



Sycamore Farm

on behalf of Myriad CEG Ltd.

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1 INTRODUCTION

1.1 BACKGROUND AND AIMS

- 1.1.1 Myriad CEG Ltd have submitted a planning application to Barnsley Council for the construction and operation of two 11kW Gaia wind turbines at Sycamore Farm, Oxspring, Yorkshire.
- 1.1.2 The proposed turbines are to be located at the following grid references;
- Turbine 1 - 426299, 401873.
 - Turbine 2 - 426254, 401919.
- 1.1.3 In response to the application, the Council's biodiversity officer requested additional information with regard to the potential for ecological impacts arising from the development.
- 1.1.4 Avian Ecology Ltd. was subsequently commissioned by Myriad CEG Ltd. to assess the likely ecological impacts arising from the development, and to specifically address the potential issues raised by the Council's biodiversity officer.
- 1.1.5 This assessment broadly follows the principles of the Institute of Ecology and Environmental Management (IEEM) 'Guidelines for Ecological Impact Assessment' (2006). The aims of this ecological appraisal are therefore to:
- Identify any ecological resources that are likely to be affected by the development;
 - Select ecological features and issues which constitute potential constraints in relation to the development and therefore require detailed assessment;
 - Provide an objective and transparent assessment of the ecological impacts of the project;
 - Facilitate objective and transparent determination of the consequences of the development in terms of national, regional and local policies relevant to nature conservation and biodiversity; and
 - Set out what steps would be taken to adhere to legal requirements relating to designated sites and legally protected or controlled species.
- 1.1.6 This report firstly describes the current legislation and guidance relevant to the assessment, and then the methodologies used to assess the potential effects of the project upon ecological resources during the construction, operation and decommissioning phases.
- 1.1.7 Where impacts are predicted, measures to be incorporated into the Project design to mitigate, or reduce the significance of these effects are suggested. Finally, residual impacts are discussed, followed by the summary and conclusions of the assessment.
- 1.1.8 Professional judgment has been used throughout this appraisal, particularly for the determination of potential impacts, where there is a lack of information about the behaviour of the species concerned.

1.2 REGULATORY AND POLICY FRAMEWORK

1.2.1 Articles of British wildlife and countryside legislation, policy guidance and both Local and National Biodiversity Action Plans (BAPs) are referred to. Their context and applicability is explained as appropriate in the relevant sections of this report. The articles of legislation are:

- The Wildlife and Countryside Act 1981 (as amended), referred to as WCA 1981;
- The Conservation of Habitats and Species Regulations 2010;
- The Natural Environment and Rural Communities Act (NERC) 2004;
- EC Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC;
- EC Council Directive on the Conservation of Wild Birds 2009/147/EC;
- The Protection of Badgers Act 1992, as amended;
- Planning Policy Statement 9: Biodiversity and Geological Conservation; ODPM, August 2005 (under review);
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services (2011);
- The United Kingdom Biodiversity Action Plan (UK BAP); and
- Barnsley Local Biodiversity Action Plan (LBAP)

2 METHODOLOGY

2.1.1 The assessment was completed through desk-study and was further informed by comments received from the council's biodiversity officer. No field visits have been undertaken.

2.1.2 Following IEEM (2006) guidelines, a 'zone of influence' has been identified as the area within which lie ecological resources and areas that may be affected by the development in question.

2.2 DESK STUDY

2.2.1 A detailed desk study was undertaken in order to identify the presence of designated sites and any records of protected or notable species at the site or in the immediate environs. A number of organisations were contacted to access relevant ecological records and obtain scoping opinions.

2.2.2 A search was conducted for existing information on:

- Statutorily designated sites (i.e. Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR) and Local Nature Reserves (LNR));
- Non-statutorily designated sites (e.g. Ancient Woodland Inventory, Local Wildlife Site);
- Legally protected or notable species (e.g. the presence of bat roosts or badgers *Meles meles*); and,

- UK and Local Biodiversity Action Plan priority habitats and species.
- 2.2.3 Searches were made from an approximate central point between the two proposed turbines (at SE 263 108).
- 2.2.4 The following search areas were used to define the zone of influence:
- Non-mobile features:
- All statutory designated sites within a 3km radius.
 - All non-statutory sites within a 2km radius.
- Features with high mobility:
- All bat records with a 2km radius, extended to 5km for noctule bats.
 - All protected and notable bird species records within a 2km radius.
- 2.2.5 The following resources were utilised:
- Natural England Website (www.naturalengland.org.uk/).
 - Barnsley Biological Records Centre (BBRC).
 - Barnsley Local Biodiversity Action Plan (LBAP). Available at : http://www.barnsley.gov.uk/0xac16000b_0x00483626 [accessed on 13/02/2012]
- 2.2.6 Reference was also made to Ordnance Survey maps of the region and on-line aerial images (www.google.co.uk/maps) in order to determine any potential features of nature conservation interest in the wider area.

2.3 IMPACT ASSESSMENT METHODOLOGY

- 2.3.1 The assessment of potential impacts to ecological receptors and the significance of these impacts followed the guiding principles provided by the Institute of Ecology and Environmental Management (IEEM) (2006).
- 2.3.2 The construction, operation and decommissioning of the proposed wind farm may result in a range of impacts on ecological receptors.
- **Construction impacts:** An area of land will be appropriated to accommodate the wind turbine base, site compound and control building, hard standings and infrastructure for electricity cabling and transport. The surfacing of new and upgraded access tracks could give rise to negative impacts, such as habitat destruction or fragmentation. Additionally, materials could be stored or deposited in areas of ecological value which would have negative impacts on biodiversity associated with these habitats. Noise and disturbance impacts from construction traffic and personnel may also be an issue. The duration of construction impacts would be temporary, estimated at nine months or less from the respective start dates. For this impact assessment, the potential impacts from decommissioning activities are assumed to be equivalent to those of the construction phase.

- **Avoidance during operation:** These effects are defined as the abandonment, temporary or permanent, of areas of wildlife significance following wind turbine construction, due to the presence of the turbine or related operational activities. This is mostly relevant to volant (i.e. flying) species and so the key concern is the possible disruption of bat and bird flight paths and foraging. Effects may be either temporary and will disappear with habituation, or permanent. Potential non-permanent impacts are judged to be reversible upon decommissioning of the turbines.
- **Collision mortality during operation:** The hazard exposure of a particular species should consider the number of individuals observed and the amount of flight activity exhibited in the proximity of the proposed turbines. The consequence of collisions with turbine blades is presumed to be 100% mortality. The impacts will persist for the duration of the operative life of the development. Potential impacts are judged to be reversible upon decommissioning of the turbine.
- **Impacts on surrounding areas of biodiversity value:** There can be the potential for a wind turbine to indirectly impact nearby wildlife refuges (e.g. SSSIs) by affecting species which reside for some length of time within the refuge, but at other times forage or migrate into the surrounding landscape within range of the turbine. The minimum duration of operational impacts is estimated at 25 years. Potential impacts are judged to be reversible upon decommissioning of the turbine.

2.3.3 The IEEM (2006) ecological impact assessment guidelines state that, where possible, the magnitude of impact should be quantified. When necessarily defined in qualified terms the impact magnitude categories and criteria are defined as:

- **Major negative impact** – that which has a harmful impact on the integrity of a conservation site or the conservation status of a population of a species within a defined geographical area (e.g. fundamentally reduces the capacity to support wildlife for the entirety of a conservation site, or compromises the persistence of a species' population);
- **Intermediate negative impact** – that which has no adverse impact on the integrity of a conservation site or the conservation status of a species' population, but does have an important adverse impact in terms of achieving certain ecological objectives (e.g. sustaining target habitat conditions and levels of wildlife for a conservation site or maintaining population growth for a species);
- **Minor negative impact** – some minor detrimental effect is evident, but the consequences to the conservation status of the affected species are considered to be insignificant;
- **Neutral impact** – that which has no predictable impact;
- **Positive impact** – that which has a net positive impact on a wildlife species.

2.3.4 The likelihood that an impact will occur is categorised to be:

- **Certain/Near-certain** – probability of occurrence estimated at 95% chance or higher;
- **Probable** – probability of occurrence estimated above 50% but below 95%;
- **Unlikely** – probability of occurrence estimated above 5% but less than 50%;
- **Extremely Unlikely** – probability of occurrence estimated at less than 5%.

- 2.3.5 Impacts were evaluated for importance (defined by a geographic frame of reference) with consideration of any statutory and/or non-statutory conservation status awarded to the affected receptor. The spatial importance of impacts are categorised following definitions given by the IEEM (2006) guidance.
- **International;**
 - **National;**
 - **Regional;**
 - **County;**
 - **District;**
 - **Parish/Local;**
 - **Within site only (i.e. the development site).**
- 2.3.6 Following the IEEM (2006) guidelines, an ecologically significant impact is that which impacts the integrity of a defined site or ecosystem and/or the conservation status of habitats or species populations within a defined geographical area. 'Integrity' in this technical sense is defined within the IEEM guidelines as "The coherence of [a site's] 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." Within the same guidelines, 'conservation status' is defined: "for species, conservation status is determined by the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area."
- 2.3.7 For the purposes of this assessment, significance (as applied for the purposes of the Town and Country Planning Act 1990) may only be attached to impacts of either intermediate negative, major negative or positive magnitude.

3 BASELINE

3.1 BACKGROUND

- 3.1.1 This section provides a summary of baseline conditions, established by combining the previously detailed desk study and field survey results.

3.2 CONSULTATION

- 3.2.1 No direct consultation was undertaken to inform this report; however Myriad CEG provided comments received from the Council's biodiversity officer (name and date unknown). These are presented as follows;
- *"Figure 10 [of the planning application submitted by Myriad CEG] is a photomontage of the new turbines on the existing site, which is shown as grassland - that to be lost due to the footprint of the turbines and the construction phase needs to be assessed and mitigation for the losses proposed in proportion to the development. This could include, for example, bird and/ or bat boxes elsewhere on the owner's nearby landholdings. The statement on page 33 about any direct habitat loss as a result of the development being negligible is almost correct - the loss of grassland is small,*

but needs mitigating. The more biodiverse the grassland, the more mitigation.

- They state that there are no designated wildlife sites within 3km, which is correct with respect to statutorily protected sites. But there appears to have been no attempt to find out if any Local Wildlife Sites (Natural Heritage Sites) or Regionally Important Geological/ Geomorphological Sites exist nearby. This information is on the UDP maps and details can be obtained via myself.
- I accept what is said about there being no internationally important bird sites close to the site. But again, there appears to be no attempt to make any enquiries of any local wildlife surveyors (such as Barnsley Bird Study Group or Barnsley Bat Group), myself or any Local Records Centres to gather any local bird or priority/protected species data and interpret it. Barnsley Biological Records Centre is now operating and I can provide the links to that resource.
- I am aware that the RSPB are broadly supportive in principle of wind turbine developments such as this, but they do also say that it is subject to site-specific analysis of the risks to nearby wildlife - reference their concerns over the turbine proposals for New Park Springs, Grimethorpe.
- Without the LWS/NHS or local bird/ species data I cannot accept the assertion that the local ecology interests are not at significant risk of harm from the development proposal”.

3.3 DESIGNATED SITES

- 3.3.1 No statutory designated sites are present within at least 3km of the proposed development.
- 3.3.2 No Geological/ Geo-morphological Sites have been identified within at least 500m of the proposed development area.
- 3.3.3 One local non-statutory designated site is present within 2km of the proposed development, as detailed in Table 3.1, below.

Site Name	Designation	Distance & Direction from Turbine	Reason for Designation/ Qualifying Features
Black Moor Common	Natural Heritage Site (Barnsley)	c.1.6km south east	Habitats: unmanaged acid grassland and dry heath with developing scrub. Supports locally notable bird species.

Table 3.1 Non-statutory designated sites within a 2km radius of the proposed turbines (excluding geological/geomorphological sites)

3.4 HABITATS

- 3.4.1 No field survey has been undertaken; however a high-level appraisal of habitats on and around the proposed development site has been completed using on-line aerial images, maps and site photographs provided by Myriad CEG.

- 3.4.2 The area on and around the development site is under agriculture, with a mixture of arable land and improved pasture. The field in which the turbines are to be located is on rotation of arable (corn production) use and intensively managed pasture used for silage production (*per. landowner*).
- 3.4.3 Field boundaries comprise largely of stone walls typical of the area, with occasional scattered bushes or trees.
- 3.4.4 No ponds or watercourses are located within at least 500m of the proposed turbines and access areas. The site is also crossed by overhead power cables.
- 3.4.5 No evidence was found that any habitats of significant conservation value are present within at least 500m of the proposed development area and habitats are therefore considered to be of no more than site value.

3.5 ORNITHOLOGY

- 3.5.1 It is possible to predict the likely suite of breeding and wintering birds through assessment of habitats, analysis of records received through consultation and placing these in the context of the geographical location of the application site.
- 3.5.2 This approach establishes that the application site and surrounding area probably support a range of breeding farmland birds typical of the region. Improved pasture fields used for silage production generally support few breeding birds due to the sward-length and cutting regime and often the use of chemical fertilisers. In arable years, it is possible that breeding species change slightly and the area may become slightly more or less attractive to a similar suite of birds depending upon the field management regime. Stone wall field boundaries are likely to reduce the suite of breeding birds due to limited foraging and nesting opportunities.
- 3.5.3 It is considered unlikely that the site supports populations of notable breeding birds, but it may support some species of local conservation value (as listed in Birds of Conservation Concern 3, Eaton *et al.*, 2009), such as lapwing *Vanellus vanellus*, skylark *Alauda arvensis* or yellowhammer *Emberiza citrinella*
- 3.5.4 During the winter months, the application site and surrounding farmland may additionally provide foraging habitat for some wader species, such as curlew *Numenius arquata*, golden plover *Pluvialis apricaria* and lapwing.
- 3.5.5 This overview is supported by the suite of species records returned from records searches. All bird records received from BBRC are summarised in Table 3.2, below.

Species	Status	Comment
Pink-footed goose <i>Anser brachyrhynchos</i>	BoCC Amber list	Two records returned from BBRC.
Kestrel <i>Falco tinnunculus</i>	BoCC Amber list	Ten records returned from BBRC. May breed locally.
Quail <i>Coturnix coturnix</i>	BoCC Amber list	One record from BBRC.
Grey partridge <i>Perdix perdix</i>	BoCC Red list, Species of Principal Importance (NERC)	One record from BBRC.
Lapwing <i>Vanellus vanellus</i>	BoCC Red list	35 records returned from BBRC. May breed

	Species of Principal Importance (NERC)	locally.
Curlew <i>Numenius arquata</i>	UKBAP, BoCC Amber Species of Principal Importance (NERC)	9 records returned from BBRC.
Common snipe <i>Gallinago gallinago</i>	BoCC Amber	Two records returned from BBRC.
Stock dove <i>Columba oenas</i>	BoCC Amber list	Three records returned from BBRC.
Cuckoo <i>Cuculus canorus</i>	BoCC Red list , Species of Principal Importance (NERC)	One records from BBRC.
Green woodpecker <i>Picus viridis</i>		Three records returned from BBRC.
Kingfisher <i>Alcedo atthis</i>	BoCC Amber list	Four records returned from BBRC.
Skylark <i>Alauda arvensis</i>	BoCC Red list, Species of Principal Importance (NERC)	Eighteen records returned from BBRC.
Swallow <i>Hirundo rustica</i>	BoCC Amber list	22 records returned from BBRC.
Meadow pipit <i>Anthus pratensis</i>	BoCC Amber list	10 records returned from BBRC.
Grey wagtail <i>Motacilla cinerea</i>		Eleven records returned from BBRC.
Dunnock <i>Prunella modularis</i>	BoCC Amber list, Species of Principal Importance (NERC)	19 records returned from BBRC.
Fieldfare <i>Turdus pilaris</i>	BoCC Red list (breeding)	7 records received from BBRC.
Mistle thrush <i>Turdus viscivorus</i>	BoCC Amber list	12 records received from BBRC.
Song thrush <i>Turdus philomelos</i>	BoCC Red list, Species of Principal Importance (NERC)	13 records returned from BBRC.
Blackbird <i>Turdus merula</i>		29 record returned from BBRC.
Willow warbler <i>Phylloscopus trochilus</i>	BoCC Amber list	16 records returned from BBRC.
Wood warbler <i>Phylloscopus sibilatrix</i>	BoCC Red list, Species of Principal Importance (NERC)	1 records from BBRC.
Goldcrest <i>Regulus regulus</i>		1 records from BBRC.
Spotted flycatcher <i>Muscicapa striata</i>	BoCC Red list, Species of Principal Importance (NERC)	Two records returned from BBRC.
Starling <i>Sturnus vulgaris</i>	BoCC Red list, Species of Principal Importance (NERC)	Seventeen records returned from BBRC.
House sparrow <i>Passer domesticus</i>	BoCC Red list, Species of Principal Importance (NERC)	24 records from BBRC.
Tree sparrow <i>Passer montanus</i>	BoCC Red list, Species of Principal Importance (NERC)	Ten records from BBRC.
Linnet <i>Carduelis cannabina</i>	BoCC Red list, Species of Principal Importance (NERC)	11 records returned from BBRC.
Goldfinch <i>Carduelis carduelis</i>		Twenty records returned from BBRC.
Bullfinch <i>Pyrrhula pyrrhula</i>	Species of Principal Importance (NERC)	Three records received from BBRC.
Reed bunting <i>Emberiza</i>	BoCC Amber list,	Six records from BBRC.

<i>schoeniclus</i>	Species of Principal Importance (NERC)	
Yellowhammer <i>Emberiza citrinella</i>	BoCC Red list, Species of Principal Importance (NERC)	Seventeen records returned from BBRC.

Table 3.2 Summary of all bird records received from BBRC.

- 3.5.6 No records of Schedule 1 protected species (WCA 1981, as amended) were returned, but it is possible that the area supports species such as barn owl *Tyto alba*.
- 3.5.7 Overall the site is considered likely to be of no more than borough-level value for breeding and wintering birds.

3.6 PROTECTED SPECIES

Bats

- 3.6.1 Habitats on and around the application site appear to be of low value for bats as a result of their open nature and lack of woodland and hedgerows features. Intensively managed grassland and arable fields around the application site are unlikely to provide significant bat foraging opportunities.
- 3.6.2 No potential roost sites (buildings or mature trees) appear to be located within at least 100m of the proposed turbine locations.
- 3.6.3 All bat records received from BBRC are summarised in Table 3.3, below.

Species	Comment
Bat Species (2km search area) <i>Chiroptera spp.</i>	Two records of unidentified bats species were returned from BBRC. Both are from 2008 and no locations were provided.
Noctule bat <i>Nyctalus noctua</i>	Six records were provided, with dates ranging from 1979 to 2011. The most recent records were from Blacker Dam (c.4km NE) and Gunthwaite Dam (c4km NW).

Table 3.3 Summary of all bat records received from BBRC.

- 3.6.1 Overall the site is considered likely to be of no more than local/parish value for bats.
- #### **Other Species**
- 3.6.2 Other protected and notable species have been considered.
- 3.6.3 The turbines are to be located within an intensively managed field and, as such, it is unlikely that noteworthy mammals are regularly present.
- 3.6.4 Badgers may forage in the proposal field occasionally, but it is unlikely to support a badger sett due to management practices. As such, no value is assigned for badgers.
- 3.6.5 No ponds or watercourses have been identified within at least 500m of the development area, so it is extremely unlikely that the site supports aquatic species such as great crested newts *Triturus cristatus*, otters *Lutra lutra* or water voles *Arvicola amphibius*. As such, no values are assigned for aquatic species.
- 3.6.6 In the context of the proposed development, no other species are considered pertinent.

4 ASSESSMENT OF POTENTIAL IMPACTS

4.1 DESIGNATED SITES

- 4.1.1 There would be no direct impacts on any statutory or non-statutory designated sites due to the small scale of the development and the locational context of the site.

4.2 HABITATS

- 4.2.1 No notable or important habitats would be subject to impacts from the project.
- 4.2.2 There will be a permanent loss of a small area of intensively managed farmland (improved pasture/arable land) under the footprint of the access track and turbine locations. This habitat is of low value for wildlife and is also abundant within the wider landscape; therefore the consequence of habitat loss is deemed negligible.

4.3 ORNITHOLOGY

- 4.3.1 Construction impacts on breeding and wintering birds will comprise a temporary increase in disturbance levels and the small-scale loss of habitat of low ecological interest.
- 4.3.2 Habitat loss during the breeding season has the potential to result in the disturbance and or destruction of nest sites.
- 4.3.3 Operational wind turbines are widely acknowledged to impact on some bird species, either through collision with the turbine blades or through displacement effects. Natural England have published guidance in '*Assessing the impact of onshore wind farms on birds*', Technical Information Note 069 (NE, 2010), which provides a list of species where detailed impact assessments and monitoring are likely to be required in locations used by nationally (or regionally) important populations.
- 4.3.4 In general, vulnerable species are considered to be rarer raptors, upland waders and concentrations of waterbirds. Detailed consideration is also given to species which represent qualifying interests of nearby statutory designated sites.
- 4.3.5 No statutory designated sites with bird interest were identified within at least 3km of the proposed turbines.
- 4.3.6 The site is likely to support a range of farmland birds typical of the habitats on site, including some species of local conservation concern (Eaton *et al.* 2009). These species are not typically considered vulnerable to impacts from wind turbine developments, and no such species are listed in NE guidance (TIN069); however it is possible that minor levels of displacement and/or collision will occur.
- 4.3.7 Records of key species received from consultation are summarised in Table 4.1. Key species are classified as those listed in NE Guidance TIN069 (2010).

Species	Summary
Pink-footed goose <i>Anser brachyrhynchus</i>	Two records returned from BBRC.

Species	Summary
Lapwing <i>Vanellus vanellus</i>	35 records returned from BBRC. May breed locally.

Table 4.1. Notable bird species records (in accordance with NE guidance TIN 069).

- 4.3.8 Referring to the species listed in Table 4.1, pink-footed geese *Anser brachyrhynchus* records are considered to relate to transient migrant birds, as the site falls well away from key wintering areas for this species. Occasional passage of vulnerable species, when viewed in the context of the small scale of the proposal is not considered likely to lead to significant displacement or collision impacts.
- 4.3.9 Lapwing and curlew may be present at times, although land management practices strongly suggest that neither species will breed on or close to the proposed turbines. Golden plover may occasionally use the fields in the non-breeding season.
- 4.3.10 Adopting a precautionary approach, it is considered possible that the development may have a minor adverse impacts on foraging curlew, lapwing and golden plover at the local scale, due to displacement effects. However, this is unlikely to be significant given the small scale of the turbines, the intensively managed nature of the fields on and around the development site and the extent of comparable habitats within the surrounding area.
- 4.3.11 Overall, collision impacts are considered to represent a minor adverse impact on commoner bird species and a negligible impact to scarcer species. Similarly, displacement impacts may have a small-scale impact on some species; however neither impact is considered to represent a threat to the integrity of any species at a population level.

4.4 PROTECTED SPECIES

Bats

- 4.4.1 No trees, potential bat roosts or commuting routes will be impacted during the construction, operation and decommissioning phases. No construction related impacts are therefore anticipated.
- 4.4.2 Two possible mechanisms have been identified whereby operational wind turbines may impact on bats;
- Ultrasound emission by turbines, and;
 - Death or injury through interaction with turbines, either through collision or the effects of rapid changes in air pressure (barotraumas).
- 4.4.3 Generic guidance on assessing the impact of wind turbines on bats has been developed at the European level under the EUROBATS Agreement (Bonn Convention), to which the UK is a signatory. Betts (2006) includes an assessment of collision risk based on the foraging strategy of different UK bat species and this was refined in Natural England 2009 guidance (TIN051), with additional NE guidance on bats and single large wind turbines also issued in 2009 (TIN059). The Natural England guidance highlights the current lack of information and goes on to make basic recommendations for avoidance of important bat areas and landscape features typically used by bats. More recently (June 2011), the Bat Conservation Trust (BCT) issued specific guidance on surveying wind farms for bats.

- 4.4.4 In respect of the current development and impact assessment, the NE *'Bats and Single Large Wind Turbines'* guidance (TIN059) is considered most appropriate. The BCT 2011 guidance was also referenced.
- 4.4.5 TIN059 states that *'a bat survey should normally be recommended for applications for turbines that will be located within 50 m of the following features:*
- *buildings or other features or structures that provide potential as bat roosts, including bridges, mines etc;*
 - *woodland;*
 - *hedgerows;*
 - *rivers or lakes; and*
 - *within or adjacent to a site designated for bats (SSSI or SAC) (but please note more extensive work will be required at such sites than is recommended in this document).'*
- 4.4.6 No such features are located within 50m of either proposed wind turbine and the habitats within the application site are considered to be of low value for bats, comprising intensively managed improved pasture bounded by stone walls.
- 4.4.7 The BCT (2011) guidance identifies survey effort and potential risk of mortality or impact on bat populations based on habitat and development characteristics. The application site is considered to be of low quality foraging habitat and unconnected to other potential bat habitats by prominent linear features. In addition, the proposal is for two relatively small turbines. This site was therefore identified through BCT guidance as offering the lowest potential risk of mortality/ impact on bat populations. In line with TIN059 guidance above, bat surveys were not considered necessary and a desk based impact assessment was considered sufficient to identify likely impacts.
- 4.4.8 Detailed research to determine impacts in the UK is on-going. Exeter University is currently undertaking research on the impacts of wind turbines on bats as part of the *'National Bats and Wind Turbines Project'*. Research employs corpse searches and automated acoustic surveys to determine impacts on UK populations, but as yet no results are available.
- 4.4.9 Research is also continuing to determine the effect of acoustic attraction or ultrasound interference on bat navigation but, although such interference has been suggested in published literature, there is currently no firm evidence that such effects exist and are significant. Therefore, the most likely effect at the current site, and the one considered further in this report is the risk of death or injury through interaction with turbine blades.
- 4.4.10 There has not yet been any published monitoring of existing wind farms to determine the collision rate of British bats and little is known about risk to individuals through interaction with the turbine blades. However, research from Europe which has focused on collision mortalities in relation to feeding, commuting and migration behaviour allows a degree of prediction of which UK species are likely to be more susceptible to collision.
- 4.4.11 This European research forms the basis of the NE 2009 guidance (TIN059), along with a broad understanding of how different bat species use the landscape. The guidance publishes two lists of species considered vulnerable to wind farms, classifying species as 'low', 'medium' or 'high' risk. The first list classifies risks to individual bats and the

second, risks at species population level. These are reproduced as Tables 4.2 and 4.3, below.

Low	Medium	High
Long-eared bats	Serotine	Nathusius' Pipistrelle
Myotis species	Barbastelle	Leisler's
Horseshoe Bats	Soprano Pipistrelle	Noctule
	Common Pipistrelle	

Table 4.2: Bat species likely to be at risk from wind turbines (from Natural England TIN059)

Low	Medium	High
Long-eared bats	Serotine	Nathusius' Pipistrelle
Myotis species	Barbastelle	Leisler's
Horseshoe Bats		Noctule
Soprano Pipistrelle		
Common Pipistrelle		

Table 4.3: Bat populations likely to be threatened by impacts from wind turbines (from Natural England TIN059)

- 4.4.12 It is the second table which is considered most pertinent in relation to any site assessment, as population level threats represent a more serious risk to the integrity of bat communities both on the project site and in the wider context.
- 4.4.13 The records search data returned very few bat records, with no specifically identified species within 2km of the application site. Noctule bat records were received; however these were from at least 4km away from the proposed turbines and it is considered that the site is unlikely to represent an important foraging area for this species.
- 4.4.14 Whilst acknowledging that the lack of records may relate to under-recording, placing these records into the context of the habitats and features on and around the application site and the geographical location, it is considered unlikely that significant bat populations are present.
- 4.4.15 As is the case with any wind turbine application, it remains possible there may be an impact on individual bats; however it is considered that the presence of two wind turbines of this scale at this location would not represent a significant impact to any bat species at a population level.

Other Protected Species

- 4.4.16 No other species are considered pertinent.

4.5 MITIGATION AND ENHANCEMENT

- 4.5.1 No specific mitigation measures are considered necessary; however appropriate pollution systems will be implemented in accordance with Environment Agency (EA) guidance.
- 4.5.2 General biodiversity enhancement measures will be implemented in order to conform to PPS9 (currently under review). Proposed measures include:
- The provision of a series of bird boxes on the land-owners property.
- 4.5.3 Final measures should be agreed with the local planning authority in advance of construction.

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