

CHAPTER 6 – ECOLOGY AND NATURE

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6 ECOLOGY AND NATURE CONSERVATION

Introduction

- 6.1 This Chapter assesses the potential impacts of the proposed wind turbines and associated infrastructure at Mynydd Pencarreg. It reports on the ecological and nature conservation value of the Site and its environs and how this would be affected during the construction and operational phases of the development. Decommissioning effects will be addressed through a decommissioning plan at the appropriate time. In this report, the 'site' refers to the area as shown on Figure 1.2: Site Layout. The Chapter discusses enhancements to the ecological and nature conservation value of the Site and surrounding area.
- 6.2 The site itself is located in a mixed landscape of improved and poor semi-improved pasture, interspersed with (often small) areas of unimproved marshy grassland, bog and flush.

Methodology

- 6.3 The ecological impact assessment comprises:
- a review of the legislative context;
 - collection and compilation of existing ecological data;
 - an Extended Phase 1 Habitat Survey including protected species;
 - breeding bird surveys;
 - bat assessment;
 - water vole and otter surveys;
 - badger surveys;
 - red kite nest surveys;
 - an assessment of the Site's ecological importance, including an analysis of the potential of the Site to support protected species or species of conservation concern;
 - identification of potential impacts likely to have an adverse effect on the Site's ecological value both in terms of the effect on individual species and habitats,

and on the overall integrity of the Site and its immediate surroundings;

- recommendations to avoid potentially significant impacts where possible, or to minimise or mitigate impacts;
- an assessment of the residual impacts¹ on species and habitats and an assessment of the effect on the overall integrity of the Site;
- proposed measures to enhance the ecological and nature conservation value of the Site and surrounding area.

Overview of International and UK Legislation

Ecological Legislation

- 6.4 There is a substantial body of international, EU and UK legislation which has the purpose of maintaining and restoring biodiversity and protecting it from damaging activity, as set out in Table 6.1 below.

Habitats

- 6.5 A hierarchy of protection and designation exists concerning habitats, from international legally binding obligations to local, non-statutory site designations (Table 6.1).

Table 6.1 Statutory and Non-statutory Habitat Designations

Level of Designation	Designation	Legislation
International Designations	Ramsar Site	Convention on Wetlands of International Importance 1971
	Special Protection Area (SPA)	EC Birds Directive 2009/147/EC
	Special Area of Conservation (SAC)	EC Habitats Directive 92/43/EEC

¹ i.e. those impacts remaining after any mitigation has been applied

National Statutory Designations	National Park	National Parks and Access to the Countryside Act 1949
	National Nature Reserve (NNR)	Wildlife and Countryside Act 1981
	Site of Special Scientific Interest (SSSI)	Wildlife and Countryside Act 1981; Countryside and Rights of Way (CROW) Act 2000
	'Important' hedgerows	Hedgerows Regulations 1997
Local Statutory Designations	Local Nature Reserve (LNR)	National Parks and Access to the Countryside Act 1949
Non-statutory Designations	Other Nature Reserves Site of Biological Importance (SBI) Ancient Woodland Inventory (AWI) Site	Countryside and Rights of Way Act 2000 (CROW) Natural Environment and Rural Communities Act (NERC) 2006 National and Local Planning Policies
Other	National and Local Biodiversity Habitat Action Plans (UK BAP and LBAPs) S. 7 Habitats of Principal Importance for maintaining and enhancing biodiversity	Convention on Biological Diversity 1992 Natural Environment and Rural Communities (NERC) Act 2006 Environment (Wales) Act 2016

Protected Species

- European Protected Species (EC Habitats Directive; EC Birds Directive)
- Conservation of Habitats and Species (Amendment) Regulations 2012
- Nationally Protected Species (Wildlife and Countryside Act 1981 & amendments; Countryside and Rights of Way (CROW) Act 2000)

- S. 7 Species of Principal Importance for maintaining and enhancing biodiversity in Wales (Section 7 Environment (Wales) Act 2016)
- Protection of Badgers Act 1992

Assessment Guidelines

- 6.6 In accordance with best practice for EIA the assessment has followed guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM): Guidelines for Ecological Impact Assessment 2018.
- 6.7 There is currently no specific guidance on the assessment of single wind turbines issued by the Welsh nature conservation body (Natural Resources Wales). In the absence of this, guidance from Natural England and the Joint Agencies has been used to inform the assessment. This is standard practice in the assessment of single or very low numbers of wind turbines. The following guidance was used:
- Natural England Technical Information Note TIN051 - Bats and onshore wind turbines Interim guidance (Third edition 11 March 2014);
 - Scottish Natural Heritage, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) January 2019 Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation; and
 - Natural England Technical Information Note TIN069 – Assessing the effects of onshore wind farms on birds (First edition 7th January 2010).

Methodology for the Assessment of Significance

- 6.8 The impact assessment is based on determining the potential sensitive receptors within a study area, predicting potential impacts which may occur due to the construction of the project and determining if there is a risk of a significant adverse effect on the sensitive receptors or the systems on which they rely.

- 6.9 The CIEEM guidelines on impact assessment set out the principal factors which should be considered within an ecological assessment. The assessment method and determination of significance of effect used in the current assessment is based on the CIEEM principles. The CIEEM guidelines are generic however, and as acknowledged in the documentation they need to be adapted to suit particular projects and sites. The approach to the determination of significance used in the current assessment is set out in the following section.
- 6.10 Within this assessment the term 'impact' is used to denote the physical attribute or change caused by the proposals. Such impacts will act upon receptors either directly or indirectly. The impact acting upon the receptor creates an effect, and the significance of the effect is dependent upon a number of factors but principally the magnitude of the impact and the sensitivity of the receptor.
- 6.11 The magnitude of an impact is often quantifiable in terms of, for example, extent of habitat loss or predicted change in feeding opportunities. However, the loss of habitat alone is not the sole determinant of the scale of the effect. In this assessment, an approach has been adopted that considers the effect on the integrity of the receptor in the area. The definition of ecological integrity² is used here in accordance with the definition originally adopted in Annexe C10 of PPG9 and subsequently by ODPM Circular 06/2005 on Biodiversity and Geological Conservation whereby designated site integrity refers to "...coherence of ecological structure and function...that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified". For non-designated sites / species the CIEEM suggested that the definition could be amended to: "...the coherence of ecological structure and function, that enables it [the Site or population] to maintain the habitats, complex of habitats and/or levels of populations of species in its/their pre-development condition".

² The concept of ecological integrity from PPG 9 is used here as there is no equivalent in the Welsh Guidance Technical Advice Note 5: NATURE CONSERVATION AND PLANNING

- 6.12 For ecological assessment, the CIEEM guidelines use a spatial scale of importance of the receptor to determine its value and therefore its sensitivity. Therefore, an internationally important species is considered to be of greater value than a species which is listed only in a LBAP. However, this is not the only determinant of value: notably large populations or concentrations of a particular species, habitats of particularly good quality, species at the edge of their range, and bio-diverse assemblages are considered to be of high value. Sensitivity of species, i.e. their ability to adapt to changes in the environment, is also an important consideration.
- 6.13 A significant effect may be broadly defined as one which should be brought to the attention of those involved in the decision-making process. More specifically, the CIEEM Guidelines define significance as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area.
- 6.14 Significant adverse effects occur where valuable or sensitive receptors, or numerous receptors, are subject to impacts of considerable magnitude and duration. Some effects will be temporary, others are permanent in nature and these have been distinguished.
- 6.15 Effects are unlikely to be significant where low value or non-sensitive receptors are subject to minor or short-term impacts, nor if only a small proportion of individuals is affected. Where an effect is considered to be significant, its magnitude will generally be classified as Negative or Major Negative with these descriptions being based on precedence or current guidance.
- 6.16 The criteria used for assessing the significance of impacts are based on professional judgement concerning the combined effect of the value of the receptor and the magnitude of the impact (see Appendix 6.1 for value of receptor).
- 6.17 Table 6.2 sets out the matrix used to guide the basic level of significance of a predicted effect. In determining the final predicted level of significance of an effect, other factors are taken into consideration. Where possible,

these are objective and quantifiable factors such as the time period over which the effect will occur and the reversibility of the effect. Another important factor in the prediction of the effects is the confidence level. The assessment is based on knowledge of similar developments, knowledge of the ecological requirements of species being assessed, and an understanding of ecological systems and their interactive nature. Any limitations in ecological information have been made explicit in the text. It is important to note that this discussion refers to pre-mitigation impacts and that such impacts may well be reduced following potential mitigation.

- 6.18 In this assessment, and with reference to Table 6.2, any effect that is of at least 'moderate' significance (with Ecological Value of at least a 'County/metropolitan' level) is considered as significant in the overall context of the development and in terms of the EIA Regulations. Where Ecological Value is assessed as District/borough level or below, effects of 'moderate' significance are considered to be not significant in terms of the EIA Regulations. Professional judgement is an important factor in determining the level of ecological value, the magnitude of the impact and the overall significance. An effect may be either negatively or positively significant. Significant effects are greyed out in Table 6.2.

Table 6.2 Basic Matrix used to Determine Significance of Effects

	International	National	Regional	County / Metropolitan	District / Borough	Parish / Neighbourhood
Major Negative	Critical	Critical	Critical to moderate	Large to moderate	Moderate to minor	Minor to Moderate
Negative	Large to minor	Large to minor	Large to minor	Moderate to minor	Moderate to minor	Minor
Neutral	No Impact					
Positive	Large to minor	Large to minor	Large to minor	Moderate to minor	Moderate to minor	Minor
Major positive	Critical	Critical	Critical to moderate	Large to moderate	Moderate to minor	Minor to moderate

Baseline

Desk Study

- 6.19 A search was made of the National Biodiversity Network (NBN) and Natural Resources Wales (NRW)) websites. The former was interrogated for records of protected species within 2km of the Site, whilst the latter was reviewed for information on designated sites within 5km of the site boundary. A review of local Sites of Importance for Nature Conservation (SINCs) was also conducted.

Habitat Survey

- 6.20 On 17th July 2020, Chris Forster Brown MCIEEM (RSKADAS UK Ltd) conducted an Extended Phase 1 Habitat survey using standard Joint Nature Conservation Committee (JNCC) (2010) techniques and methodologies. Phase I habitat categories were recorded on a field map,

which is reproduced at Figure 6.1. Notes on relevant botanical species were also compiled by Chris Forster Brown on 17th July 2020, as part of the extended Phase I habitat survey. This included the recording of indicator species and an estimation of DAFOR³ values for these species where relevant. Chris Forster Brown has over 25 years' experience as an ecologist and has carried out very many Phase I habitat and other botanical surveys.

Breeding Birds Survey

- 6.21 Breeding birds survey was based on the Brown and Shepherd (1993) methodology which requires a minimum of two visits to a site. To this end, two visits were carried out, once on 9th July and once on 16th July 2020. The surveyor (Steven Shepherd MCIEEM) has extensive experience of the Brown and Shepherd methodology (and of bird survey more generally) and is highly familiar with breeding bird species and species assemblages.
- 6.22 The survey area encompassed the whole area within the boundary of the Site and the immediate surrounds. It also included a 500 m buffer surrounding the boundary, where this was visible.
- 6.23 Following the Brown and Shepherd methodology, the observer covered the survey area so that he passed within 100 m of all points of the Site. The methodology was adapted in less open areas (particularly along the scrubby and wooded sides to the track). Here, the track was walked at a slow pace and individual locations were approached closer than in the more open areas. In both situations, all birds were recorded, using standard British Trust for Ornithology (BTO) symbols on a relevant scale map. The behaviour of individual birds was also recorded, where appropriate. Birds are said to be breeding if they are observed displaying or singing, adults are repeatedly alarm calling, nests, eggs or young are located, distraction displays are seen and/or territorial disputes are seen. Species particularly targeted by the survey were breeding waders (Curlew *Numenius arquata*, Lapwing *Vanellus vanellus* and Snipe *Gallinago*

³ DAFOR is an estimation of relative abundance: Dominant, Abundant, Frequent, Occasional, Rare.

gallinago) and raptors associated with open moorland (e.g. Hen Harrier *Circus cyaneus* and Merlin *Falco columbarius*). All species were noted on field maps. Those species that are listed on S.7 of the Environment (Wales) Act and/or are red-listed by RSPB (Wales) as of conservation concern, are detailed on Figure 6.2. It should be noted that whilst breeding bird survey was conducted later in the year than ideally, this was not felt to compromise survey results. The site is relatively small and most birds are still highly vocal in July. It is concluded that no significant species or species numbers were missed due to survey timing.

Red Kite Nest Survey

- 6.24 In 2014, a specifically targeted survey for nests of Red Kite *Milvus* was carried out. This was considered necessary on a precautionary basis. This area of mid Wales (i.e. Carmarthenshire) is known to support a generally high population of Red Kite. Due to the high volume of individual turbine applications, LPAs within mid Wales are concerned about the cumulative impact on the Red Kite population. To this end, and as a basic prerequisite for most proposals, the mid Wales LPAs are seeking to establish if Red Kites are breeding within the immediate area (300m radius) of turbines.
- 6.25 A Red Kite survey was conducted in October 2014, encompassing a 300m radius around the proposed location of the two wind turbines. The survey took into account guidance in Hardey *et al* (2006) and Gilbert *et al* (1998). The survey was conducted by an experienced ornithologist.
- 6.26 The time of year at which Red Kite nest survey was carried out meant that the breeding season was finished. However, it also meant that individual nests would be much more visible in typical tree nesting habitat, and there would be no danger of disturbing breeding red kite (or other nesting birds). Individual nests are usually obvious, being large and bulky, often incorporating sheep's wool.
- 6.27 All woodland areas and individual large trees within the 300m radius were surveyed.

- 6.28 The Red Kite nest survey in 2014 determined that no Red Kites were breeding at the site. It was considered that a further standalone Red Kite nest survey was not necessary in 2020. However, the breeding bird survey, as well as other surveys (e.g. protected species surveys) would have established whether the site was being used by Red Kite.

Protected Species Surveys

Bats

- 6.29 Bats were surveyed in accordance with recent Scottish Natural Heritage, Bat Conservation Trust et al (2019) guidelines (SNH, BCT et al, 2019). The survey method entailed the use of static recording surveys with survey effort and timing determined with reference to the SNH/BCT guidelines.
- 6.30 The site was rated as low risk in line with the guidelines. This was because the site had no known bat roosts within the immediate surrounding area (within 2km). The site does support a network of hedgerows and a small watercourse, all of which could act as linear flight line features. However, these all lie at some distance (> 100m) from proposed turbine locations. In line with the SNH/BCT guidelines, two Song Meter SM2 detectors were deployed for at least ten night periods during the summer and autumn periods. These were located at the proposed turbine positions. Spring survey was not carried out, however, this was not felt to compromise overall survey results, as the periods of highest bat activity are the summer and autumn. Furthermore, detectors were left recording for longer than the ten day period in both the summer and autumn surveys (15 days in the summer and 18 days in the autumn). The additional information gained from these extended survey periods were considered more than adequate to counteract the lack of a spring survey period.

Badger

- 6.31 A full Badger *Meles meles* survey was undertaken, looking for signs such as setts, foraging signs, dung pits or tracks, as part of the Extended Phase 1 habitat survey. Active setts in particular were searched for, as these may

constrain the location of any development (i.e. no development within 30m of an active sett).

Otter

- 6.32 A standard Otter *Lutra lutra* survey was undertaken, following the methodology detailed by Chanin (2003). The watercourse within the site area was searched for signs of Otter at suitable locations. Otter signs include spraints (faeces), tracks, paths, food remains and shelters (holts and couches). The last is a particularly important survey requirement, in that breeding sites and resting places are specifically mentioned in the European legislation covering this species. Habitat type and quality were recorded in conjunction with the position of field signs.

Water Vole

- 6.33 Survey work for Water Vole *Arvicola amphibius* was based on searching along and adjacent to on-site watercourses, following the methodology of Strachan and Moorhouse (2006). In particular, areas of marshy grassland dominated by Soft Rush (*Juncus effusus*) and Purple Moor-grass (*Molinia caerulea*) adjacent to watercourses were searched. Survey concentrated on searching for field signs, principally droppings, feeding remains (for example, piles of pith from Soft Rush) and burrows.
- 6.34 Habitat type and, where relevant, quality were recorded, and positions of features established using a GPS. The type of field sign/s was recorded (i.e. burrows, feeding piles, droppings) as was the extent of individual Water Vole colonies.

Great Crested Newt

- 6.35 There were no potentially suitable ponds on the Site for Great Crested Newt *Triturus cristatus* and this species was discounted from further assessment.

Reptiles

- 6.36 Assessment for reptiles was carried out in conjunction with other field work. This entailed an assessment of the suitability of habitat for species of reptile.

Dormouse

6.37 The potential for Dormouse *Muscardinus avellanarius* was assessed through habitat appraisal. This included reviewing the Site for the following features, considered favourable for dormice (Natural England/Forestry Commission interim guidance, 2007):

- Woods that are connected to other areas of suitable woodland;
- Wide range of broadleaved species and ages present, in patches, scattered throughout, or around the edge;
- Shrub layer present, especially with hazel, honeysuckle or bramble;
- Species-rich scrub on woodland margins, ride sides or in patches;
- Canopy connections across tracks or thick, wide hedgerow connections to other nearby suitable habitat;
- Conifer/broadleaved mixtures or conifer plantations colonised by native broadleaves; and
- Fruiting hazel or sweet chestnut - ideally as managed coppice

6.38 There was no potentially suitable habitat for dormouse at the proposed intake and powerhouse locations, therefore, this species was discounted.

Survey Results

Desk Study

Protected Sites

6.39 The Site is not protected by any nature conservation designations. There are also no nature conservation sites within 500m of the site boundary. The nearest designation is Cefn Blaenau SSSI which lies 800m to the east and north-east of the Proposed Development. This SSSI is a small upland valley which supports a mosaic of habitats such as small wet flushes, valley mires and 'ffridd' (usually a mixture of Bracken, Gorse and Hawthorn). Such habitats have been greatly reduced in north Carmarthenshire due to land improvement and afforestation.

- 6.40 Two other SSSIs are found within 5km of the Proposed Development. These are Caeau Blaen-Bydernyn, 3.4km to the north-west and Cae Blaen-Dyffryn, 4.75 km to the north-east. The former is designated for its wet grassland and species-rich acid grassland and supports Marsh Fritillary, Small Pearl-bordered Fritillary butterflies and Scarlet Tiger-moth. The latter is an exceptionally rich botanical site (also managed as a Plantlife Reserve). It supports both Greater and Lesser Butterfly-orchids, Moonwort, Mountain Pansy and a range of other declining and local species.

Notable species

- 6.41 A data search was requested from West Wales Biodiversity Information Centre (WWBIC)⁴ for records of internationally or nationally protected and priority species, species of conservation concern and locally important species that may occur within 2km of the proposed turbines.
- 6.42 A large number of records were returned. By far the majority of these related to birds, mainly small passerines, flying over or using the search area for feeding.
- 6.43 No records were found of any raptor species (Red Kite, Kestrel *Falco tinnunculus*, Buzzard *Buteo* and Peregrine *Falco peregrinus*) nesting within 2km of the proposed turbines. There were however visual records of these species hunting over the Site.
- 6.44 There were no records of any bat species at or near the proposed turbine site.
- 6.45 There were no records of Otter or Water Vole within the area. A record of Badger occurs from 1994 at a site approximately 1.5km to the east. Single records also occur of Red Squirrel *Sciurus vulgaris*, 1km to the west of the Site, and Brown Hare *Lepus europaeus*, 2km to the south west of the Site.

Habitat Survey

Habitat Descriptions

⁴ The data search was requested by 'Ecology Matters' in 2007. It was considered unnecessary to repeat this search.

6.46 Habitats are marked on the Phase I habitat map (Figure 6.1). Species nomenclature follows that of Stace (2019). Target Notes (TN) are shown on this plan by the symbol TN.

6.47 The proposed Development can be divided into nine Phase I habitat categories:

- Improved and Poor semi-improved grassland
- Acid Grassland
- Marshy Grassland
- Neutral Grassland
- Wet Heath and Wet Heath/Acid Grassland Mosaic
- Acid Flush
- Scrub
- Broadleaved Woodland
- Coniferous Plantation

6.48 These are described more fully below:

Improved/poor Semi-improved grassland

6.49 Approximately two thirds of the Proposed Development, and particularly in the south and west of the core study area, comprises improved or poor semi-improved grassland. This grassland is of low species diversity and is largely dominated by Perennial Rye-grass *Lolium perenne*, with abundant White Clover *Trifolium repens*, occasional Creeping Buttercup *Ranunculus repens* and frequent Common Mouse-ear *Cerastium fontanum*. All of these species are indicative of long-continued agricultural improvement.

Acid Grassland

6.50 Acid grassland is found in the north of the Proposed Development, to the west, south and east of the proposed location for Turbine 2 (e.g. TN1). Species diversity is relatively high in these areas (though unexceptional) and includes a number of species typical of unimproved conditions. These include frequent Purple Moor-grass *Molinia caerulea*, frequent/abundant Heath Rush *Juncus squarrosus*, frequent Common Sedge *Carex nigra*, occasional Creeping Bent *Agrostis stolonifera*, frequent Mat-grass *Nardus stricta*, occasional Common Bent *Agrostis capillaris*, occasional/frequent

Carnation Sedge *Carex panicea*, occasional Pill Sedge *Carex pilulifera*, frequent Bilberry *Vaccinium myrtillus*, frequent Tormentil *Potentilla erecta*, occasional Heath Milkwort *Polygala serpyllifolia* and a range of characteristic mosses and lichens (e.g. *Hylocomium splendens*, *Pleurozium schreberi*, *Polytrichum commune* and *Cladonia portentosa*).

- 6.51 The presence of frequent Mat-grass and Heath Rush indicate over-grazed conditions, as both are favoured by intensive grazing. The track to the Proposed Development also supports a type of acid grassland community. This track has been abandoned for several years and now supports a number of species indicative of unimproved conditions. These include Lousewort *Pedicularis sylvatica*, Ivy-leaved Bellflower *Wahlenbergia hederacea* and species of sedges.

Marshy Grassland

- 6.52 Marshy grassland is found in the east of the Proposed Development (west of the small watercourse, TN4) and in a small area in the south-west (TN6). This is relatively species-rich with the main constituents being Purple Moor-grass and Sharp-flowered Rush *Juncus acutiflorus*, and other species such as frequent Velvet Bent *Agrostis canina*, occasional Marsh Thistle *Cirsium palustre*, occasional Bog Asphodel *Narthecium ossifragum* and occasional Devil's-bit Scabious *Succisa pratensis*. A heathy element is present in much of the marshy grassland, with frequent Heather *Calluna vulgaris*, and occasional Bilberry. Sedges (Carnation, Common and Green-ribbed *Carex binervis*) are also present as are the bog-mosses *Sphagnum fallax* (Frequent), *Sphagnum palustre* (Occasional) and *Sphagnum papillosum* (Rare). The area of marshy grassland in the east of the Proposed Development (close to the small watercourse) is becoming scrubby and is being invaded by Bramble *Rubus fruticosus* in particular.

Neutral Grassland

- 6.53 Much of the area to the west and east of Turbine 1 was recorded as neutral grassland. This includes the field where the access track emerges into open fields (TN3), as well as the slopes to the west of Turbine 1 (TN7). A

diverse sward is present here, with a range of grasses (Bents, Yorkshire-fog *Holcus lanatus*) being the main constituents. Eyebright *Eurphrasia officinalis* and Yellow Rattle *Rhinanthus minor* are both frequent to abundant and Whorled-caraway *Carum verticillatum* is found in abundance towards the southern and western edges of the smaller field (denoted by TN3). The sward surrounding Turbine 1 is not as species-rich and key species such as Eyebright, Yellow Rattle and Whorled-caraway are absent here.

Wet Heath and Wet Heath/Acid Grassland Mosaic

- 6.54 A relatively small area in the north of the Site has been categorised as wet heath or as a mosaic of acid grassland and wet heath (TN2). These areas contain many of the species detailed under the acid grassland category above, with (in the purer wet heath areas) a higher representation of Heather, Cross-leaved Heath and Deergrass *Trichophorum cespitosum*. Previously (2014), this area of wet heath and wet heath/acid grassland mosaic appeared to be over-grazed. This is indicated by the presence of frequent to abundant Heath Rush. However, in 2020, it was noted that the heath species (Heather, Cross-leaved Heath) appeared to be less suppressed by grazing and were probably more frequent, covering a larger area.

Acid Flush

- 6.55 Small areas within the wet heath and marshy grassland areas have been marked as acid flush. These areas are where bog-moss (*Sphagnum*) species are found beneath a layer of rushes. At the Proposed Development, the main rush species appeared to be Sharp-flowered Rush, with Soft Rush *Juncus effusus* playing a more minor role.

Scrub

- 6.56 Scrub is found along the margins of both the plantation woodland and towards the eastern edge of the Proposed Development in more open conditions. It mainly comprises Gorse *Ulex europaeus* and Bramble. Along the edge of the plantation, the scrub also contains Willow *Salix* and Hazel *Corylus avellana*. These scrubby margins and the more open area of Gorse provide good breeding conditions for a variety of common bird

species. Scrub is also becoming rather invasive in the area of marshy grassland in the east of the Proposed Development (close to the watercourse).

Broadleaved Woodland

- 6.57 Small areas of the Proposed Development comprise broadleaved woodland. It is found in small patches towards the southern end of the access track and in the south and south-west corners of the Proposed Development. The main species are Sessile Oak *Quercus petraea*), Hazel and occasional Ash *Fraxinus excelsior*. Planted Beech *Fagus sylvatica* is also present, particularly along boundary banks.

Coniferous Plantation

- 6.58 Coniferous plantation is found in a strip towards the west of the main access track. This is largely Spruce *Picea* and Larch *Larix*.

Flora

- 6.59 In general, the plant species recorded from the Site were all common and typical of the geographical locality. The species associated with the wet heath areas (in particular, Cross-leaved Heath, Heather, Bog Asphodel, sedges) are a more localised assemblage. The species associated with the area of neutral grassland are also more localised (and subject to widespread declines generally, along with the habitat itself). The frequency of Ivy-leaved Bellflower along the access track is also noteworthy, as this species is also subject to declining populations. No herbaceous plant species were found that are protected or are ecologically significant.

Breeding Birds Survey

- 6.60 No waders were recorded. There was no evidence of breeding Red Kite within the Proposed Development, though a single Red Kite was recorded flying to the south of the site. Small numbers of Buzzard *Buteo buteo* (in flight) were recorded on each survey visit.

- 6.61 The scrubby and marshy grassland areas of the Site provide good habitat for a range of common breeding species and in particular, scrub areas close to the main access track provide ideal conditions for breeding warblers (e.g. Chiffchaff *Phylloscopus collybita* and Willow Warbler *Phylloscopus trochilus*). Relatively high numbers of Skylark *Alauda arvensis* were recorded on each occasion, from the acid grassland and wet heath areas in the north of the Site.
- 6.62 Song Thrush *Turdus philomelos* were recorded from woodland surrounding the site and Reed Bunting *Emberiza schoeniclus* were singing from an area of marshy grassland just to the north of the site. The locations of those bird species listed under Section 7 of the Environment (Wales) Act 2016 and/or RSPB (Wales) red-listed species are shown on Figure 6.2.

Protected Species Surveys

Bats

- 6.63 In terms of reporting results, it should be noted that different bat species produce sonograms of varying distinctiveness. The Pipistrelles and Noctule are usually relatively straightforward to identify from a sonogram. The different Myotis species can be difficult to distinguish even when a high-quality sonogram is recorded because they are so similar. Natterer's and Daubenton's bats can sometimes be identified with a reasonably high degree of confidence (80%), whereas Whiskered and Brandt's Bats are less easy to separate (approx. 60% confidence i.e. the bat is slightly more likely to be either a Whiskered or a Brandt's Bat).
- 6.64 The bat survey results for summer and autumn 2020 are reported below.
- 6.65 Summer (9th – 24th July 2020). Species recorded included Common Pipistrelle (Ppip in the table below), Soprano Pipistrelle (Ppyg), indeterminate Pipistrelle (Pip), Brandt's Bat (Mbr), Daubenton's Bat (Md), indeterminate Myotis (Myotis), and indeterminate bats (Unknown; usually due to an indistinct sonogram).

- 6.66 The level of recorded bat activity at Turbine 1 was low, with bat activity recorded on just six of the 15 night survey period. Only 55 passes were recorded during the survey period, the majority of which were Common Pipistrelle passes (~89%). Table 6.3 presents a summary of the results.
- 6.67 No activity was recorded at Turbine 2.
- 6.68 No foraging activity was recorded at any point during the survey; there were no feeding buzzes recorded, the majority of passes were isolated in time, and passes generally comprised only a few calls, which all probably indicates commuting bats rapidly passing by the detectors.

Turbine no.	Ppip	Ppyg	Pip	Mbr	Myotis	Md	Unknown	Total
T1	49	4	2					55
T2	341	112	52	3	4	2	7	521

Table 6.3. Summary of bat activity recorded during the Summer survey period

- 6.69 Summer (17th September – 14th October 2020). The species recorded included Common Pipistrelle, Soprano Pipistrelle, and Noctule. Activity levels were very low, with just two passes at Turbine 1, and 17 at Turbine 2. Turbine 1 recorded no activity on 16 of the 18-night survey period, and Turbine 2 had no activity on 11 nights of the survey period. 94% of the passes were produced by either Common or Soprano Pistrelles, with just one Noctule pass.
- 6.70 The data is summarised in Table 6.4.
- Again, no feeding buzzes were recorded, implying that bats were not lingering around the detector stations.

Turbine no.	Ppip	Ppyg	Nn	Total
T1	2			2
T2	8	8	1	17

Table 6.4. Summary of bat activity recorded during the Autumn survey period

Badgers

- 6.71 Few signs of recent Badger activity were found on the Site. The area of pasture land to the west of Esgairliving showed signs of recent foraging activity by Badger (snufflings in the turf where Badger had been looking for Leatherjackets and other invertebrates). In addition, a single hole was found at SN57088 40744. This appeared to have been recently used as an 'outlier sett', as evidenced by freshly excavated earth at the entrance. A further disused hole was found, close to the access track at SN57115 40684. This was identified as a Badger hole, potentially an 'outlier'. The hole had not been recently used however, as was evidenced by debris/detritus accumulating in the entrance and spiders' webs constructed across the entrance. A single path led from this hole, through a fence to the access track. The locations of these badger 'setts' (holes) are marked on Figure 6.3.

Dormouse

- 6.72 There was no suitable habitat on the Site to support Dormouse. The majority of the criteria outlined in paragraph 6.38 were not met, and therefore there was no suitability for Dormouse.

Otter

- 6.73 No signs of Otter were recorded at the Proposed Development. Use of the watercourse will be at most occasional.

Water Vole

- 6.74 No signs of Water Vole were recorded (though the habitat close to the watercourse appeared relatively suitable). The absence of field signs means that Water Vole are not present in the Proposed Development.

Reptiles

- 6.75 Small areas of habitat appeared suitable for supporting common species of reptile. This included the wet heath/acid grassland mosaic, which was suitable for small numbers of Common Lizard *Lacerta vivipara*.

Other Species

- 6.76 No other species of recognised conservation value were recorded in the Proposed Development.

Assessment of Effects

Summary of Habitat, Species and Value

Habitats

- 6.77 For the majority of the Proposed Development, the habitats are of low ecological value. For this reason, there are also few associated species of conservation concern. The exceptions to this are the area of neutral (unimproved) grassland in the centre of the Proposed Development (TN 3, TN7), the area of marshy grassland also in the east (immediately west of the small watercourse, TN4) and a similar area in the west of the Proposed Development (TN6). These areas are considered to be of District level of value. The area of wet heath at TN2 is also considered to be of District level of value.
- 6.78 The footprint for Turbine 1 comprises an area of semi-improved neutral grassland of relatively low species diversity. This is of parish/neighbourhood ecological value. The footprint for Turbine 2 is situated in an area of wet heath/acid grassland of low species diversity. The habitat surrounding the Turbine 2 area appears to have become of better quality since 2014, due to reduced levels of grazing. Wet heath is relatively extensive in the Welsh uplands and this example should be rated as of District level of ecological value. Due to the fact that it has remained disused for a number of years, the existing access track has developed a relatively rich flora. This includes the local and declining species Ivy-leaved Bellflower. The area crossed by the new section of access track comprises unimproved neutral grassland, unimproved acid grassland and acid grassland/wet heath mosaic. The

neutral grassland is of District level of value, with the area of unimproved acid grassland being of parish/neighbourhood level of value. The area of acid grassland/wet heath mosaic is also of District level of value (see Appendix 6.1).

Birds

- 6.79 No breeding waders were recorded and it can be stated conclusively that none are breeding at the Site.
- 6.80 A single Red Kite was recorded during the course of bird surveys and other surveys. This area is in the heart of a buoyant population of Red Kite. The low number of records made of this species is not considered to be significant.
- 6.81 Whilst a reasonable range of passerine species were recorded at the Proposed Development, none of these were considered significant, either in terms of species or numbers.
- 6.82 The Site supports a good number of Skylark (amber-listed species in Wales), but not exceeding three pairs. This is a relatively low number for upland Wales, compared to similar sites.
- 6.83 The Site is relatively poor for birds (apart from passerine species) and should be rated as of parish/neighbourhood level of value, as defined in Appendix 6.1.

Bats

- 6.84 Extensive recording at the turbine locations during the summer and autumn periods only identified very low to low levels of bat activity. As a result, it can be stated with confidence that the risk of bat collision at the site is extremely unlikely. The turbine locations also accord with the separation distance stipulated in the Natural England TIN051 guidance note. The site is of parish/neighbourhood level of value for bat species, as defined in Appendix 6.1.

Other Protected Species

- 6.85 The Proposed Development is used occasionally by Badger, as evidenced by a single recently used outlier hole, a disused outlier hole and feeding

signs in the grassland. No other protected species or signs of protected species were recorded at the Site. The Site has therefore been rated as of parish/neighbourhood level of value for protected species, as defined in Appendix 6.1.

Possible Impacts of Proposed Development

- 6.86 For the most part, the lack of ecologically valuable or significant habitats, and the absence of protected species, means that there are limited ecological concerns relating to the Proposed Development. Areas of note are outlined below.

Construction Phase

Designated Sites

- 6.87 There are three designated sites within 5km of the proposal. The ecological characteristics of these sites and their locations mean that there can be no possibility of impacts on them from the proposal. This is because all three have been designated for their vegetation and/or invertebrate communities. The small-scale nature of the Proposed Development will not result in any impacts on these sites. Overall, impacts on designated sites are considered to be neutral (Table 6.2).

Habitats

- 6.88 Small areas of habitats will be removed for construction. In general, these habitats are of low (parish/neighbourhood) level of value. Small areas, such as the neutral grassland (TN3) and wet heath are of higher (District value). It should be noted that the majority of neutral grassland will be avoided, as the track across this area runs along the eastern edge of the field, which is less species-rich than the centre and western edge of the field. The removal of these habitats would represent a major negative impact, since it would be long term. Therefore, combined with parish/neighbourhood level of value, overall impacts are within the range of minor – moderate (see Table 6.2). Since the ecological value of the habitat at the Site is low, the removal of small areas of this habitat should be considered as a minor adverse impact (non-significant, see Table 6.2).

Where habitats of District level value neutral grassland, wet heath are removed, this would be considered as a more moderate impact but would be deemed as non-significant (see Table 6.2).

Birds

- 6.89 The breeding bird assemblage at the Site is considered to be poor to moderate and has been rated at a parish/neighbourhood level of value. However, if construction operations are carried out during the bird nesting season (March to August inclusive), it is considered that there is a low risk that ground-nesting or arboreal nesting birds could be harmed through the clearance of vegetation required to accommodate the turbines and their associated infrastructure or any pruning/felling of overhanging trees and shrubs required to facilitate access. It is considered highly unlikely that any species listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) would be affected in this way (none were present at the Site). Therefore, this represents a negative potential impact at a parish/neighbourhood level resulting in an overall minor negative impact; therefore, this is non-significant (see Table 6.2). Outside the bird breeding season, this impact would be reduced to negligible or neutral.
- 6.90 A minor period of disturbance is likely to occur during the construction phase due to the noise of machinery. However, the low numbers of birds present on-site and, in particular, the absence of any Schedule 1 breeding birds means that any disturbance effects will be very limited. Again, overall impacts are considered to be minor negative, therefore, this is non-significant (see Table 6.2).

Protected Species

- 6.91 The lack of protected species at the Site (apart from low level of usage by Badger and the foraging by bats along the access track area) means that there will be no impact from construction on these species. There is some potential for very low numbers of common reptiles to be present (e.g. Common Lizard *Lacerta vivipara*). There is therefore a very slight potential for these species to be crushed by machinery. Impacts are considered to

be negative, and therefore, combined with parish/neighbourhood level of value, overall impacts are minor (non-significant, see Table 6.2).

Operational Phase

Habitats

- 6.92 No additional impacts are anticipated on habitats during the operational phase.

Birds

- 6.93 It is not anticipated that there will be any disturbance impacts on birds during the operational phase. The general lack of breeding birds and the low levels of noise generated by operational wind turbines of this size will not produce any disturbance impacts on breeding birds. Effects are considered to be neutral (see Table 6.2).
- 6.94 The combination of two single turbines and the relatively low density of birds using the Site make the risk of bird collision very low. Bird collisions are often raised as an issue concerning wind farm developments. However, a number of studies (Winkelman, 1985, Winkelman, 1992, Musters et al, 1996, Still et al, 1995) have shown that a majority of operational wind turbines have negligible effects on bird populations. Where turbines are present in much greater numbers, and are inappropriately sited on migration and/or important breeding sites, more serious effects can arise (Orloff and Flannery, 1992, SEO/Birdlife, 1995). The proposal comprises two single turbines. It is not on a recognised migration route. No waders, waterfowl or other migrating species were recorded.
- 6.95 It can therefore be stated with confidence that the numbers of these birds flying over the Site or using it for foraging do not pose any serious risk of collision. Impacts are predicted as being negative, which combined with the Parish/neighbourhood level of value, results in an overall minor negative impact (non-significant, see Table 6.2).

Protected Species

- 6.96 There is a low potential for blades to strike resident bat species. Mitchell-Jones and Carlin (2009) have carried out an analysis of available information related to UK bats and wind turbines. Although some areas are still in need of research (e.g. definitive answers as to whether any British bats migrate), it is clear from the available information that those species that forage at height are much more likely to collide with operational turbine blades. Furthermore, the density of bat populations is a key factor, i.e. the more bats that are using an area, the more likelihood there is of collision. On both these counts, the Site presents a very low risk. In particular, the open conditions surrounding the turbine locations mean that bats are only likely to forage there in ideal weather conditions. Moreover, the lack of good flightlines also militates against high bat usage. The low availability of roost sites associated with the Site is also indicative of low bat usage. Mitchell-Jones and Carlin (2009) cite a number of these factors as being integral to the size of bat populations. In particular, open, relatively windy sites which lack roost locations are considered to be of low value to bat populations. The lack of records of bats for the area from the data search underlines these conclusions. This is also backed up by the results of the 2020 bat survey, which identified that very few bats were passing the turbine locations. In addition, the turbines are positioned at greater than 50m in terms of blade sweep from the nearest boundaries and thus accord with Natural England TIN051. As a result, the risk of bat collision is very low. Effects are considered to be negative, which, combined with parish/neighbourhood level of value, results in an overall minor negative impact (non-significant, see Table 6.2).

Mitigation

Construction Period Effects

Habitats

- 6.97 The width of the track through the neutral grassland and through areas of wet heath and wet heath/acid grassland mosaic should be kept to a minimum. Spoil from the track construction should be deposited on the downslope side of the track through the neutral grassland. No other

mitigation is considered necessary for construction period effects on habitats (but see enhancement section below).

Birds

- 6.98 Any felling or pruning of woody vegetation that might be required will, where possible, be undertaken outside the bird nesting season (typically mid-February to August inclusive), or be immediately preceded by a detailed inspection by an ecologist for nests. Should any active nests be found, they will be left undisturbed with at least a 5m buffer of cover around them until the young have fledged.
- 6.99 Similarly, all in-field areas that might be affected by the Proposed Development will be inspected for ground-nesting birds immediately prior to any construction activities being undertaken during the bird nesting season. Any active ground nests that are found will be clearly marked (e.g. with a coloured cane) and left undisturbed until the young have fledged, with a buffer zone of at least 30m established around each nest in which no activities should be undertaken.

Protected Species – Badger

- 6.100 The location of the single used Badger hole close to the access track should be subject to a pre-construction survey to determine usage immediately prior to construction. If there is any suggestion of usage, any Badgers associated with this hole should be allowed to disperse and the hole itself closed off, in line with standard procedures. A speed limit of 15mph should be maintained at the Site, in line with recommendations on other sites. This will allow reptiles to make their escape unharmed from vehicles.
- 6.101 No other mitigation is considered necessary with regard to other protected species.

Operational Period Effects

- 6.102 No mitigation is considered necessary for operational period effects.

Enhancement of Nature Conservation Value of Site

- 6.103 The loss of small areas of unimproved habitat as a consequence of the Proposed Development is non-significant but ecological enhancement is proposed. The Applicant proposes to establish hedges and/or trees which would result in the planting of up to 1,319.4m, to improve connectivity in the wider landscape by providing 'wildlife corridors'.. The reduced grazing levels that are evident around the location of Turbine 2, should be continued as this has already resulted in tangible benefits. Similarly, the maintenance of the neutral grassland hay meadow areas, as denoted by TN3 and TN7, should continue in line with current procedures. These have already resulted in good quality grassland habitats. These measures would benefit a variety of species and would result in an ecology gain over and above any ecology loss.

Residual Effects and Conclusion

- 6.104 Provided the mitigation measures stipulated in paragraph 6.99 onwards are adhered to, the Proposed Development will not result in any significant adverse effects. Moderate (though non-significant) adverse effects remain for the area of neutral grassland (TN3) and the area of wet heath and wet heath/acid grassland mosaic (Turbine 2 and associated track). These will be compensated for through the implementation of habitat enhancement elsewhere.

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