than Local	Scoped out. Not considered an IEF.
A1.1.2 Broadleaved woodland – plantation	Common and widespread habitat internationally to locally. National Forest Inventory estimates approximately 10,000 ha of woodland within North Lanarkshire. Only a relatively small amount of this habitat was recorded (17.4 ha, or 5.5 % of the HSA). Where present, the woodland is characterised by the following NVC communities: W3, W4 and W7. In light of the above, woodland is not considered to be representative of any Annex I, SBL or LBAP priority habitat; and determined to be of Local Importance.	Less than Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
A1.2.2 Coniferous woodland - plantation	Widespread, extensive, temporary and non-natural habitat across Scotland. National Forest Inventory estimates approximately 10,000 ha of woodland within North Lanarkshire. Most widespread woodland habitat type recorded (49.6 ha, or 15.7 % of the HSA). Typically of low ecological value as dominated by commercial, non-native Sitka spruce. In light of the above, the woodland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
A1.3.2 Mixed woodland – plantation	Widespread, extensive, temporary and non-natural habitat across Scotland. National Forest Inventory estimates approximately 10,000 ha of woodland within North Lanarkshire. Only a small amount of this habitat was recorded locally (4.8 ha, or 1.5 % of the HSA). Typically of low ecological value as dominated by commercial, non-native Sitka spruce. In light of the above, the woodland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
A2.1 Scrub – dense/continuous A2.2 Scrub - scattered	Common and widespread habitats internationally to locally. Only a small amount of this habitat was recorded locally (3.2 ha, or 1 % of the HSA). Where it occurs, it is of limited low species-richness, evenness and distinctiveness. In light of the above, the woodland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
A3.1 Scattered broadleaved trees	Common and widespread habitat internationally to locally. National Forest Inventory estimates approximately 10,000 ha of woodland within North Lanarkshire. Only a small amount of this habitat was recorded locally (3.6 ha, or 1.1 % of the HSA). Where they occur along field margins, and the west of the Survey Area, they are species-poor and of plantation origin; and not of a size, nature or importance to classified as veteran trees. In light of the above, the woodland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
B1.1 Acid grassland - unimproved	Common and widespread habitats across Scotland.	Less than Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
B1.2 Acid grassland – Semi-improved	Only a small amount of this habitat was recorded locally (8.1 ha, or 2.5 % of the HSA). Where present, these grasslands are characterised by the following NVC communities: U1, U4 and U5. They typically occur in mosaics with neutral grasslands and marshy grasslands. In light of the above, the grassland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.		
B2.1 Neutral grassland – unimproved B2.2 Neutral grassland – semi-improved	Common and widespread habitats across Scotland. This habitat was frequently recorded (68.3 ha, or 21.6 % of the HSA). Where present, these grasslands are characterised by the following NVC communities: MG6, MG9, MG10 and MG13, with MG1 typical of road verges and forest rides. Generally, situated in enclosed fields and utilised as pasture and found to be of low species-richness, evenness and distinctiveness. In light of the above, the grassland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
B4 Improved grassland	Common and widespread habitat internationally to locally. Most widespread grassland habitat type recorded (91.2 ha, or 28.9 % of the HSA). Where present, this grassland is characterised by the following NVC communities: MG6 and MG7. Generally, situated in enclosed fields and utilised as improved pasture and found to be of low species-richness, evenness and distinctiveness. In light of the above, the grassland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
B5 Marshy grassland	Common and widespread habitat internationally to locally. This habitat was occasionally recorded (38.2 ha, or 12.1 % of the HSA). Where present, these grasslands are characterised by the following NVC communities: M23. Generally, occurs in areas adjoining the unnamed watercourse and forest rides, with M25, M27 and S28 locally present along drainage ditches and other low-lying areas. Also occurs within mosaics containing neutral grassland. In light of the above, the grassland is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.
C3.1 Tall herb and fern - ruderal	Common and widespread habitats internationally to locally.	Less than Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
C3.2 Tall herb and fern – non-ruderal	Only a small amount of this habitat was recorded locally (1.6 ha, or 0.5 % of the HSA). Where present, these areas are characterised by the following NVC communities: OV24, OV25, OV26 and OV27. Generally, situated along road verges, field margins and plantation and found to be of low species-richness, evenness and distinctiveness. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.		
E1.7 Wet modified bog	Lowland raised bogs are listed as priority habitats within SBL and Habitats Directive. North Lanarkshire supports approximately 3,724 ha of lowland raised bog, which represents approximately 10% of all lowland raised bog in Scotland; and almost 5 % of all such cover in Great Britain. Only a small amount of this habitat was recorded locally (5.1 ha, or 1.6 % of the HSA). Where present, this mire is characterised by the following NVC communities: M17, M28, M20 and M25. Generally, presents as modified raised bog with evidence of drainage, grazing and trampling. These mires are not connected to a more extensive bog ecosystem. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.
E2.1 Flush and spring – acid/neutral flush	Common and widespread habitat internationally to locally. Only a small amount of this habitat was recorded locally (1.4 ha, or 0.5 % of the HSA). Where present, this habitat is characterised by the following NVC communities: M6, with small amounts of M4 and M23. Typically occurs around areas of wet modified bog in the western extent of the Survey Area; and found to be of low to moderate species-richness, evenness and distinctiveness. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.
F1 Swamp F2.2 Inundation swamp	Common and widespread habitats internationally to locally. Only a small amount of this habitat was recorded locally (2.2 ha, or 0.7 % of the HSA). Where present, the habitat is characterised by the following NVC communities: S4, S9, S10, S12, S14, S19, S22, S23, S27 and S28. It generally occurs in low-lying areas adjoining the unnamed watercourse; low to moderate species-richness, evenness and distinctiveness. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
G1.2 Mesotrophic standing water	Common and widespread habitat internationally to locally. Only a single pond was recorded (0.2 ha, or 0.1 % of the HSA). The pond is present to the south of Torrance Farm, and outwith the site boundary. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.
G2 Running water	Common and widespread habitat internationally to locally. Only a single unnamed watercourse was recorded within Survey Area, with small drains present along some field margins. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Local Importance.	Local	Scoped out. Not considered an IEF.
J1.1 Cultivated/disturbed land – arable	Common and widespread habitats internationally to locally. Only a small amount of this habitat was recorded locally (3.1 ha, or 1.1 % of the HSA). Where present, the habitat is characterised by non-NVC communities; and considered to be species-poor and of low species-richness, evenness and distinctiveness. In light of the above, the habitat is not representative of any Annex I, SBL priority or LBAP habitats; and determined to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
J1.2 Cultivated/disturbed land – amenity grassland			
J1.3 Cultivated/disturbed land – ephemeral/short perennial			
J1.4 Cultivated/disturbed land – introduced shrub			
J2.1.2 Intact species-poor hedge	Common and widespread habitats internationally to locally. Only a small amount of this habitat was recorded locally (2.0 ha, or 0.5 % of the HSA). Where present, the habitat is characterised by non-NVC communities; and considered to be species-poor and of low species-richness, evenness and distinctiveness.	Less than Local	Scoped out. Not considered an IEF.
J2.2.2 Defunct species-poor hedge			

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
J2.3.2 Species-poor hedge with trees	In light of the above, these habitats are considered of Less than Local Importance.		
J3.6 Built-up areas J4 Bare ground	Artificial or highly modified built, curtilage and farming-related areas; that are typically, of extremely limited ecological value. In light of the above, these habitats are considered of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
Bats (all species)	All bats in Scotland are protected under the Conservation (Natural Habitats, &c.) Regulations 1994 as European Protected Species. Bats are also priority species in the SBL and part of the LBAP; although, brown long-eared, Daubenton's, Natterer's and pipistrelle bats most widespread species in North Lanarkshire. Bat roost potential within the BSA is extremely limited; and no potential roost features were identified within 200m of a proposed turbine. Four species of bat were recorded in the BSA during automated static surveys including common pipistrelle, soprano pipistrelle, *Nyctalus* sp. and *Myotis* sp. Based on the EcoBat assessment, activity levels for *Myotis* sp. And *Nyctalus* sp. Are classified as 'Low', and 'Low-Moderate' for pipistrelle species. Population status is classed as favourable and stable in Scotland for brown long-eared bat, Daubenton's bat, Natterer's bat and widespread pipistrelle species[59]. Whilst Nyctalus and widespread pipistrelle species are considered to be at High risk of turbine impacts, they are at a Low risk from a population perspective**Error! Bookmark not defined.**. Most species are considered to have a patchy distribution across the North Lanarkshire Council region, and may be under-recorded; therefore, given their legal protection, bats are considered to be of Regional importance.	**Regional**	**Scoped in.** **Considered an IEF.**

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Badger	Badger is legally protected by the Protection of Badgers Act 1992 (as amended). The species is at risk of persecution but it not recognised as a high conservation priority. Badger are a widespread species throughout the UK with a stable and inclining estimated population of 562,000[59]. In Scotland, the population has shown a similar rate of increase. The species is listed on the IUCN Red list as of 'Least Concern' in mainland UK. Badgers are present in the ESA, as discussed in Confidential Annex, with setts close to Site and infrastructure. Due to legislative protection, and presence of setts within the ESA, they are considered to be of Regional importance.	**Regional**	**Scoped in.** **Considered an IEF.**
Otter	Otter is protected under the Conservation (Natural Habitats, and c.) Regulations 1994 as a European Protected Species. Otter is also a priority species in the LBAP and the SBL. Otter are listed on the IUCN Red List as 'Vulnerable' in Scotland. Surveys identified suitable habitats for otter within the ESA, and evidence was found in the east of the ESA, which included spraints and feeding remains identified alongside a pond. Otter considered to be widespread across North Lanarkshire Council region; and evidence has been found in nearly all suitable waterways. Due to legislative protection they are considered to be of Regional importance.	**Regional**	**Scoped in.** **Considered an IEF.**
Water vole	Water vole is legally protected under the Wildlife and Countryside Act 1981 (as amended) and is a priority species in the LBAP and the SBL. The species is listed on the IUCN Red list and 'near threatened' in Scotland, but 'endangered' elsewhere in the UK. Although the current UK population (132,000) is believed to have declined by 50% since 1998, and the species are in decline in both England and Wales, the Scottish population, which is largely genetically and phenotypically distinct, is in fact inclining is size with a stable range[60]. No evidence of water vole was found within the ESA. As the result, the species is considered to be absent from the ESA and of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF

[59] Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) A Review of the Population and Conservation Status of British Mammals: Technical Summary. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.
[60] Harris, S. & Yalden, D. W. eds. (2008). Mammals of the British Isles: Handbook, 4th Edition.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Pine marten	Pine marten is legally protected under the Wildlife and Countryside Act 1981 (as amended). Pine marten is a priority species in the LBAP and SBL. Scotland's population is estimated at 3,700 adult pine martens, which represent approximately 99% of the known UK population[61.] There are few records of Pine marten in North Lanarkshire, but the data shows that the species is expanding into the central belt of Scotland, with records confirmed near Cumbernauld[20]. No evidence of pine marten and habitats within the ESA are considered to be extremely limited for pine marten. In light of the above, the species is considered to be absent from the ESA and of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
Amphibians	The great crested newt is protected under the Conservation (Natural Habitats, and c.) Regulations 1994 as a European Protected Species. Great crested newt is also a priority species in the SBL and LBAP. A single pond has been identified in the eastern extent of the ESA. eDNA sampling of the pond returned a negative result for great crested newt, confirming that the species is absent from the pond. Therefore, great crested newt is considered to be absent from the ESA and of Less that Local Importance. During the ecology walkover surveys, remains of common frog and common toad were recorded in the east of the ESA, next to the pond, most likely as a result of foraging otter moving the through the region. There is potential for common toad to be present in the pond within the eastern extent of the ESA. Common toad a SBL priority species but not listed on the LBAP. Therefore, common toad is considered to be of Local Importance.	Local	Scoped out. Not considered an IEF.
Reptiles	Only common and widespread reptile species are found on mainland Scotland. Common reptile species; the common lizard, slow-worm (*Anguis fragilis*), and adder are protected under the Wildlife and Countryside Act 1981 (as amended). The aforementioned reptile species are all included in the SBL. No incidental sightings of reptiles were recorded within the ESA, although small pockets of habitat offering foraging, refuge and hibernation were identified within the ESA. In light of the above, widespread reptile species are considered of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.

[61] Croose, E., Birks, J.D.S. & Schofield, H.W. 2013. Expansion zone survey of pine marten (Martes martes) distribution in Scotland. Scottish Natural Heritage Commissioned Report No. 520.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Atlantic Salmon	Atlantic salmon is legally protected (in freshwater only) under the Schedule 3 of the Conservation (Natural Habitats, and c.) Regulations 1994 and is listed as a priority in the SBL. The Scottish salmon population has seen a decline in recent years as a result of numerous pressures, the key pressure being climate change which may affect both the marine and freshwater phases of the species[62]. FHQ and FUP of sampled watercourses ranged between poor-moderate and low-moderate, respectively, in terms of supporting salmonid populations. Salmonids are considered to be absent from sampled watercourses, due to numerous barriers to fish passage throughout the catchment. It is noted that barriers to fish migration on the River Almond, situated downstream of the site boundary, have been removed or improved by Rivers and Fisheries Trusts of Scotland (RAFTS) at Livingston Rugby Club, Old Inveralmond Bridge, Kirkton and Mid-Calder. An impassable barrier (Dowies Mill, Cramond) is still present on the River Almond, and downstream of the site boundary. Therefore, whilst the accessibility of watercourses through the catchment has been improved, the catchment is still considered to be largely inaccessible to migratory fish. In light of the above, Atlantic salmon is considered to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
Brown Trout	Neither form of trout (sea trout or brown trout) receives much protection within conservation legislation, however some protection exists in the form of exploitation controls exist within fisheries legislation, and the species are listed on the SBL. Brown trout are a common, widespread and adaptable species found across a wide variety of watercourses, either as part as a resident population, or the migratory anadromous forms, however the species have been in decline across Scotland for many decades as result of numerous pressures such as changes in land use, and more recently climate change. As described for Atlantic salmon, an impassable barrier (Dowies Mill, Cramond) is still present on the River Almond, and downstream of the site boundary. Therefore, whilst the accessibility of watercourses through the catchment has been improved, the catchment is still considered to be largely inaccessible to migratory fish; and brown trout is considered to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.

[62] Todd, C.D. *et al.* (2010) "Getting into hot water? Atlantic salmon responses to climate change in freshwater and Marine Environments," *Atlantic Salmon Ecology*, pp. 409–443. Available at: https://onlinelibrary.wiley.com/doi/abs/10.1002/9781444327755.ch16. Accessed: November 2022.

Ecological Feature	*Evaluation Rationale*	*Importance*	*Scoped in/out of assessment*
Lamprey species	Three lamprey species can be found using aquatic habitats in Scotland and the UK, these are; the brook lamprey, the river lamprey and the sea lamprey. River lamprey are listed on Schedule 3 of the Conservation (Natural Habitats, and c.) Regulations 1994 (as amended) and on the SBL. As described for Atlantic salmon, an impassable barrier (Dowies Mill, Cramond) is still present on the River Almond, and downstream of the site boundary. Therefore, whilst the accessibility of watercourses through the catchment has been improved, the catchment is still considered to be largely inaccessible to migratory fish; and lamprey species are considered to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.
European eel	The European eel is widely distributed within European freshwaters and can be found in a wide variety of freshwater and estuarine habitats in the UK. The European eel hasn't been heavily exploited in Scotland, yet eel numbers in Scotland are thought to have fallen by more than 90% since the 1990s[63]. The IUCN Red List now regards the species as 'Critically Endangered'. Although not a protected species, the widespread decline in European eels has led the European Commission to develop an eel recovery plan, which has been incorporated in Scotland since 2008. It is also on the SBL. As described for Atlantic salmon, an impassable barrier (Dowies Mill, Cramond) is still present on the River Almond, and downstream of the site boundary. Therefore, whilst the accessibility of watercourses through the catchment has been improved, the catchment is still considered to be largely inaccessible to migratory fish; and European eel is considered to be of Less than Local Importance.	Less than Local	Scoped out. Not considered an IEF.

[63] NatureScot. *European Eel Information Page*. Available at: https://www.nature.scot/plants-animals-and-fungi/fish/freshwater-fish/european-eel. Accessed on: December 2022.

Scoped Out of Further Assessment

10.6.3 Following the systematic evaluation of importance outlined in Table 10.8, the following ecological features are considered of Local Importance or below, and thus not considered to be IEFs, and have therefore been scoped out of further assessment within Section 10.8:

- Blawhorn Moss NNR/SAC/ SSSI
- Hassockrigg and North Shotts Mosses SSSI
- North Shotts Moss SAC
- Black Loch Moss SAC/SSSI
- Eastfield Strip SINC
- Harthill Bing SINC
- Southrigg Bog SINC
- Polkemmet and River Almond to Greenrigg LBS
- Forrestburn Bog SINC
- Forrestburn Water SINC
- Broadleaved woodland – semi-natural;
- Broadleaved woodland – plantation;
- Coniferous woodland – plantation;
- Mixed woodland – plantation;
- Scrub – dense/continuous;
- Scrub – scattered;
- Scattered broadleaved trees;
- Acid grassland – unimproved;
- Acid grassland – semi-improved;
- Neutral grassland – unimproved;
- Neutral grassland – semi-improved;
- Improved grassland;
- Marsh/marshy grassland;
- Tall herb and fern: ruderal;
- Tall herb and fern: non-ruderal;
- Wet modified bog
- Flush and spring – acid/neutral flush;
- Swamp;
- Inundation swamp;
- Mesotrophic standing water;
- Running water;
- Cultivated/disturbed land – arable;
- Cultivated/disturbed land – amenity grassland;
- Cultivated/disturbed land – ephemeral/short perennial;
- Cultivated/disturbed land – introduced shrub;
- Intact species-poor hedge;
- Defunct species-poor hedge;
- Species-poor hedge with trees;
- Built-up areas;
- Bare ground;
- Water vole;
- Pine marten;
- Herpetofauna (amphibians and reptiles); and
- Migratory fish (salmonids, lamprey species and European eel).

10.6.4 Although the above IEFs have been scoped out of further assessment within this Chapter, measures to mitigate or avoid potential effects on these IEFs have been included within embedded mitigation to help ensure legislative compliance of works as well as adherence to accept industry good practice (see Section 10.7).

Scoped into the Assessment of Potential Effects

10.6.5 Following the systematic evaluation of importance outlined in Table 10.8, the following ecological features are considered of Regional Importance or above, and thus are considered to be IEFs, and have therefore will be further assessed in Section 10.8:

- Barblues Bing SINC;
- Loan Birch Wood SINC and AWI site;
- Torrance Marshes SINC;
- Bats (all species);
- Badger; and
- Otter.

10.7 Embedded Mitigation

10.7.1 Application of the 'mitigation hierarchy' has been achieved throughout the Proposed Development process, with the identification and incorporation of methods for the avoidance of impacts and application of embedded mitigation, compensation and enhancement within the EcIA.

10.7.2 Mitigation to reduce potential ecological effects has been incorporated into the design of the Proposed Development ('embedded mitigation'). This includes 'mitigation by design' whereby aspects of the Proposed Development have been re-designed to avoid or reduce ecological effects. This type of mitigation is particularly beneficial for ecological resources as there is greater certainty that it will be delivered. Embedded mitigation also includes 'mitigation by practice' whereby mitigation is actively implemented during the Proposed Development process. Embedded mitigation is taken into consideration when undertaking the EcIA.

Mitigation by Design

10.7.3 Ecological features have been considered at all stages of the Proposed Development design, from initial feasibility to final layout. This has helped to avoid or greatly reduce impacts on IEFs and other ecological features. A critical design consideration has been the avoidance of habitats with high conservation value and potential groundwater dependency, which has been largely achieved by siting the majority of the Proposed Development outwith sensitive habitats.

10.7.4 The sensitive designs (e.g. of watercourse crossing and culverts) presented in Chapter 3, Volume 1 of this EIA Report have been developed to safeguard the water environment, will also help effectively mitigate construction-related direct and indirect impacts to fish and other aquatic features.

10.7.5 Good practice design mitigation measures will be adopted to minimise the risk of bats colliding with operational turbines, in accordance with NatureScot published guidance[36]. Turbines will have a 50 m separation distance between blade tips and high-value bat habitats, such as woodland, riparian habitats, and forest edges.

Mitigation by Practice: Construction

10.7.6 In addition to the incorporation of effective mitigation through Development design, the following sections outline mitigation of Development impacts through practice, particularly with the aim of safeguarding of protected species during Development construction and operation and to restore and, where possible, enhance habitats. These elements will be included in **TA 10.5**: Outline Habitat Management Plan (oHMP), Volume 4, as part of the wider environmental management of Development construction and operation.

Ecological Clerk of Works (ECoW)

10.7.7 A suitably qualified and experienced Ecological Clerk of Works (ECoW) will be appointed to provide ecological and environmental advice during construction, including the monitoring of compliance with the recommendations of this EIA Report and subsequent planning conditions.

10.7.8 Before construction begins, the ECoW and the project hydrologist will undertake a review of design and drainage plans to inform the requirement for micro-siting, to minimise the potential for effects to habitats of conservation concern, and to assist in the identification of appropriate locations for commencement of habitat restoration works. Where possible, the ECoW will advise on the drainage design to minimise hydrological disruption and reduce the risk of scour and erosion. The ECoW will also monitor and advise on the implementation of pollution prevention and good working practices throughout construction, to protect both terrestrial and aquatic ecosystems from accidental pollution.

Construction Phase Mitigation for Protected Species

10.7.9 Pre-construction Surveys for protected species, such as otter and badger, will be undertaken to provide up-to-date information about the distribution and abundance of the protected species identified in the baseline. The results of the surveys will inform the scope of SPPs and associated mitigation and licencing requirements, all of which will be developed in line with NatureScot guidance.

Construction Phase Mitigation for Aquatic Habitats

10.7.10 Mitigation presented in Chapter 14 of this EIA Report to safeguard the water environment, will also effectively mitigate construction-related impacts to fish such as the direct and indirect effect of pollution and sedimentation from surface water run- off.

Outline Habitat Management Plan

10.7.11 The oHMP details four aims for the Proposed Development:

- Increase native woodland coverage;
- Minimise collision risk to bats around operational turbines;
- Enhance habitat for birds; and
- Enhance habitat for bats.

10.7.12 The four aims have related objectives which define quantifiable targets to fulfil the aims. Each objective has associated prescriptions which detail the indicative management works to be implemented to achieve these aims and objectives. These are outlined in Table 10.9 below.

Table 10.9: oHMP Objectives and Management Prescriptions

Aim	Objective	Prescriptions
Increase native woodland coverage	*Establish native tree cover within the site*	Plant native woodland along the forest edge, field margins and adjacent to the planned cycle track. Particular attention will be focussed on the habitats associated with Barblues Bing Site of Importance for Nature Conservation (SINC) in order to increase the biodiversity value of this non-statutory designated site. Depending on local ground conditions, tree species will comprise at least some of the following: downy birch (*Betula pubescens*), silver birch (*Betula pendula*), oak (*Quercus* sp.), rowan (*Sorbus aucuparia*), alder (*Alnus glutinosa*), aspen (*Populus tremula*), gean (*Prunus avium*), goat willow (*Salix caprea*), grey willow (*Salix cinerea*) and woody shrubs. Exact proportions of species, planting locations and any grazing protection measures (e.g. tree tubes) will be determined by a forester during the construction period and 'on the ground' surveys. Planting will be carried out during the planting season (e.g. November to March) when trees are dormant and more likely to establish successfully. Planting during days when the ground is waterlogged, frozen and/or when snow is present will be avoided.
Minimise collision risk to bats around operational turbines	*Minimise woodland regeneration within bat buffer zones to reduce habitat suitability for foraging and commuting bats; and minimise potential collision risk with turbines.*	Reduce the extent of tree cover within bat buffer zones by regularly removing natural regeneration and self-seed non-native conifers.
Enhance habitat for birds	*Increase the availability of nesting and foraging opportunities for a variety of bird species around the wind farm site.*	Install 30 small nest boxes in suitable locations within or adjacent to the wind farm site.
		Create a minimum of 4 wader scrapes in suitable habitat within or adjacent to the wind farm site to provide important foraging habitat for breeding waders and their chicks. The areas shown on **Figure 10.8** have been identified as potentially suitable, however a site walkover will be undertaken to assess the ground conditions and suitability of the proposed area. Scrapes should be created following RSPB guidance[64,65,66].
Enhance habitat for bats	*Increase availability of roosting opportunities for*	Install at least five four-seasons bat boxes (e.g. Schwegler Hibernation Bat Box – 1FW) on suitable trees within the wind farm site, at least 100 m from any turbines.

[64] RSPB (undated) *Scrape Creation for Wildlife*
[65] RSPB (undated) *Scrape Creation for Waders*
[66] RSPB (2003) *Creating Wader Scrapes and Flashes on Farmland*

	bats around the wind farm site.	Install at least five summer roost boxes (e.g. Schwegler 45-2F or 55-2FN) in the vicinity of each of the four-season bat boxes.

10.7.13 Monitoring will establish whether the proposed management prescriptions are achieving the various aims and objectives and in turn will inform adaptive management to ensure the aims and objectives are achieved through the life of the HMP. This includes tree monitoring, bat and bird box monitoring and ornithological monitoring, all detailed in **TA 10.5**, Volume 4.

10.7.14 Annual reporting of management undertaken, and operational monitoring results, will be carried out towards the end of every year in which management and monitoring is carried out.

Mitigation by Practice: Decommissioning

10.7.15 Decommissioning activities are anticipated to be of a similar character to those of Development construction. Although proposed enhancement may mean that the importance of some ecological receptors may have changed from current levels, the embedded mitigation outlined in Chapter 10 is considered appropriate for safeguarding ecological features during the decommissioning phase.

10.8 Assessment of Potential Effects

10.8.1 The key issues for the assessment of potential Ecological effects relating to the Proposed Development are as follows;

- Direct and indirect impacts on nearby designated sites and their qualifying interests, including those which may result in adverse effects on the integrity of the three SINCs in close proximity;
- Direct and indirect habitat loss and disturbance - temporary or permanent loss to terrestrial and aquatic habitats;
- Turbine-related bat mortality - death or injury by collision with the turbine blades; and
- Indirect and direct effects on protected fauna including, but not limited to, badger and otter.

Designated Sites

Barblues Bing SINC

Construction Phase Impacts

10.8.2 An extremely small amount habitat within the SINC will be permanently impacted during construction by a new access track (0.068 ha, or less than 1 % of the total SINC). This habitat loss would occur towards the southern extent of the SINC, where habitats consist of acid/neutral flush. At this location, the flush has been damaged from tree furrows/drainage associated with historic forestry activities; and scattered trees have also encroached into the habitat from adjoining woodland areas. Considering the prevailing climatic conditions in the area (e.g. open landscape with high annual precipitation levels), temporary deposition of dust and particulates during construction would be temporary and extremely localised; and not predicted to affect sensitive vegetation communities. Therefore, small-scale habitat loss during construction is considered to be adverse, irreversible and of low magnitude; and not significant in terms of the EIA Regulations.

10.8.3 None-the-less, areas retained within and adjoining the SINC will be incorporated into the oHMP to improve locally important habitats and the long-term resilience of the SINC.

Operational Phase Impacts

10.8.4 No additional land-take will be required to operate the Proposed Development; and access will be limited to hardstanding created during the construction phase. Habitat restoration will likely have a long-term positive impact on the SINC, which may bring benefit to species beyond the boundary of the site.

10.8.5 In light of the above, no significant detrimental operational effects on the SINC are predicted. Although it is reasonable to anticipate that the successful implementation of habitat restoration would result in a positive operational effect, as a scale and success of these measures are yet to be determined, it is considered that the effects will be negligible, and thus not significant in terms of the EIA Regulations.

Decommissioning Phase Impacts

10.8.6 Impacts to the SINC from decommissioning works are anticipated to be of a similar nature to the construction phase impacts, but of lower magnitude. Although successful habitat restoration will mean that the future baseline condition of habitats in the site are higher value that they are currently, these improvements will take place outwith the Proposed Development footprint, so will be unaffected by decommissioning. Decommissioning impacts to the SINC are considered to be localised, temporary, reversible and of negligible magnitude; and not significant in terms of the EIA Regulations.

Loan Birch Wood SINC and AWI

Construction Phase Impacts

10.8.7 No direct loss of habitat is predicted to occur within the SINC or AWI site, as the cycleway is located outwith, but immediately adjoining to, the woodland area. Vegetation removal during construction would be largely limited to low-lying grassland habitats of low ecological value. Considering the prevailing climatic conditions in the area (e.g. open landscape with high annual precipitation levels), temporary deposition of dust and particulates during construction would be temporary and extremely localised; and not predicted to affect sensitive vegetation communities. There is potential for excavations and vehicles movements along the boundary of the SINC and AWI site during construction to cause incidental damage. In the unlikely event of incidental damage during construction, it is likely that the overall integrity of the woodland would not be affected. Therefore, indirect loss of individual trees within the SINC and AWI site would be adverse, irreversible and of low magnitude; and not significant in terms of the EIA Regulations.

10.8.8 None-the-less, new planting along the edge of the new cycleway will be incorporated into the oHMP to improve the long-term resilience and biodiversity value of the SINC and AWI site. Additional compensatory planting would also be required for any tree loss arising during construction, in accordance with Scottish Government's control on woodland removal[67].

[67] Scottish Government (2009). The Scottish Government's Policy on Control of Woodland Removal. Available online: https://forestry.gov.scot/publications/285-the-scottish-government-s-policy-on-control-of-woodland-removal Accessed on: January 2023.

Operational Phase Impacts

10.8.9 No additional land-take within the SINC or AWI site will be required to operate the Proposed Development; and access will be limited to hardstanding created during the construction phase. Habitat restoration will likely have a long-term positive impact on the SINC and AWI site, which may bring benefit to species beyond the boundary of the site.

10.8.10 In light of the above, no significant detrimental operational effects on the SINC or AWI site are predicted. Although it is reasonable to anticipate that the successful implementation of habitat restoration would result in a positive operational effect, as a scale and success of these measures are yet to be determined, it is considered that the effects will be negligible, and thus not significant in terms of the EIA Regulations.

Decommissioning Phase Impacts

10.8.11 Impacts to the SINC and AWI site from decommissioning works are anticipated to be of a similar nature to the construction phase impacts, but of lower magnitude. Although successful habitat restoration will mean that the future baseline condition of habitats in the site are higher value that they are currently, these improvements will take place outwith the Proposed Development footprint, so will be unaffected by decommissioning. Decommissioning impacts to the SINC and AWI site are considered to be localised, temporary, reversible and of negligible magnitude; and not significant in terms of the EIA Regulations.

Torrance Marshes SINC

Construction Phase Impacts

10.8.12 No direct loss of habitat is predicted to occur within the SINC, which is outwith the site boundary and situated over 250 from closest Development infrastructure associated with the eastern-most turbine. Based on current SEPA guidance[68], there is unlikely to be any significant hydrological connectivity to wetland habitats within the SINC, as these are situated more than 250 m from deep excavations and generally beyond an unnamed watercourse that flows through the SINC. Considering the prevailing climatic conditions in the area (e.g. open landscape with high annual precipitation levels), temporary deposition of dust and particulates during construction would be temporary and extremely localised; and not predicted to affect sensitive vegetation communities. Therefore, potential impacts are considered to be negligible; and not significant in terms of the EIA Regulations.

Operational Phase Impacts

10.8.13 No additional land-take within the SINC will be required to operate the Proposed Development; and access will be limited to hardstanding created during the construction phase.

[68] SEPA (2017) Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (LUPS-GU-31) [Online] Available at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf (accessed November 2022).

10.8.14 In light of the above, no significant detrimental operational effects on the SINC are predicted. Therefore, it is considered that the effects will be negligible, and not significant in terms of the EIA Regulations.

Decommissioning Phase Impacts

10.8.15 Impacts to the SINC from decommissioning works are anticipated to be of a similar nature to the construction phase impacts, but of lower magnitude. Although successful habitat restoration will mean that the future baseline condition of habitats in the site are higher value that they are currently, these improvements will take place outwith the Proposed Development footprint, so will be unaffected by decommissioning. Decommissioning impacts to the SINC are considered to be localised, temporary, reversible and of negligible magnitude; and not significant in terms of the EIA Regulations.

Habitats

10.8.16 The construction of the Proposed Development will result in the loss of and disturbance to habitats during construction and the effects may be both permanent and temporary. Permanent losses are calculated based on the Proposed Development layout but estimates of temporary losses, such as those caused by construction activities (e.g. vehicle movements and stockpiling) in the areas surrounding built infrastructure, are more difficult to quantify. However, temporary losses will be relatively limited in extent, based on experience of the construction of similar developments, and so are assumed, on a precautionary principle, to equate to approximately 20% of the areas permanently lost.

10.8.17 In total, an estimated 12.3 ha of habitats will be lost, equating to 11.6 % of the site. Of this loss, the majority (65%) will consist of conifer plantation woodland. The next greatest habitat type to be lost will be unimproved neutral grassland (7.3%). Further detail on habitat loss is presented in Table 10.9. No IEF habitats will be impacted by habitat loss and are provided to help characterise potential impacts on designated sites and protected species.

Table 10.9: Summary of Phase 1 Habitat Loss by Infrastructure

Phase 1 Habitat Type recorded in HSA	*Total Habitat Size within HSA (Ha)*	*Habitat Loss within HSA (Ha)*	*% of Habitat Type Lost within HSA*
A1.1.2 Broadleaved woodland – plantation	17.4	0.4	2.4
A1.2.2 Coniferous woodland – plantation	49.6	8	16.1
A1.3.2 Mixed woodland – plantation	4.8	0.1	1.9
A2.1 Scrub – dense/continuous	0.6	<0.1	3.6
A2.2 Scrub – scattered	2.6	<0.1	3.1
A3.1 Broadleaved parkland/scattered trees	3.6	<0.1	0.9

Phase 1 Habitat Type recorded in HSA	*Total Habitat Size within HSA (Ha)*	*Habitat Loss within HSA (Ha)*	*% of Habitat Type Lost within HSA*
B1.1 Acid grassland – unimproved	4.6	0.2	5.5
B2.1 Neutral grassland – unimproved	14.2	0.9	6.6
B2.2 Neutral grassland – semi-improved	54.1	0.6	1.2
B4 Improved grassland	91.2	0.8	0.8
B5 Marsh/marshy grassland	38.2	0.8	2.1
E1.7 Wet modified bog	5.1	<0.1	1.1
E2.1 Flush/spring – acid/neutral	1.4	<0.1	3.8
J2.2.2 Defunct hedge – species-poor	1.4	<0.1	0.9
J4 Bare ground	0.9	0.2	18.4
Total	**289.7 Ha**	**12.3 Ha**	**-**

Bats

Construction Phase Impacts

10.8.18 Woodland loss as a result of the Proposed Development infrastructure will be largely limited to commercial forestry, which includes removal of a 50 m buffer between the turbine blade tip and adjoining bat foraging/commuting bat habitats (as described in Section 10.7).

10.8.19 Bats within the site could be impacted through the direct loss of roosts, and via direct harm or indirect disturbance to roosting bats, as a result of felling activities and the associated noise and vibration. No bat roosts were identified within the site and commercial forestry generally offers few roosting opportunities for bats; however, felling during the construction of the Proposed Development may result in the removal of a very small number of unrecorded, isolated potential roost features. Such unlikely losses of roosting habitat are considered to be adverse, permanent and of low magnitude; and not significant in terms of the EIA Regulations.

10.8.20 The provision of artificial bat boxes in suitable locations would also compensate for loss of future potential for trees removed during construction to develop potential roost features, as trees mature, which could be utilised by bats in the locality.

10.8.21 Woodland losses would account for approximately 10 % of all woodland areas identified in the HSA. The loss of woodland (largely commercially forestry) will result in localised losses of foraging and commuting habitats within the site, which could lead to a minor reduction in the utilisation of habitats within the site through localised displaced. This short-term displacement may result in a minor reduction in fitness to individual bats; however, this detrimental effect will be offset notable by the benefits of reducing collision risk in the medium and long term. Other linear features (including watercourses) will be largely retained due to the 50 m watercourse buffer for any infrastructure or construction activity. Where new watercourse crossings are required, these would be designed in an ecologically sensitive manner to avoid potential fragmentation.

10.8.22 Due to the Low levels of bat activity recorded, the limited suitability of commercial forestry for roosting bats and the overall benefits of embedded mitigation, the magnitude of any displacement effects on the local bat population is considered adverse, temporary and low magnitude; and not significant in terms of the EIA Regulations.

Operational Phase Impacts

10.8.23 During the operational phase, there is potential for collision risk upon commuting and foraging bat species, together with the risk that bats may be affected by barotrauma when flying in close proximity of the turbine blades. For the purposes of this assessment, the potential effects 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 with turbines blades or barotrauma.

10.8.24 In accordance with the recent guidance**Error! Bookmark not defined.**, embedded mitigation (see Section 10.7) will ensure that a 50 m separation distance between high-value bat habitats (such as woodland edges) and blade tips is established. If micro-siting of turbines is required during construction, the 50 m separation distance would be adjusted accordingly. As required, this buffer would also be sustained throughout operation via routine maintenance.

10.8.25 To calculate the necessary stand-off distance between the centre of the turbine (the turbine location) guidance advises the use of the following equation:

$$b = \sqrt{(50+bl)^2 - (hh-fh)^2}$$

10.8.26 Based on candidate turbine parameters detailed in Chapter 3 - The Proposed Development, the calculation uses blade length (bl) and hub height (hh) alongside feature height (fh) to calculate a stand-off distance (b) from the base of the turbine within which no habitats that could encourage bat activity should be allowed to develop (i.e. trees). The equation assumed to represent a 'worst case' scenario of 17 m for the tree heights within the site. Table provides the values and stand-off distances required for each turbine model.

Table 10.10: Stand-off buffer required for bats

Turbine Model	Hub Height (m)	Blade Length (m)	Equation	Stand-off Distance Required (m)
SG170	115	85	$b = \sqrt{(50+85)^2 - (115-17)^2}$	92.85

10.8.27 Therefore, based on the equation in Table 10.10, the minimum turbine stand-off distance to be implemented during construction and maintained through operation for the candidate SG170 turbines will be at least 92.85m.

10.8.28 Furthermore, the typical flight height for common pipistrelle and soprano pipistrelle (the dominant species recorded within the site) is 2-10 m above the ground[69]. Therefore, with a minimum rotor sweep height of 17 m, the majority of bats continuing to utilise the site are unlikely to fly at rotor height, and are therefore at lower risk from turbine collision.

10.8.29 Due to the overall Low-Moderate levels of bat activity recorded, and the benefits of embedded mitigation recommendations, the magnitude of effects of turbine collision on the local bat population is likely to be negligible. Despite this, due to the lack of data regarding bat interactions with turbines, impacts on low numbers of bats cannot be ruled out. As a result, operational effects are considered to be of low magnitude; and not significant in terms of the EIA Regulations.

Decommissioning Phase Effects

10.8.30 Decommissioning activities are considered to be of a similar nature to those of Development construction; however, as no habitats used by bats are likely to be impacted, the potential for detrimental impact to bats is likely to be on a significantly notably smaller scale, and therefore effect are likely to be not significant in terms of the EIA Regulations.

Badger

Construction Phase Impacts

10.8.31 Woodland loss as a result of the Proposed Development infrastructure will be largely limited to commercial forestry.

10.8.32 No badger setts are present within 50 m of any Development infrastructure, and over 100 m away from the closest proposed turbine location. There is potential for vegetation removal to affect new setts established by badger in the locality prior to the construction phase. Such unlikely losses of newly created setts are considered to be adverse, permanent and of low magnitude; and not significant in terms of the EIA Regulations.

10.8.33 Woodland losses would account for approximately 10 % of all woodland areas identified in the HSA. The loss of woodland (largely commercially forestry) will result in localised losses of foraging and commuting habitats within the site, which could lead to a minor reduction in the utilisation of habitats within the site through localised displaced. Other linear features (including watercourses) will be largely retained due to the 50 m watercourse buffer for any infrastructure or construction activity. Where new watercourse crossings are required, these would be designed in an ecologically sensitive manner to avoid potential fragmentation. Therefore, impacts on foraging and commuting habitats would be adverse, short-term, and low magnitude; and not significant in terms of the EIA Regulations.

[69] Bat Conservation Trust: Species Factsheets. Available at: https://www.bats.org.uk/about-bats/what-are-bats/uk-bats. Accessed on: December 2022.

10.8.34 Direct increase of traffic and plant movements and operation from Development construction have the potential to result in a temporary increase in the risk of accidental collisions and badger injury and fatality. As badgers are largely crepuscular and nocturnal, the risk is largely limited to periods when construction is taking place at night, or during low light levels during the winter months. However, construction activities would largely be undertaking during daylight hours; and good practice during construction would include implementation of a speed limit within the site (e.g. 20 m.p.h.). Therefore, animal road mortality is considered to be adverse, short-term and negligible; and not significant in terms of the EIA Regulations.

10.8.35 Construction phase excavations if left uncovered and unattended between shifts have the potential to injure or entrap wildlife including badgers which could result in injury or mortality. However, through the implementation of embedded mitigation measures, such as the implementation of good practice working measures including covering excavations or leaving a suitable means of escape when unattended, as well as monitoring of works by the ECoW, the potential impact is of low risk. Therefore, the effect of this impact is considered to be negligible; and not significant in terms of the EIA Regulations.

Operation Phase Impacts

10.8.36 Development maintenance is likely to result in occasional vehicle movements and personnel presence throughout the operation of the Proposed Development; however, this activity will be limited to the Proposed Development infrastructure, with no disturbance of the surrounding environment expected. Due to the infrequency and localised nature of operational activities, the potential detrimental effect is negligible; and not significant in terms of the EIA Regulations.

Decommissioning Phase Impacts

10.8.37 Decommissioning activities are considered to be of a similar nature to those of Development construction, therefore potential exists for direct and indirect effects to badgers, where decommissioning works may take place in close proximity to existing or newly established setts. Decommissioning activities may result in a localised increase in noise, vibration, traffic and presence of people, potentially causing disturbance to badgers. However, this effect would be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

Otter

Construction Phase Effects

10.8.38 Construction activities are typically located more than 50 m from watercourses within, or adjoining the site, and over 200 m from a pond located to the east of the site boundary. However, Development infrastructure includes installation of three small watercourse crossings over minor unnamed watercourses. Where new watercourse crossings are required, these would be designed in an ecologically sensitive manner to avoid potential fragmentation. Therefore, impacts on foraging and commuting otter would be adverse, short-term, and low magnitude; and not significant in terms of the EIA Regulations.

10.8.39 There is also potential for ground works in close proximity to watercourse crossings to be affected during construction; as a result of disturbance, siltation, sedimentation and accidental pollution.

10.8.40 These impacts could affect otter in the locality by reducing habitat suitability for prey species, thus reducing prey availability, or by directly damaging habitats used to otters for resting and commuting. Both effects could result in the displacement of otters from the site, reduction of connectively to the wider local area, and a minor reduction of fitness in members of the otter population, due to decreased resources and the subsequent increase in completion for resources. However, through the implementation of embedded mitigation measures and good practice during construction, including monitoring of works by the ECoW, disturbance to watercourses is considered to be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

10.8.41 Potential development related disturbance and displacement may result from an increase in noise, vibration, traffic and the presence of people, in close proximity to areas used by otter. In accordance with NatureScot guidance[70], disturbance is likely to constitute any construction activity taking place within 30 m of holts and shelters where otters are not breeding, but up to 200 m for breeding holts. Aquatic otters typically establish resting areas in close proximity to the riparian corridor, and therefore watercourses represent the areas of greatest risk to disturbance.

10.8.42 Otters typically breed in areas where there is access to an abundant food supply, where disturbance is minimal and where more than one resting area suitable to be used as a natal holt is already available[71]. No resting areas have been recorded within the site, habitats within the site are largely of limited value to the species, and otter has only been recorded on one pond outwith the site, therefore the site is considered to be unlikely to support a breeding holt. Although the presence of other future non-breeding holt or shelter cannot be ruled out, with the exception of the water crossings, the vast majority of Development is located no closer than 50 m to watercourses (and in many areas considerably further away), out with the likely range of disturbance.

10.8.43 Based on the existing baseline, Development-related construction work will not impact any known resting areas for otter. Although the likelihood of a resting area becoming established in the future ahead of construction within 30 m of the water crossing works is considered low, with adherence to embedded mitigation such as pre-construction surveys and ECoW supervision of works, the risk is considered to be negligible. As discussed, habitats within the site are largely of limited value to the species, and the vast majority of works are outwith proximity of watercourses.

10.8.44 Through the implementation of embedded mitigation measures, including pre-works ECoW monitoring and surveys, the implementation of 50 m riparian buffers from working areas, and the adoption of good practise working practises and emergency procedures, the potential for disturbance and displacement to otter during construction is limited. Therefore, the effects of disturbance and displacement impacts are considered to be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

10.8.45 In addition to construction phase disturbance, the direct increase of traffic and plant movements and operation from Development construction have the potential to result in a temporary increase in the risk of accidental collisions and otter injury and fatality.

10.8.46 As otter are largely crepuscular and nocturnal, the risk is largely limited to periods when construction is taking place at night, or during low light levels during the winter months. Additionally, as habitats are largely of low value to otter, no otter

[70] NatureScot (2021) Standing advice for planning consultations: Otters. Available at: https://www.nature.scot/doc/standing-advice-planning-consultations-otters Accessed on: January 2023.

resting places were identified within the site, activity is limited to one pond over 200 m east of the ESA.

10.8.47 This risk is likely to be further reduced through the implementation of embedded mitigation measures, such as pre-construction surveys, the implementation of good practise working measures, and monitoring of works by the ECoW. Therefore, the effect of this impact is considered to be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

10.8.48 Construction phase excavations if left uncovered and unattended have the potential to injure or entrap wildlife including otters which could result in injury or mortality. As habitats are largely of low value to otter, activity is limited to one waterbody outwith the site and works will largely take place outwith 50 m of major watercourses, the risk is considered to be very low. Embedded mitigation measures include the implementation of good practise working measures such as covering excavation or leaving a suitable means of escape when unattended, as well as monitoring of works by the ECoW. Therefore, the effect of this impact is considered to be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

Operational Phase Impacts

10.8.49 Development maintenance is likely to result in occasional vehicle movements and personnel presence throughout the operation of the Proposed Development; however, this activity will be limited to the Proposed Development infrastructure, with no disturbance of the surrounding environment (including riparian habitats) expected. Due to the infrequency and localised nature of operational activities, and the low value and use of the site by otters, the potential detrimental effect is considered to be of negligible; and not significant in terms of the EIA Regulations.

Decommissioning Phase Impacts

10.8.50 Decommissioning activities are considered to be of a similar nature to those of Development construction, therefore potential exists for direct and indirect effects to otters, where decommissioning works may take place in close proximity to riparian habitats. Decommissioning activities may result in a localised increase in noise, vibration, traffic and presence of people, potentially causing disturbance to commuting and foraging otters. However, this effect is considered to be adverse, short-term and low magnitude; and not significant in terms of the EIA Regulations.

Residual Effects

10.8.51 No significant residual effects are predicted following the implementation of embedded mitigation, as detailed in Section 10.7.

Cumulative Effect Assessment

10.8.52 The EIA Regulations require the cumulative effects of the Proposed Development with other relevant projects or plans to be assessed. In considering cumulative effects, it is necessary to identify any effects that may be not significant in isolation but that may be significant in combination with other developments.

10.8.53 This assessment considers that cumulative effects can result from effects that were individually assessed as non-significant, but in combination with effects or actions

[71] Liles G (2003). Otter Breeding Sites. Conservation and Management. Conserving Natura 2000 Rivers Conservation Techniques Series No. 5. English Nature, Peterborough

taking place over time, or across a wider spatial range (such as where the zone of influence of other developments or actions may overlap the with Development) non-significant effects may cumulatively be considered significant.

10.8.54 Cumulative effects are particularly important in EcIA as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline.

Designated Sites

10.8.55 Habitat loss within Barblues Bing SINC is extremely small in scale and limited to areas of degraded habitats of low value. The Proposed Development is also located outwith Loan Birch Wood SINC, Loan Birch Wood AWI site and Torrance Marshes SINC; and no habitat loss is predicted to occur from within these sites. No potentially significant impacts on any of the above sites have been identified from any other proposed or operational wind farm developments in the locality, including the adjoining Torrance Wind Farm and Torrance Wind Farm Extension I. Therefore, due to the low magnitude of this non-significant effect, no significant cumulative effects in terms of the EIA Regulations are predicted.

Bats

10.8.56 Habitat loss within the site boundary will be relatively low at 12.65 ha, with the majority of habitat loss comprising commercial forestry that is widespread in the locality. No roosts were recorded in woodland areas to be affected, which were also considered to be of low value to foraging and commuting bats; and unlikely to provide a significant resource to the local bat population. No potentially significant impacts on bats have been identified from any other proposed or operational wind farm developments in the locality, including the adjoining Torrance Wind Farm and Torrance Wind Farm Extension I. Furthermore, embedded mitigation will retain linear features in areas that will minimise potential collision risk and mortality to bats. Therefore, due to the low magnitude of this non-significant effect, no significant cumulative effects in terms of the EIA Regulations are predicted.

Badger

10.8.57 Habitat loss within the site boundary will be relatively low at 12.65 ha, with the majority of habitat loss comprising commercial forestry that is widespread in the locality. No setts were recorded in woodland areas to be affected, which were also considered to be of low value to foraging and commuting badger. No potentially significant impacts on badger have been identified from any other proposed or operational wind farm developments in the locality, including the adjoining Torrance Wind Farm and Torrance Wind Farm Extension I. Furthermore, embedded mitigation will retain linear features in areas that will minimise potential disruption to badger. Therefore, due to the low magnitude of this non-significant effect, no significant cumulative effects in terms of the EIA Regulations are predicted.

Otter

10.8.58 Habitat loss within the site boundary will be relatively low at 12.65 ha, with the majority of habitat loss comprising commercial forestry. No resting sites or holts were recorded in woodland areas to be affected, which were also considered to be of low value to foraging and commuting otter. Otter activity was limited to a pond located over 200 m to the east of Development infrastructure; however, on-site watercourses are considered to be of extremely low value to otter; and unlikely to provide a significant resource to the local otter population.

10.8.59 No potentially significant impacts on otter have been identified from any other proposed or operational wind farm developments in the locality, including the adjoining Torrance Wind Farm and Torrance Wind Farm Extension I. Furthermore, embedded mitigation will retain linear features in areas that will minimise potential disruption to otter. Therefore, due to the low magnitude of this non-significant effect, no significant cumulative effects in terms of the EIA Regulations are predicted.

10.9 Statement of Significance

10.9.1 No significant ecological effects have been identified for the construction and operation of the Proposed Development, either alone or in combination with other developments. Embedded mitigation has been proposed to minimise potential effects during the construction phase and to reduce the likelihood of legal offences. Furthermore, opportunities for ecological enhancement are described within the oHMP, which would improve biodiversity in the locality. Therefore, potential effects are not significant in relation to the EIA Regulations.

10.9.2 Table 10. provides a summary of the effects detailed within this Chapter.

Table 10.11: Summary of Effects

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Significance of Residual Effect
Construction Phase				
Barblues Bing SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant.
Loan Birch Wood SINC and AWI	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant.
Torrance Marshes SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant.
Bats	Habitat loss, habitat change, interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant.
Badger	Habitat loss, habitat change, interaction with traffic, plant and personnel, entrapment in excavation.	Not Significant.	Embedded Mitigation	Not Significant.
Otter	Habitat loss, habitat change, interaction with traffic, plant and personnel, entrapment in excavation.	Not Significant.	Embedded Mitigation	Not Significant.

Receptor	Potential Effect	Significance of Effect	Mitigation Proposed	Significance of Residual Effect
Operational Phase				
Barblues Bing SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Loan Birch Wood SINC and AWI	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Torrance Marshes SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Bats	Turbine related mortality.	Not Significant.	Embedded Mitigation	Not Significant
Badger	Badger interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant
Otter	Otter interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant
Decommissioning Phase				
Barblues Bing SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Loan Birch Wood SINC and AWI	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Torrance Marshes SINC	Habitat loss, disturbance and degradation.	Not Significant.	Embedded Mitigation	Not Significant
Bats	Bats interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant
Badger	Badger interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant
Otter	Otter interaction with traffic, plant and personnel.	Not Significant.	Embedded Mitigation	Not Significant