

# Technical note:

# Mynydd Carn y Cefn Wind Farm – Construction Mitigation Monitoring Strategy

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## 1. Introduction

The purpose of this document is to provide a programme of monitoring of sensitive bird and bat populations within the Proposed Development at Mynydd Carn y Cefn Wind Farm. This includes:

- Surveys for birds that are required prior to and during construction; and
- Monitoring of the potential impacts on birds and bats during operation.

The programme of bird monitoring guidance issued by Scottish Natural Heritage (SNH) – ‘*Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms*’<sup>1</sup>. Breeding and non-breeding surveys were undertaken by Wood UK Limited (Wood) between the period of March 2020 to March 2022 encompassing two full seasons of both the breeding and winter period. These surveys were in line with guidance issues by SNH (2017) and have been used to inform the programme of works advised in this document during and post construction.

Bat surveys were undertaken throughout 2020 and 2021 and incorporated a range of different survey methodologies including transects, static detectors, roost surveys (emergent/re-entry) and tree climbing. The bat monitoring and mitigation recommendations follows guidance from *Bats and Onshore Wind Turbines (2021)*<sup>2</sup> and include a post construction monitoring strategy which is detailed in **Section 2**.

### 1.1 Purposes of monitoring

The principal purpose behind the proposed monitoring is to determine whether birds or bats are disturbed or displaced from the wind farm development site, in addition to detecting direct impacts through collision.

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<sup>1</sup> Scottish Natural Heritage (2009) Guidance note - Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms. (Online) Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20note%20-%20Guidance%20on%20methods%20for%20monitoring%20bird%20populations%20at%20onshore%20windfarms.pdf> (Accessed April 2022).

<sup>2</sup> NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation (Online) Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> (Accessed April 2022).

The results of monitoring data should be used to provide a direct comparison of activity levels and flight heights (for birds) with baseline conditions to determine behavioural changes that may be attributable to the presence of wind turbines.

Monitoring data can then be used to update the management and operation of the wind farm should effects be identified which could be mitigated through feathering or curtailment of operation at key locations or critical times of year (for individual receptors).

## 1.2 Potential impacts

### Ornithology

Wood completed two years of targeted ornithological surveys aimed at assessing the potential impact of the proposed development on the breeding and non-breeding bird population present on and immediately adjacent to the Proposed Development. Species observed on or within 1km of the Site and therefore most likely to be impacted by the proposed development either directly through collisions or through active avoidance can be found in **Table 1.1** below.

Table 1.1 Summary of key species identified within 1km of the Proposed Development

Common name	Scientific name	Conservation status	Status on site
<b>Northern goshawk</b>	<i>Accipiter gentilis</i>	Schedule 1 of the Wildlife and countryside Act 1981	Breeding (1+pairs)
<b>Red kite</b>	<i>Milvus milvus</i>	Schedule 1 of the Wildlife and countryside Act 1981	Non-breeding (present all year round)
<b>Peregrine</b>	<i>Falco peregrinus</i>	Schedule 1 of the Wildlife and countryside Act 1981	Breeding within 2km of site
<b>Barn owl</b>	<i>Tyto alba</i>	Schedule 1 of the Wildlife and countryside Act 1981	Breeding (1 pair on site)
<b>Hen harrier</b>	<i>Circus cyaneus</i>	Schedule 1 of the Wildlife and countryside Act 1981, Annex I; EU Birds Directive, BoCC Red listed	Wintering species. Recorded infrequently during the non-breeding period.
<b>Nightjar</b>	<i>Caprimulgus europaeus</i>	Annex I; EU Birds Directive, BoCC	Breeding (recorded in areas of clear fell and plantation within 500m of the proposed development)
<b>Common crossbill</b>	<i>Loxia curvirostra</i>	Schedule 1 of the Wildlife and countryside Act 1981	Breeding (recorded in areas of plantation woodland within 500m of the proposed development)
<b>Long-eared owl</b>	<i>Asio otus</i>	Wildlife and Countryside Act 1981	Breeding (recorded in areas of plantation woodland within 500m of the proposed development)

Baseline data collection identified regular overflights of the proposed development by red kite and goshawk and this information was used to produce estimated numbers of collision using collision risk modelling following (Band et al. 2007<sup>3</sup>; SNH 2000<sup>4</sup>). Full details of the analysis are provided in **Appendix 9B** of the Draft Environmental Statement and a brief summary of the results can be found in **Table 1.2**.

Table 1.2 Summary of collision risk modelling results for goshawk and red kite

Species	Season	Predicted Potential collisions	Year 1	Year 2	Average
<b>Red Kite (99% Avoidance)</b>	Breeding	Per year	0.618	0.95	0.784
		Over 30 years	18.54	28.51	23.525
	Non-Breeding	Per year	0.619	0.252	0.435
		Over 30 years	18.56	7.56	13.06
	<b>Annual Total</b>	<b>Per year</b>	<b>1.237</b>	<b>1.202</b>	<b>1.2195</b>
		<b>Over 30 years</b>	<b>37.1</b>	<b>36.07</b>	<b>36.585</b>
<b>Goshawk (98% Avoidance)</b>	Breeding	Per year	0.065	0.072	0.068
		Over 30 years	1.95	2.15	2.05
	Non-Breeding	Per year	0.174	0.143	0.159
		Over 30 years	5.21	4.28	4.745
	<b>Annual Total</b>	<b>Per year</b>	<b>0.239</b>	<b>0.215</b>	<b>0.227</b>
		<b>Over 30 years</b>	<b>7.16</b>	<b>6.43</b>	<b>6.795</b>

## Bats

A suite of bat activity surveys, 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

<sup>3</sup> Band, W., Madders, M. & Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In *Birds and Wind Farms: Risk Assessment and Mitigation*. de Lucas, M., Janss, G., and Ferrer, M. (eds). Lynx Edicions, Barcelona.

<sup>4</sup> Scottish Natural Heritage. (2000). *Windfarms and Birds: Calculating a theoretical collision risk assuming no avoiding action*. SNH Guidance Note. (Online) Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf> (Accessed April 2022).

common pipistrelle, *Myotis* sp., noctule, *Plecotus* sp. (considered likely to be brown long-eared), soprano pipistrelle, greater horseshoe and lesser horseshoe.

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 total.

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 8 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.

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 the *Bats and Onshore Wind Turbines (2021)*<sup>5</sup>. 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.

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 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 1.3**.

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<sup>5</sup> NatureScot (2021). Bats and onshore wind turbines - survey, assessment and mitigation (Online) Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation> (Accessed April 2022)

Table 1.3 Overall collision risk assessment for high risk bat species recorded on Site

Automated detector	Turbine location	Common pipistrelle		Soprano pipistrelle		Noctule	
		Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall 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

## 2. Methodology

### 2.1 Pre-construction monitoring - Birds

The start date of the construction programme has not yet been determined; however it is expected to cover a period of 22 months. Given the length of the programme and the range of activities required on site it is assumed that potential impacts on sensitive receptors could be avoided through scheduling. However, it is recommended that all works consider the potential presence of sensitive receptors and that monitoring is implemented as described below.

Due to the observed and continued potential presence of breeding raptors on site, including species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), the focus of the pre-construction monitoring would be to establish the presence and status of nest sites in relation to identified access and construction areas. These surveys would also include monitoring of active nest sites and confirmation of breeding outcomes at identified nests.

Schedule 1 nesting raptor surveys would be undertaken following survey methods outlined by the Scottish Raptor Monitoring Scheme (SRMS): see <http://raptormonitoring.org/need-advice-on-monitoring><sup>6</sup>. Specific guidance with respect to barn owl would also need to be followed as described in "*Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment*"<sup>7</sup>.

Target species have been identified through previously undertaken survey work and the relevant Natural Resources Wales (NRW) disturbance licence would need to be secured. Target species, for which the license would need to be applied, include:

- Goshawk;
- Red kite;
- Peregrine;
- Barn owl.

The Schedule 1 breeding survey is designed to identify potential nesting areas for the target species within 1km of the Site, through a combination of desk study analysis, habitat scoping, observational watches and finally (if deemed appropriate) nest searches. Using data already collected from the previous two years of survey work, locations for nesting raptors would likely be easily established although new areas of interest on site might be discovered throughout the course of the work. Areas where breeding had previously been suspected but was not confirmed would also be targeted for surveys.

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<sup>6</sup> Hardey, J. Humphrey, C. Wernham, C. Riley, H. Etheridge, B and Thompson, D. (2014). Raptors: A field guide for surveys and monitoring 2<sup>nd</sup> Edition.

<sup>7</sup> Shawyer C (2012). Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment. Wildlife Conservation Partnership. (Online) Available at: [http://ousewashes.org.uk/wp-content/uploads/2017/07/Survey\\_Methodology.pdf](http://ousewashes.org.uk/wp-content/uploads/2017/07/Survey_Methodology.pdf) (Accessed April 2022).

## 2.2 Post construction monitoring - Birds

Survey methods employed for post-construction monitoring would be in line with guidelines issued by the Scottish Natural Heritage (SNH, 2009<sup>1</sup>, SNH 2017<sup>8</sup>). Post-construction monitoring would be undertaken in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm.

Post-construction monitoring would include:

- Vantage Point Surveys (36 hours from 1 or 2 VPs) year-round; and
- Carcass Searches (targeted bird collision surveys).

### Vantage point surveys

Vantage point watches are used to determine whether birds are displaced by wind farms, on the basis that levels of activity within a wind farm after construction are likely to be much lower if displacement or disturbance is occurring at a level sufficient to alter ranging and flight behaviour. Behaviour may change in one of several ways: by altering the height at which birds fly; by altering the horizontal flight pattern (e.g. more changes in flight direction), or by altering the extent to which they use an area (i.e. by avoiding it altogether).

The methodology for vantage point watches should follow guidelines issued by SNH & (2017)<sup>8</sup>. The proposed vantage point watches would require a minimum of 36 hours/VP per season as per guidelines issued by SNH. Monthly visits would be undertaken for a full calendar year between January and December inclusive. During each visit, six-hour vantage point watches would be undertaken from each fixed vantage point location that offers an un-interrupted view of the study area.

Two vantage points (VPs) were identified and used during 2020-2022, as detailed in **Table 2.1** and would be used for post construction monitoring purposes to enable direct comparison with pre-construction survey results.

Table 2.1 Vantage Point Locations used in baseline surveys

VP No.	Grid Ref	View Bearing
1 – VP1	320375, 203537	090
2 – VP2	320014, 205003	180

### Carcass searches (Collision casualties)

Carcass searches are the most direct way of estimating the number of collisions and hence the likely impact on species of conservation importance. Measures of the number of collisions can also help to quantify avoidance rates (as used in collision risk modelling calculations), and, when

<sup>8</sup> Scottish Natural Heritage (2017) Guidance note - Recommended bird survey methods to inform impact assessment of onshore wind farms. (Online) Available at: <https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms> (Accessed April 2022).

collisions can be ascribed to a particular time, contribute to an understanding of environmental conditions and behaviours that increase collision risk.

Carcass searches are an important part of monitoring, especially for species for which collision is highlighted as a critical issue in the preliminary environmental statement, in this case goshawk and red kite but also other species highlighted in **Table 1.1**. These searches would be based on guidance issued by SNH (2009)<sup>1</sup> methods such as those used by Duffy & Steward (2008)<sup>9</sup>.

Searches would be conducted, as a minimum, once monthly during each year of monitoring (as defined above) It is proposed that a minimum area of 130mx130m, with the turbine in the centre, would be subjected to these targeted collision searches. Transects would be devised within each of these 130m squares and be walked by two surveyors spaced 10m apart and the following observations would be recorded upon discovery of collision victim:

- GPS location of each carcass.
- Species (only if identifiable).
- Photographic record.
- Condition of carcass (Intact, decomposed, scavenged or feathers).
- Distance from turbine.
- Date and time of find.
- Any other potentially relevant information.

## 2.3 Post-construction monitoring and operational mitigation – Bats

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 locations.

To assess the effectiveness of proposed mitigation and to validate the predicted outcomes of the assessments with respect to bats, post construction bat monitoring would be conducted for three years following construction and will comprise:

- 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.

The results of monitoring would be reported to NRW and BGCBC at the end of each year and if necessary additional mitigation measures (such as curtailment) will be agreed with NRW and BGCBC in response to monitoring results.

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<sup>9</sup> Duffy, K and Steward, M. (2008). Turbine search methods and carcass removal trials at the Braes of Doune windfarm. Natural Research Ltd. (Online) Available at: <https://www.natural-research.org/application/files/1414/9623/5676/NRIN4final.pdf> (Accessed April 2022).



### 3. Survey timeframe

**Table 3.1** and **Table 3.2** provides a summary of the recommended survey approaches and monitoring periods for birds and bats respectively

Table 3.1 Summary of bird monitoring approaches and periods

Survey type	Phase	Period	Survey method
<b>Schedule 1 breeding surveys</b>	Pre-construction	February – July	Combination of vantage point surveys, cold searches and nest monitoring
<b>Vantage point surveys</b>	Year 1, 2, 3, 5, 10 and 15	January – December	Monthly 6-hour watches per VP location
<b>Carcass Searches (Bird Casualties)</b>	Year 1, 2, 3, 5, 10 and 15	January – December	Targeted transects conducted at each turbine

Table 3.2 Summary of bat monitoring approaches and periods

Survey type	Phase	Period	Survey method
<b>Static detector bat recording</b>	Year 1-3 of operation	10 days each in spring (April – May), summer (June – August) and autumn (September – October)	Monitoring and analysis of recordings
<b>Carcass searching</b>	Year 1-3 of operation	Summer and autumn	Direct searching for bat carcasses under each turbine

The requirements for changes in the management of the windfarm (i.e. such as the need for a curtailment regime) would be subject to the results of the surveys and through agreement with NRW and BGCBC.

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### Document revisions

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01	First draft	01 April 2022