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8. Biodiversity

8.1 Introduction

- 8.1.1 The Draft ES has been produced to fulfil the Applicant's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Proposed Development. This chapter therefore provides an assessment of the likely significant effects of the Proposed Development with respect to Biodiversity, based on the information obtained to date. Assessments will be updated for the final ES following additional surveys (as specified in **Table 8.7**).
- 8.1.2 This chapter should be read in conjunction with:
- the description provided in **Chapter 4: Description of the Proposed Development;** and
 - the relevant parts of the following chapters where common receptors have been considered and where there is an overlap or relationship between the assessments of effects:
 - ▶ **Chapter 10: Water Environment;**
 - ▶ **Chapter 11: Ground Conditions;** and
 - ▶ **Chapter 13: Noise.**
- 8.1.3 This chapter describes:
- the legislation, policy and technical guidance that has informed the assessment (**Section 8.2**);
 - consultation and engagement that has been undertaken and how comments from consultees relating to Biodiversity have been addressed (**Section 8.3**);
 - the methods used for baseline data gathering (**Section 8.4**);
 - overall baseline (**Section 8.5**);
 - embedded measures relevant to Biodiversity (**Section 8.6**);
 - the scope of the assessment for Biodiversity (**Section 8.7**);
 - the methods used for the assessment (**Section 8.8**);
 - the preliminary assessment of Biodiversity effects (**Section 8.9 -8.21**)
 - preliminary assessment of cumulative (inter-project) effects (**Section 8.22**);
 - a summary of the preliminary significance conclusions (**Section 8.23**);
 - an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 8.24**).

Limitations and assumptions

- 8.1.4 The Draft ES has been produced to fulfil the Applicant's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Proposed Development.
- 8.1.5 One location within the bat survey area could not be surveyed due to access restrictions. As illustrated on **Figure 4.2 (Appendix 8A)**, this was an area of plantation woodland to the west of the Site, separated from the Site by the busy A4046 road. This area was only located within the bat survey area (275m from the Site boundary) due to the existing forestry access track to the west of the Site being proposed as the main access to the Proposed Development and therefore included within the Site boundary. Areas within 275m of proposed turbines have all been included within the bat survey area. No impacts will occur in the area which hasn't been surveyed and any areas which may require tree removal alongside the access track have been surveyed; as such a survey of this area is not considered essential to inform the assessment.
- 8.1.6 Access to some buildings could not be made for some external and/or internal/hibernation surveys or follow-on emergence surveys due to restrictions associated with either the Covid-19 pandemic, structural instability or safe access at night. Where buildings could not be internally surveyed, emergence and re-entry surveys were conducted in line with best-practice guidance; static detector monitoring was used where emergence and re-entry surveys could not be conducted due to unsafe access conditions. These methods have allowed for the presence/absence and where applicable status of any bat roosts to be established and the assessment presented remains robust.
- 8.1.7 Due to evolution of scheme design some turbine locations were added/removed or moved whilst the bat survey programme was underway. In these instances, the need for additional survey or automated monitoring was assessed, based on how far turbines have moved and any survey data collected up to that point; where necessary, additional static monitoring was undertaken and it is considered that sufficient data has been captured to inform a robust assessment. Full details of the bat survey limitations are provided in **Appendix 8B**, final automated monitoring locations are shown in **Figure 8.6**.

8.2 Relevant legislation, planning policy and technical guidance

- 8.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Biodiversity. Further information on policies relevant to the Proposed Development is provided in **Chapter 5: Legislation and policy overview**.

Legislation

- 8.2.2 A summary of the relevant legislation is given in **Table 8.1**.

Table 8.1 Legislation relevant to the biodiversity assessment

Legislation	Legislative context
The Conservation of Habitats and Species Regulations 2017 (as amended)¹	<p>The Conservation of Habitats and Species Regulations 2017 (“the Habitats Regulations”) transposed the Habitats Directive into English and Welsh law. The regulations provided for the designation and protection of European sites, the protection of certain species (referred to as European Protected Species or EPS) and the adaptation of planning and other controls for the protection of European sites.</p> <p>Note that The Conservation of Habitats and Species Regulations 2017 were amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 to reflect the UK’s exit from the EU. These largely carried forward the provisions and terminology of the 2017 Regulations, and so the term ‘European site’ is currently retained and for all practical purposes the definition is essentially unchanged, although the UK European sites are no longer legally part of the ‘Natura 2000’ network of protected sites, with this being replaced in the UK by the ‘national site network’ which comprises all existing SACs and SPAs and any new SACs and SPAs designated under the 2019 Regulations (Ramsar sites do not form part of the network). This also has relevance if compensation measures are required for an adverse effect, as the relevant metric is the overall coherence of the ‘national site network’. The 2019 Regulations establish management objectives for the ‘national site network’ which contributes to the conservation of UK habitats and species that are also of pan-European importance, and to the achievement of their favourable conservation status within the UK.</p>
The Environment (Wales) Act 2016²	<p>The Act makes provisions within Wales for the planning and managing of natural resources at national and local level. Section 6 of the Act introduces the biodiversity and resilience of ecosystems duty whereby public authorities are required to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 of the Act introduces a list of living organisms and types of habitat in Wales, known as Species or Habitats of Principal Importance, which in Wales are considered of key significance to sustain and improve biodiversity.</p>
The Wildlife And Countryside Act 1981 (as amended) (WACA)³	<p>This act consolidates and amends existing national legislation to implement the Bern Convention. This piece of legislation remains the primary UK mechanism for statutory site designations (e.g. Sites of Special Scientific Interest (SSSI)) and the protection of individual species listed under Schedules 5 and 8 of the Act, each subject to varying levels of protection.</p>
Countryside & Rights of Way Act 2000⁴	<p>This act details further measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation</p>

¹ UK Government (2017). Conservation of Habitats and Species Regulations 2017 (“the Habitats Regulations”) has been amended by (*inter alia*) the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (Online). Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111179512/contents?sort=year> (Accessed 7 October 2021).

² UK Government (2016). The Environment (Wales) Act 2016. (Online). Available at: <https://www.legislation.gov.uk/anaw/2016/3/contents> (Accessed 7 October 2021).

³ UK Government (1981). The Wildlife And Countryside Act 1981 (as amended). (Online) Available at: <https://www.legislation.gov.uk/ukpga/1981/69> (Accessed 7 October 2021).

⁴ UK Government (2000). Countryside and Rights of Way Act 2000. (Online) Available at: <https://www.gov.uk/guidance/open-access-land-management-rights-and-responsibilities> (Accessed 7 October 2021).

Legislation	Legislative context
The Hedgerows Regulations 1997⁵	The Hedgerows Regulations is intended to protect important countryside hedges from damage or destruction.
Protection of Badgers Act 1992⁶	The Protection of Badgers Act provides protection to badgers and their places of shelter (setts).

Planning policy

8.2.3 A summary of the relevant national and local planning policy is given in **Table 8.2**.

Table 8.2 Planning policy relevant to the biodiversity assessment

Policy	Policy context
National planning policy	
Future Wales: The National Development Plan 2040⁷	<p>The Welsh national development framework sets the direction for development in Wales to 2040 and includes a Habitats Regulations Assessment. Policy 9: Resilient Ecological Networks and Green Infrastructure outlines measures to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure. Policy 18: Renewable and Low Carbon Energy Developments of National Significance also outlines that proposals will be permitted where:</p> <ul style="list-style-type: none"> • <i>“there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species; and</i> • <i>the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity”</i>
Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)⁸	<p>Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government’s objectives for Distinctive and Natural Places the theme of planning policy topics covers historic environment, landscape, biodiversity & habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales.</p>

⁵ UK Government (1997). The Hedgerows Regulations 1997 (Online). Available at: <https://www.legislation.gov.uk/uksi/1997/1160/contents/made> (Accessed 7 October 2021).

⁶ UK Government (1992). Protection of Badgers Act 1992. (Online) Available at: <https://www.legislation.gov.uk/ukpga/1992/51/introduction/enacted?view=plain> (Accessed 7 October 2021).

⁷ Welsh Government (2021). Future Wales: The National Plan 2040. (Online). Available at: <https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf> (Accessed 19 April 2022).

⁸ Welsh Government (2021) Planning Policy Wales, Edition 11, February 2021. (Online). Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf. (Accessed 01 December 2021).

Policy

Policy context

Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)⁹

Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species. It brings together advice on sources of legislation relevant to various nature conservation topics which may be encountered by local planning authorities. It sets out the key principles of planning for nature conservation and addresses nature conservation in development control procedures. It also deals with the conservation of protected and priority species. It also outlines those developments that may adversely impact on sites designated for their national nature conservation interest will generally not be permitted.

Local planning policy**Blaenau Gwent County Borough Council Local Development Plan up to 2021 (Adopted November 2012)¹⁰**

The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provides maximum benefits to the community.

Strategic Policy 10 (SP10) Protection and Enhancement of the Natural Environment: outlines the measures to protect, and, where appropriate, enhance Blaenau Gwent's natural environment and designated landscape, measures include ensuring that:

- The development does not have a significant effect on the neighbouring Usk Bat Site, Cwm Clydach Woodlands and Aberbargoed Grasslands;
- The locally identified Site of Importance for Nature Conservation (SINC) and Local Biodiversity Action Plan (LBAP) species are protected and enhanced; and
- The development seeks to produce a net gain in nature conservation by designing in wildlife, and ensuring any avoidable impacts are appropriately mitigated for.

Additionally, proposal should conform to policies DM14, DM15 and DM16.

DM14 Biodiversity Protection and Enhancement: includes guidance on proposals within 10km of Usk Bat Sites SAC and outlines proposals will only be permitted within, or in close proximity to sites designated as SINC or Priority Habitats and Species, where either: It maintains or enhances the ecological or geological importance of the designation and species, or the need for the development outweighs the nature conservation importance of the site/ species and it can be demonstrated that the development cannot reasonably be located elsewhere and compensatory provision will be made equivalent to that lost as a result of the development.

DM15 Protection and Enhancement of the Green Infrastructure: outlines measures to consider, protect and enhance green infrastructure and DM16 Trees,

⁹ Welsh Government, (2009). Planning Policy Wales Technical Advice Note 5: Nature Conservation and Planning. (Online) Available at: <https://gov.wales/sites/default/files/publications/2018-09/tan5-nature-conservation.pdf> (Accessed April 2022).

¹⁰ Blaenau Gwent County Borough Council (2012) Local Development Plan up to 2021. (Online). Available at: <https://www.blaenau-gwent.gov.uk/en/resident/planning/local-development-plan/adopted-ldp-allocations/adopted-local-development-plan-2006-2021/>. (Accessed 01 December 2021).

Policy	Policy context
	<p>Woodland and Hedgerow Protection outlines development proposals will be permitted provided there would not be unacceptable harm to trees, woodlands and hedgerows that have natural heritage value or contribute to the character or amenity of a particular locality.</p> <p>DM16 Trees, Woodlands and Hedgerow Protection states that development proposals will only be permitted in cases where there is no unacceptable harm to trees, woodlands and hedgerows that have natural heritage value or contribute to the character or amenity of a particular locality.</p>
Blaenau Gwent Local Biodiversity Action Plan 2015	The national strategy for biodiversity is delivered at local level via LBAP. Blaenau Gwent's LBAP is the driver to protect, enhance and manage the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Blaenau Gwent.

Technical guidance

- 8.2.4 A summary of the technical guidance for biodiversity that is relevant to the assessment is given in **Table 8.3**. Technical guidance that has been used to define the survey methods employed to inform this assessment is referenced in **Appendices 8A – 8D** as required.

Table 8.3 Technical guidance relevant to the biodiversity assessment

Technical guidance document	Context
Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018, updated in 2019). ¹¹	Sets out the industry standard approach to Ecological Impact Assessment (EIA) for assessing the potential effects of a project on ecological receptors.

8.3 Consultation and engagement

Overview

- 8.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 2.4 of Chapter 2: Approach to Environmental Impact Assessment**.

Scoping Direction

- 8.3.2 A Scoping Direction was issued by Planning and Environmental Decisions Wales (PEDW) (previously Planning Inspectorate (PINS) Wales) on behalf of the Welsh Ministers on 15 June 2021. A summary of the relevant responses received in the Scoping Direction in relation to biodiversity and confirmation of how these have been addressed within the assessment to date is presented in **Table 8.4**

¹¹ CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.1. (Online). Available at: <https://cieem.net/wp-content/uploads/2018/08/EIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1Update.pdf> (Accessed 31 March 2021).

Table 8.4 Summary of EIA Scoping Direction responses for biodiversity

Consultee	Consideration	How addressed in this Draft ES
Natural Resources Wales (NRW)/PEDW (ID.13)	<p>Dormouse:</p> <p><i>"NRW indicate that dormice should be addressed; if it is considered that they can be scoped out of the ES this should clearly addressed and justified within the ES.</i></p> <p><i>Dormice are provisionally scoped into the ES."</i></p>	Dormouse have been considered in Section 8.21.
NRW/PEDW (ID.14)	<p>Otter:</p> <p><i>"NRW consider that potential effects on otter should be assessed. Given this, the Inspectorate welcomes the assurance in Table 7.4 that appropriate locations within 250 m of the site boundary will be surveyed for otter, and the fact that Otter are not listed as being scoped out in Chapter 5 of Appendix 7.1. The applicant is encouraged to seek agreement with NRW regarding the approach to this element of the ES."</i></p>	The baseline otter survey report is provided in Appendix 8D . Otter are not considered to be present on or adjacent to the Site and as such are scoped out of the ES.
NRW/PEDW (ID.15)	<p>Bats surveys:</p> <p><i>"NRW have provided detailed comments with regards to Bats including requirements for:</i></p> <ul style="list-style-type: none"> <i>• Additional static monitoring at turbine locations should the design layout change significantly and;</i> <i>• Automated bat survey data acquired to date is displayed in a manner that analyses of the timings of bat calls to show patterns of movement throughout the night across the seasons;</i> <i>• Further consideration in relation to Lesser Horseshoe Bats.</i> <p><i>The Inspectorate directs that the ES should comply with these requirements, unless otherwise agreed with NRW and justified in the submitted ES."</i></p>	<p>Bats have been considered in Section 8.19.</p> <p>The requirements outlined by NRW with respect to bats have been incorporated within the bat survey programme and reporting (Appendix 8B).</p>
NRW	<p>Habitat surveys:</p> <p><i>"Any habitat surveys should accord with the NCC Phase 1 survey guidelines (NCC (1990) Handbook for Phase 1 habitat survey. NCC, Peterborough). We advise that Phase 1 surveys are undertaken and completed during the summer to ensure the best chance of identifying the habitats present"</i></p>	Results from the habitat surveys are presented in Appendix 8A . Habitat surveys have been conducted in line with the JNCC (2016) <i>Handbook for Phase 1 habitat survey – a technique for environmental audit</i> (JNCC, Peterborough) which are the most recent version of the NCC Phase 1 survey guidelines cited by NRW. Initial surveys were conducted in April with the previous botanical survey updated in June 2020 to gather detail on species throughout the growing season, recording plants that are more visible at different times and support broad habitat classifications.

Consultee	Consideration	How addressed in this Draft ES
NRW	<p>Impact assessment:</p> <p><i>“Should protected species be found during the surveys, information must be provided identifying the species specific impacts in the short, medium and long term together with any mitigation and compensation measures proposed to offset the impacts identified.</i></p> <p><i>Where proposals concern protected species, which are also notified features of designated sites (e.g. SAC, SSSI), we advise that the ES considers the impacts on those species from both perspectives.</i></p> <p><i>We advise that the ES sets out how the long term site security of any mitigation or compensation will be assured, including management and monitoring information and long term financial and management responsibility. Where the potential for significant impacts on protected species is identified, we advocate that a Conservation Plan is prepared for the relevant species and included as an Annex to the ES.</i></p> <p><i>Where a European Protected Species is identified and the development proposal will contravene the legal protection they are afforded, a licence should be sought from NRW.”</i></p>	<p>For all protected species confirmed present within the Site:</p> <ul style="list-style-type: none"> • impacts in the short, medium and long term are presented within the assessment section of the ES. • Embedded environmental measures are described within Section 8.6.
NRW	<p>Designated Sites:</p> <p><i>“We note the location of the Usk Bat SAC within 7.4km of the proposal. We also note bat surveys to date have identified a lesser horseshoe hibernation roost within 800m of the proposal. As identified within the report, we welcome a Habitat Regulations Assessment to be undertaken as part of the ES. We would advise that the hibernation roost identified is included in this consideration (supported with the additional surveying as referred to above) as it is likely to include bats that form the SAC population even though it is not within the SAC boundary.”</i></p>	<p>A Habitat Regulations Assessment is being undertaken with regards to the Usk Bat Sites/ Safleoedd Ystlumod Wysg SAC. The lesser horseshoe hibernation roost outside the Site boundary is included in this consideration and supported with additional surveying as referred to by NRW. The surveys conducted to establish the status of this roost and lesser horseshoe bat populations on site are detailed in the bat survey report (Appendix 8B).</p>
NRW	<p>Local Biodiversity Interests:</p> <p><i>“We recommend that the developer consults the local authority Ecologist on the scope of the work to ensure that regional and local biodiversity issues are adequately considered, particularly those habitats and species listed in the relevant Local Biodiversity Action Plan, and are that are considered important for the conservation of biological diversity in Wales.</i></p>	<p>A data-gathering exercise was undertaken to obtain information relating to statutory and non-statutory nature conservation sites, habitats of principle importance and species, and legally protected and controlled species (Appendix 8A). The data were obtained from South East Wales Biodiversity Records Centre.</p>

Consultee	Consideration	How addressed in this Draft ES
	<i>We would expect the developer to contact other relevant people/organisations for biological information/records relevant to the site and its surrounds. These include the relevant Local Records Centre and any local ecological interest groups (e.g. bat groups, mammal groups)."</i>	<p>EIA Scoping Consultation response has been provided by Blaenau Gwent County Borough Council ecologist</p> <p><i>"As part of the scoping exercise a suite of ecological surveys, for protected and priority species, have been conducted which includes:</i></p> <ul style="list-style-type: none"> • Preliminary Ecological Appraisal (March 2021) • Interim Bat Survey Report (March 2021) <p><i>These help to form a robust baseline and approach in identifying potential ecological constraints when assessing the potential for significant effects upon biodiversity and ornithology. The report adequately covers all the effects on designated sites, key habitats and species arising as a result of the construction, operation and decommissioning of the proposed development in chapters 7 and 8 (Biodiversity; Table 7.6 and Ornithology; Table 8.8)."</i></p>

Technical engagement

8.3.3 Technical engagement with consultees in relation to biodiversity is ongoing. A summary of the technical engagement undertaken to date is outlined in **Table 8.5**.

Table 8.5 Technical engagement on the biodiversity assessment

Consultee	Consideration	How addressed in this Draft ES
NRW	Wood held a technical meeting with NRW on 7 September 2021. The bat survey approach was discussed outlining surveys completed to date and how surveys had taken into account the NRW scoping response, including with regards to the lesser horseshoe hibernation roost and surveys in support of the HRA. Wood's approach to dormouse and consideration of habitat suitability for this species were also discussed.	The bat survey approach agreed within the meeting is presented as part of this Draft ES. Impacts on lesser horseshoe bats are considered as discussed in relation to the Usk Bat Sites/Safleoedd Ystumod Wysg SAC. Following NRW consultation dormouse surveys are being conducted in 2022 as detailed in Section 8.24 .
Blaenau Gwent County Borough Council (BGCBC) Ecologist	Wood held a technical meeting with the BGCBC ecologist on 30th March 2022. The species, habitats and SINCS potentially impacted were discussed along with appropriate prescriptions to include within the HMP. The scope of surveys which had been completed to date were discussed and any additional survey requirements were	HMP measures have been included to limit grazing pressure around SINC waterbodies and include monitoring as part of the HMP (Appendix 8F). The scope of surveys was agreed as detailed in Table 8.7 .

Consultee	Consideration	How addressed in this Draft ES
	discussed to ensure site, regional and local biodiversity issues were adequately considered.	

8.4 Data gathering methodology

Study area

- 8.4.1 The study area encompasses the area for which desk-study and field-survey data were collected to inform the biodiversity assessment. The level and type of data collection varies across the study area due to the presence of multiple ecological features and effect-pathways. The study area comprises:
- the land within the Site boundary (as shown on **Figure 1.2**);
 - the desk study areas (known as 'areas of search') for sites designated for their nature conservation interest at the international, national and local levels;
 - the area of search for legally protected and notable ecological features;
 - the area of search for any legally controlled species; and
 - for the Wind Farm development, the field survey areas for each ecological feature covered during baseline data collection activities¹².
- 8.4.2 The extent of the areas of search and field survey areas (see **Section 8.4.3** and **Table 8.7**) were determined based on best practice guidance and a high-level overview of the types of ecological features present, informed by the desk study and Preliminary Ecological Appraisal and the potential effects that could occur (see **Table 8.12**). The study area was defined on a precautionary basis to ensure that the Zone of Influence (Zol)¹³ relevant to all ecological features were covered during baseline data collection activities. Zols are the areas within which a potentially significant effect associated with the Proposed Development may be identified for a particular ecological feature.

Desk study

- 8.4.3 A data-gathering exercise was undertaken in April 2020 and then updated in March 2022 to obtain information relating to statutory and non-statutory biodiversity sites; species or habitats of principal importance for the conservation of biodiversity; legally protected and controlled species; and other conservation-notable habitats or species (see **Boxes 8.1** and **8.2**, below). Given the potential for the proposed development to affect ecological features located off- as well as on-site, data were obtained for:

¹² Desk study alone has been used to inform the baseline for the Grid Connection

¹³ The Zol in this context is the area over which an individual ecological feature may be subject to a potentially significant effects resulting from changes in the baseline environment due to the Proposed Development.

- European sites and other biodiversity sites of international importance within 10km of the Site.
- Statutory designated biodiversity sites of national/local importance within 2km of the Site.
- Non-statutory designated biodiversity sites areas within 2km of the Site.
- Protected species, species of principal importance for the conservation of biodiversity, or other conservation-notable species recorded within 2km of the Site, and bat records within 10km of the Site.
- Habitats of principal importance for the conservation of biodiversity in Wales or Blaenau Gwent, or other conservation-notable habitats recorded within 2km of the Site.
- Water bodies within 500m of the Site.

8.4.4 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 8.6**.

Box 1 - Designated Biodiversity Sites, and Priority Habitats and Species

Statutory Biodiversity Sites

- **European sites:** The *Conservation of Habitats and Species Regulations 2017* were amended by the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* to reflect the UK's exit from the EU. These largely carried forward the provisions and terminology of the 2017 Regulations, and so the term 'European site' is currently retained and for all practical purposes the definition is essentially unchanged. **European sites are therefore:** any **Special Area of Conservation (SAC)** from the point at which the European Commission and the UK Government agreed the site as a '**Site of Community Importance (SCI)**' (if this was before 31 Jan 2020); any classified **Special Protection Area (SPA)**; and any **candidate SAC (cSAC)**. However, the term is also commonly used when referring to **potential SPAs (pSPAs)**, to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') are applied; and to **possible SACs (pSACs)** and listed **Ramsar Sites**, to which the provisions of the Habitats Regulations are applied a matter of Government policy (**TAN 5.1.3**) when considering development proposals that may affect them. **"European site" is therefore used in this document in its broadest sense, as an umbrella term for all of the above designated sites.** Note, it is likely that this term will be supplanted at some point in the future although an appropriate UK-wide alternative has not yet been agreed (e.g. the NPPF in England has adopted the term 'Habitats sites' to refer collectively to those sites defined by Regulation 8; the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* has renamed the Natura 2000 network of sites as the 'National Site Network').
- **Sites of Special Scientific Interest (SSSIs):** Nationally important sites notified under the *Wildlife and Countryside Act 1981* (as amended) that provide the best examples of the UK's flora, fauna, or geological or physiographical features (note, this assessment focuses on those sites notified for their biodiversity interest).
- **National Nature Reserves (NNRs):** Nationally important sites notified under the *National Parks and Access to the Countryside Act 1949* and the *Wildlife and Countryside Act 1981* (as amended); in practice most NNRs are SSSIs also.
- **Local Nature Reserves (LNRs):** Locally important sites that are designated under the *National Parks and Access to the Countryside Act 1949* with the objective of encouraging their use for the study, research or enjoyment of nature.

Non-statutory Biodiversity Sites

Non-statutory biodiversity sites in Blaenau Gwent County Borough Council are known as Sites of Importance for Nature Conservation, (SINCS) and are safeguarded by the policy provisions of Blaenau Gwent County Borough Council Local Development Plan.

Other important habitats or species

Species or habitats of "principal importance for the conservation of biodiversity" in Wales are those listed by Natural Resources Wales (NRW) pursuant to Section 7 of the *Environment Act (Wales) 2016*. They are commonly referred to as 'Section 7' or 'S.7' habitats or species, or HPI/SPIs (Habitats / Species of Principal Importance).

Other conservation-notable habitats and species would include:

- Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern Red List (Eaton *et al.* 2009).
- Ancient woodland (i.e., areas that have been under continuous woodland cover since at least 1600 listed on the Ancient Woodland Inventory (AWI));
- Nationally Rare and Nationally Scarce species in the UK, which are species recorded from, respectively, 1-15 and 16-100 hectads (10x10km squares of the UK national grid).
- Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available).
- Habitats and species listed by the relevant LBAP; and
- Other species or assemblages such as large populations of animals considered uncommon or threatened in a wider context.

Box 2 - Legally Protected and Controlled Species

Legal Protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this report, legal protection refers to:

- Species included on Schedules 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see Sections 9[5] and 13[2] of the Act);
- Species included on Schedules 2 and 5 of the *Conservation of Habitats and Species Regulations 2017*; and
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

Legal Control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it is an offence to release or allow to escape into the wild (for example grey squirrel) and species of plant that it is an offence to plant or otherwise cause to grow in the wild (for example, Japanese knotweed).

Table 8.6 Data sources used to inform the biodiversity assessment

Aspect	Data	Sources
Statutory sites	<ul style="list-style-type: none"> • Boundary data • Citations • Other site information (e.g. Conservation Objectives; Management Plans; etc.) 	Magic: www.magic.gov.uk JNCC: http://jncc.defra.gov.uk/page-4 NRW: http://lle.gov.wales/home
Non-statutory sites	<ul style="list-style-type: none"> • Boundary data • Citations 	South East Wales Biodiversity Records Centre (SEWBRc)
Other sites and habitats	<ul style="list-style-type: none"> • Boundary data 	Magic: www.magic.gov.uk SEWBRc
Species records	<ul style="list-style-type: none"> • Location data 	SEWBRc

Survey work

- 8.4.5 The biodiversity field survey programme has been designed to provide sufficient information on legally protected and conservation notable species, and the general status and condition of all habitats within the Wind Farm development ('the Proposed Development') study area. Surveys were designed based on the evolving Proposed Development Site boundary.
- 8.4.6 The grid connection between the on-site substation and electricity grid will be agreed and delivered as a separate DNS application. Notwithstanding this, the potential environmental effects arising from this have been considered in the Environmental Impact Assessment (EIA) for the Proposed Development, by means of a desk-based assessment using currently available information on the proposals. Where the Proposed Development Site survey areas have overlapped with the proposed Grid Connection corridor, this data has also been used to inform the assessment of the Grid Connection corridor.

- 8.4.7 The survey areas for each ecological feature comprises the land within the Proposed Development Site and additional areas that were determined based on best-practice guidance and the potential effects that could occur. The search areas were defined on a precautionary basis to ensure that the Zol relevant to each ecological feature was covered during baseline data collection activities. The field survey programme was also informed by the results of the desk study, discussions with Natural Resources Wales and comments received in the Scoping Direction.
- 8.4.8 A list of ecological surveys carried out to inform the preparation of this chapter is provided in **Table 8.7**. The methods and results of these surveys are detailed in **Appendices 8A to 8D**.

Table 8.7 Surveys conducted to inform the biodiversity assessment

Survey type	Scope of survey	Survey status	Location of survey report
Phase 1 habitat survey	<p>Phase 1 habitat survey has been used to classify and map habitats inside the Site boundary and within a buffer up to 250m from it. The survey was 'extended' to identify the presence or potential presence of species of importance for biodiversity conservation and/or species that are afforded legal protection.</p> <p>Surveys followed the methods described in the Joint Nature Conservation Committee (JNCC) Handbook for Phase 1 habitat survey (2010)¹⁴.</p>	Survey complete (April and botanical survey updated June 2020). Survey will be updated in 2022 prior to final submission.	Appendix 8A Preliminary Ecological Appraisal
Bat roost	<p>Bat roost surveys have focussed on establishing which trees and built structures inside the Site boundary and within a buffer of 275m from it support roosting bats. This has been achieved via a mix of external and internal inspections and static monitoring on built structures and ground based and climbing inspections on trees with emergence/re-entry surveys on both trees and built structures as required.</p> <p>Surveys have followed the Bats and Onshore Wind Turbines Guidelines (2019)¹⁵, Bat Conservation Trust Good Practice Guidelines (2016)¹⁶, Bat Tree Habitat Key, 2013¹⁷, and British Standard 8596:2015: Surveying for bats in trees and woodland, 2016¹⁸.</p>	Survey complete (May 2020 to October 2021)	Appendix 8B Bat Survey Report Final

¹⁴ JNCC, (2010), Handbook for Phase 1 habitat survey – a technique for environmental audit, JNCC; Peterborough, UK.

¹⁵ SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) Bats and onshore wind turbines: survey, assessment and mitigation. (Online) Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> (Accessed April 2022).

¹⁶ Collins (ed.) (2016). Bat surveys for professional ecologists: Good practice guidelines. 3rd Edition.: Bat Conservation Trust; London.

¹⁷ H. Andrews (2008). Bat roosts in trees: a guide to identification and assessment for tree-care and ecology professionals. Pelagic Publishing; Exeter.

¹⁸ British Standards Institution (2015). BS 8596:2015: Surveying for bats in trees and woodland. BSI; London.

Survey type	Scope of survey	Survey status	Location of survey report
Bat activity	<p>Automated detector surveys were completed over 10 days at turbine locations in spring, summer and autumn 2021 and three manual transect surveys were completed monthly between May and October 2020.</p> <p>Additional automated detector surveys were undertaken at the eight turbine locations between April and June 2021, completing 10 days monitoring in each month to provide activity data where turbine locations had moved since monitoring was undertaken the 2021 automated monitoring locations are shown on Figure 8.6. An additional transect survey was undertaken between August and October 2021 in proximity to a lesser horseshoe bat hibernation roost to determine levels of activity.</p> <p>Surveys have followed the Bats and Onshore Wind Turbines Guidelines (2019) and Bat Conservation Trust Good Practice Guidelines (2016).</p>	Survey complete (May 2020 to October 2021)	Appendix 8B Bat Survey Report Final
Badger	<p>Badger surveys have focussed on identifying signs of activity and places of shelter (setts) inside the Site boundary and within a buffer of 250m from it.</p> <p>Surveys have been informed by good practice guidelines by Scottish Badgers (2018)¹⁹.</p>	Survey complete, surveys undertaken concurrently with the Phase 1 habitat surveys and subsequent tree roost assessments. An update survey will be undertaken in 2022.	Appendix 8A Preliminary Ecological Appraisal
Otter	The Nant Big river located centrally to the south of the Site and the waterbodies on site were surveyed for otter.	Survey complete (March 2021)	Appendix 8A Preliminary Ecological Appraisal
Reptile	<p>Reptile presence/likely absence surveys, comprising seven visits using artificial refugia, have been undertaken within the Site.</p> <p>Surveys have followed Froglife (1999) Advice sheet 10 Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.</p>	Survey complete (September 2020)	Appendix 8C Reptile Report
Great crested newts	All accessible waterbodies within 500m of the Site were assessed using the Habitat Suitability Index (HSI) scoring system. Environmental DNA (eDNA) surveys for GCN presence/absence were undertaken on all accessible waterbodies	April 2020	Appendix 8A Preliminary Ecological Appraisal

¹⁹ Scottish Badgers (2018). Surveying for Badgers: Good Practice Guidelines. Version 1. (Online) Available at: https://www.scottishbadgers.org.uk/wp-content/uploads/2020/12/Surveying-for-Badgers-Good-Practice-Guidelines_V1-2020-2455979.pdf (Accessed April 2022).

Survey type	Scope of survey	Survey status	Location of survey report
	<p>supporting water. All samples returned negative for GCN.</p> <p>The surveys were undertaken in line with Oldham et al. "Evaluating the suitability of habitat for the Great Crested Newt (<i>Triturus cristatus</i>)" (2000)²⁰, and Biggs et al "Analytical and methodological development for improved surveillance of the Great Crested Newt" (2014)²¹.</p>		
Dormouse	<p>The suitability of the habitats on and within 250m of the Site to support dormouse were assessed during the Phase 1 habitat survey and were not considered to be typical of habitat that would support dormouse.</p> <p>Following scoping opinion from NRW surveys will be conducted in 2022.</p>	July 2021	<p>Appendix 8A Preliminary Ecological Appraisal</p> <p>(NB. further surveys to be undertaken in summer 2022)</p>
Terrestrial and aquatic invertebrates	<p>The suitability of the habitats on and within 250m of the Site were assessed for their potential to support protected or notable invertebrate populations during the Phase 1 habitat surveys. Following evolution of design targeted additional habitat-based suitability surveys focussing on habitats within the Site which may be affected by the Proposed Development were conducted.</p>	August 2021	Appendix 8A Preliminary Ecological Appraisal
Other protected/conservation notable species	<p>The suitability of the habitats on and within 250m of the Site were assessed for their potential to support populations of other protected or conservation notable species recorded by the desk-study, based on the Extended Phase 1 habitat survey and during incidental records during all other survey work.</p>	August 2021	Appendix 8A Preliminary Ecological Appraisal

8.5 Overall baseline

- 8.5.1 The description of the ecological features below provides a summary of the biodiversity baseline as determined through desk-study and field survey. Further details of the desk study and field survey programme are provided in **Appendix 8A - Appendix 8D**.

²⁰ Oldham, R.S., Keeble, J., Swan, M.J.S., Jeffcote, M (2000), Evaluating the Suitability of Habitat for Great Crested Newt (*Triturus cristatus*). Herpetological Journal.

²¹ 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.

Current baseline

Site context and surrounding habitats

- 8.5.2 The Proposed Development Site ('the Site') is typical of many grazed upland areas in South Wales, dominated by semi-natural and heavily modified habitats including improved grassland, semi-improved acid and neutral grassland, dry heath/acid grassland, marshy grassland, areas continuous bracken and arable (**Figure 8.5**). Within the Site boundary there is a large number of mature trees scattered throughout the grassland and along the field boundaries. This is dominated by beech with ~200 trees, with oak, hawthorn and silver birch scattered occasionally. The Site habitats are not particularly notable examples, with their condition heavily influenced by historic and current agricultural practices (drainage, grazing, etc.).
- 8.5.3 The surrounding area is dominated by managed forestry comprising conifer plantation immediately adjacent to the western and north-western boundaries of the Site and in between the forked upland ridges with areas of larch, Scots pine and Sitka spruce. The area of conifer plantation immediately adjacent to the west of the Site is the location of the proposed grid connection corridor.
- 8.5.4 On the northwest and southeast boundaries of the Site there is semi-natural broad-leaved woodland present, generally with a very bare or bracken dominated understorey and high canopy. Species recorded include oak, beech and silver birch.

Designated sites

- 8.5.5 There are four statutory designated nature conservation sites (three SACs and one SSSI) and 26 non-statutory nature conservation sites (SINCs) within the study area (**Figure 8.1, 8.2 and 8.3**). The interest features of these sites area summarised in **Table 8.8**.
- 8.5.6 The following sites are considered particularly relevant to this application:
- Usk Bat Sites SAC (7.1km N of the Site Boundary).
 - Arail Farm Slopes SINC (within Site boundary).
 - Arail Pond SINC (within Site boundary).
 - Cefn Bach SINC (within Site boundary).
 - Coetgae Pond SINC (within Site boundary).
 - Craig y Deri Pond SINC (within Site boundary).
 - Cwm Big North, Aberbeeg SINC (within Site boundary).
 - Hafod-y-Dafal acid grassland SINC (within Site boundary).
 - Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC (within Site boundary).
 - Pond Group 3 SINC (within Site boundary).

Table 8.8 Designated nature conservation sites within the search areas

Site	Location*	Summary of interest features
Aberbargoed Grasslands SAC	4.5km SW	Small (~40ha) grassland site designated primarily for its marsh fritillary butterfly population; the qualifying features are: Annex I features: <ul style="list-style-type: none"> • Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) (Q) Annex II features: <ul style="list-style-type: none"> • Marsh fritillary butterfly (<i>Euphydrya (Eurodryas, Hypodryas) aurinia</i>)
Cwm Clydach Woodlands / Coedydd Cwm Clydach SAC	7.1km N	Mature beech forest site located on the sides of a steep valley; the qualifying features are: Annex I features: <ul style="list-style-type: none"> • <i>Asperulo-Fagetum</i> beech forests • Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrub layer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) (Q)
Usk Bat Sites/ Safleoedd Ystumod Wysg SAC	7.1km N	The Usk Valley area in south-east Wales contains one of the largest maternity roosts for lesser horseshoe bat as well as a number of important hibernacula in caves in the area; the qualifying features are: Annex I features: <ul style="list-style-type: none"> • European dry heaths (Q) • Degraded raised bogs still capable of natural regeneration (Q) • Blanket bogs (priority feature if active bog) (Q) • Calcareous rocky slopes with chasmophytic vegetation (Q) • Caves not open to the public (Q) • Tilio-Acerion forests of slopes, screes and ravines (priority feature) (Q) Annex II features: <ul style="list-style-type: none"> • Lesser horseshoe bat <i>Rhinolophus hipposideros</i>
Cwm Merddog Woodlands SSSI	1.4km NW	The site comprises two blocks of beech woodland on slopes below Mynydd Carn-y-Cefn to the south of Ebbw Vale, with interesting transition zones to alder dominated communities in areas of impeded drainage in the lower slopes. The beech woodland is at the north-western limit of its European range and at a relatively high altitude.
Arail Farm Slopes SINC	Within site	Collection of sheep grazed acid grasslands.
Arail Pond SINC	Within site	Unimproved and semi-improved acid grassland. 40% of the pond is open water.
Bourneville Slip, Blaina SINC	2km N	Reclaimed colliery spoil, where trees have been planted and a rich mosaic of habitats.
Cefn Bach SINC	Within Site	Large open hill area supporting a mosaic of semi-improved acid grassland and dry and wet scrub heath.
Coed-y-Gilfach SINC	1.4km E	Primarily a beech wood, with some signs of old pollarding and charcoal platforms.
Coedcae Coch, Aberbeeg SINC	1.1km SE	Oak wood with a few large beech and some old bird. Ground flora is very variable from bare ground.
Coetgae Pond SINC	Within Site	Located on the hillside above the woodland at Craig yr Arial at an altitude of 400m. It is on post-industrial land amidst colonising spoil tips.

Site	Location*	Summary of interest features
Craig y Deri Pond SINC	Within Site	Located on the hillside above the woodland at Craig y Deri at an altitude of 390m. The surrounding land is semi-improved grassland and coniferous woodland.
Cwm Big North, Aberbeeg SINC	Within Site	This woodland is the northernmost extension of a coniferous woodland block and occupies the east-facing slope of a valley, almost to its emergence on the plateau. To the west are improved pastures, with moorland on the east side of the valley. The upper boundary comprises a relic beech hedge.
East of Penrhiwgwingi SINC	0.8km W	Acidic woodland.
Garn-Cam-Isaf SINC	2.1km NW	Most of the site is woodland, partly grazed by horses, grading to bracken and acid grassland at the western end.
Green Meadow Farm SINC	1.7km NE	A habitat mosaic including acid grassland, woodland, heathland and mire.
Hafod-y-Dafal acid grassland SINC	Within Site	Extensive area of semi-improved acid grassland over relatively low ground, grazed by sheep. The site is heavily disturbed by a variety of intersecting tracks and trenches.
Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC	Within Site	Valley ridge separating the Ebbw Fach and Ebbw Fawr valleys. Heathland is the main vegetation community with other areas of wet heath and following the spring lines mire communities.
Mynydd Pen-y-Fan, South East of Manmoel SINC	14.4km SW	Marshy grassland / flush vegetation with at least 12 indicator species. Semi-improved acid grassland with at least 7 indicator species
Nant Gwynt Woodland, Glandwr SINC	1.6km S	Broad-leaved woodland with an assemblage of semi-natural indicator species. Semi-improved acid grassland containing at least 7 indicator species.
Pentwyn Fields, Pentwyn SINC	2.4km S	A mosaic of broad-leaved woodland with several semi-natural indicators, and patches of acid and marshy grassland. Semi-improved neutral grassland with at least 8 indicator species.
Pen-y-Fan Pond and Meadows, West of Pentwyn SINC	1.9km SW	Marshy grassland / flush vegetation with at least 12 indicators; semi-improved neutral grassland with at least 8 indicator species; acid grassland / heath with at least 7 indicator species; standing open water with diverse bank-side and aquatic vegetation; lesser horseshoe bat roost.
Pen-y-Fan-Fach Grasslands, Glandwr SINC	1.2km S	Semi-improved acid grassland containing at least 7 indicator species.
Pond Group 3 SINC	Within Site	A series of man-made ponds.
Quarry at Gilfach Wen Farm SINC	1.7km SE	Disused quarry with some areas of exposed rock face and vegetated undulating ground of the old working.
Rear of New Cwm Terrace SINC	1.2km NW	Semi-improved poor grassland lies beneath scattered high canopy trees, including silver birch, goat willow and some mature oaks. Areas of semi-improved acid grassland to the north of site.

Site	Location*	Summary of interest features
River Ebbw Fach SINC	0.3km S	Large river providing a significant linear wildlife corridor.
Roseheyworth Community Woodlands SINC	0.9km NE	A patchwork of intergrading woodland types and associated areas of grassland, mire and heath all under the influence of the site's hydrological patterns.
Six Bells Colliery Site SINC	0.8km SE	Range of habitats including woodland, grassland and scrub with intermittent areas of spoil
Twyn y Bleiddiaid, South East of Manmoel SINC	0.9km SW	Marshy grassland.

* Location (distance and direction) in relation to development site boundary.

(Q): Interest features (habitats or species) that are qualifying SAC features; all other habitats and species are a primary reason for designation.

Annex I/II: Habitats or species listed on Annex I or II (respectively) of Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') Habitats.

Habitats

8.5.7 The habitats present within and immediately adjacent to the Site boundary are summarised in **Table 8.9**, with the approximate areas within the Site boundary (i.e. which could be directly affected by the scheme) also noted. Where habitats are large enough to map these are shown in **Figure 8.5**.

Table 8.9 Habitats within the site boundary and the approximate area

Phase 1 habitat	S.7 Priority Habitat*	Summary	~Area in Site boundary (ha)**
Semi-improved grassland – acid	No	This habitat was present across the northeast and east of the Site, including around the proposed locations of turbines 3, 4 and 5, and bordering the southwest boundary. These areas are heavily grazed. Species include sheep's fescue, creeping bent, bristle bent, sweet vernal, wavy hair grass, and sheep's' sorrel, with scattered gorse and rush throughout. A large area of purple moor grass was identified in the east of the Site (TN8) with patches of this scattered within adjacent grassland, as well as scattered bracken. Upland acid grasslands are not S.7 habitats, although good examples may sometimes contribute the 'Upland heathland' S.7 habitat where they occur in mosaics with heathland habitats.	52.7

Phase 1 habitat	S.7 Priority Habitat*	Summary	~Area in Site boundary (ha)**
Semi-improved grassland - neutral	No	Small areas of semi-improved neutral grassland were located around the proposed location of turbine 6 and the adjacent ponds. This area was well-grazed although the dominant grass identified was red fescue with other species found in these habitats including perennial rye grass, cock's foot, annual meadow grass, creeping bent, common bent, Yorkshire fog, sweet vernal, crested dog's tail with cuckoo flower, speedwell sp., ribwort plantain, common nettle, creeping thistle, and dense scattered soft rush.	6.9
Poor semi-improved grassland	No	Heavily grazed poor semi-improved grassland was recorded in the southwest of the Site around turbine and 8 (bordering areas of improved grassland and semi-improved acid grassland), and underneath the solar farm in the centre of the Site. Species recorded include perennial rye grass, ribwort plantain and white clover, with Yorkshire fog, annual meadow grass and yarrow also present among areas of scattered soft rush and bracken.	20.9
Improved grassland	No	There are enclosed fields present in the west of the Site that are characteristic of improved grassland, these are present around Turbine 7. These areas are intensely grazed by sheep or cattle, with species recorded limited to perennial rye grass, white clover, dandelion and daisy, with patches of bare ground from poaching.	31.6
Dry heath/acid grassland	Upland heathland	Dry heath/acid grassland was recorded within the eastern Site boundary. Species in this area included ling heather, with scattered heath rush, purple moor grass, early hair grass, wavy hair grass, mat-grass, with marshy patches of sphagnum <i>sp.</i> and other moss species present. Abundant berberry, heather and gorse were also scattered throughout.	16.2
Marsh/marshy grassland	No	A small area of marshy grassland was identified at the northeast boundary of the Site. This habitat was dominated by moss species, including sphagnum moss, with scattered rush, silver birch scrub, young conifer and gorse. This was not considered a priority habitat under 'upland flushes, fens and swamps' being species-poor with rush swards.	0.8
Continuous bracken	No	There are large swathes of dense continuous bracken present centrally in the Site and around the proposed location of turbine 2, with smaller areas scattered in the south and northeast. The smaller areas are generally interspersed with rush and semi-improved grassland and the larger areas are dominant on open slopes with scattered silver birch and gorse scrub.	36.1

Phase 1 habitat	S.7 Priority Habitat*	Summary	~Area in Site boundary (ha)**
Dense and scattered scrub	No	There are very localised areas of scrub within the Site boundary comprising a block of dense continuous gorse in the northern part of the Site.	0.19
Unimproved grassland – acid	Yes	The SEWBReC data search returned records of unimproved acid grassland at the Site (TN7 on Figure 8.5). This habitat was not recorded at the time of survey. Based on guidance from the 'Handbook for Phase 1 Habitat Survey' ¹⁴ areas were identified as semi-improved acid grassland.	0
Arable	No	An area in the northeast of the Site around the proposed location of turbine 1 has been cultivated for root crops, being ploughed and treated with lime.	13.9
Coniferous woodland - plantation	No	There are several small blocks of coniferous woodland plantation within the Site; however, most recorded during the survey were off-site adjacent to the Site boundary. On the northern boundary of the Site there is a block of Sitka spruce plantation which extends around to the north-east boundary, with a very heavily shaded, bare understorey and very little species diversity. Another block of Sitka spruce is present in the north-west corner of the Site, with sections of this previously felled.	3.54
Broad-leaved woodland – semi-natural	No	In the centre of the Site a small section of semi-natural woodland is present on slopes bordering a dry riverbed (see TN10 on Figure 8.5). This is predominantly oak woodland with mature beech spread throughout. The canopy is high with the understorey comprising scattered bracken and bare ground.	3.6
Broadleaved trees	No	There are numerous mature trees scattered throughout the grassland and along the field boundaries within the Site. These are predominantly beech (~200 trees), with oak, hawthorn and silver birch scattered occasionally.	0.41
Ponds	Ponds	There are 16 ponds within the Site boundary. The majority of waterbodies identified were within heavily grazed grasslands, frequently used by livestock with evidence of poaching at the margins, with low plant diversity and poor water quality. Five ponds are considered to have higher water quality and plant diversity, and may meet the criteria for S.7 'Pond' habitats (ponds 6, 7, 21, 23 and 25). These ponds are part of the SINC designations (Pond Group 3 SINC, Arail Pond SINC and Coetgae Pond SINC detailed in Table 8.8). Ponds are shown in Figure 4.4 (Appendix 8A) .	1.15

Phase 1 habitat	S.7 Priority Habitat*	Summary	~Area in Site boundary (ha)**
Watercourses	Rivers	Approximately 300m of the Nant Big watercourse is located centrally onsite. This area forms the start of the river and comprises a very shallow stream 2-3cm deep and ~50cm wide. The 'Rivers' priority habitat applies to stream headwaters that are "marked with a blue line on Ordnance Survey (OS) maps at a scale of 1:50,000" (JNCC 2011), therefore this section of stream classifies as S.7 'River' habitat.	-
Buildings	No	Several functional and dilapidated buildings of varying building materials are present within the Site boundary. In the southwest of the Site there are the defunct remnants of a stone barn, with only the walls remaining (TN1, Figure 8.5). Similar collapsed stone buildings lie in the southwest and the east of the Site (TN2 & TN3). In the centre of the Site there is a collection of buildings consisting of an uninhabitable abandoned farmhouse with a collapsed adjoining structure and associated corrugated barns and storage containers. There is also a small brick building within a fenced area of grassland that is associated with the electrical distribution of the solar farm. In the east of the Site there is a farmyard with a series of associated buildings including a stone farmhouse and adjoining barn, open barns with corrugated rooves and a mix of corrugated and wooden shed type structures. There is another collection of buildings further south used as a kennel for hunting dogs, with the majority consisting of corrugated metal structures and a wooden 'house' with a corrugated roof.	-
Hardstanding (including tracks)	No	The Site is intersected by numerous hardstanding forestry tracks and PRoWs. There is also hardstanding present in the farmyards.	2.1
Bare ground	No	Bare ground is generally recorded in association with the buildings on Site, including the farmyards and dog kennels.	-

* Corresponding S.7 habitat based on the S.7 lists and the criteria within the *UK Biodiversity Action Plan: Priority Habitat Descriptions* (Maddock, JNCC 2011).

** Approximate area within the Site boundary.

8.5.8 The Grid Connection corridor is predominantly coniferous woodland plantation, managed for forestry activity with Scots pine and Sitka spruce dominant with minimal species and canopy layer diversity, and a bare understorey. Scattered broadleaved trees are present and a small area of semi-improved grassland and dense bracken is present within the north of the corridor adjacent to a large residential property; the habitats are not considered Section 7 priority habitats.

Bats

- 8.5.9 The desk study returned records of at least 12 species of bat from the last 15 years and within 10km of the Site, with the most frequent records being for common pipistrelle. **Figure 3.1, (Appendix 8B)** shows the distribution of roost records.
- 8.5.10 A suite of bat activity surveys (see **Appendix 8B**), comprising walked transects and static detector surveys in 2020 and 2021, determined that at least seven species of bat were using the bat survey area including common pipistrelle, *Myotis sp.*, noctule, *Plecotus sp.* (considered likely to be brown long-eared), soprano pipistrelle, greater horseshoe and lesser horseshoe.
- 8.5.11 The Site, as a whole, is of moderate suitability for foraging and commuting bats. Common pipistrelle was widely recorded across the Site and 81.5% of the total number of contacts over the survey period were common pipistrelle, with soprano pipistrelle and *Myotis* bats making up approximately 5% each of recordings. All the other recorded species or species groups each accounted for less than 1% of the total²².
- 8.5.12 The highest levels of bat activity were recorded in those areas of the Site closest to woodland, woodland edge, waterbodies, hedgerows and tree lines, such as the south-western corner of the Site, where Turbines 7 and 8²³ were located. The highest levels of bat activity were recorded at Turbines 2, 5, 7 and 8, this corresponds with the highest levels of common pipistrelle activity.
- 8.5.13 Roost identification surveys found 256 trees with moderate or high roosting potential and seven built structures with some potential to support roosting bats. Five roosts have been identified within the bat survey area, comprising three built structures and two trees:
- B3: common pipistrelle day and hibernation roost.
 - B6: lesser horseshoe bat maternity and hibernation roost.
 - B9: long-eared bat hibernation roost.
 - Tree 207: long-eared bat summer day roost.
 - Tree 261: long-eared bat hibernation roost.
- 8.5.14 The desk study found no records of bats within the Grid Connection corridor. While survey work was focussed on the Wind Farm development site, ground level tree scoping and follow on winter roost identification surveys for bats also covered the majority of the Grid Connection corridor. These surveys identified 15 trees with bat roosting potential (five trees were classed as high roosting potential, eight moderate and two low) (**Figure 3.3, Appendix 8B**)

Otter

- 8.5.15 The desk study returned 11 records of otter within 2km of the Site. The closest of these was 380m from the site in 2013, associated with the Ebbw River. The habitats on Site are

²² The remaining recordings (3.3%) could not be identified to species group.

²³ Turbine location references vary between the bat report (**Appendix 8B**) and those presented in this ES, due to an additional ninth turbine location being removed from the Proposed Development (which is included in the bat report).

of low suitability for otter. A 300m section of the Nant Big watercourse is located centrally onsite, this forms the start of the river and comprises only a very shallow stream which is mainly dry but seasonally holds 2-3cm of water. Offsite the downstream section of the Nant Big has moderate suitability for otter; no evidence of otters was found in or around the Site during surveys. The ponds on Site are considered to have negligible suitability for otter, although it is possible that otters periodically cross the site. (**Figure 3.1, Appendix 8D**).

- 8.5.16 No desk study records for otter were recorded within the proposed Grid Connection corridor with no suitable habitat present for otter within or directly adjacent to this area.

Water vole

- 8.5.17 There were no records of water vole returned within 2km of the Site boundary and the 300m section of watercourse present on Site (which extends off Site to the south) is not considered to be suitable for water vole. The banks of the watercourse were not vegetated, other than exposed tree roots, and no suitable aquatic vegetation for foraging and cover was present. Though earth banks were present, the flow and depth of the watercourse was not suitable for the species.
- 8.5.18 No desk study records for water vole were recorded within the proposed Grid Connection corridor with no suitable habitat present for water vole within or directly adjacent to this area.

Hazel dormouse

- 8.5.19 There were no desk study records of dormouse within 2km of the Site boundary (or the Grid Connection corridor). The habitats present within and adjacent to the Proposed Development Site and Grid Connection corridor are not considered habitats that would typically support dormouse. There are no hedgerows present, and the broadleaved and conifer plantation woodland that borders the Site is low in species diversity, with a high canopy and minimal vegetation in the understorey. The areas of scattered and dense/continuous scrub are not large enough on their own, and are not well-connected to off-Site habitats that could support the species. Typical food plant species were limited on site with no hazel identified and very limited bramble across the Site. An adjacent wind farm application (Mynydd Llanhilleth Wind Farm²⁴) approximately 1km to the east of the Site conducted a dormouse survey in 2020 across similar habitats and altitude and found no dormice. Therefore, we consider them absent from the Site.

Great crested newts

- 8.5.20 There were no desk study records of GCN within 2km of the Site boundary. Twenty-seven waterbodies were identified within 500m of the Site during the desk study and extended Phase 1 survey. Two waterbodies were outside of the Site boundary and scoped out from

²⁴ Pennant Walters (2020) Mynydd Llanhilleth Wind Farm Environmental Impact Assessment Scoping Report. (Online). Available at: <https://dns.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/DNS/3273368/DNS-3273368-000001-2021-05-28%20-%20Scoping%20Report%20-%20Redacted%20&%20Reduced.pdf> (Accessed September 2021)

further survey based on the presence of barriers to dispersal, the remaining waterbodies (25) were assessed using the Habitat Suitability Index (HSI) scoring system; of these:

- four were dry;
- four were categorised as 'poor' for breeding GCN;
- three were categorised as 'below average';
- eight were categorised as 'average'; and
- six were categorised as 'good'.

8.5.21 Environmental DNA (eDNA) surveys for GCN presence/absence were undertaken on all accessible waterbodies with water. All samples returned negative for GCN.

8.5.22 No desk study records for GCN were recorded within the proposed Grid Connection corridor with no suitable waterbodies present within or within 200m to this area.

Badgers

8.5.23 There are no records of badger within the study area from the last 10 years. The habitats present within the Site and wider landscape comprise pasture, plantation woodland, scattered and dense/continuous scrub and have the potential to support badgers when foraging, sett building and commuting. A badger was recorded commuting across the Site in July 2021 during a nightjar survey, although no evidence of badger setts was recorded on-Site or within 275m of its boundary (which encompasses the majority of the Grid Connection corridor) during the extended Phase 1 habitat survey and subsequent bat surveys.

Reptiles

8.5.24 The desk study returned 25 records of common lizard and eight records of slow worm within 2km of the Site, with slow worm also recorded on Site (**Figure 3.1, Appendix 8C**). Suitable habitats for basking, foraging, commuting and hibernating reptiles are present throughout the Site, in particular, the mosaic of semi-improved neutral and acid grassland, dry heath, continuous bracken, scattered gorse with bordering woodland.

8.5.25 During the presence/absence reptile surveys common lizard and slow worm were recorded in suitable habitat within the Site boundary, with results indicating the presence of a low population of slow worm and a good population of common lizard in line with Froglife Advice Sheet 10²⁵.

8.5.26 No desk study records for reptiles were recorded within the proposed Grid Connection corridor; the majority of the habitats within the corridor are unsuitable for reptiles comprising heavily shaded plantation woodland, although some localised areas of suitable reptile habitat are present along the edges of existing access tracks and where small areas of semi-improved grassland are present in the north of the corridor.

²⁵ Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

Notable plant species

- 8.5.27 The four notable plant species identified in the desk study were bluebell, small scabious, Welsh poppy (all outside the Site boundary) and flowering rush (within the Site). The Site is considered to have low potential for flowering rush to occur given that the species prefers wetland habitats, of which there are limited present within the Site. No legally protected or notable plant species were recorded during the extended Phase 1 habitat surveys.
- 8.5.28 No notable plant species were recorded within the proposed Grid Connection corridor during the desk study and the dense predominantly coniferous plantation woodland alongside limited areas of semi-improved grassland is not considered suitable habitat to support notable plant species.

Terrestrial and aquatic invertebrates

- 8.5.29 The desk study identified six Section 7 butterfly species and 25 Section 7 moth species within 2km of the Site with the small pearl bordered fritillary and small heath recorded within the Site.
- 8.5.30 Habitats on and adjacent to the Site, including the longer areas of grassland, continuous stands of bracken, and clear-felled woodland with deadwood left in-situ, are suitable for generalist moth and butterfly species. The areas of continuous bracken, particularly in the centre of the Site, and areas of cleared conifer woodland colonised by bracken on the northwest boundary, are suitable habitat for these species, located on south facing sunny slopes. These habitats are however predominately outside the areas which will be impacted by the Proposed Development.
- 8.5.31 No Section 7 invertebrate species were recorded within the proposed Grid Connection corridor during the desk study and the dense predominantly coniferous plantation woodland alongside limited areas of semi-improved grassland is not considered suitable habitat to support notable invertebrate populations.

Other protected/conservation notable species

- 8.5.32 The desk study identified four additional Section 7 species within 2km of the Site: hedgehog, brown hare, polecat and common toad; the suitability of the site (potential habitat types are illustrated in **Figure 8.5**) for these species is summarised below:
- Hedgehog: The majority of the Site has low suitability for hedgehog, although some areas (e.g. woodland edge or mixed habitats with areas of dense vegetation or other cover) are likely to be periodically used by this species; however, these areas are localised across the site and unlikely to support potentially notable populations of hedgehog.
 - Brown hare: The habitats on site have moderate suitability for brown hare with opportunities for shelter and cover in the conifer plantation on site adjoining the heathland and some of the areas of less heavily grazed grassland, particularly areas of purple moor grass in the east of the Site. The majority of the heavily grazed grassland, however, holds limited suitability for the species.

- Polecat: The habitats on Site hold low suitability for polecat, a species that favours lowland areas, farmland with hedgerows present and small blocks of woodland.
- Toad: The waterbodies on Site are suitable for breeding common toad breeding, and the woodland and less heavily grazed semi-improved grasslands provides optimal terrestrial habitat.

Invasive non-native flora

- 8.5.33 A total of seven invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were previously identified from the desk study (inside the Site or within 2km of it), with 25 individual records. These include three records from within the Site boundary of Montbretia, Rhododendron and Three-cornered Garlic.
- 8.5.34 No invasive plant species were recorded on Site during the extended Phase 1 walkover survey.
- 8.5.35 No invasive plant species were recorded within the proposed Grid Connection corridor during the desk study. The majority of this area was surveyed during the extended Phase 1 walkover and no invasive plant species were recorded, although it is possible that unsurveyed areas may support species such as Rhododendron for which the habitats are suitable.

Peat

- 8.5.36 Full details regarding peat surveys and results are detailed in **Chapter 11: Ground Conditions**. The Unified Peat Map of Wales showed no peat deposits on the Proposed Development site and the absence of deep peat was confirmed by a peat survey completed in 2021 (Wood, 2021).

Future baseline

- 8.5.37 Determining a future baseline draws upon information about the likely future use and management of the site in the absence of development, known population trends (for species), climate change and any other proposed developments (consented or otherwise) that may act cumulatively with the proposed development to affect ecological features.
- 8.5.38 In this instance the future baseline in the absence of the Proposed Development is unlikely to be markedly different from the current baseline, as land use/management within the Site is anticipated to remain largely unchanged.
- 8.5.39 Adjacent to the Site (including within the proposed Grid Connection corridor) the areas of plantation woodland bordering the Site centrally and to the west will be managed in line with the Forestry Commission Wales Forest Design Plan²⁶; this comprises a mix of clear fell and restock of larger coupes of productive conifer alongside some smaller areas of native woodland expansion using thinning operations and Low Impact Silvicultural Systems (LISS) over the period 2022 to 2037 onwards. The ecology within these areas will change, with clear felling allowing more light and hence increasing floristic diversity and opportunities

²⁶ Forestry Commission Wales (2012). Heads of the Valleys Forest Design Plan. Forestry Commission Wales; Cardiff.

for associated fauna in the short term, prior to commercial replanting and the native woodland expansion areas altering the habitat mix over a longer timeframe.

- 8.5.40 Apart from a small turning area on the most western part of the Site boundary (where the main access track joins the A4046) these changes will occur outside the wind farm Site boundary. They are not considered likely to create a baseline environment markedly different from the current baseline. It is therefore considered appropriate to use the current baseline for the purpose of this assessment.
- 8.5.41 Based on the Forestry Commission Wales Forest Design Plan woodland management activities would likely occur in the proposed Grid Connection corridor over a similar timeframe as the grid connection construction works. Woodland management operations would change the ecology in the area, however this would take a number of years and it is not considered sufficient time would have elapsed for the baseline to have sufficiently changed from the current baseline environment at the time of the grid connection construction works. It is therefore considered appropriate to use the current baseline for the purpose of this assessment.

8.6 Embedded measures

- 8.6.1 A range of environmental measures have been embedded into the Proposed Development as outlined in **Section 4.9. Table 8.10** outlines how these embedded measures will influence the biodiversity assessment.
- 8.6.2 Environmental Measures required to avoid or reduce biodiversity impacts will be incorporated into a Habitat Management Plan (HMP). The HMP will set out the objectives for biodiversity protection, mitigation, monitoring and habitat enhancement (where applicable). It will set out a framework and timetable for ecological measures throughout the lifetime of the Proposed Development, including any pre-construction measures that are required. The HMP will be agreed with the planning authority at the pre-construction stage either as part of the Construction Environmental Management Plan (CEMP) or as a standalone document.

Table 8.10 Summary of the embedded environmental measures

Aspect/Feature	Potential changes and effects	Embedded measures	Compliance mechanism
Construction			
Dust management	<p>Loss or damage of sensitive flora through smothering resulting in effects on habitat composition and the fauna that it supports.</p> <p>Deposition of dust resulting in enrichment of sensitive HPIs, including those contained within statutory designated sites, leading to alteration of flora through changes in baseline</p>	<p>Construction works would be undertaken using all necessary and practical measures to minimise the release of dust including: wheel wash facilities on site, enclosed and screened storage of aggregates; damping down haul roads during dry weather; and ensuring that lorries transporting material onto or off site are sheeted when conditions</p>	CEMP/CMS

Aspect/Feature	Potential changes and effects	Embedded measures	Compliance mechanism
	<p>conditions and the species which they support.</p> <p>Direct effects on invertebrates through ingestion or direct deposition on sedentary species.</p>	<p>warrant, e.g. during dry periods or when carrying fine materials.</p> <p>Best practices air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the assessment of dust from demolition and construction 2014, version 1.1.</p>	
Run-off	The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage to terrestrial or freshwater environments and the fauna they support.	Construction works would be undertaken using all necessary and practical measures to minimise the release of additional sediment-laden run-off into nearby watercourses full measures are detailed in Chapter 10: Water Environment, Section 10.6.	CEMP/CMS
General species safeguarding	<p>Death, injury or displacement during construction, e.g. due to entrapment within excavations or collisions with construction traffic; particularly relevant for:</p> <ul style="list-style-type: none"> • Badgers; • Otters; • Brown hare; • Polecat; • Bats; and • Hedgehog. 	<ul style="list-style-type: none"> • Appropriate pre-construction surveys or inspections will be carried out. • A method statement would be prepared under which: <ul style="list-style-type: none"> ▶ Vehicle movement outside of daylight hours would be restricted, vehicle speeds controlled, and operatives warned of the presence of certain species in order to reduce the risk of collisions. ▶ All excavations would have sloped sides or have a means of escape for entrapped animals. Excavations to be checked each morning by operatives prior to work within the excavation. ▶ Construction activities would be restricted to normal working hours (so largely avoiding the hours of darkness, particularly in the summer when species are most active). ▶ Site lighting will be controlled to prevent incidental spillage on to features that may be used by nocturnal species. 	CEMP

Aspect/Feature	Potential changes and effects	Embedded measures	Compliance mechanism
Reptiles	<p>Permanent or temporary land-take/changes to habitats resulting in:</p> <ul style="list-style-type: none"> • Degradation and/or loss of habitat • Reduction in the availability of foraging and commuting habitat and resting or breeding sites. • Killing or injury of reptiles through the removal of occupied resting or breeding sites 	<ul style="list-style-type: none"> • Reptiles are confirmed present on Site and individual reptiles will be protected during construction using normal best-practice. Effects on individual reptiles during construction can be easily avoided or mitigated using standard best-practice displacement techniques, due to the spatially discrete nature of the works and the large amounts of suitable habitat that would remain accessible. • Removal of habitat or features that could support reptiles (e.g. scrub, dense tussocky grassland, rocks) will be kept to a minimum, and excavations in these areas will take place outside the hibernation period. • Refugia features will be retained on site. • Scrub or tussocky grassland will be cut to ~150mm above ground level during the winter period to avoid nesting birds becoming established during the nesting season. Final removal, and grubbing out of roots, will be conducted in the spring, outside of reptile hibernation period (i.e. avoiding mid-October through to mid-April depending on seasonal temperature) to allow any individuals to move out of the area of works. • Areas of long grass and other similar vegetation that need to be removed will be strimmed prior to construction to reduce their suitability, and hand-searched as necessary to disperse reptiles from the construction area. • Vegetation clearance will be sequenced to direct reptiles away from the construction area. 	CEMP
Habitats	<p>Permanent or temporary land-take/changes to habitats resulting in degradation and/or loss of habitat</p>	<p>The wind farm infrastructure layout has been designed to avoid the loss of key habitats on-site (wetland habitats/semi-natural</p>	Embedded in design

Aspect/Feature	Potential changes and effects	Embedded measures	Compliance mechanism
		habitats) as far as is practicable, i.e. the infrastructure is generally located within improved grassland and semi-improved grassland and areas of bracken.	
Habitats	Permanent or temporary land-take/changes to habitats resulting in degradation and/or loss of habitat	Habitats which would be subject to temporary loss, will be re-vegetated and reinstated as soon as possible after construction.	CEMP
Cefn Bach SINC	Permanent or temporary land-take/changes to habitats resulting in degradation and/or loss of habitat	Annual bracken reduction measures shall be undertaken across Cefn Bach SINC to increase the diversity of habitats and botanical interest across the SINC.	HMP
Pond Group 3	Permanent or temporary land-take/changes to habitats resulting in degradation and/or loss of habitat	Grazing pressure will be controlled around waterbodies west of the access track to allow a greater diversity of terrestrial and bankside vegetation to establish.	HMP
Operation			
Bats	Potential killing or injury to bats in flight, through direct collision with moving turbine blades or barotrauma.	A minimum of 50m stand-off will be maintained between turbine blade tips and the nearest point of linear/foraging features likely to be well-used by bats such as treelines, woodland, wetland habitats and waterbodies. This will be achieved at all turbines with the exception of location 7.	Embedded in design
Bats	Permanent or temporary land-take/changes to habitats resulting in loss of roosting site.	Any trees with moderate or high bat roosting potential which require felling will be subject to appropriate updated roost surveys to ensure that roosting bats will not be affected.	CEMP
Bats	Potential killing or injury to bats in flight, through direct collision with moving turbine blades or barotrauma.	Collision and barotrauma risk to bats will be reduced by pitching the blades out of the wind ("feathering") to reduce rotation speeds below ~2 rpm while idling at all eight turbines.	Collision Mitigation Monitoring Strategy (CMMS)
Bats	Potential killing or injury to bats in flight, through direct collision with moving turbine blades or barotrauma.	Post construction bat monitoring will be conducted for three years following construction and will comprise:	Monitoring will be detailed in the CMMS and agreed with the planning authority prior to

Aspect/Feature	Potential changes and effects	Embedded measures	Compliance mechanism
		<ul style="list-style-type: none"> • Static detector bat recording at each turbine location 10 days in Spring, 10 days in Summer, 10 days in Autumn (to replicate the survey effort undertaken at the pre-application stage) • Carcass searching physically searching under the turbines for dead bats during both summer and autumn. <p>The results of monitoring will be reported to NRW and BGCBC at the end of each year. Results of the monitoring will inform ongoing operation of the windfarm with any changes to be agreed with NRW and BGCBC.</p>	construction and implemented during construction as proposed.

8.7 Scope of the assessment

Overview

- 8.7.1 The CIEEM guidelines recognise that an appropriate EclA cannot consider in detail every individual species or habitat that may potentially be present at a Site or affected by a development. The EclA process therefore aims to focus the assessment on those ecological features that could be 'significantly' affected by the Proposed Development (i.e. where the effects on the ecological features are of sufficient concern that they could influence the decision about whether or not planning permission should be consented), or for which the development could result in the contravention of relevant legislation. The EclA process therefore includes a 'scoping' stage (which excludes those ecological features that cannot be 'significantly' affected²⁷), and a 'detailed assessment' stage, which examines more closely the potential effects of the scheme on those ecological features that could be subject to 'significant' effects. Detailed assessments may also be undertaken where it is considered appropriate to examine the predicted effects on a feature in more detail, for example due to consultee comments. This section summarises the approach to and outcomes of the EclA scoping stage.

The Proposed Development

- 8.7.2 All the activities and consequent environmental changes associated with the construction, operation and decommissioning of the Proposed Development, as set out in **Chapter 4: Description of the Proposed Development** have been considered.

²⁷ Based on the results of desk-studies; field surveys; consultations; the importance of the ecological feature; the presence (or not) of pathways for effects; and the measures incorporated into the scheme to avoid effects occurring.

Spatial scope

- 8.7.3 The spatial scope of the assessment of biodiversity covers the area of the Proposed Development contained within the red line boundary and Grid Connection corridor, together with the Zones of Influence (Zols) that have formed the basis of the study area described in **Section 8.4** (as shown on **Figure 1.2**).
- 8.7.4 Through an understanding of the activities associated with the Proposed Development and the resulting environmental change, it is possible to identify ecological features that cannot be subject to potentially significant effects due to an absence of effect pathways, or certainty that incorporated measures will be entirely successful in preventing a significant effect occurring. In order to identify such ecological features, all the activities and consequent environmental changes associated with the construction, operation and decommissioning of the Proposed Development have therefore been considered.
- 8.7.5 The construction, operation and decommissioning of the wind farm may result in the following environmental changes, which have the potential to cause significant effects on ecological features at or near the Site. Many of these aspects will operate additively or synergistically to affect ecological features.
- Construction:
 - ▶ Permanent or temporary land-take/changes to habitats;
 - ▶ Increased light levels;
 - ▶ Production of aural and visual stimuli and vibration;
 - ▶ Hydrological changes;
 - ▶ Creation of airborne particles (e.g. dust);
 - ▶ Contamination of site run-off; and
 - ▶ Vehicle movements.
 - Operation:
 - ▶ Physical changes to the spatial environment;
 - ▶ Vehicle movements;
 - ▶ Hydrological changes; and
 - ▶ Increased light levels.
 - Decommissioning:
 - ▶ As per construction stage.
- 8.7.6 Given these environmental changes the spatial scope of the biodiversity assessment covers the area of the Proposed Development, together with the Zols that have formed the basis of the study area described in **Section 8.4**. However, Zols differ depending on the type of environmental change (i.e. the change from the existing baseline) as a result of the proposed development and the ecological feature being considered.

- 8.7.7 The most straightforward Zol to define is the area affected by land-take and direct land-cover changes associated with the proposed development. This Zol is the same for all affected ecological features.
- 8.7.8 By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (e.g. increased noise associated with construction activities within the land-take area), the Zol may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change. For example, a badger might only be disturbed by noise generated very close to its sett, while nesting marsh harrier might be disturbed by noise generated at a much greater distance; other species (e.g. many invertebrates) may be unaffected by changes in noise. In view of these complexities, the definition of the Zols that extend beyond the land-take area was based upon professional judgement informed as far as possible by a review of published evidence (e.g. disturbance criteria for various species) and discussions with the technical specialists who are working on other chapters of the ES.
- 8.7.9 The spatial extent of the assessment therefore reflects the area occupied by the ecological feature that is being assessed and the Zol of the changes that are likely to affect it. Where part of a designated site which is considered as an ecological feature for the purposes of this assessment is located within the ecological Zol relating to a particular biophysical change as a result of the Proposed Development, an assessment would be made of the effects on the designated site as a whole. A similar approach has been taken for areas of notable habitat. For species that occur within the Zol, the assessment has considered the total area that is used by the affected individuals or the local population of the species (e.g. for foraging or as breeding territories).
- 8.7.10 It should be noted that the avoidance of potential effects through design are implicitly taken into account through the consideration of each Zol.

Temporal scope

- 8.7.11 The temporal scope of the assessment of effects on Biodiversity is consistent with the period over which the development would be carried out, as defined in **Chapter 4**, and therefore covers the construction and operational periods. Effects during decommissioning are considered to be similar or no worse than during construction and have therefore not been considered. Furthermore, given the timescales involved (approximately 22 month construction period plus 30 years' operation) it is considered that an accurate assessment of decommissioning effects cannot be undertaken at this stage.

Ecological features

- 8.7.12 The starting point for defining which ecological features are taken forward to the detailed assessment stage was to use the baseline data collected through the desk study and field surveys to determine which of the identified ecological features are 'important' at the level of the project. Following CIEEM (2019) guidance, the importance of ecological features was determined using a geographic scale and described in relation to UK legislation and policy, and with regard to the extent of habitat or size of population that may be affected by the Proposed Development.

- 8.7.13 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example a small length of hedgerow (a Section 7 habitat), even if deemed to be 'important' with regard to the Hedgerow Regulations, is unlikely to be considered to have greater than 'local' importance due to the extent of this habitat type across a given county.
- 8.7.14 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features has been used to inform the categorisation described in **Table 8.10** and determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement has been used to determine importance. A justification of all determinations of importance are provided in **Table 8.11** (for 'scoped in' ecological features) and **Appendix 8F** (for all ecological features, both those scoped in and out) to ensure transparency.

Table 8.11 Importance of the Proposed Development for Ecological Features

Geographic context of importance	Description
International	<ul style="list-style-type: none"> European sites (SPAs, SACs, candidate SACs (cSACs) and Sites of Community Importance (SCI)), plus sites treated as such by national planning policy (potential SPAs (pSPA), possible SACs (pSAC) and Ramsar sites (designated under international convention). Areas of habitat or populations of species which meet the published selection criteria based on discussions with Natural England and field data collected to inform the EclA for designation as a European site, but which are not themselves currently designated at this level.
National (UK context)	<ul style="list-style-type: none"> A nationally designated site including SSSIs and National Nature Reserves (NNRs). Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the EclA, and in agreement with NRW. Section 7 habitats and species, Red listed and legally protected species that are not addressed directly in Part 2 of the "Guidelines for Selection of Biological SSSIs" but can be determined to be of national importance using the principles described in Part 1 of the guidance. Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
National (Wales context)	<ul style="list-style-type: none"> Regularly occurring Section 7 habitats or populations of Section 7 species, Red listed and legally protected species may be of regional (Wales) importance in the context of published information on population size and distribution.
County	<ul style="list-style-type: none"> LNRs and Non-Statutory Designated sites including: SINCs of County Importance. Areas which based on field data collected to inform the EclA meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local	<ul style="list-style-type: none"> Section 7 habitats and species, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above.

Geographic context of importance	Description
	<ul style="list-style-type: none"> • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	<ul style="list-style-type: none"> • Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

8.7.15 All ecological features that were determined to be important at a 'local' or 'negligible' level were 'scoped out' of the assessment at this stage, with the exception of:

- species receiving specific legal protection or subject to legal control (e.g. invasive species); or
- features which consultees specifically indicated that the ES should consider.

8.7.16 This is because effects on features that are only important at a 'local' or 'negligible' level would not influence the decision-making about whether or not consent should be granted for the Proposed Development (i.e. a significant effect in EIA terms could not occur). Specific justification for the exclusion of these ecological features from detailed assessment is provided in **Appendix 8F**.

8.7.17 Legally protected species and ecological features that are sufficiently important, such that effects upon them as a result of the Proposed Development could be significant, were then taken through to the next stage of the assessment.

8.7.18 The value of bat roosts, commuting and foraging areas has been informed by Wray et al (2010)²⁸

Pathways for potentially significant effects

8.7.19 Ecological features that are scoped into the assessment (i.e. those of sufficient importance occurring within a relevant Zol) are summarised in **Table 8.12**. For each ecological feature presented in **Table 8.12** the potential environmental changes and effects resulting from the Proposed Development are provided.

8.7.20 **Appendix 8F** provides the same information for those ecological features of greater than local importance scoped out of further assessment based on a relevant Zol and the potential environmental changes and effects resulting from the Proposed Development.

²⁸ Wray et al (2010). Valuing Bats in Ecological Impact Assessment, IEEM In Practice v.70, p 23-25. (Online) Available at: <https://cieem.net/wp-content/uploads/2019/01/InPractice70.pdf> (Accessed April 2022).

Table 8.12 Ecological features scoped in for further assessment and pathways for potentially significant effects

Ecological feature	Pathways for potentially significant effects
Usk Bat Sites SAC	Permanent or temporary land-take/changes to habitats Increased light levels Production of aural and visual stimuli and vibration Physical changes to the spatial environment
Arail Farm Slopes SINC	Permanent or temporary land-take/changes to habitats
Arail Pond SINC	Permanent or temporary land-take/changes to habitats
Cefn Bach SINC	Permanent or temporary land-take/changes to habitats
Coetgae Pond SINC	Permanent or temporary land-take/changes to habitats
Craig y Deri Pond SINC	Permanent or temporary land-take/changes to habitats
Cwm Big North, Aberbeeg SINC	Permanent or temporary land-take/changes to habitats
Hafod-y-Dafal acid grassland SINC	Permanent or temporary land-take/changes to habitats
Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC	Permanent or temporary land-take/changes to habitats
Pond Group 3 SINC	Permanent or temporary land-take/changes to habitats
Bats	Permanent or temporary land-take/changes to habitats Increased light levels Production of aural and visual stimuli and vibration Physical changes to the spatial environment
Hazel dormouse	Permanent or temporary land-take/changes to habitats
Reptiles	Permanent or temporary land-take/changes to habitats

8.7.21 The effects detailed in **Table 8.13** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 8.13 Summary of pathways and effects scoped out of the Biodiversity assessment

Potential effects	Justification
Contamination of site run-off	The risk of contamination of site run off from the construction site, or decommissioning activity will be controlled via the implementation of embedded environmental measures (see Section 8.6 and Chapter 4). These measures will be effective in negating the risk to ecological features.
Creation of airborne particles (e.g. dust)	Changes in air quality during construction due to plant emissions or dust will be negligible and so this aspect has not been subject to detailed assessment within the Draft ES (see Dust and Air Quality, Chapter 4). As set out in Section 8.6 and Chapter 4 ; however, measures will be implemented during construction and decommissioning to control dust emissions. Any effects on



Potential effects	Justification
	Site habitats due to this mechanism will be inconsequential, and so this aspect is not considered further in this chapter.
Vehicle movements	The risk to ecological receptors from vehicles from the construction site, operation or decommissioning activity will be controlled via the implementation of embedded environmental measures (Section 8.6 and Chapter 4). These measures will be effective in negating the risk to ecological features.
Hydrological changes	Changes in hydrology – Chapter 10: Water environment does not identify any likely significant effects on the hydrological regimes across designated sites or ground water dependent terrestrial ecosystems due to the construction, operation or decommissioning of the Proposed Development. Therefore, the ecological features that these designated sites and habitats support will also not be subject to likely significant effects.

8.8 Assessment methodology

- 8.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to Environmental Impact Assessment**, and specifically in **Sections 2.5 to 2.7**. However, whilst this has informed the approach that has been used in this Biodiversity assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to align with the standard industry guidance provided by CIEEM (2019).
- 8.8.2 The assessment has been based upon not only the results of the desk study and field surveys, but also relevant published information (for example on the status, distribution, sensitivity to environmental changes and ecology of the features scoped into the assessment, where this information is available), and professional knowledge of ecological processes and functions.
- 8.8.3 For each scoped-in ecological feature (see **Table 8.12**), effects were assessed against the baseline conditions for that feature during construction, operation and decommissioning.
- 8.8.4 Throughout the assessment process, the initial results of the assessment regarding potentially significant effects have been used to inform whether additional baseline data collection is required, together with the identification of environmental measures that should be embedded into the development proposals (see **Section 8.6**). The results of the assessments therefore reflect the final scheme design (i.e. incorporating the environmental measures described in **Table 8.10**).

Significance evaluation methodology

Overview

- 8.8.5 CIEEM (2019) defines a significant effect as one “that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general”.
- 8.8.6 When considering potentially significant effects on ecological features, whether these be adverse or beneficial, the following characteristics of environmental change are taken into account²⁹:
- Extent – the spatial or geographical area over which the environmental change may occur;
 - Magnitude – the size, amount, intensity or volume of the environmental change;
 - Duration – the length of time over which the environmental change may occur;
 - Frequency – the number of times the environmental change may occur;
 - Timing – the periods of the day/year etc. during which an environmental change may occur; and
 - Reversibility – whether the environmental change can be reversed through restoration actions.

Magnitude of change

- 8.8.7 Although the characteristics described above are all important in assessing effects by using information about the way in which habitats and species are likely to be affected, a scale for the magnitude of the environmental change, as a result of the Proposed Development, has been described in **Table 8.14** to provide an understanding of the relative change from the baseline position, be that adverse or beneficial changes.

Table 8.14 Guidelines for the Assessment of the Scale of Magnitude

Scale of change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the project.

²⁹ The definitions of the characteristics of environmental change are based on the descriptions provided in CIEEM (2019). Other chapters in this ES may use some of the same terms albeit with a different definition.



Scale of change	Criteria and resultant effect
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this receptor in the context of the project.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance.
Very Low	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

Determining Significance - adverse and beneficial effects

- 8.8.8 Adverse effects are assessed as being significant if the favourable conservation status of an ecological feature would be lost as a result of the Proposed Development. Beneficial effects are assessed as those where a resulting change from baseline improves the quality of the environment (e.g. increases species diversity, increases the extent of a particular habitat etc., or halts or slows down an existing decline). For a beneficial effect to be considered significant, the conservation status would need to positively increase in line with a magnitude of change of "high" as described in **Table 8.14**.
- 8.8.9 Conservation status is defined as follows (as per CIEEM 2018¹¹):
- "For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and typical species within a given geographical area;*
- For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area".*
- 8.8.10 The decision as to whether the conservation status of an ecological feature would alter has been made using professional judgement, drawing upon the information produced through the desk study, field survey and assessment of how each feature is likely to be affected by the Proposed Development.
- 8.8.11 A similar procedure is used where designated sites may be affected by the Proposed Development, except that the focus is on the effects on the integrity of each site; defined as:

"The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".

8.8.12 The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated.

8.9 Assessment of effects: Usk Bat Sites/Safleoedd Ystlumod Wysg SAC

8.9.1 The effects of the scheme on the Usk Bat Sites/Safleoedd Ystlumod Wysg SAC are assessed against the requirements of Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) in a separate Habitats Regulations Assessment (HRA) report (**Appendix 8G**). This section draws on this HRA but assesses the effects on the interest features of the site in the context of the EIA Regulations. There are some key differences between these assessments that should be recognised; in particular:

- A 'significant' effect in EIA terms is not equivalent to a 'likely significant effect' (i.e. the 'screening test' or 'test of significance' in HRA terms).
- Mitigation is taken into account when assessing the significance of any effects in the EIA (this is not appropriate for the HRA test of significance, in accordance with case law³⁰).

Baseline conditions

Current baseline

8.9.2 The Usk Bat Sites/Safleoedd Ystlumod Wysg SAC supports one of the largest maternity roosts for lesser horseshoe bats in the UK as well as a number of important hibernacula in caves in the area. The area contains up to 5% of the UK population, though counts in hibernation sites suggest this may be an underestimate. The SAC is 7.1km from the Site boundary; there are no hydrological linkages to the European site itself.

8.9.3 Bat surveys have recorded lesser horseshoe bats on and adjacent to the Site; due to the proximity of the SAC these bats are considered likely to be part of the population for which the SAC is notified.

8.9.4 The baseline for the Site has been established through:

- A desk study, involving a search for statutory sites within 10km for which bats are a key interest feature, non-statutory nature conservation within 2km and records of bats within 10km.
- Surveys undertaken in 2020 and 2021 (reported in **Appendix 8B**), comprising:
 - ▶ roost identification surveys (built structures);

³⁰ 2018. People Over Wind and Sweetman v Coillte Teoranta (C-323/17). (Online) Available at: <https://curia.europa.eu/juris/document/document.jsf?docid=200970&doclang=EN> (Accessed April 2022).

- external inspections;
- hibernation inspections/static monitoring;
- emergence, re-entry surveys;
- summer automated acoustic monitoring;
- ▶ roost identification surveys (trees):
 - ground level roost assessment;
 - winter potential roost feature (PRF) inspection;
 - summer PRF inspection;
 - emergence, re-entry surveys;
- ▶ bat activity surveys:
 - three activity transects across the Site surveyed monthly between May and October 2020;
 - one activity transect surveyed monthly between August and October 2021 to incorporate potential bat flight lines around a confirmed lesser horseshoe roost (B6);
 - 2020 automated detector surveys (batlogger A+) deployed at nine turbine locations in spring (May with the exception of location 9) summer (July) and autumn (September) for at least 10 nights in each period;
 - 2021 automated detector surveys (batlogger A+) deployed at eight turbine locations in April, May and June 2021 for at least 10 nights in each period; and
 - Analysis of the data collected during the automated monitoring included use of Ecobat³¹ to aid in quantifying bat activity levels in the context of bat activity levels recorded elsewhere in the region.

8.9.5 The survey approach and results are detailed in **Appendix 8B**; alongside any details of constraints or data gaps. The baseline is summarised in the following section.

8.9.6 A lesser horseshoe hibernation and assumed maternity roost (**B6, Figure 3.2 Appendix 8B**) was recorded outside the Site boundary (750m north-west from the nearest turbine (turbine 1) and 900m north of the Grid Connection corridor); this comprised a fissure/cave structure located in woodland. During static detector monitoring in January and February 2021, 77 lesser horseshoe passes were recorded at the cave entrance; between August to October 2021, 5,958 lesser horseshoe passes were recorded showing high levels of use by this species over the summer/autumn period.

8.9.7 A static detector was placed adjacent to built structure **B13 (Figure 3.2, Appendix 8B)**, located outside the Site boundary approximately 300m east of the closest turbine (8) in a woodland valley which separates the two southern halves of the Site. Over June, July and

³¹ The Mammal Society (2017). Ecobat (Online). Available at: <http://www.ecobat.org.uk/> (Accessed November 2021)

September a total of 425 lesser horseshoe passes were recorded; these were outside the average emergence time for lesser horseshoe bats indicating the structure was unlikely to be a roost although the results showed this wooded valley is used for commuting and foraging by lesser horseshoe bats.

- 8.9.8 Static monitoring at turbine locations across 2020 and 2021 identified an overall 'low'³² level of activity at turbine locations. Lesser horseshoe bats were recorded at all turbine locations with the exception of Turbines 4 and 5, with the highest number of passes recorded at Turbine 2 in 2020 (an average of 1.8 passes per night across May, July and September) and Turbine location 1 and 2 in 2021 (an average of 0.33 passes per night across April, May and June). Although lesser horseshoe bats can be under recorded during detector surveys, high levels of activity were recorded at woodland locations outside the Site boundary using the same static detector recording method, and so the low level of activity at the turbine locations is considered accurate.
- 8.9.9 Walked monthly transect surveys conducted across the Site between May and October 2020 incorporating turbine locations and working areas recorded no lesser horseshoe passes. In 2021 a transect was designed to incorporate potential bat flight lines which may link the confirmed hibernation roost B6 to the Site and nearest turbine location; one lesser horseshoe pass was recorded over the survey period (transects in August, September and October 2021).
- 8.9.10 Lesser horseshoe bats are associated with sheltered valleys with extensive deciduous woods or dense scrub, close to roost sites (Bontadina *et al.*, 2002³³); this corresponds with the data recorded during surveys, with high levels of activity in the sheltered broadleaved and mixed woodland areas outside the Site boundary and low levels of activity within the Site where habitats are sub-optimal for this species, being dominated by well grazed, open, semi-improved and improved grasslands with limited connective features.
- 8.9.11 In summary although lesser horseshoe bats have been recorded on Site, the habitats within the Site boundary are used only infrequently by this species with low or no activity at turbine locations. The broadleaved woodland habitats outside the Site boundary are more suitable and support higher levels of activity including a confirmed maternity/hibernation roost to the northwest. The confirmed roost B6 outside the Site is considered of 'National (Wales)' importance, the habitats within the Site boundary are considered to be of 'county' importance for lesser horseshoe bats.
- 8.9.12 The habitats within the Grid Connection corridor are considered sub-optimal for lesser horseshoe comprising predominantly of managed conifer plantation with Scots pine and Sitka spruce dominant with minimal species and canopy layer diversity, and a bare understorey.

Future baseline

- 8.9.13 The areas of plantation woodland bordering the Site centrally and to the west will be managed in line with the Forestry Commission Wales Forest Design Plan as detailed in

³² Based on Ecobat criteria

³³ Bontadina, F., H. Schofield & B. Naef-Daenzer. (2002). Radio-tracking reveals that lesser horseshoe bats (*Rhinolophus hipposideros*) forage in woodland. *Journal of Zoology* 258: 281-290.

Section 8.5. These changes will occur predominately outside the Site boundary and are not considered to create a baseline environment markedly different from the current baseline within the Site.

- 8.9.14 The woodland within the Grid Connection corridor is predominately categorised as 'Mixed Productive Woodland', the woodland management for this area is detailed as clear fell and restocking; a smaller southernmost area of the corridor is categorised as 'Native Woodland Expansion' and will be managed through the use of thinning operations and LISS.
- 8.9.15 The ecology within these areas will change with clear felling allowing more light and increasing floristic diversity and associated fauna in the short term prior to commercial replanting and the native woodland expansion areas having an increase in native broadleaved trees, ground flora and associated fauna over a longer timeframe.
- 8.9.16 It is considered the areas of clear fell and restocking would maintain the same level of low suitability for lesser horseshoe, the areas of Native Woodland Expansion' would over time increase in suitability for lesser horseshoe bats, however any habitat improvements for lesser horseshoe bats would occur after the grid connection has been completed due to the timescales for woodland regeneration to establish after management activities have been undertaken. It is not considered sufficient time would have elapsed for the baseline to have sufficiently changed from the current baseline environment it is therefore considered appropriate to use the current baseline for the purpose of this assessment.

Predicted effects and their significance

Overview

- 8.9.17 The Proposed Development has the potential to affect lesser horseshoe bats in local area thus, adversely affect the integrity of the SAC, through the following mechanisms:
- loss of habitats used for foraging, commuting or roosting;
 - disruption to roosting bats, flight lines or behavioural alterations due to construction and operation noise and lighting; and/or
 - increased mortality through barotrauma³⁴ or collisions with turbines.
- 8.9.18 It should be noted that these effects will typically operate 'in combination' to affect the use of the landscape by bats, and therefore the assessment of effects considers the overall effect of these factors on lesser horseshoe bat populations. The Proposed Development includes embedded measures that will moderate these effect pathways:
- Turbines have been located to maintain a minimum 50m blade-tip stand-off from features that are known to be favoured by bats (e.g. woodland edges and key waterbodies). This has been possible at all locations except for Turbine 7.
 - Construction would adhere to a CEMP which will incorporate measures to minimise construction-stage effects on bats (specifically, ensuring that temporary lighting does

³⁴ Damage to lungs caused by air pressure variations associated with the blades.

not impinge on features that are known to be favoured by bats for commuting or foraging).

- Any trees with moderate or high bat roosting potential which require felling would be subject to appropriate updated roost surveys to ensure that roosting bats will not be affected and/or that appropriate mitigation (replacement roosts, etc.) is delivered.
- Collision and barotrauma risk to bats would be reduced by pitching the blades out of the wind ("feathering") to reduce rotation speeds below ~2 rpm while idling at all eight turbines.
- Bat activity monitoring and bat carcass searches shall be undertaken at all eight turbines for three years post-construction and if necessary additional mitigation measures (such as curtailment) will be agreed with NRW and BGCBC in response to monitoring results (see **Table 8.10**).

Permanent or temporary land-take/changes to habitats

Wind Farm development

- 8.9.19 The Proposed Development would affect open upland habitats (grassland etc.) small areas of plantation woodland and isolated trees. Some of these habitat changes would be long-term (either permanent for the lifetime of the scheme or involving tree removal that will not be offset in the short-term) and could affect the value of the site for foraging bats; however, the effects of habitat loss on the lesser horseshoe bats would be negligible and not significant as discussed below.
- 8.9.20 **Loss of roosts or roosting opportunities:** the tree areas adjacent to the access tracks which would be felled (**Figure 8.7**) have been surveyed for bats and there is no evidence of potentially notable bat roosts; lesser horseshoe bats typically roost in buildings and caves and are not typically associated with tree roosts. The confirmed hibernation/maternity roost is 750m NW from the closest works location (Turbine 1). There are no features within the development footprint of the wind farm area that are suitable for roosting lesser horseshoe bats. As a result, the Proposed Development would have no effect on the availability or quality of roosting opportunities locally. Any trees requiring felling would be subject to appropriate roost surveys to ensure that roosting bats will not be affected.
- 8.9.21 **Loss of foraging or commuting habitat:** the direct effect of habitat loss due to the Proposed Development on lesser horseshoe foraging and commuting opportunities would be inconsequential. The existing network of farm tracks on the Site would be utilised where possible (only 3.4km of the 6.3km of track required for the Proposed Development would be new), and vegetation removal required for access track installation and for Turbines and crane pads would primarily affect semi-improved grazed grassland habitats. Any woody vegetation removal would be very limited and restricted to isolated trees which are not part of key foraging or connective habitat for lesser horseshoe bats. Tree removal areas are shown on **Figure 8.7**.
- 8.9.22 An additional area 0.4ha of commercial conifer plantation would require felling to facilitate vehicle turning where the Site is accessed off the A4046 Aberbeeg Road to the west of the

Site. The conifer woodland here is dominated by Scots pine and Sitka spruce with minimal species and canopy-layer diversity, and a bare understorey; it is considered sub-optimal for lesser horseshoe bats. The habitat removal required along the access would not sever any linear features (e.g. treelines) that may be used by lesser horseshoe bats for commuting. The habitats to be lost are not unique or otherwise notable in a site or local context, and their loss will have no effect on the availability or value of lesser horseshoe foraging habitat locally.

- 8.9.23 The magnitude of change is predicted to be negligible. The effect is therefore assessed as Not Significant on an ecological feature of international importance.

Grid Connection

- 8.9.24 The Grid Connection would connect the wind farm through plantation woodland to the west of the Site; this will be the subject of a separate application but is assumed (as a worst-case scenario) to comprise a 33kV overhead line on wooden poles. The Grid Connection would result in the loss of a strip of productive plantation woodland and may (subject to the final route at the time of application) cross through a small block of broadleaved woodland bordering the west of the Site. The majority of the trees within this area have been scoped for their suitability to support roosting bats with high suitability trees subject to a PRF inspection (endoscope using ladder/climbing) in winter; no tree roosts have been identified.
- 8.9.25 Note, any trees requiring felling that have high or moderate bat roosting potential will be re-surveyed prior to any works to ensure that roosting bats will not be affected.
- 8.9.26 The habitat loss associated with a 33kV overhead line is not considered to be significant. The width of the wayleave is not known and would be contained in a separate application however it is not considered the wayleave for 33kV route on wooden poles through plantation woodland would create fragmentation for lesser horseshoe bats.
- 8.9.27 The managed wayleaves under a 33kV line would improve floristic and habitat diversity within the plantation woodland, creating a ride and edge habitat which would increase invertebrate diversity and provide an improved foraging resource for bats. Overall, it is considered the effect of the land-take/changes to habitats associated with the Grid Connection on lesser horseshoe bats would be negligible.
- 8.9.28 The magnitude of change is predicted to be negligible. The effect is therefore assessed as Not Significant on an ecological feature of international importance.

Increased light levels and production of aural and visual stimuli and vibration

Construction/Decommissioning

- 8.9.29 With regard to temporary changes in habitat use due to site lighting or construction activities, this would be short-term and would be controlled with normal best-practice construction measures including controls on night-time working and the appropriate design and placement of any site lighting to avoid habitat features that may be used by roosting or commuting bats, and so displacement effects via this mechanism would be negligible. The lesser horseshoe maternity/hibernation roost is located underground in a

dense woodland approximately 750m from the nearest works location, and would not be subject to any disturbance from construction or decommissioning activities.

- 8.9.30 The magnitude of change is predicted to be negligible. The effect is therefore assessed as Not Significant on an ecological feature of international importance.

Operation

- 8.9.31 Some studies have suggested that active avoidance of wind farms by some bats may occur (e.g. Roeleke *et al.* 2016³⁵), although there is also evidence that some bat species are attracted to wind turbines (Cryan *et al.* 2014³⁶) through a range of potential mechanisms. As a result, it is difficult to predict how bats would respond to the installation of turbines at this site.
- 8.9.32 The survey data demonstrates that the vast majority of the lesser horseshoe bat activity is associated with woodland blocks bordering the Site (which provide roosting, commuting routes and foraging opportunities), and all turbines (except for Turbine 7) have been sited to provide a stand-off of at least 50m between blade tip and these features. This stand-off will minimise the risk of the turbines physically intruding into areas of higher activity and minimise any effects of light spill. There may still be some displacement effects due to the general proximity of new structures, but the effects of this are likely to be negligible and it is certain that bats would continue to use features around the Site margins for roosting foraging and commuting. It is considered unlikely that the turbines would attract lesser horseshoe bats, with this species being associated with sheltered, cluttered and dark habitats.
- 8.9.33 The magnitude of change is predicted to be negligible. The effect is therefore assessed as Not Significant on an ecological feature of international importance.

Physical changes to the spatial environment

- 8.9.34 The principal mechanism for significant effects on bats is from fatalities/injuries caused by collision with wind turbines or barotrauma (collectively referred to herein as 'collision risk'). The method for quantifying collision risk for bats from onshore wind turbines has been detailed in 'Bats and Onshore Wind Turbines' (2021)³⁷. Following this guidance, as illustrated in **Table 8.15** lesser horseshoe bats in Wales are considered a 'rarer' species with low collision risk and an overall 'low population vulnerability' to collision.

³⁵ Roeleke, M., Blohm, T., Kramer-Schadt, S., Yovel, Y., and Voigt, C. C. (2016). Habitat use of bats in relation to wind turbines revealed by GPS tracking. *Sci. Rep.* 6:28961.

³⁶ Cryan PM, Gorreson PM, Hein C, Schirmacher MR, Diehl RH, Huso MM, Hayman DTS, Fricker PD, Bonaccorso FJ, Johnson DH, Heist K, Dalton DC. 2014. Behaviour of bats at wind turbines. *Proceedings of the National Academy of Sciences* 111:15126–15131.

³⁷ SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) Bats and onshore wind turbines: survey, assessment and mitigation. (Online) Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> (Accessed April 2022).

Table 8.15 Level of potential vulnerability of Welsh bat populations to wind farms

Wales	Collision Risk			
		Low collision risk	Medium collision risk	High collision risk
Relative abundance	Common species			Common pipistrelle Soprano pipistrelle
	Rarer species	Brown long-eared bat Daubenton's bat Natterer's bat Lesser horseshoe		
	Rarest species	Alcathoe bat Bechstein's bat Brandt's bat Greater horseshoe Grey long-eared bat Whiskered bat	Barbastelle Serotine	Nathusius' pipistrelle Noctule bat Leisler's bat

Extracted from *Bats and Onshore Wind Turbines* (2021): Yellow = low population vulnerability, Orange = medium population vulnerability, Red = high population vulnerability.

8.9.35 Lesser horseshoe bats are a low collision risk species due to their flight pattern and behaviour, with an overall 'low population vulnerability' to collision, and in line with *Bats and Onshore Wind Turbines* (2021) further detailed collision risk assessment is not required. The levels of lesser horseshoe bat activity at each of the turbine locations is presented in **Table 8.16**.

Table 8.16 Relative levels of lesser horseshoe bat activity at turbine locations based on Ecobat outputs of automated detector data

Turbine location	Ecobat Median Category
1	Low
2	Low
3	No bats recorded
4	Low
5	No bats recorded
6	Low - Moderate
7	Low
8	Low

8.9.36 Due to the combination of lesser horseshoe bats being a low collision risk species, with an overall 'low population vulnerability' to collision and activity levels based on Ecobat

outputs being categorised as low or low to moderate (at the turbines where they were recorded), the overall risk of significant effects on lesser horseshoe bat populations due to collision/barotrauma fatalities associated with the Proposed Development is considered to be negligible and therefore the overall risk of adverse effects on the integrity of the SAC is considered negligible.

- 8.9.37 Feathering blades when idle and the post construction monitoring strategy for bats (see **Table 8.10**) would further reduce any collision risks to lesser horseshoe bats although these measures have been implemented with regards to the high collision risk species recorded on Site (see **Section 8.19**) and are not considered an essential measure to maintain the favourable conservation status of the lesser horseshoe bat populations on Site or avoid adverse effects on the integrity of the SAC (see **Appendix 8G**).
- 8.9.38 The magnitude of change is predicted to be negligible. The effect is therefore assessed as Not Significant (in EIA terms) on an ecological feature of international importance.

Summary

- 8.9.39 The Proposed Development would not significantly affect the use of the Site or Grid Connection corridor by lesser horseshoe bats or have any significant effects on local lesser horseshoe bat populations due to the low activity levels of this species within the Site boundary; and due to the low collision risk of this species and the incorporation of stand-off distances from those features that are most likely to be used by lesser horseshoe bats. It is therefore considered there will be no significant effects (in EIA terms) on the integrity of the Usk Bat Sites SAC.

8.10 Assessment of effects: Arail Farm Slopes SINC

Baseline conditions

Current baseline

- 8.10.1 Arail Farm Slopes SINC is a non-statutory designated site that is partly located within the south-eastern corner of the Site. The SINC is listed as a collection of sheep grazed acid grasslands. The majority of this site lies outside the Site boundary. The habitats predominately comprise well-grazed semi-improved neutral grassland and semi-improved acid grassland as part of an agricultural landholding, based on the Phase 1 habitat surveys of the site (**Appendix 8A**).

Future baseline

- 8.10.2 The site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.10.3 The SINC would not be subject to direct encroachment effects; the nearest land-take is from a turbine approximately 180m north west to the nearest section of the SINC.
- 8.10.4 There would be no direct effects on this SINC. The embedded measures (see **Section 8.6**) would ensure that indirect effects on Arail Farm Slopes SINC would be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Arail Farm Slopes SINC, and the effects are considered Not Significant on an ecological feature of County importance.

8.11 Assessment of effects: Arail Pond SINC

Baseline conditions

Current baseline

- 8.11.1 Arail Pond SINC is a non-statutory designated site located on the south-eastern Site boundary. The SINC is identified as a pond surrounded by unimproved and semi-improved acid grassland with 40% of the pond as open water. Extended Phase 1 habitat surveys and pond Habitat Suitability Index (HSI) assessment of the pond (**Appendix 8A**) determined that the pond was located in an enclosed grassland area, with a short treeline to the south and bound by dry heath/acid grassland outside the enclosed area, with the pond being considered of sufficient ecological quality to be considered a Section 7 priority habitat under the 'Ponds' classification.

Future baseline

- 8.11.2 The Site is unlikely to be subject to significant changes in land use in the absence of the Proposed Development. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.11.3 The SINC would not be subject to direct encroachment effects; the nearest land-take is from a turbine approximately 280m northeast to the nearest section of the SINC.
- 8.11.4 There would be no direct effects on this SINC. The embedded measures (see **Section 8.6**) would ensure that indirect effects on Arail Pond SINC would be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Arail Pond SINC, and the effects are considered Not Significant on an ecological feature of County importance.

8.12 Assessment of effects: Cefn Bach SINC

Baseline conditions

Current baseline

- 8.12.1 Cefn Bach SINC is a non-statutory designated site within the eastern half of the Site covering a total area of 31.1ha. The SINC is designated as a large open hill area supporting a mosaic of semi-improved acid grassland and dry and wet scrub heath. Extended Phase 1 habitat surveys of the site (**Appendix 8A**) determined that the site comprises a large open hillside dominated by areas of dense mature bracken, with very limited ground flora consisting of soft rush, creeping bent, false oat grass and purple moor-grass with very few forbs. The site also supports some more open areas of heavily grazed semi-improved acid grassland with areas of dry heath/acid grassland (which would meet the criteria for classification as the Section 7 habitat 'Upland heathland'). Bracken is becoming dominant across the SINC and outcompeting areas of acid grassland and dry heath.

Future baseline

- 8.12.2 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.12.3 Turbines 2 and 3 are located within the Cefn Bach SINC along with the associated permanent crane pads and temporary blade storage areas. Additionally, sections of the internal wind farm tracks for turbine locations 2, 3 and 4 cross through parts of the SINC. This would result in an estimated temporary loss of 0.39ha of habitat (blade storage areas) and permanent loss of 0.88ha of habitat.
- 8.12.4 The habitats within that SINC that would be subject to permanent or temporary land-take around the turbine locations comprise areas of dense mature bracken with very limited ground flora and well-grazed semi-improved acid grassland including sheep's fescue and sweet vernal grassland with dense soft and hard rush. The access tracks have been designed to be kept to a minimum length and utilise the existing access tracks across the SINC which comprise gravel or disturbed very short grassland, to minimise the amount of habitat loss. The sections of access track which do not follow existing tracks cover areas of dense bracken and heavily grazed semi-improved acid grassland.
- 8.12.5 The habitats impacted by the Proposed Development are common and widespread across the designated site, the Proposed Development Site and is not botanically notable locally.

- 8.12.6 To mitigate the habitat losses within the SINC and additionally to provide an enhancement, measures are detailed within the Outline HMP (**Appendix 8F**) and **Section 8.6**. Habitats which would be subject to temporary loss will be re-vegetated and reinstated as soon as possible after construction additionally approximately 4ha of the SINC will be managed on an annual basis for bracken control to reduce its overall cover across the SINC; areas of bracken will however be retained as part of a habitat mosaic for the SINC with this habitat having value to invertebrates, small mammals, some plant species and birds. The reduction will increase the diversity of habitats and botanical interest across the SINC.
- 8.12.7 Due to the limited extent of temporary and permanent habitat losses in comparison to the retained areas of the SINC, the low ecological value of the habitats and compensation measures detailed in the HMP which will improve the ecological value of retained areas of the SINC it is considered the Proposed Development would have no effect on the integrity or conservation status of Cefn Bach SINC. The magnitude of change is assessed to be low. This means that the effect is considered to be negative and is assessed as Not Significant on an ecological feature of County importance.

8.13 Assessment of effects: Coetgae Pond SINC

Baseline conditions

Current baseline

- 8.13.1 Coetgae Pond SINC is a non-statutory designated site located in the south-eastern corner of the Site. The designation states the SINC comprises a pond and adjacent terrestrial habitat covering 0.2ha on the hillside above the woodland at Craig yr Arail at an altitude of 400m.
- 8.13.2 Extended Phase 1 habitat surveys and Habitat Suitability Index (HSI) assessment of the pond (**Appendix 8A**) determined that the pond was located in an open short, grazed grassland landscape but directly bordered by terrestrial habitat comprising dry heath/acid grassland and soft rush. The waterbody supported common reed, flag iris and bull rush and was considered of sufficient ecological quality to be considered a Section 7 priority habitat under the 'Ponds' classification.

Future baseline

- 8.13.3 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.13.4 The SINC would not be subject to direct encroachment effects; the nearest land-take is from a turbine approximately 130m northeast to the nearest section of the SINC.
- 8.13.5 There would be no direct effects on this SINC. The embedded measures (see **Section 8.6**) will ensure that indirect effects on Coetgae Pond SINC will not occur. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Coetgae Pond SINC, and the effects are considered Not Significant on an ecological feature of County importance.

8.14 Assessment of effects: Craig y Deri Pond SINC

Baseline conditions

Current baseline

- 8.14.1 Craig y Deri Pond SINC is a non-statutory designated site located on the western side of the Site. The SINC is listed as a pond and adjacent terrestrial habitat covering 0.23ha located on the hillside above the woodland at Craig y Deri at an altitude of 390m. The surrounding land is semi-improved grassland and coniferous woodland.
- 8.14.2 Extended Phase 1 habitat surveys and Habitat Suitability Index (HSI) assessment of the pond (**Appendix 8A**) determined that the pond was located in an open semi-improved grassland field with the field and pond bankside habitat subject to heavy poaching from cattle. The waterbody supported no visible aquatic vegetation and was not considered of sufficient quality to qualify as a Section 7 priority habitat.

Future baseline

- 8.14.3 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.14.4 The SINC would not be subject to direct encroachment effects; the nearest land-take is from Turbine 6 approximately 500m southeast to the nearest section of the SINC.
- 8.14.5 There would be no direct effects on this SINC. The embedded measures (see **Section 8.6**) would ensure that indirect effects on Craig y Deri Pond SINC would be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no

effect on the integrity or conservation status of the Craig y Deri Pond SINC, and the effects are considered Not Significant on an ecological feature of County importance.

8.15 Assessment of effects: Cwm Big North, Aberbeeg SINC

Baseline conditions

Current baseline

8.15.1 Cwm Big North, Aberbeeg SINC is a non-statutory designated site located centrally on Site, covering a total area of 5.46ha. The SINC is designated as woodland which forms the northernmost extension of a coniferous woodland block. Extended Phase 1 habitat surveys of the site (**Appendix 8A**) recorded the SINC as a small section of semi-natural woodland bordering a dry riverbed. The area is predominantly sloping oak woodland with mature beech spread throughout. The canopy is high with the understorey comprising scattered bracken and bare ground.

Future baseline

8.15.2 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.15.3 An internal wind farm access track would be sited on an existing well-used gravel, stone and earth agricultural track that runs outside the western boundary of this SINC. An assessment of the vegetation clearance requirements associated with access tracks has been undertaken (shown on **Figure 8.7**) and no tree removal from the SINC would be required.
- 8.15.4 Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of Cwm Big North, Aberbeeg SINC, and the effects are considered Not Significant on an ecological feature of County importance.

8.16 Assessment of effects: Hafod-y-Dafal acid grassland SINC

Baseline conditions

Current baseline

8.16.1 Hafod-y-Dafal acid grassland SINC is a non-statutory designated site partly located within the north-western boundary of the Site, covering a total area of 10.04ha. The SINC is

designated as an extensive area of semi-improved acid grassland over relatively low ground, grazed by sheep and being heavily disturbed by a variety of intersecting tracks and trenches. Extended Phase 1 habitat surveys of the site (**Appendix 8A**) identified that the area of the SINC within the Site boundary consisted almost entirely of arable land, having been ploughed and supporting a planted turnip crop. A well-used agricultural farm access track was located along the eastern site boundary of the SINC with a narrow strip of disturbed semi-improved acid grassland located between the access track and the arable field.

Future baseline

- 8.16.2 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.16.3 Turbine location 1 is located within Hafod-y-Dafal acid grassland SINC along with the associated permanent crane pad and temporary blade storage area and internal wind farm access track to this turbine. This would result in the temporary loss of 0.19ha of habitat (blade storage areas) and a permanent loss of 0.49ha of habitat.
- 8.16.4 The habitats within the SINC that would be subject to permanent or temporary land-take around the turbine comprise areas of ploughed arable land supporting a turnip crop at the time of survey, with the proposed access track located on the arable land and an existing well-used farm access track. The habitats which would be subject to permanent or temporary land-take are therefore assessed as having negligible ecological importance.
- 8.16.5 Due to the negligible ecological importance of the habitats to be impacted within the SINC, habitat compensation measures are not proposed at final ES stage as the temporary and permanent loss of these habitats would have no effect on the integrity or conservation status of Hafod-y-Dafal acid grassland SINC.
- 8.16.6 The magnitude of change is assessed to be negligible due to the negligible importance of the habitats that would be subject to permanent or temporary land-take. This means that the effect is assessed as Not Significant on an ecological feature of County importance.

8.17 Assessment of effects: Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC

Baseline conditions

Current baseline

- 8.17.1 Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC is a non-statutory designated site predominately located outside but bordering the Site boundary to the north. The SINC covers a total area of 441.50ha of which 0.76ha lies with the Site boundary and 0.69ha within the proposed Grid Connection corridor. The citation identifies the SINC as a valley ridge separating the Ebbw Fach and Ebbw Fawr valleys, with heathland being the main vegetation community and localised areas of wet heath and mire being present along spring lines.
- 8.17.2 Whilst only a very small area of the SINC is within the Site boundary this area, and the adjacent area to the north outside the Site, was recorded as dry heath acid grassland during the Extended Phase 1 habitat surveys of the site (**Appendix 8A**) where ling heather was identified, with scattered heath rush, purple moor grass, early hair grass, wavy hair grass, mat-grass, with marshy patches of *Sphagnum* sp. and other moss species present. The very small area of the SINC within the proposed Grid Connection corridor comprised a dense area of mature bracken and an area of semi-improved neutral grassland intersected by a well-used agricultural access track and recreational paths.

Future baseline

- 8.17.3 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.17.4 The area of SINC within the Site would not be subject to direct encroachment effects; the nearest land take is from Turbine 1 approximately 110m southeast. The SINC within the proposed Grid Connection corridor may be subject permanent and temporary habitat loss associated with the construction of the 33kV overhead line on wooden poles. The route for the overhead line is not finalised and will be confirmed by WPD in their application for the grid connection works, although the option corridor for the overhead line is wide and the SINC may not be impacted by the final route. Notwithstanding this, an assumed worst-case scenario for the overhead line would result in approximately 0.1ha of habitat temporarily damaged with the SINC during the construction with only the footprint of the wooden poles being permanently lost.

- 8.17.5 The habitats within the proposed Grid Connection corridor are common and widespread and are not botanically notable locally comprising a dense area of mature bracken and an area of semi-improved neutral grassland which is heavily disturbed and damaged by a well-used agricultural access track and recreational paths. The area of habitat damage and loss associated with the Proposed Development is very small in comparison to the size of the SINC (0.1ha against 441.50ha). The temporary and permanent loss of these habitats would have no effect on the integrity or conservation status of Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC.
- 8.17.6 The magnitude of change is assessed to be negligible due to the extent of the loss in comparison to the retained areas of the SINC and the condition of the habitats due to be lost which are of negligible importance. This means that the effect is considered to be negative and is assessed as Not Significant on an ecological feature of County importance.

8.18 Assessment of effects: Pond Group 3 SINC

Baseline conditions

Current baseline

- 8.18.1 Pond Group 3 SINC is a non-statutory designated site located on the western side of the Site. The SINC is listed as a series of man-made ponds covering 6.5ha. Extended Phase 1 habitat surveys and HSI assessments of the ponds within the SINC (**Appendix 8A**) identified eight ponds within the SINC; these are located within well-grazed semi-improved neutral and improved grassland, and mostly have limited bankside or emergent aquatic vegetation. Two of the ponds (pond IDs 6 and 7, **Figure 4.4, Appendix 8A**) meet the criteria for the 'Ponds' Section 7 priority habitat, with higher water quality, emergent aquatic vegetation and a more diverse bankside habitat including common reed. The area designated as Pond Group 3 SINC also includes a well-used, heavily disturbed area of bare ground which forms the working farmyard south of Hafod-y-Dafal farmhouse and barns.

Future baseline

- 8.18.2 The Site is unlikely to be subject to significant changes in land use in the absence of the wind farm. The land use and management in the future has been assumed to remain the same with the potential for long-term improvement depending on future land management. Given the uncertainty of this, the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.18.3 Turbine 6 would be located adjacent to the western boundary of Pond Group 3 SINC with associated permanent crane pads and sections of the internal wind farm track crossing through parts of the SINC. This would result in the permanent loss of 0.23ha of habitat

- 8.18.4 The habitats within the SINC that would be subject to permanent or temporary land-take around the Turbine 6 comprise areas of heavily grazed semi-improved neutral grassland. The length of the access track has been minimised and predominately follows the footprint of the well-used existing main access track to the farmhouse, which currently crosses through the SINC. It is estimated only 60m of new access track would be required across the semi-improved grass pasture. These grassland habitats are common and widespread across the Site and in the wider landscape, and are considered to be of negligible ecological importance.
- 8.18.5 The contractor's compound and electrical substation for the Proposed Development would be located in the farmyard south of Hafod-y-Dafal Farmhouse, which comprises bare ground. Approximately 0.1ha of this this facility would be located in the SINC. Although within the SINC the bare ground farmyard does not contribute to the integrity of the site.
- 8.18.6 The Proposed Development would not directly encroach on any of the ponds which comprise the main features of this designated site. However, to mitigate for the habitat losses within the SINC and additionally to provide enhancement measures are detailed within Section 8.6 and the HMP (**Appendix 8F**) to improve the ecological quality of waterbodies within the SINC. The ponds west of the current access track (ponds 3, 4, 5, 6 and 7, **Figure 4.4, Appendix 8A**) would be fenced off, with a small area of water available to animals for drinking at one waterbody only. This would allow grazing pressure to be controlled and allow a greater diversity of terrestrial and bankside vegetation to establish from the current poached and well-grazed baseline.
- 8.18.7 The magnitude of change is assessed to be very low due to the extent of the loss in comparison to the retained areas of the SINC and the condition of the habitats due to be lost which are of negligible importance. This change would have no effect on the integrity or conservation status of Pond Group 3, the effect is considered to be negative and is assessed as Not Significant on an ecological feature of County importance.

8.19 Assessment of effects: Bats

Baseline conditions

Current baseline

- 8.19.1 The baseline for the Site has been established through:
- S desk study, involving a search for statutory sites within 10km for which bats are a key interest feature, non-statutory nature conservation within 2km and records of bats within 10km.
 - Surveys undertaken in 2020 and 2021 (reported in **Appendix 8B**), comprising:
 - ▶ roost identification surveys (built structures):
 - external inspections;
 - hibernation inspections/static monitoring;

- emergence, re-entry surveys;
- summer automated acoustic monitoring;
- ▶ roost identification surveys (trees):
 - ground level roost assessment;
 - winter PRF inspection;
 - summer PRF inspection;
 - emergence, re-entry surveys;
- ▶ bat activity surveys:
 - three activity transects across the Site surveyed monthly between May and October 2020;
 - one activity transect surveyed monthly between August and October 2021 to incorporate potential bat flight lines around a confirmed lesser horseshoe roost (B6);
 - 2020 automated detector surveys (batlogger A+) deployed at nine turbine locations in spring (May, with the exception of location 9), summer (July) and autumn (September) for at least 10 nights in each period; and
 - 2021 automated detector surveys (batlogger A+) deployed at eight turbine locations in April, May and June 2021 for at least 10 nights in each period.

8.19.2 The survey approach and results are detailed in **Appendix 8B**, alongside any details of constraints or data gaps. The baseline is summarised in the following sections. It should be noted that the activity surveys (transects and statics) focused on main site and not the western access track or the proposed Grid Connection corridor as the works here would be limited and would not have any significant negative effects on bat commuting or foraging.

Site habitats

8.19.3 The dominant habitats within the Site boundary are a mosaic of semi-improved acid and neutral grassland. The majority of the Site is heavily grazed by cattle, sheep and horses and, as such, grass swards are short which limits botanical diversity and reduces foraging value of these habitats for bats. There are localised areas of scrub within the Site boundary along with small areas of marshy grassland, dry heath and acid grassland; mature trees are present in treelines and scattered throughout the Site alongside large areas of continuous bracken. The open mosaic of habitats, when assessed with reference to the BCT guidelines (2016), are assessed as being of 'moderate' suitability for bats.

Roosts

8.19.4 The desk-study data shows that 500 bat roosts have been recorded within 10km of the Site in the last 15 years. The total number of roosts per species and nearest roost per species are shown in **Table 8.17**. Three 'high collision risk' species were identified roosting

within 10km: common pipistrelle (within 762m), soprano pipistrelle (within 1.4km) and noctule (within 2.1km).

Table 8.17 Summary of bat roost records within 10km of the Site

Species	Status	No. records	Type of roost	Date of most recent record	Location relative to site*
Brandt's Bat	EPS, WCA, S7, LBAP	3	Hibernation / Day Roost	2012	5,6km to E
Brown Long-eared Bat	EPS, WCA, S7, LBAP	40	Hibernation / Building roost / Day Roost / Nursery roost	2018	2.1km to W
Common Pipistrelle	EPS, WCA, S7, LBAP	106	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost / Under Culvert	2019	0.7km to SE
Daubenton's Bat	EPS, WCA, S7, LBAP, HD2	8	Hibernation / Tunnel / Day Roost	2016	0.4km to NE
Greater Horseshoe Bat	EPS, WCA, S7, LBAP,	8	Hibernacula Roost / Day Roost	2017	6.9km to NE
Lesser Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	91	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost / Under Culvert	2019	0.4km to NE
Long-eared Bat Species	EPS, WCA, S7, LBAP	3	Hibernation / Day Roost	2008	4.1km to W
Myotis Bat Species	EPS, WCA, S7, LBAP	13	Hibernation / Day Roost	2018	3.2km to NW
Natterer's bat	EPS, WCA, S7, LBAP	9	Hibernation / Day Roost / Building Roost	2017	2.8km to W
Noctule	EPS, WCA, S7, LBAP	10	Hibernation / Day Roost / Building Roost	2013	2.1km to W
Pipistrellus Species	EPS, WCA, S7, LBAP	65	Maternity roost / Day Roost / Building Roost	2019	0.7km to NE

Species	Status	No. records	Type of roost	Date of most recent record	Location relative to site*
Serotine	EPS, WCA, S7, LBAP	1	Hibernation	2016	7.6km to N
Soprano Pipistrelle	EPS, WCA, S7, LBAP	26	Maternity roost / Day Roost / Building Roost	2019	1.4km to W
Unidentified Bat Species	EPS, WCA, S7, LBAP	109	Building Roost	2017	5.5km to NE
Whiskered Bat	EPS, WCA, S7, LBAP	8	Hibernation / Day Roost / Bat Houses	2016	0.3km to NE

*Location relative to site (distance,

Key to 'Status' abbreviations:

EPS = European Protected Species

WCA1 = Wildlife and Countryside Act Schedule 1

S7 = Environment Act (Wales) Section 7 Species

LBAP = Local Biodiversity Action Plan Species

HD2 = Habitats Directive Annex II

8.19.5 The bat survey area has 256 trees with 'moderate' or 'high' roosting potential and seven built structures with some potential to support roosting bats. Five bat roosts have been identified within the bat survey area (only B6 is located with the Site boundary), comprising:

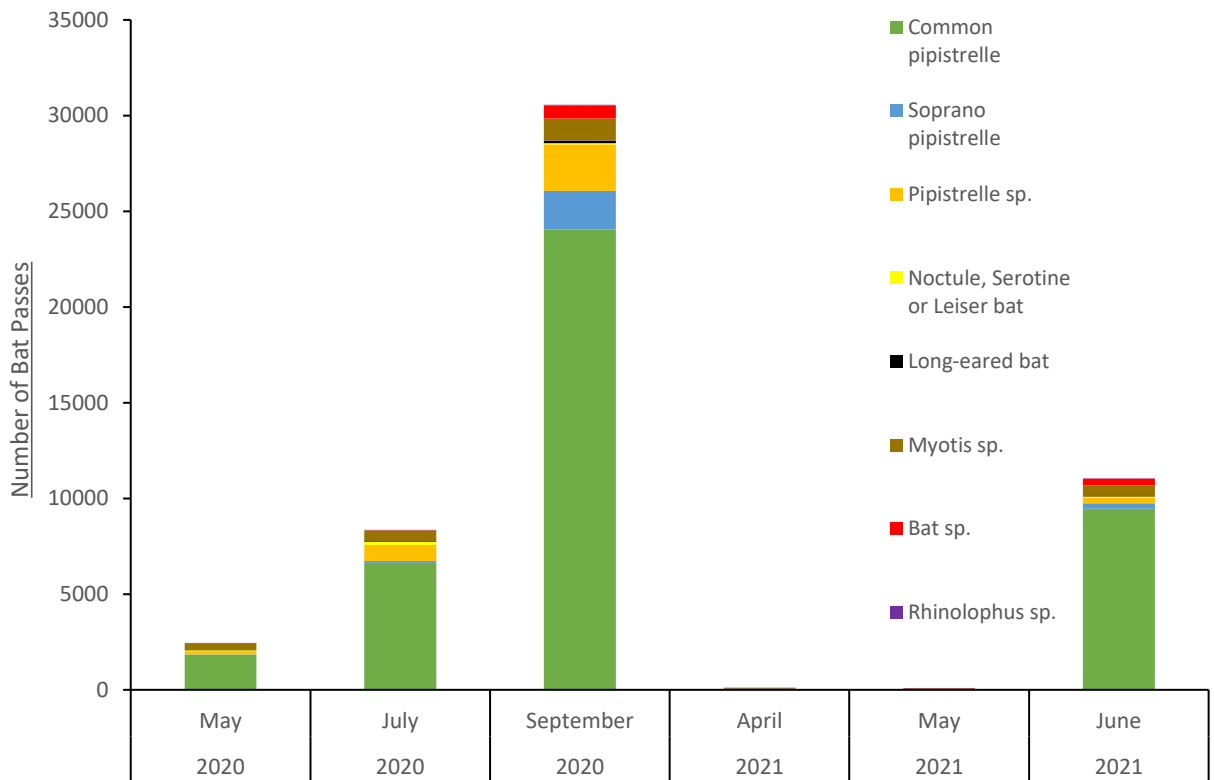
- Three built structures (locations detailed in **Figure 3.2, Appendix 8B**):
 - ▶ B3: common pipistrelle day and hibernation roost – supporting a small number of common species = county importance³⁸.
 - ▶ B6: lesser horseshoe bat maternity and hibernation roost - for rarer species = national (Wales) / regional UK importance.
 - ▶ B9: brown long-eared bat hibernation roost - hibernation site for small number of common species = county importance.
- Two trees:
 - ▶ Tree 207: long-eared bat day roost - supports small number of common species = local importance.
 - ▶ Tree 261: brown long-eared bat hibernation roost - hibernation site for small number of common species = county importance.

³⁸ Value based on Wray *et al.* 2010. *Valuing Bats in Ecological Impact Assessment*. IEEM In Practice v.70, December 2010²⁸
This document is widely used as a standard for determining value of bat populations in the EIA process.

Bat activity

- 8.19.6 A total of seven species or species groups were recorded at the Site during the transect and automated detector surveys (common, soprano pipistrelle; noctule; long-eared bat species; *Myotis* species; lesser and greater horseshoe bat).
- 8.19.7 Leisler's bat, serotine and Nathusius' pipistrelle are also known to occur in South Wales and several ambiguous calls were recorded that may be attributable to these species; however, none of the calls recorded over the two-year survey period were definitively from these species, and so the ambiguous calls are considered more likely to be noctule (rather than Leisler's bat or serotine) or common pipistrelle (rather than Nathusius' pipistrelle), which were widely recorded across the site.
- 8.19.8 Transect surveys identified a relatively low level of bat activity across all transects. In 2020 the greatest levels of bat activity were recorded from the transects sections that incorporated woodland or woodland edge habitat and tree lines; these locations also correspond with the highest levels of common pipistrelle activity with lower levels of activity found in the more open habitats.
- 8.19.9 Common pipistrelle made up the greatest proportion of recordings, representing 81.9% of all bat passes, followed by *Myotis* sp. (4.9%), soprano pipistrelle (4%), and very low levels of noctule and long-eared bat activity (0.5%). The transect adjacent to the lesser horseshoe bat roost (B6) in 2021 recorded similar results with common pipistrelle being the most frequently recorded species (72.5% of all bat passes) with *Myotis* the second most frequently recorded group (11.6%) and very low levels of lesser horseshoe activity recorded (1.45%).
- 8.19.10 During automated recording common pipistrelle was widely recorded across the Site and made up 81.5% of all automated detector recordings across all locations and all months, with soprano pipistrelle and *Myotis* bats making up approximately 5% each of recordings; all the other recorded species or groups of species each accounted for less than 1% of the total. The highest levels of bat activity were recorded on the areas of the Site that were closest to woodland, woodland edge, waterbodies and tree lines, such as the southwestern corner of the Site, where Turbines 7 and 8 were located. A summary of bat activity from the 2020 and 2021 automated monitoring is presented in **Chart 8.1**; full results in automated detector locations are presented in **Appendix 8B**.

Chart 8.1 Average number of bat passes per recording month across Site for all automated monitoring locations in 2020 and 2021



8.19.11 In order to interpret the results of the automated detector surveys the data was processed through Ecobat³⁹ to aid in quantifying bat activity levels in the context of bat activity levels recorded elsewhere in the region.

8.19.12 The activity levels of each species recorded on Site is discussed below in reference to the 2020-2021 automated detector locations (at turbine locations) and Ecobat outputs.

Myotis

8.19.13 *Myotis* bats are grouped together, as these species have widely overlapping call parameters and therefore can't be identified from calls alone. **Table 8.18** below presents the *Myotis* bat species which may have been recorded within the bat survey area.

³⁹ Ecobat compares survey results with a national reference dataset and objectively quantifies bat activity levels: The Mammal Society (2021). Ecostat (Online) Available at: <http://www.mammal.org.uk/science-research/ecostat/> (Accessed October 2021)



Table 8.18 Status of *Myotis* bat populations which may be recorded within the bat survey area (data from Mathews *et al.*, 2018⁴⁰ and Battersby, 2005⁴¹).

Common name	Scientific Name	UK population status	UK population	Welsh population
Bechstein's bat	<i>Myotis bechsteinii</i>	Very rare	21,800	1,500
Whiskered bat	<i>Myotis mystacinus</i>	Local	Not available	8,000
Brandt's bat	<i>Myotis brandtii</i>	Common in north and west, rare or absent elsewhere	Not available	22,500
Natterer's bat	<i>Myotis nattereri</i>	Fairly common throughout much of the UK	973,000	70,000
Daubenton's Bat	<i>Myotis daubentonii</i>	Common throughout much of the UK	1,030,000	95,000

- 8.19.14 Bechstein's, whiskered and Brandt's bat are predominantly woodland bats, with Bechstein's an extremely rare bat species which is not considered likely to be present. While woodland borders the Site, it is considered unlikely these bats account for the *Myotis* passes recorded at the turbine locations, being located in open habitats. It is therefore considered the *Myotis* activity is most likely associated with Daubenton's bat and Natterer's bat, although Brandt's and whiskered may be present in the adjoining woodland blocks.
- 8.19.15 Data suggests an overall moderate level of *Myotis* activity across the Site. Moderate - high levels of activity were recorded at detectors 2, 3, 5 and 9. Moderate levels at detector 6, Low – Moderate at detector 1, 4 and 8 and Low at detector 7. Activity levels are lowest in April, increase to Moderate through May till June with High activity recorded in September.
- 8.19.16 As illustrated in **Table 8.15 (Section 8.9)**, Daubenton's bat and Natterer's bat are considered to have a 'low collision risk' and an overall 'low population vulnerability' to collision.

Noctule

- 8.19.17 Data suggests an overall low – moderate level of noctule activity across the Site. Moderate activity levels were recorded at detector locations 1, 2 and 6, low – moderate levels were recorded at locations 4 and 8 and low at 3, 7 and 9. Activity levels were highest in June and July being categorised as moderate in comparison to low – moderate in May and September. Noctule has an estimated population in Wales of 91,900 (Mathews *et al.* 2018).

⁴⁰ Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C., McDonald, R.A., Shore, R.F (2018). A review of the population and conservation status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage.

⁴¹ Battersby, J. (Ed) & Tracking Mammals Partnership. (2005). UK Mammals: Species Status and Population Trends. First Report by the Tracking Mammals Partnership. JNCC/Tracking Mammals Partnership, Peterborough.

Noctule bat are considered to have a 'high collision risk' and an overall 'high population vulnerability' to collision.

Common pipistrelle

- 8.19.18 Data suggests an overall high level of activity across the Site for common pipistrelle bats. High levels of activity were recorded at location 2, 5, 8 and 9, moderate - high levels were recorded at location 1, 3 and 6, and moderate levels at location 4 and 7. Activity levels in June, July and September were categorised as high, with April being moderate-high, and May categorised as moderate. A large peak in activity was seen at automated detector location 9 in September 2020 with 20,300 calls over the recording period. Common pipistrelle is one of the most abundant species of bat across the UK with a UK population of around 3,040,000 and 297,000 in Wales (Mathews *et al.*, 2018). Common pipistrelle are considered to have a 'high collision risk' and an overall 'medium population vulnerability' to collision.

Soprano pipistrelle

- 8.19.19 Data indicates an overall moderate level of activity across the Site for this species. High levels of activity were recorded at location 9, moderate levels at location 5 and 8, low – moderate at location 4 and 6 and low at 1, 2, 3 and 7. Activity increased from low-moderate in May to moderate between June and September with a large peak in activity in comparison to other locations and other months seen at automated detector location 9 in September 2020 with 1,818 calls over the recording period. Soprano pipistrelle is one of the most common species of bat in the UK with a population of around 4,670,000 and 478,000 in Wales (Mathews, *et al.* 2018). Soprano pipistrelle are considered to have a 'high collision risk' and an overall 'medium population vulnerability' to collision.

Long-eared bats

- 8.19.20 Long-eared bat recordings cannot typically be assigned to species level based on acoustic files alone although as the known distribution of the grey long eared bat is very restricted in the UK, with no confirmed records of this species occurring in this region of Wales, it is assumed all long-eared bat records collected during the survey work are brown long-eared bats. Data suggests an overall low - moderate level of brown long-eared activity across the Site. Moderate levels of activity were recorded at location 6 and 8, low – moderate at location 1, 2, 3, 4 and 7 and low at 5 and 9. Activity levels are broadly similar across seasons apart from a decrease in activity in May.
- 8.19.21 Brown long-eared bats have an estimated population in the UK of 934,000 and 97,000 in Wales (Mathews *et al.* 2018). This species is a woodland specialist and does not typically cross open spaces. Brown long-eared bats are considered to have a 'low collision risk' and an overall 'low population vulnerability' to collision.

Greater horseshoe bats

- 8.19.22 Data suggests an overall low level of activity across the Site for greater horseshoe bats with only seven passes recorded across all automated monitoring locations across 2020 and 2021. Low-moderate levels of activity were recorded at location 4 and low levels of

activity were recorded at location 2, 3, and 8. No passes were recorded at other locations. Contacts were recorded in only May June and July. Greater horseshoe bats have an estimated population in Wales of 2700 (Mathews *et al.* 2018). Greater horseshoe bats are considered to have a 'low collision risk' and an overall 'low population vulnerability' to collision.

Lesser horseshoe bats

- 8.19.23 The baseline and preliminary assessment of effects for lesser horseshoe bats has been presented in **Section 8.9** with reference to the Usk Bat Sites SAC, and as such is not considered further in this Section.

Future baseline

- 8.19.24 The areas of plantation woodland bordering the Site centrally and to the west will be managed in line with the Forestry Commission Wales Forest Design Plan as detailed in **Section 8.5**. These changes will occur predominately outside the wind farm development Site boundary and are not considered to create a baseline environment markedly different from the current baseline within the Site. Woodland management within the Grid Connection corridor would in time change the ecology in the area however it is not considered sufficient time would have elapsed for the baseline to have sufficiently changed from the current baseline environment it is therefore considered appropriate to use the current baseline for the purpose of this assessment.

Predicted effects and their significance

Overview

- 8.19.25 Research from Europe and North America has found that bat species can be affected by operational wind turbines, sometimes fatally through collision or barotrauma⁴². However, the behavioural responses of bats to wind farms are complex and not fully understood, with responses varying between sites, species, sexes and times of year. For example, whilst some studies have suggested that active avoidance of wind farms by some bats may occur (e.g. Roeleke *et al.* 2016⁴³), there is good evidence that some bat species are attracted to wind turbines (Cryan *et al.* 2014⁴⁴) for a range of possible reasons, including the presence of insect aggregations around the structures (Cryan *et al.* 2014); ultrasound emissions (Kunz *et al.* 2007⁴⁵); or even attraction to red navigation lights (Voigt *et al.* 2018⁴⁶).

⁴² Damage to lungs caused by air pressure variations associated with the blades.

⁴³ Roeleke, M., Blohm, T., Kramer-Schadt, S., Yovel, Y., & Voigt, C. C. (2016). Habitat use of bats in relation to wind turbines revealed by GPS tracking. *Scientific Reports*, 6, 28961.

⁴⁴ Cryan, P.M., Gorresen, P.M., Hein, C.D., Schirmacher, M.R., Diehl, R.H., Huso, M.M., Hayman, D.T.S., Fricker, P.D., Bonaccorso, F.J., Johnson, D.H., et al. (2014). Behaviour of bats at wind turbines. *Proc. Natl. Acad. Sci. USA* **111**, 15126–15131.

⁴⁵ Kunz, T.H., Arnett, E.B., Erickson, W.P., Hoar, A.R., Johnson, G.D., Larkin, R.P., Strickland, M.D., Thresher, R.W., and Tuttle, M.D. (2007). Ecological impacts of wind energy development on bats: questions, research needs, and hypotheses. *Front. Ecol. Environ.* 5, 315–324.

⁴⁶ Voigt CC, Rehnig K, Lindecke O, Pētersons G (2018): Migratory bats are attracted by red light but not by warm-white light: Implications for the protection of nocturnal migrants. *Ecology and Evolution* 2018;8:9353–9361.

- 8.19.26 The Proposed Development therefore has the potential to affect bat species using the local area through the following mechanisms:
- loss of habitats used for foraging, commuting or roosting;
 - disruption of flightlines or behavioural alterations due to turbines (e.g. due to presence of turbines, noise, lighting etc); and/or
 - increased mortality due to collisions with turbines.
- 8.19.27 It should be noted that these effects will typically operate 'in combination' to affect the use of the landscape by bats, and therefore the assessment of effects considers the overall effect of these factors on local bat populations. The Proposed Development includes embedded measures that will moderate these effect pathways:
- Turbines have been located to maintain a minimum 50m blade-tip stand-off from features that are known to be favoured by bats (e.g. woodland edges and key waterbodies). This has been possible at all locations except for Turbine 7.
 - Construction would adhere to a CEMP which would incorporate measures to minimise construction-stage effects on bats (specifically, ensuring that temporary lighting does not impinge on features that are known to be favoured by bats for commuting or foraging).
 - Any trees with moderate or high bat roosting potential which require felling would be subject to appropriate updated roost surveys to ensure that roosting bats will not be affected.
 - Collision and barotrauma risk to bats would be reduced by pitching the blades out of the wind ("feathering") to reduce rotation speeds below ~2 rpm while idling at all eight turbines.
 - Bat activity monitoring and bat carcass searches shall be undertaken at all eight turbines for three years post-construction and if necessary additional mitigation measures (such as curtailment) will be agreed with NRW and BGCBC in response to monitoring results (see **Table 8.10**).

Permanent or temporary land-take/changes to habitats

Wind Farm development

- 8.19.28 The Proposed Development would predominately affect open upland habitats (grassland etc.) and a small areas of plantation woodland. Some of these habitat changes are long-term (either permanent for the lifetime of the scheme or involving tree removal that will not be offset in the short-term) and could affect the value of the Site for foraging bats; however, the effects of habitat loss on bat populations would be negligible and not significant as discussed below.
- 8.19.29 **Loss of roosts or roosting opportunities:** the tree areas which require removal (shown on **Figure 8.7**) have been surveyed for bats and there is no evidence of potentially notable bat roosts. Five bat roosts were identified during surveys; of these, only one (B3, an old farmhouse located on the west of the Site) is within the Site. All of these roosts would be

retained, and their accessibility to bats would not be affected (e.g. due to habitat fragmentation or land take).

- 8.19.30 Tree 74 which has moderate potential for roosting bats (**Figure 3.3 (Page 6 of 8) Appendix 8B**) is on the edge of a vegetation clearance zone and may require removal, any trees requiring felling which have high or moderate bat roosting potential would be subject to appropriate updated roost surveys to ensure that roosting bats would not be affected.
- 8.19.31 **Loss of foraging commuting habitat:** the direct effect of habitat loss due to Proposed Development on bat foraging and commuting opportunities would be inconsequential. The Proposed Development would affect a very small proportion of the habitat available to bat populations at this Site. The Proposed Development would result in the permanent loss of areas of open upland habitats, including improved and semi-improved acid grassland, arable and bracken, these habitats have suitability for bats which forage in the open such as common and soprano pipistrelle however the areas of loss with regard to the areas of similar or more optimal habitat which would be retained in the wider landscape would be inconsequential.
- 8.19.32 Species such as greater horseshoe bat, brown long-eared and *Myotis* forage and commute in more sheltered/cluttered habitats; the open/exposed habitats with limited structural complexity which would be lost provide sub-optimal habitats for these species. An existing network of farm access tracks currently cross the Site and of the 6.3km of required access track 2.9km would be on existing accesses, as such vegetation removal is limited and would predominately comprise semi-improved and improved, grazed, grassland habitats. Any woody vegetation removal would be very limited and restricted to isolated trees which do not provide important foraging or connective habitat for bat populations.
- 8.19.33 The Site is accessed from an existing commercial forestry haul road off the A4046 Aberbeeg Road to the west of the Site, and so vegetation removal in this area will be limited. Approximately 0.4ha of commercial conifer plantation (Scots pine and Sitka spruce) would require felling to facilitate vehicle turning at the junction of the site access with the A4046; this habitat is considered sub-optimal for bats. Any habitat removal would not result in any direct severance of linear features (e.g. treelines) that may be used by bats for commuting. The habitats to be lost are not unique or otherwise notable in a site or local context, and their loss would have no effect on the availability or value of bat foraging habitat locally.

Grid Connection

- 8.19.34 The Grid Connection would connect the wind farm through plantation woodland to the west of the Site. This will be the subject of a separate application but it is assumed, as a worst-case scenario, that this will comprise a 33kV overhead line on wooden poles. The Grid Connection would result in the loss of a narrow strip of productive plantation conifer woodland and may (subject to the final route at the time of application) cross through a small block of broadleaved woodland bordering the west of the Site. The majority of the trees within this area have been scoped for their suitability to support roosting bats with high suitability trees subject to a winter PRF inspection (endoscope using ladder/climbing); no tree roosts have been identified. Prior to any works associated with the Grid

Connection any trees requiring felling which have high or moderate bat roosting potential will be subject to appropriate updated roost surveys to ensure that roosting bats will not be affected.

- 8.19.35 The habitat loss associated with a 33kV overhead line is not considered to be significant. The width of the wayleave is not known and would be contained in a separate application however it is not considered the wayleave for 33kV route on wooden poles through plantation woodland would create fragmentation for species such as greater horseshoe bat, brown long-eared and *Myotis* able to commute across wayleaves of this size.
- 8.19.36 Additionally, conifer plantations are sub-optimal habitats for the bat populations recorded and it is considered the managed wayleaves under a 33kV line would improve floristic and habitat diversity within the plantation woodland, creating a ride and edge habitat that would increase invertebrate diversity and provide an improved foraging resource for bats. Overall, it is considered the effect of the land-take/changes to habitats associated with the Grid Connection on bat populations would be negligible.
- 8.19.37 Overall, any affects from the permanent or temporary land-take/changes to habitats from the Proposed Development and Grid connection are considered negligible and would result in no change to the conservation status of the bat populations on Site and the effects are considered Not Significant on an ecological feature of County importance.

Increased light levels and production of aural and visual stimuli and vibration

Construction/Decommissioning

- 8.19.38 With regard to temporary changes in habitat use due to site lighting or construction activities, this would be short-term and largely controlled with normal best-practice construction measures including controls on night-time working and the appropriate design and placement of any site lighting, and so displacement effects via this mechanism would be negligible. The only roost recorded during surveys which may be subject to disturbance is roost B3, an old farmhouse, located on the west of the Site, which supports a common pipistrelle day roost and hibernation roost for a small number of bats. The construction compound and new electrical substation for the Wind Farm development would be located on an existing farmyard (currently used for agricultural purposes) approximately 80m to the southeast of this roost.
- 8.19.39 The construction compound and substation have the potential to cause light/noise disturbance to the common pipistrelle roost, however they would be separated from the farmhouse roost by an existing complex of farm buildings which screen the farmhouse on three sides. Whilst the baseline level of noise/light would increase the roost is already subject to an ambient level of noise/light from the active agricultural activities across the farm; additionally common pipistrelle are considered tolerant to low level changes in light and noise. Due to the distance of this roost from the construction compound, the fact it would be shielded by buildings, and the adherence to normal best-practice construction and lighting measures including controls on night-time working and sensitive lighting the roost would not be subject to any disturbance from construction, operation or decommissioning activities. It is considered any effects from increased light levels and

production of aural and visual stimuli on bat populations during construction/decommissioning would be negligible.

Operation

- 8.19.40 Some studies have suggested that active avoidance of wind farms by some bats may occur (e.g. Roeleke *et al.* 2016), there is also evidence that some bat species are attracted to wind turbines (Cryan *et al.* 2014) through a range of potential mechanisms. As a result, it is difficult to predict how bats would respond to the installation of turbines at this site.
- 8.19.41 The most optimal habitats on site for foraging and commuting are the woodland/woodland edges, waterbodies and connected treelines. All turbines (except for Turbine 7) have been sited to provide a stand-off of at least 50m (from blade tip) from these features. This stand-off will minimise the risk of the turbines physically intruding into areas of higher activity. There may still be some displacement effects due to the general proximity of new structures, but the effects of this are likely to be negligible and it is certain that bats would continue to use features around the site margins for foraging and commuting.
- 8.19.42 With regard to turbines attracting bats, whilst this would increase collision risk (see below) it would not (in itself) necessarily result in adverse effects on bat populations; the net cost or benefit of any behavioural alteration would depend on the reasons for the change. Bats continually adapt their foraging strategies based on energy costs versus benefits, and there is no reason to assume that this would not occur if the turbines created a new foraging resource (i.e. the benefit of the resource would be set against the cost of accessing it). Adverse effects are possible if bats are attracted for reasons that don't confer a benefit, such as exploring an unusual ultrasound source or lighting; however, these effects in themselves are unlikely to significantly affect bat populations: the main risk is collision and increased mortality.
- 8.19.43 Overall, any affects from the light levels and production of aural and visual stimuli and vibration from the Proposed Development (during construction and operation) are considered negligible and would have no change on the conservation status of the bat populations on Site and the effects are considered Not Significant on an ecological feature of County importance.

Physical changes to the spatial environment

- 8.19.44 The principal mechanism for significant effects on bats is from fatalities/injuries caused by collision with wind turbines or barotrauma (collectively referred to herein as 'collision risk'). The method for quantifying collision risk for bats from onshore wind turbines is detailed in the *Bats and onshore wind turbines - survey, assessment and mitigation* guidance (NatureScot 2021). Following this guidance, a collision risk assessment for bats has been carried out which estimates the vulnerability of bat populations to windfarms based on the following factors:
- Relative abundance and collision risk of bat species.
 - The project size and habitat suitability within the Site.
 - Bat activity recorded at the Site.

- 8.19.45 **Table 8.15** outlines the relative abundance and level of potential vulnerability from wind farms of populations of Welsh bat species which has been used to inform the assessment.
- 8.19.46 The species recorded on Site that are considered to be 'high collision risk' are common pipistrelle, soprano pipistrelle and noctule bats; the other species recorded are all 'low collision risk' and so further consideration is not required (in line with the guidance, as the risk of mortality from collision is low such a significant effect could not occur). The full details of the methods and results of this collision risk assessment are presented in **Section 5, Appendix 8B**, but the outcomes of the process are summarised below.
- 8.19.47 The overall collision risk to common pipistrelle bats from the Proposed Development (based on the median levels of recorded activity) is considered high, and medium for soprano and pipistrelle and noctule. To further understand the risk, the collision risk assessment was also undertaken for each species at each automated detector location (turbine locations) as presented in **Table 8.19**.

Table 8.19 Overall collision risk assessment for high-risk bat species recorded on Site

Detector	Turbine location	Common pipistrelle		Soprano pipistrelle		Noctule	
		Ecobat Median Category	Collision risk category	Ecobat Median Category	Collision risk category	Ecobat Median Category	Collision risk category
1	1	Moderate - High	12	Low	3	Moderate	9
2	2	High	15	Low	3	Moderate	9
3	4	Moderate - High	12	Low	3	Low	3
4	3	Moderate	9	Low – Moderate	6	Low – Moderate	6
5	5	High	15	Moderate	9	-	-
6	6	Moderate - High	12	Low – Moderate	6	Moderate	9
8	7	High	15	Moderate	6	Low - Moderate	6
9	8	High	15	High	15	Low	3

Overall assessment: Low (green) 0-4; Medium (amber) 5-12; High (red) 15-25

- 8.19.48 The collision risk assessment at the turbine level shows that at the eight Turbine locations, four locations are classed as high risk for collision with the other four moderate risk for one or more species. Embedded measures have therefore been designed into the Proposed Development (see **Table 8.10**) to ensure the risk to bat populations from collision risk are reduced. These measures have been informed by *Bats and onshore wind turbines - survey, assessment and mitigation* guidance (NatureScot 2021).

- 8.19.49 A minimum of 50m stand-off will be maintained between turbine blade tips and the nearest point of linear/foraging features likely to be well-used by bats such as treelines, woodland, wetland habitats and waterbodies. This will be achieved at all turbines with the exception of location 7.
- 8.19.50 The blades at all turbines will be pitched out of the wind ("feathering") to reduce rotation speeds below ~2 rpm while idling, this has been shown to reduce fatality rates by up to 50% when compared to normal idling (NatureScot 2021).
- 8.19.51 The effectiveness of these measures would be monitored for three years post construction to determine whether it is working effectively (i.e. the level of bat mortality is considered to be incidental), or whether additional measures such as an operational curtailment regime is required. Monitoring would comprise casualty searches and acoustic monitoring at all locations with the results of monitoring reported to NRW and BGCBC and the requirement for any additional measures agreed where necessary.
- 8.19.52 It is possible that the Proposed Development would result in bat fatalities, these would be predominantly common pipistrelle (or soprano pipistrelle to a lesser degree); both these species are common and widespread and do not have a high population vulnerability to wind turbine fatalities (**Table 8.15**). It is considered that the embedded measures including monitoring and adapting wind farm operation in response to results (if required) would ensure any mortalities were a level that would not negatively impact the favourable conservation status of these species' populations (or any other bat species) at a Site level or national level. The magnitude of change on bat populations is assessed to be low. This means that the effect is considered to be negative and is assessed as Not Significant on an ecological feature of County importance.

Summary

- 8.19.53 It is likely that the proposed wind farm would affect the use of the Site by bats, and would increase the mortality risk for bats locally, particularly common pipistrelle (this being by far the most frequently recorded bat on Site). However, these changes are not considered to have any significant effects on local bat populations due to the embedded measures incorporated within the Proposed Development.

8.20 Assessment of effects: Reptiles

Baseline conditions

Current baseline

- 8.20.1 The suitability of the Site for reptile species was assessed during the Preliminary Ecological Appraisal (see **Appendix 8A**). Suitable habitat for reptiles (including potential refugia and foraging areas) were recorded across the Site with opportunities for hibernation in the woodland and stone walls. Mosaic and edge habitats are particularly important; for example, less-heavily grazed areas of semi-improved neutral and acid grassland alongside dry heath, continuous bracken, scattered gorse or bordering woodland.

- 8.20.2 A seven-visit presence/absence survey for reptiles was carried out in the areas of habitat that were highlighted during the PEA to have the potential to support reptiles (see **Appendix 8C**). This recorded maximum counts of:
- 17 viviparous lizard (15 adults and two juveniles); and
 - 4 slow worm (all adults).
- 8.20.3 This indicates the presence of a low population of slow worm and a good population of viviparous lizard (based on Froglife⁴⁷). It should be noted that a full population assessment comprising 20 visits was not conducted as this was not considered essential to assess the likely effects of the Proposed Development adequately and robustly on reptiles, or to design appropriate mitigation that would ensure no potentially significant effects on these species.

Future baseline

- 8.20.4 The Site and surrounding areas are unlikely to be subject to significant changes in land use in the absence of the wind farm, and so their suitability for the reptile species is unlikely to change. Forestry clearance may provide new habitat opportunities, although the predicted future baseline is assumed to be the same as the current baseline.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

- 8.20.5 Of the environmental changes associated with the Proposed Development it is considered that reptiles present on or near the Site could be affected through land use change/habitat modification (loss of habitat, particularly areas that may be suitable for shelter or concealment); and associated physical intrusion (incidental killing or injury of individuals during construction).
- 8.20.6 The following incorporated measures are taken into account in the assessment:
- Standard/established construction management and pollution control measures.
 - Standard/established construction management best-practice for reptiles, including phased or directional vegetation clearance techniques in higher-risk areas, and appropriate management of excavations and materials storage (etc).
- 8.20.7 The Proposed Development would affect a very small proportion of the habitat potentially available to reptiles at this Site, the majority of which is semi-improved grazed grassland with few refugia, and the habitats lost to the development infrastructure are not considered to form a unique or critical resource for reptiles in this area. The exact area of habitat loss is not possible to quantify accurately as suitable and unsuitable habitats for

⁴⁷ Froglife (1999). Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. (Online) Available at: <https://gat04-live-1517c8a4486c41609369c68f30c8-aa81074.divio-media.org/M4-Newport/C%20-%20Core%20Documents/11.%20Ecology%20and%20Nature%20Conservation/11.3.3%20-%20Froglife%20Advice%20Sheet%2010%20reptile%20survey.%20Froglife%2C%20London.%201999.pdf> (Accessed April 2022).

reptiles are not clearly defined over the large open upland site, with a mosaic of habitats providing areas of suitable habitats, interspersed with less suitable areas dependant on grazing pressure at the time of year. The area lost would not significantly affect the local reptile populations.

- 8.20.8 Effects on individual reptiles during construction will be avoided or mitigated using standard best-practice displacement techniques, due to the spatially discrete nature of the works and the large amounts of suitable habitat that would remain accessible. In summary, the removal of habitat or features that could support reptiles (mostly longer areas of grassland and bracken) would be kept to a minimum, and excavations in these areas would take place outside the hibernation period. Where present, suitable habitat would be cut to ~150mm above ground level during the winter period to avoid nesting birds becoming established during the nesting season. Final removal, and grubbing out of roots would be conducted in the spring, outside of reptile hibernation period (i.e. avoiding mid-October through to mid-April depending on seasonal temperature) to allow any individuals to move out of the area of works. Areas of long grass and other similar vegetation that need to be removed would be strimmed prior to construction to reduce their suitability, and hand-searched as necessary to disperse reptiles from the construction area. The mortality risk would be elevated above the baseline during the construction period but the incorporated measures and the accessibility of suitable habitats would ensure that this elevated risk is moderated so that the reptile population at the site is not significantly affected during construction.
- 8.20.9 With regard to operation, the alteration of the site habitats may alter the mortality risk by increasing the amount of 'bare ground' that is likely to be attractive to reptiles for basking; however, the effects of this on populations would be negligible and plenty of refugia would remain close to the new areas of bare ground, and so effects would not be significant.
- 8.20.10 The magnitude of change on reptile populations is assessed to be very low and would not change the conservation status of the population on Site or in the county. This means that the effect is considered to be negative and is assessed as Not Significant on an ecological feature of local importance.

8.21 Preliminary assessment of effects: Dormouse

Current baseline

- 8.21.1 There were no desk study records of dormouse found within 2km of the Site. The suitability of the Site for dormouse was assessed during the Preliminary Ecological Appraisal (see **Appendix 8A**), and a detailed habitat-based assessment of the areas that would be impacted by the Proposed Development was subsequently conducted following evolution of the scheme design.
- 8.21.2 The habitats present within and adjacent to the Site are not considered to be typical of habitat that would support dormouse. There are no hedgerows present, and the broadleaved and conifer plantation woodland that borders the Site is low in species diversity and has a high canopy with minimal vegetation in the understorey. The areas of scattered and dense/continuous scrub on site are not large enough nor not sufficiently

well-connected to potential off-site habitats that could support the species. Food species are limited on Site with no hazel identified and very limited bramble across the Site. The desk study also determined that Dormouse surveys conducted in 2020 on a proposed wind farm (Mynydd Llanhilleth) approximately 1km to the east (across similar habitats) found no records for dormouse. Dormouse are therefore considered to be absent from the Site. Dormouse have been scoped in for assessment; however, following consultation with NRW and surveys for this species are being undertaken in 2022.

Future baseline

- 8.21.3 The areas of plantation woodland bordering the Site centrally and to the west will be managed in line with the Forestry Commission Wales Forest Design Plan as detailed in **paragraphs 8.5.37 and 8.5.38**. These changes will occur predominately outside the wind farm development Site boundary and are not considered to create a baseline environment markedly different from the current baseline within the Site. Woodland management within the Grid Connection corridor would in time change the ecology in the area however it is not considered sufficient time would have elapsed for the baseline to have sufficiently changed from the current baseline environment it is therefore considered appropriate to use the current baseline for the purpose of this assessment.

Predicted effects and their significance

Permanent or temporary land-take/changes to habitats

Wind Farm development

- 8.21.4 Permanent or temporary land-take associated with the Proposed Development is predominately within well grazed semi-improved grassland habitats, along with areas of arable and small areas of bracken; these habitats have negligible suitability for dormouse. Whilst dormouse can sometimes be recorded in bracken, the habitat which would be lost within the Site is located within/adjacent to open grassland isolated from any suitable arboreal dormouse habitat with no dormouse food species present.
- 8.21.5 An existing network of farm access tracks currently cross the Site and 2.9km of the 6.3km of access tracks will be on existing accesses, with vegetation removal limited predominately semi-improved grazed grassland habitats. Any woody vegetation removal is very limited and restricted to isolated trees which provide no arboreal connectivity for dormouse between areas of sub-optimal habitat on and off-Site (tree removal areas are shown on **Figure 8.7**).
- 8.21.6 An additional area 0.4ha of commercial conifer plantation would require felling to facilitate vehicle turning where the Site is accessed off the A4046 Aberbeeg Road to the west of the Site. The area of conifer woodland along this Site access is managed for commercial forestry with Scots pine and Sitka spruce dominant, limited species and canopy layer diversity, and a bare understorey with no linkage to areas of suitable habitat for dormouse. Dormouse can be recorded in conifer woodlands especially if they are large, are Plantations on Ancient Woodland Sites (PAWS), or well-linked to other suitable

habitats including scrub, bramble or gorse; however, this tends to be unusual, particularly in upland conifer plantations⁴⁸.

- 8.21.7 The conifer plantation on this upland site is not on PAWS and does not have strong links to areas of suitable habitat for dormouse and as such the habitats are not considered suitable for dormouse.
- 8.21.8 The Proposed Development would result in a negligible change due to the lack of suitable dormouse habitat on and adjacent to the Site, permanent or temporary damage to habitats would predominantly be to grazed semi-improved grassland habitats and arable; the limited areas of conifer plantation and bracken which would require removal are unsuitable for dormouse and as such any effects are assessed as Not Significant on an ecological feature of Negligible importance⁴⁹.

Grid Connection

- 8.21.9 The habitat loss associated with a 33kV overhead line is not considered to be significant. The width of the wayleave is not known and would be contained in a separate application; however, it is not considered the wayleave for a 33kV route on wooden poles through plantation woodland would create fragmentation for lesser horseshoe bats.
- 8.21.10 The Grid Connection would result in the loss of a strip of productive conifer plantation woodland and may potentially (subject to the final route at the time of application) cross through a small block of broadleaved woodland bordering the west of the Site. Further surveys for protected species may be undertaken to support this separate application by WPD.
- 8.21.11 The small broadleaved woodland block is isolated from suitable dormouse habitat and has limited species diversity and no canopy layers or suitable understorey for dormouse commuting, nesting and foraging. The conifer woodland habitats are detailed in the Wind Farm development assessment above; all habitats within the proposed Grid Connection corridor are considered to have negligible habitat suitability to support dormouse.
- 8.21.12 The habitat loss associated with a 33kV overhead line is not considered to be significant, a strip of woodland would require clearance to ground level to facilitate the construction and subsequent maintenance of wayleaves. It is considered the managed wayleaves under a 33kV line would improve floristic and habitat diversity within the plantation woodland, creating a ride and edge habitat, notwithstanding this would have the potential to cause severance in the absence of mitigation (such as deadhedging across the wayleaves). Overall, it is considered the effect of the land-take/changes to habitats associated with the Grid Connection on dormouse populations would be negligible.
- 8.21.13 The Grid Connection would result in a negligible change due to the lack of suitable dormouse habitat within the Grid Connection Corridor and as such any effects are assessed as Not Significant on an ecological feature of Negligible importance.

⁴⁸ Bright PW, Morris PA and Mitchell-Jones A (2006) Dormouse Conservation Handbook 2nd Edition. English Nature, Peterborough.

⁴⁹ At the project level as this species is considered absent from the Site.

8.22 Preliminary assessment of cumulative (inter-project) effects

- 8.22.1 Consideration has been given as to whether any of the ecological features that have been taken forward for assessment in this chapter are likely to be subject to cumulative effects as a result of the Proposed Development and by other developments. This includes the consideration of the effects summarised in **Appendix 8E** that are not significant, as a number of minor effects on an ecological feature from multiple projects may result in a significant cumulative effect.
- 8.22.2 Cumulative effects would generally be either:
- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific receptor (e.g. two developments in the same river catchment); or
 - Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affect the same habitat type in a region, reducing its overall area).
- 8.22.3 Assessment of these is complex and relies on the definition of a reasonable scope for cumulative effects, and the availability of a reasonable baseline for other developments. However, the same principles of assessment apply, i.e. an effect would have to be significant at the 'county' level to be significant in EclA terms. In addition, the assessment focuses on those occasions where two 'not significant' effects might operate cumulatively to result in a significant effect (rather than where the effects of one development on an ecological feature are already, on their own, considered significant).
- 8.22.4 No developments have been identified in the immediate vicinity of the Mynydd Carn-y-Cefn site which are likely to affect those spatially discrete or range-limited features present on the Site or in close proximity; therefore, there will be no possibility of significant cumulative effects on:
- Any of the SINCs (as the Proposed Development will have low to negligible effects on these sites, and no other schemes (etc.) are likely to affect them);
 - Aberbargoed Grasslands SAC, Cwm Clydach Woodlands SAC and Cwm Merddog Woodlands SSSI as there would be negligible effects on these sites, due to the distance and absence of reasonable impact pathways (no hydrological linkages; interest features not sensitive);
 - Any species present or potentially present at the site, except for bats (all species other than bats will have relatively limited ranges and so the populations associated with Proposed Development would not be exposed to the effects of other developments; and the Proposed Development itself will have a very low- negligible effect on these populations, ensuring that the Mynydd Carn-y-Cefn development will make a negligible contribution to any effects on county-wide populations that may occur cumulatively with other developments).
 - Any site habitats, as the Proposed Development would have negligible effects on these habitats, and they are not of sufficient value for any cumulative loss with other developments to be significant.

- 8.22.5 It is considered there will be no possibility of significant cumulative effects on the Usk Bat Sites/Safleoedd Ystlumod Wysg SAC, there is an absence of effect pathways on the SAC due to the distance of the Proposed Development from the SAC and due to the distance of recorded and known lesser horseshoe roosts and important commuting or foraging habitat (located and retained outside the Site) from construction and operational areas. Lesser horseshoe bats are a low collision risk species due to their flight pattern and behaviour which is low and outside the swept path of a turbine blade, and are categorised as having an overall 'low population vulnerability' to collision or barotrauma from interaction with turbines. It is considered that any effects from the Proposed Development would be so limited in scale that there is, in reality, no possibility of cumulative effects with other developments that may occur in the same period.
- 8.22.6 The following sections therefore examine the potential cumulative effects on bats, these ecological features are taken forward as due to their large ranges of bats and their dependence on a range of habitats through their life-cycle.

Bats

- 8.22.7 There are no accepted protocols or methods for assessing the cumulative effects of developments on local bat populations, and in reality, the range of conceivable cumulative effects is as variable as the range of developments or activities that could conceivably affect bats. For example, the loss of a roost due to a barn conversion could arguably have a cumulative effect with a wind farm if this increases collision risk as bats travel further to forage.
- 8.22.8 Furthermore, it is acknowledged that accurately establishing bats' use of the wider landscape (away from a development site) is very difficult. This is due to severe practical constraints on meaningful field surveys across substantially larger areas and the inherent limitations of current bat survey techniques (e.g., areas that can be covered, effective range of detection, and so on).
- 8.22.9 The range of conceivable effects and the patchiness of survey data therefore present some difficulties when assessing any potential cumulative effects on bats. In order to keep the assessment manageable, only wind farms which are either built, consented or with submitted planning applications within 10km of the Proposed Development are considered for cumulative effects. This is because:
- i) It is considered that the principal risks to bat populations from wind farm development are increased collision risk and (to a lesser extent) possible reductions in available upland habitat if displacement occurs. Other than vehicles, wind farms are likely to present the main collision risk for bats in rural Wales. Since very few other developments are likely to significantly increase collision risk, it is most relevant to consider cumulative collision risk from wind farm developments only. Similarly, few (if any) other developments are likely to significantly affect the availability or accessibility of upland habitat resources.
 - ii) Most other developments do not take place on the same geographical scale as wind farms, and therefore it is likely that any effects that other developments may have on bats can be fully mitigated locally, without significant risk of cumulative effects with local wind farms. This is particularly relevant when considering the

possible cumulative effects of wind farm developments with the lowland developments that are typical of rural Wales.

- iii) The flight range of bat species is very variable (with some flying substantial distances between winter and summer roosts), but most species tend to forage within ~5km of their roost (based on BCT 2007) with the Core Sustenance Zone (CSZ)⁵⁰ for the bat species recorded on Site being between 2-4km (BCT 2016). On this basis, bats roosting ~5km from the Proposed Development could also be affected by other wind farms ~10km from Mynydd Carn-y-Cefn. The wind energy developments within 10km of the Site which are considered as part of the cumulative assessment are detailed within **Table 8.20**.

Table 8.20 Cumulative assessment wind energy developments within 10km of the Site boundary

Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd Carn-y-Cefn Wind Farm (km)	Status
Abertillery Wind Farm	Blaenau Gwent	7	180m	1.2km	Proposed
Manmoel Wind Farm	Blaenau Gwent	5	180m	1.5km	Proposed
Mynydd Llanhilleth Wind Farm	Torfaen/ Blaenau Gwent County Borough Councils	12	180m	2.0km	Proposed
Coed-y-Gilfach Farm	Blaenau Gwent	2	45	1.8km	Operational
Pen Y Fan Ganol Farm	Caerphilly County	1	73.5	2.2km	Operational
Cruglwyn	Caerphilly County	1	86.5	2.2km	Operational
Pen-y-Fan Industrial Estate	Caerphilly County	1	124	2.5km	Operational
Oakdale Business Park	Caerphilly County	2	130	3.4km	Operational
Penrhiwgwaith Farm	Blaenau Gwent	1	86.5	3.4km	Operational
Blaentillery Farm	Blaenau Gwent	2	45	3.7km	Operational
Gelli-wen Farm	Caerphilly County	1	77	3.9km	Operational
Pen-yr-heol Farm	Caerphilly County	1	77	4.0km	Operational
Bedlwyn Farm	Caerphilly County	1	86.5	4.7km	Operational
Cefn Bach Farm	Caerphilly County	1	78	6.2km	Operational
Groesfaen Farm	Caerphilly County	1	77	6.3km	Operational

⁵⁰ A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost.



Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd Carn-y-Cefn Wind Farm (km)	Status
Eurocaps Premises, Crown Business Park	Blaenau Gwent	2	45	7.8km	Operational
Pen Bryn Oer	Caerphilly County	3	110	8.3km	Operational
Rassau Industrial Estate (Unit 18)	Blaenau Gwent	1	78	8.4km	Approved
Rassau Industrial Estate (Former Tech Board Site)	Blaenau Gwent	1	78	8.4km	Operational
Rassau Industrial Estate (Unit 15)	Blaenau Gwent	1	72	8.5km	Operational
Tafamaubach Industrial Estate	Blaenau Gwent	1	74	9.5km	Operational

*Proposed; all other wind farms are operational or under construction.

8.22.10 Direct comparison of bat survey results from different developments is not possible due to the variability in site conditions and survey effort. However, where studies for bats for the wind farms within 10km of the Proposed Development have been completed they report similar patterns and conclusions, i.e.:

- Common pipistrelle is typically the most commonly recorded species with greatest activity;
- Bat activity within the sites, particularly in more 'exposed' areas away from features typically used by bats, is low;
- Some areas of the sites experience relatively higher levels of activity, but these areas invariably have features that are typically favoured by foraging or commuting bats (e.g. riparian corridors; woodland edges; hedgerows; sheltered treelines or gullies) which are away from Turbine locations.

8.22.11 The three wind farms which have the greatest risk of cumulative effects on the local bat populations in conjunction with the Proposed Development are Abertillery Wind Farm, Manmoel Wind Farm and Mynydd Llanhilleth Wind Farm. These are all proposed wind farms within 2km of the Proposed Development with between 5-12 turbines.

8.22.12 Mynydd Llanhilleth Wind Farm scoping submission results show that common pipistrelle is the most commonly recorded species with Myotis, noctule and soprano pipistrelle bat otherwise dominate the remainder of bat registrations in respect of the automated detectors (5.6%, 3.7% and 1.6% respectively), no assessment of collision risk is available yet. While Mynydd Llanhilleth Wind Farm automated data has not been analysed through Ecobat, data collected to date illustrates that on average, circa 600 bat registrations were recorded per automated detector per month, which is much lower than the high collision risk range of activity recorded at Turbines 2, 5, 7 and 8 at Mynydd Carn-y-Cefn.

- 8.22.13 Abertillery Wind Farm has submitted scoping however no bat data is available yet, with surveys being undertaken. Automated detector results available for Manmoel Wind Farm show that common pipistrelle is the most commonly recorded bat species, the site has been assessed as having a low collision risk to bats with activity levels recorded showing that no bat species are assessed as being at high collision risk.
- 8.22.14 Based on available data the wind farms within 10km are unlikely (on their own) to have any significant effect on either local bat populations, or their usage of the sites (this is also the conclusion reached by the assessment for the Proposed Development).
- 8.22.15 The primary cumulative effects of multiple wind farms are considered to be increased collision risk (and hence direct effects on population size) and the possibility of indirect effects on habitat use (i.e. the displacement of bats from foraging areas due to the presence of turbines, or 'barrier effects' (the loss or modification of flight paths, although Jones *et al.* (2009) report no documented cases of barrier effects occurring at wind farms)).
- 8.22.16 The available bat survey data for the wind farms within 10km of the Proposed Development indicate that bat activity across these upland sites is generally low, and that the qualitative risk of collision is therefore also low (provided that turbines are sited away from features typically used by bats). Where data is available it is apparent the wind farms have or will all benefit from bat surveys and subsequent siting of turbines to avoid features used by bats. It is therefore considered that the existing or proposed wind farms have taken appropriate measures to minimise collision risk and so avoid potentially significant effects on local bat populations.
- 8.22.17 Furthermore, the wind farms are sited in predominantly upland or upland margin habitats, away from the valley environments that are likely to provide the most significant foraging and roosting habitats locally, and the principal commuting and migration routes. The inter-connectivity of the valley systems in this area will not be meaningfully affected by the wind farms, and so the general 'permeability' of the landscape to bats is unlikely to be significantly reduced. As noted, there are no documented cases of wind farms having 'barrier effects' (Jones *et al.* 2009). There is little evidence to suggest that the upland areas (particularly on the Proposed Development Site) provide a significant habitat resource for local bat populations. It is therefore considered extremely unlikely that the wind farms within 10km of the Proposed Development will operate cumulatively to significantly affect local bat populations.

8.23 Significance conclusions

- 8.23.1 A summary of the results of the biodiversity assessment is provided in **Table 8.21**.

Table 8.21 Summary of significance of effects

Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
<p>Usk Bat Sites/Safleoedd Ystumod Wysg SAC</p> <p>Potential effects: Permanent or temporary land-take/changes to habitats</p>	International	Negligible	Not significant	Vegetation removal associated with the Proposed Development would predominately comprise semi-improved grazed grassland which is sub-optimal lesser horseshoe habitat. Any woody vegetation removal would be very limited and restricted to isolated trees which are not part of key foraging or connective habitat for lesser horseshoe bats or small areas of sub-optimal conifer woodland. No loss of optimal foraging habitat or severance of flightlines would occur. A confirmed lesser horseshoe hibernation/maternity roost would be retained (750m NW to the closest works location) with the Proposed Development having no impact on the availability or quality of roosting opportunities locally. It is therefore considered that the risk to lesser horseshoe bats from permanent or temporary land-take/changes to habitats would be negligible with no significant effect in EIA terms.
<p>Usk Bat Sites/Safleoedd Ystumod Wysg SAC</p> <p>Potential effects: Increased light levels and production of aural and visual stimuli and vibration</p>	International	Negligible	Not significant	Temporary changes in habitat use due to site lighting or construction activities, would be short-term and would be largely prevented with embedded best-practice construction measures including controls on night-time working and the appropriate design and placement of any site lighting to avoid habitat features that may be used by roosting or commuting bats, and so displacement effects via this mechanism would be negligible.
<p>Usk Bat Sites/Safleoedd Ystumod Wysg SAC</p> <p>Potential effects: Physical changes to the spatial environment</p>	International	Negligible	Not significant	Lesser horseshoe bats are a low collision risk species with an overall 'low population vulnerability' to collision. This species was recorded at six of the eight turbine locations, activity levels were categorised as low at five locations and low to moderate at the other, collision risk for this species for the Site as a whole is assessed as low. It is therefore considered that the risk to lesser horseshoe bats from collision/barotrauma would be negligible with no adverse effects on the integrity of the Usk Bat Sites SAC.



Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
Arail Farm Slopes SINC Potential effects: Permanent or temporary land-take/changes to habitats	County	Negligible	Not significant	There would be no direct effects on this SINC. The embedded measures would ensure that indirect effects on Arail Farm Slopes SINC will be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Arail Farm Slopes SINC.
Arail Pond SINC Potential effects: Permanent or temporary land-take/changes to habitats	County	Negligible	Not significant	There would be no direct effects on this SINC. The embedded measures will ensure that indirect effects on Arail Pond SINC would be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Arail Pond SINC.
Cefn Bach SINC Potential effects: Permanent or temporary land-take/changes to habitats	County	Low	Not significant	Turbines 2 and 3 are located within the Cefn Bach SINC along with the associated permanent crane pads and temporary blade storage areas and access tracks, this would result in permanent and temporary land-take/changes to habitats. The habitats impacted (bracken and well grazed semi-improved acid grassland) are common and widespread and are prevalent across the designated site, the Proposed Development Site and the wider landscape and are considered to be of negligible ecological importance. Compensation measures for habitat losses within the SINC include the enhancement of other areas habitat within the SINC through bracken reduction measures to increase botanical diversity across the SINC. Due to the limited area of temporary and permanent habitat losses in comparison to the retained areas of the SINC, the low ecological value of the habitats and compensatory habitat management measures to improve the ecological value of retained areas of the SINC it is considered the Proposed Development would have no effect on the integrity or conservation status of Cefn Bach SINC.
Coetgae Pond SINC	County	Negligible	Not significant	There would be no direct effects on this SINC. The embedded measures will ensure that indirect effects on Coetgae Pond SINC would be prevented

Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
<p>Potential effects: Permanent or temporary land-take/changes to habitats</p>				or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Coetgae Pond SINC.
<p>Craig y Deri Pond SINC</p> <p>Potential effects: Permanent or temporary land-take/changes to habitats</p>	County	Negligible	Not significant	There would be no direct effects on this SINC. The embedded measures will ensure that indirect effects on Craig y Deri Pond SINC would be prevented or appropriately managed. Overall, therefore, the Proposed Development would have no effect on the integrity or conservation status of the Craig y Deri Pond SINC.
<p>Cwm Big North, Aberbeeg SINC</p> <p>Potential effects: Permanent or temporary land-take/changes to habitats</p>	County	Negligible	Not significant	An internal wind farm access track would be located on the western boundary of the woodland which comprises the SINC on an existing well used gravel, stone and earth agricultural site access track. No vegetation removal will be required. As no permanent habitat loss would occur it is considered the Proposed Development will have no effect on the integrity or conservation status of Cwm Big North, Aberbeeg SINC.
<p>Hafod-y-Dafal acid grassland SINC</p> <p>Potential effects: Permanent or temporary land-take/changes to habitats</p>	County	Negligible	Not significant	Turbine 1 is located within Hafod-y-Dafal acid grassland SINC along with the associated permanent crane pad and temporary blade storage area and internal wind farm access track to this turbine. This would result in permanent and temporary land-take/changes to habitats. The habitats within the SINC that would be subject to permanent or temporary land-take around the turbine location comprise areas of ploughed arable land supporting a turnip crop at the time of survey, with the proposed access track located on the arable land and an existing well used farm access track. These habitats are assessed as having negligible ecological importance and the temporary and permanent loss of these habitats would have no effect on the integrity or conservation status of Hafod-y-Dafal acid grassland SINC
<p>Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC</p>	County	Negligible	Not significant	The area of SINC within the Site will not be subject to direct encroachment effects from the Proposed Wind Farm. The SINC within the proposed Grid Connection corridor may be subject to permanent and temporary habitat

Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
<p>Potential effects: Permanent or temporary land-take/changes to habitats</p>				<p>loss associated with the construction of the 33kV overhead line on wooden poles. The habitats within the proposed Grid Connection corridor are of negligible ecological importance comprising a dense area of mature bracken and an area of semi-improved neutral grassland heavily damaged/disturbed by access tracks and paths. The area of potential habitat damage and loss is a very small area in comparison to the size of the SINC (estimated 0.1 ha against 441.50ha). The temporary and permanent loss of these habitats would have no effect on the integrity or conservation status of Mynydd Carn-y-Cefn and Cefn-yr-Arail SINC.</p>
<p>Pond Group 3 SINC</p> <p>Potential effects: Permanent or temporary land-take/changes to habitats</p>	County	Very Low	Not significant	<p>Turbine 6 would be located adjacent to the western boundary of Pond Group 3 SINC with associated permanent crane pads and sections of the internal wind farm track for Turbine 6 resulting in land take in parts of the SINC. The habitats that would be subject to permanent or temporary land-take associated with the turbine comprise areas of heavily grazed semi-improved neutral grassland which are common and widespread across the Site and in the wider landscape and are considered to be of negligible ecological importance. The contractor's compound and electrical substation will be located in the farmyard south of Hafod-y-Dafal Farmhouse, which comprises bare ground, part of which is within the SINC boundary. The bare ground farmyard is considered to be of negligible ecological importance. The Proposed Development would not directly encroach on any of the ponds which comprise the main citation features of this designated site. Compensation measures for habitat losses within the SINC have been detailed within the HMP for the Site and include measures to improve the ecological value of the ponds within the SINC. Due to the low ecological value of the habitats which would be impacted, the retention of the pond habitats and the compensatory habitat management measures to improve the ecological value of retained areas of the SINC it is considered the Proposed Development would have no effect on the integrity or conservation status of Pond Group 3 SINC.</p>



Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
Bats Potential effects: Permanent or temporary land-take/changes to habitats	County	Negligible	Not significant	Vegetation removal associated with the Proposed Development would predominately comprise sub-optimal semi-improved grazed grassland habitats. Any woody vegetation removal would be very limited and restricted to isolated trees which are not part of key foraging or connective habitat for bats or small areas of sub-optimal conifer woodland. No loss of optimal foraging habitat or severance of flightlines would occur and the areas of loss with regard to the areas of similar or more optimal habitat which will be retained on site and in the wider landscape will be inconsequential. All confirmed roosts would be retained with the Proposed Development having no impact on the availability or quality of roosting opportunities locally. Overall any affects from the permanent or temporary land-take/changes on bat populations from the Proposed Development are considered negligible and would result in no change to the conservation status of the bat populations on Site.
Increased light levels and production of aural and visual stimuli and vibration	County	Negligible	Not significant	Temporary changes in habitat use due to site lighting or construction activities, would be short-term and will be largely prevented with embedded best-practice construction measures including controls on night-time working and the appropriate design and placement of any site lighting to avoid habitat features that may be used by roosting or commuting bats, and so displacement effects via this mechanism would be negligible.
Physical changes to the spatial environment	County	Low	Not significant	Common pipistrelle, soprano pipistrelle and noctule bats were recorded on Site, these are considered a high-risk species for collision and or barotrauma with wind turbines blades. The other species recorded on Site are all low collision risk and the risk of mortality from collision is low such as a significant effect could not occur. Four turbines are classed as high risk for collision (Turbine locations 2, 5 and 7 for common pipistrelle and 8 for common and soprano pipistrelle). Embedded measures have therefore been designed into the Proposed Development to ensure the risk to bat populations from collision risk are reduced. Measures include a minimum 50m stand-off between all turbine blade tips and the nearest point of

Ecological feature and summary of predicted effects	Sensitivity/ importance/ value of ecological feature ¹	Magnitude of change ²	Significance ³	Summary rationale
				<p>linear/foraging features likely to be well-used by bats (with the exception of location 7); feathering will also reduce rotation speeds below ~2 rpm while idling at all eight turbines, a post construction bat monitoring programme will be conducted for three years to ensure the mitigation is appropriate and adapted where necessary.</p> <p>It is likely that the proposed wind farm would increase the mortality risk for bats locally, particularly common pipistrelle (this being by far the most frequently recorded bat on site). However, inclusive of the embedded measures these changes are not considered to have adverse effects on the favourable conservation status of bat populations.</p>
<p>Reptiles</p> <p><u>Potential effects:</u> Permanent or temporary land-take/changes to habitats</p>	Local	Very low	Not significant	<p>The Proposed Development would result in permanent or temporary loss of habitat suitable to support reptiles but will affect a very small proportion of the habitat available to reptiles at this Site. It is not considered the habitats lost to the development infrastructure would form a unique or critical resource for reptiles in this area. This loss would be offset by the habitat enhancement provided in the HMP and the site infrastructure may incidentally improve some areas for reptiles by providing greater habitat complexity. Individual reptiles would be protected using standard best-practice measures that temporarily displace them from areas likely to be affected by construction; this is entirely achievable due to the discrete nature of the works and the large amounts of suitable habitat that would remain accessible.</p>
<p>Hazel dormouse</p> <p><u>Potential effects:</u> Permanent or temporary land-take/changes to habitats</p>	Negligible	Negligible	Not significant	<p>The habitats on and adjacent to the Site are not considered suitable to support dormouse and this species is not considered present. The land-take associated with the Wind Farm development is predominately within well grazed semi-improved grassland habitats, along with areas of arable and small areas of bracken, these habitats have negligible suitability for dormouse. An area of upland conifer plantation would require removal to facilitate access to the Site this comprises sub optimal habitat for dormouse.</p>



1. The sensitivity/importance/value of an ecological feature is defined using the criteria set out in **Section 8.8** and is defined as international, National (UK context), National (Wales context), county, local and negligible.
2. The magnitude of change on an ecological feature resulting from activities relating to the development is defined using the criteria set out in **Section 8.8** and is defined as negligible, very low, low, medium and high.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 8.8**.

8.24 Further work to be undertaken

8.24.1 The final assessment of likely significant effects will be reported in the ES. This section describes the further work to be undertaken to support the biodiversity assessment presented in the ES.

Baseline

- 8.24.2 A Phase 1 habitat survey update will be completed in May 2022 to check the status of the habitats on Site and record botanical interest. The survey will ensure the habitat baseline is up to date and captures any changes since the original survey was completed in 2020.
- 8.24.3 A dormouse survey is being undertaken in habitats on an adjacent to the Site between April and September 2022, to establish the presence or absence of this species.