



APPENDIX 7-7
BIRD MONITORING PROGRAMME

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1. INTRODUCTION

1.1 Background

This Bird Monitoring Programme (BMP) has been prepared by MKO for the proposed Lemanaghan Wind Farm (i.e., the Proposed Project). The BMP provides a timeframe and monitoring schedule for the bird population in the study area during the pre-construction, construction, operational and decommissioning phases of the Proposed Project, informed by surveys undertaken to date. Bird surveys were undertaken from October 2020 to March 2025. Key ornithological receptors (KORs) in the study area were identified based on these surveys. These surveys were in line with SNH Guidance entitled: ‘Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms’ (SNH, 2017).

The objectives of the BMP are:

- To ensure any required construction phase monitoring is scheduled to avoid impacts on birds of conservation concern during the construction phase
- To record birds using the study area and their interaction with operating turbines
- To monitor short-term and long-term effects on bird populations in the study area, with a particular emphasis on birds of high conservation concern (birds listed on Annex I of the EU Birds Directive or on the Red List of Birds of Conservation Concern in Ireland).
- Monitor bird usage of the whooper swan and breeding lapwing enhancement areas¹.
- To undertake collision monitoring for potential bird fatalities as a result of a collision with turbine blades.
- To report on the findings of monitoring at the end of Years 1, 2, 3, 5, 10 and 15 of the operational life of the wind farm.
- To ensure any required decommissioning phase monitoring is scheduled to avoid impacts on birds of conservation concern during the decommissioning phase.

1.2 Key Ornithological Receptors

Table 7 - 7 - 1 lists the key ornithological receptors (KORs) recorded within the Proposed Project site during surveys conducted from October 2020 to March 2025 inclusive. These species form the basis of the BMP.

Table 7 - 7 - 1 Key ornithological receptors identified during surveys

Species	Scientific Name	Conservation Status
Crane	<i>Grus grus</i>	Annex I EU Birds Directive
Golden Plover	<i>Pluvialis apricaria</i>	Annex I EU Birds Directive; BoCCI Red Listed (Breeding & Wintering Populations); SCI of Middle Shannon Callows SPA & Lough Ree SPA
Hen Harrier	<i>Circus cyaneus</i>	Annex I EU Birds Directive
Kingfisher	<i>Alcedo atthis</i>	Annex I EU Birds Directive
Merlin	<i>Falco columbarius</i>	Annex I EU Birds Directive
Peregrine	<i>Falco peregrinus</i>	Annex I EU Birds Directive
Whooper Swan	<i>Cygnus cygnus</i>	Annex I EU Birds Directive; SCI of Middle Shannon Callows SPA & Lough Ree SPA
Barn Owl	<i>Tyto alba</i>	BoCCI Red-list
Kestrel	<i>Falco tinnunculus</i>	BoCCI Red-list

¹ It is noted that habitat monitoring is also proposed in the enhancement areas, this is detailed in Appendix 6-5.

Species	Scientific Name	Conservation Status
Lapwing	<i>Vanellus vanellus</i>	BoCCI Red Listed (Breeding & Wintering Populations; SCI of Middle Shannon Callows SPA & Lough Ree SPA;
Snipe	<i>Gallinago gallinago</i>	BoCCI Red Listed (Breeding & Wintering Populations)
Woodcock	<i>Scolopax rusticola</i>	BoCCI Red-Listed Species (Breeding Populations)
Buzzard	<i>Buteo buteo</i>	Species sensitive to wind farm developments (Raptor Species)
Sparrowhawk	<i>Accipiter nisus</i>	Species sensitive to wind farm developments (Raptor Species)

2. METHODOLOGY

This BMP consists of three discrete parts: the pre-construction/construction phase, operational phase and decommissioning phase. Construction and decommissioning phase monitoring will begin one month before the commencement of construction or decommissioning works to avoid impacts on birds of conservation concern during the works. Operational monitoring will be conducted during prescribed monitoring years throughout the operational lifetime of the Proposed Wind Farm. In addition, annual monitoring of the enhancement lands is also proposed.

Target species during surveys will include all KORs listed in Table 7 - 8 - 1. In addition, target species will include all other waterbirds, raptors, groundfowl, and passerines/near-passerines of conservation concern².

2.1 Pre-construction Monitoring

It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Works are defined as the clearing of woody vegetation, any building or engineering works. Pre-commencement surveys will be undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites.

If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive when works are taking place. If works run into the subsequent winter season(s) (October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if evidence of roosting of birds of conservation concern is observed.

Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the Proposed Project footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of roosting/nesting birds, where conditions are suitable.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

2.2 Operational Monitoring

Operational monitoring will be undertaken in prescribed monitoring years during the operational lifetime of the Proposed Wind Farm. The NatureScot guidance document '*Monitoring the impact of onshore wind farms on birds*' (SNH, 2009) requires that bird monitoring in wind farms should occur in years 1, 2, 3, 5, 10 and 15 after the turbines become operational. These monitoring requirements are proposed for the Proposed Wind Farm. In addition, as enhancement is being undertaken at the Proposed Wind Farm

² Conservation concern comprises (i) species listed on Annex I of the EU Birds Directive (Directive 2009/147/EC) and (ii) species listed as Red on the Birds of Conservation Concern in Ireland.

(refer to Appendix 6-5 Biodiversity Management and Enhancement Plan), there is an associated requirement for an increase in the frequency of monitoring surveys compared to guidance. Monitoring will be conducted annually. Any future decision to reduce the frequency of surveys, will be confirmed in writing with the Planning Authority and will include consultation with the National Parks and Wildlife Service (NPWS), allowing an adaptive approach to monitoring.

2.2.1 Surveys

The ornithological surveys that will be undertaken during the prescribed monitoring years are listed below and the methodology is outlined in the following sections:

- Flight activity surveys
 - Vantage Point Surveys
- Distribution and Abundance Surveys
 - Breeding bird surveys: Adapted Brown & Shepard;
- Targeted bird collision surveys (corpse searches) will be undertaken by a trained dog and handler. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.
- Enhancement Area Monitoring
 - Breeding Lapwing area monitoring;
 - Whooper swan roost area monitoring; and
 - Barn owl box visits.

2.2.2 Flight Activity Surveys

2.2.2.1 Vantage Point Surveys

Vantage point surveys will be undertaken to monitor flight activity within a 500m radius of the turbine positions monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the Proposed Wind Farm. Surveys should be conducted from the same fixed point vantage points as were used during pre-planning surveys (i.e. VP 1, 2, 3, 5 & 6)³. Should vantage point numbers/locations need to be adjusted, a viewshed analysis will be conducted to ensure there is still comprehensive coverage of the 500m radius of turbines at the new locations.

To provide comparable data before and after construction of the Proposed Wind Farm, vantage point survey methodology will be the same as used during pre-planning surveys. Survey methodology should follow SNH (2017, 2025) and any revisions to the same. The surveyor should collect data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e. 6 hours total) per month. Surveys should be conducted every month and provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity.

Flight activity of target species will be mapped and recorded as per defined flight bands chosen in relation to the dimensions of the turbines as built: below rotor swept height, at the rotor swept height and above rotor swept height. In addition, the presence of any non-target species will be recorded to inform the evaluation of supporting habitat.

³ VP4/4a does not contain any turbines and was not utilised for the collision risk assessment. This VP is therefore not included as part of the bird monitoring programme.

2.2.3 Distribution and Abundance Surveys

2.2.3.1 Breeding Walkover Surveys

During monitoring years, post-construction breeding walkover surveys will follow the adapted Brown & Shepard survey methods. The survey methodology will be similar to methods employed for baseline EIA surveys, which will allow a comparison of data to be made for each monitoring year.

The timing of visits will follow the recommendations of Calladine et al. (2009), i.e. four visits between April and July. Transects should ensure all areas of suitable breeding/ foraging habitat are approached to within 100m. Target species will include waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional species observed will be recorded to inform the evaluation of supporting habitat. These surveys will follow the same routes that were followed during pre-planning surveys.

A total of four site visits will be undertaken during the breeding season for each monitoring year and timed to coincide with the core breeding period of April - July. Notes will be recorded on nesting and territorial behaviour and breeding signs using standard BTO codes. Non-breeding behaviour such as birds flying over the site will also be recorded.

2.2.4 Collision Monitoring

Carcass searches for bird casualties⁴ as a result of collision with turbines will follow survey methods broadly based on guidelines issued by the SNH (2009) and search methods adopted by Duffy and Steward (*Turbine Search Methods and Carcass Removal Trials at the Braes of Doune Windfarm*, (Natural Research Information Note 4. Natural Research Ltd, Banchory, UK, 2008). A trained dog and handler should be used to locate carcasses. The study area will be visited once per month during operational Years 1, 2, 3, 5, 10 and 5 of the lifetime of the Proposed Wind Farm. During each visit, the base of each operating turbine will be searched for bird carcasses.

The area to be searched will be based on the turbine size and surrounding landscape. Edkins (2014) *Impacts of Wind Energy Developments on Birds and Bats: Looking into The Problem*, recommends the "search width should be equal to the maximum rotor tip height". Given a turbine rotor tip height of 220 meters the search area surrounding the base of the turbine would be taken as a 220 meters radius centred on the turbine base. This area will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at 10m intervals apart with the observer covering 5m on either side for each transect. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field.

If a bird carcass is found, the following details will be recorded: GPS location of each bird carcass, photographic record, carcass condition (intact - carcass that is completely intact or not badly composed; scavenged - evidence that the carcass was fed upon by a scavenger/predator; or feather spot - ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty), distance from the turbine, date and time.

Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the dog to find bird carcasses and the likelihood of scavenging of carcasses by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a study area periodically and is monitored for a set number of days or until scavengers remove the carcass. A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses

⁴ It is noted that these bird carcass searches can be combined with bat carcass searches.

are placed in a study area by a person, then searched for by the dog. The result of these trials is a correction factor that can be applied to the results of the carcass searches.

2.2.5 Enhancement Area Monitoring

As proposed in the Biodiversity Management and Enhancement Plan (EIAR Appendix 6-5), fixed point vantage points will be used to monitor the use of the enhancement areas by breeding lapwing and roosting whooper swan. The Biodiversity Management and Enhancement Plan will be the subject of ongoing monitoring to assess the effectiveness of the measures proposed to contribute to advances in habitat management methods, which can be applied to future similar projects. Monitoring will be undertaken annually throughout the construction, operational and decommissioning phases, unless a reduction in the monitoring burden is justifiable and, as such, agreed with the planning authority. Please see Section 4 of the Biodiversity Management and Enhancement Plan for further details on monitoring.

Analysis of the data collected will be the basis for a review of the measures and techniques employed. Should any adjustments to the plan be deemed necessary or advisable, these will be the subject of consultation with the NPWS prior to any alterations to the plan.

It is considered that a single vantage point will be required to provide adequate views of the respective enhancement areas to ground level, i.e. VP6 from the preplanning surveys. A ground truthing exercise will be undertaken prior to the commencement of surveys to confirm coverage of the required viewshed (to ground or water level as relevant). Monitoring will be undertaken as follows.

Breeding Lapwing Area

Surveys will be undertaken annually between March and August inclusive. The core breeding season for lapwing runs from April to July. The surveys will run from March to August to ensure early and late breeding attempts are identified. A total of 36 hours of vantage point watches will be undertaken per vantage point during the period, as per SNH guidance (2017, 2025).

The rationale for monitoring the enhancement area by means of a vantage point rather than a breeding bird walkover survey is to minimise disturbance and identify if there is connectivity between the enhancement area and any adjacent wetlands. There is potential that breeding waders including lapwing will forage in some adjacent areas. If this is the case regular flight paths between the enhancement area and these areas will be recorded during the vantage point surveys.

Whooper Swan Roost Area

Surveys will be undertaken annually between October and March inclusive. A total of 36 hours of vantage point watches will be undertaken per vantage point during the period, as per SNH guidance (2017, 2025).

Barn Owl Box Visit

The barn owl boxes erected at the Proposed Wind Farm will be visited to check their condition and occupancy. The nest boxes will be sited as near as possible to the barn owl breeding sites identified during the pre-planning surveys, while still within Bord na Móna (BnM) controlled lands. The surveyor will visit the boxes (annually) outside the breeding season (preferably November or December). The surveyor will check the condition of the box and note any repairs that are necessary and check that the box remains well fixed and stable. If the box requires repairs/replacement, these will be communicated to the wind farm operator to organise repairs/replacement promptly, before the beginning of the next breeding season.

The surveyor will open the box to check and record signs of barn owl occupancy. As per the Barn Owl Trust guidance (Barn Owl Trust, 2025), these visits should be conducted during dry calm weather, close

to dusk, in case a roosting owl is flushed. Nest box inspection should be undertaken outside the breeding season (i.e. November to January).

If debris in the box is deeper than ~50mm, it should be cleared out and disposed of by the surveyor, to maintain a drop between the bottom of the access hole and the floor of the box of ~460mm. If there are any obstructions around the access hole (e.g., ivy), these should be removed. While the box is open, the surveyor should note if there are any leaks that make the inside of the box wet, and report these for repair.

2.2.6 Operational Phase Summary

Table 7 - 7 - 2 summarises the proposed bird monitoring schedule for each monitoring year.

Table 7 - 7 - 2 Proposed bird monitoring schedule

Survey	Phase	Period	Visits	Survey Method
Vantage Point Surveys	Years 1, 2, 3, 5, 10 and 15	Commencing at the beginning of the breeding or non-breeding and continuing for 12 months thereafter.	1 visits/ VP per month for each monitoring year	Five fixed, 6-hour, Vantage Point Surveys (VP 1,2,3,5 & 6)
Breeding Walkover Surveys	Years 1, 2, 3, 5, 10 and 15	April - July	4 visits per monitoring year	Adapted Brown and Shepherd Surveys
Breeding Lapwing Area Monitoring	Annually	March – August	6 visits per monitoring year	One fixed, 6-hour, Vantage Point Survey
Whooper Swan Roost Area Monitoring	Annually	October - March	6 visits per monitoring year	One fixed, 6-hour, Vantage Point Survey
Barn Owl Boxes	Annually	November/December	1 visit per box	Barn Owl Trust guidance (Barn Owl Trust, 2025)
Corpse Searches (Bird Casualties)	Years 1, 2, 3, 5, 10 and 15	Commencing at the beginning of the breeding or non-breeding and continuing for 12 months thereafter.	1 visit per month for each monitoring year	Targeted corpse searches at turbine bases

2.3 Decommissioning Monitoring

It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement surveys will be undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites.

If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive when works are taking place. If works run into the subsequent winter season(s) (October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if there is evidence to justify continuing (i.e. potential roosting behaviour of birds of conservation concern).

Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of birds, where conditions are suitable.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the ‘no-work zone’ will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

2.4

Reporting

A report summarising the findings of monitoring surveys will be submitted to the Planning Authority at the end of each prescribed monitoring year.

Survey results should be presented in a manner that allows a comparison of bird activity before and after the construction and commissioning of the turbines, so that short and long term effects on birds can be monitored. To facilitate this, the wind farm operator should make the results of previous surveys available. The current year’s findings should be compared to previous monitoring and pre-planning surveys to understand patterns and trends.

The report will discuss potential impacts on birds (particularly KORs) and any recommendations that may inform additional mitigation measures during the operational phase of the Proposed Wind Farm. This report will also include the findings of the Biodiversity Management and Enhancement Plan (Appendix 6-5), including field inspections, adherence to the plan actions and any additional associated recommendations.

2.4.1

Sharing Ecological Data

As a measure to support conservation research and policy, it is proposed to submit the pre-planning survey data and information to the National Biodiversity Data Centre (NBDC) and to BirdWatch Ireland to contribute to the upcoming bird atlas (2027) on relevant ecological records, for example, information on the location of breeding territories and nest sites of bird species of conservation concern. The submission of the data will follow relevant standards and will be provided in the preferred NBDC excel template. This measure will be fulfilled within the first year of the construction phase in the event of a successful application. This commitment ensures the project is contributing to the aims of Objective Four, Outcome 4B of Ireland’s 4th National Biodiversity Action Plan: Data relevant to biodiversity and ecosystems, including conservation needs, is widely accessible and standardised.

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