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7 ORNITHOLOGY

7.1 Introduction

7.1.1 This chapter presents the findings of the assessment of likely significant effects of the proposed Beinn Ghlas Wind Farm Repowering development (the 'Proposed Development') on ornithological features. It details the methods used to establish the bird populations within the Site (as shown in **Volume 3a, Figures 1.1 – 1.3)** and its surroundings, the results of the baseline surveys, and the process used to determine the sensitivity of the bird populations present. The ways in which birds might be affected (directly or indirectly) by the construction and operation of the Proposed Development are assessed, prior to and after the application of any required mitigation measures.

7.1.2 Particular attention has been paid to species of high or moderate Nature Conservation Importance (target species). These include, but are not restricted to, species with national or international protection under the Wildlife and Countryside Act 1981 (and later amendments) and the EU Birds Directive (79/409/EEC).

7.1.3 This chapter presents the findings of the assessment of effects of the Proposed Development on birds. Effects on other flora and fauna are presented in **Volume 2, Chapter 6: Ecology**. The ornithology assessment was undertaken by Natural Research (Projects) Ltd.

7.1.4 The following appendices are also referred to throughout the chapter:

- Appendix 7.1: Ornithology Technical Report;
- Appendix 7.2: Confidential Ornithology;
- Appendix 7.3: Collision Risk Modelling
- Appendix 7.4: Confidential Report – Golden Eagle Topography (GET) Modelling;
- Appendix 7.5: Confidential Report - Roost analysis using satellite tag data from a resident pair of golden eagles; and
- Appendix 7.6: Confidential Reports - Eagle Breeding Success 2023 & 2024.

7.1.5 The following terminology will be referred to throughout this chapter:

- 'Ornithology Study Area' ('OSA') refers to the area enclosed by the OSA boundary (see **Volume 4, Appendix 7.1: Figure 1**).
- 'moorland bird survey area', 'winter transect survey area' or 'core survey area' refers to the OSA plus an additional 500 m wide strip around the OSA.
- 'black grouse survey area' refers to the OSA plus an additional 1.5 km wide strip.
- 'scarce breeding bird survey area' refers to the OSA plus an additional 2 to 6 km wide strip depending on the focal species and presence of contiguous suitable habitat outside of the core survey area.
- 'flight activity survey area' (FASA) refers to a polygon around the outermost turbines plus an additional 500 m strip around the polygon.

7.1.6 Please note that the Ornithology Study Area was defined prior to the design refinement of the Proposed Development and therefore encompasses an area much larger than the Planning Application boundary ("red-line boundary"). However, the study area for this

assessment is defined with reference to the locations of turbines, tracks and ancillary infrastructure associated with the final design of the Proposed Development.

7.2 Legislation and Guidance

Legislation

7.2.1 This assessment is carried out in accordance with the principles contained within relevant European legislation. Of particular relevance is the following European legislation:

- Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive'; European Commission, 2016a);
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) ('Habitats Directive'; European Commission, 2016b); and
- Environmental Impact Assessment Directive 2014/52/EU (European Commission, 2016c).

7.2.2 The following national legislation, which has recently been amended as a consequence of the United Kingdom (UK)'s exit from the European Union, has also be considered as part of the ornithology assessment:

- Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the EIA Regulations);
- The Nature Conservation (Scotland) Act 2004 (as amended); and
- The Wildlife and Countryside Act 1981 (as amended).

Guidance

7.2.3 This assessment is carried out with due regard to the following documents:

- Band, W., Madders, M. & Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M, Janss, G.F.E. and Ferrer, M. (Eds.) Birds and Wind Farms: Risk assessment and Mitigation, pp. 259 - 275. Quercus, Madrid;
- Brown, A.F. & Shepherd, K.B. (1993). A method for censusing upland breeding waders. Bird study 40: 3 pp189-195;
- CIEEM. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester;
- European Commission. (2010). Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- Gilbert, G., Gibbons, D.W. & Evans, J. (1998). Bird monitoring methods. Royal Society for the Protection of Birds (RSPB) Sandy, Bedfordshire.
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors, a field guide to survey and monitoring. 3rd Edition. The Stationery Office, Edinburgh.
- NatureScot. (2022). General pre-application and scoping advice for onshore wind farms. Guidance.

- Scottish Natural Heritage (SNH). (2000a). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note.
- SNH. (2000b). Natural Heritage Zones. SNH, Battleby, UK.
- SNH. (2016a). Assessing connectivity with Special Protection Areas (SPAs). Version 3.
- SNH. (2016b). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees Version 2.
- SNH. (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Windfarms. SNH Guidance Note.
- SNH. (2018a). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2.
- SNH. (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note.
- SNH. (2018c). Environmental Impact Assessment Handbook - Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.
- SNH. (2018d). Avoidance Rates for the onshore SNH Wind Farm Collision Risk Model. SNH Information and Guidance Note. Scottish Natural Heritage, Battleby.
- SERAD (Scottish Executive Rural Affairs Department). (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("the Habitats and Birds Directives"). Revised Guidance Updating Scottish Office Circular No 6/1995; and
- Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., & Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747.

7.3 Consultation Undertaken

7.3.1 In undertaking the assessment, consideration has been given to the scoping responses and other consultation which has been undertaken as detailed in **Table 7.1**.

7.3.2 The Argyll Raptor Study Group (ARSG) was consulted, who provided existing ornithological information on breeding Schedule 1 raptors and owls within proximity to the Proposed Development.

Table 7.1: Summary of consultation responses relevant to this chapter (2022-2025)

Consultee	Issued Raised	Response/Action Taken
Argyll & Bute Council Scoping response – 25 May 2023	At time of writing advice from the Council's Local Biodiversity Officer (LBO) has not been obtained. It is therefore not possible to provide comment on the scope of these assessments.	Noted
NatureScot	We agree that the Glen Etive & Glen Fyne SPA can be scoped out given the lack of connectivity.	Noted.

Consultee	Issued Raised	Response/Action Taken
Scoping response – 30 August 2022	… the applicant should consult with the Argyll Raptor Study Group with regards to nest sites, alternative nest sites, and recent breeding productivity.	Consultation with the Argyll Raptor Study Group was undertaken.
	We would also expect Golden Eagle Territory (GET) modelling to be undertaken as part of the EIA to provide a detailed assessment of the current territory.	GET modelling and analysis of satellite tag data has been undertaken to inform the assessment (see **Appendices 7.4 and 7.5**)
	Potential effects of displacement/ loss of territory from the Consented Scheme need to be fully considered and whether the Proposal risks territory viability.	The potential effects of displacement and habitat loss have been fully assessed within this chapter.
	Cumulative impacts on ornithological interests from other operational and consented wind farm developments should be assessed at the Natural Heritage Zone (NHZ) level.	Cumulative impacts have been assessed in-line with NatureScot guidance.
NatureScot Consultation – 24 June 2024	Meeting to discuss an appropriate methodology for assessing impacts to golden eagle roost sites.	An analysis of satellite tag data has been undertaken to inform the assessment (see **Appendix 7.5**)
RSPB Scoping response – 26 August 2022	RSPB Scotland accept that, based on the rational presented in section 5.4.12 of the Scoping Report, the Glen Etive & Glen Fyne Special Protection Area (SPA) can likely be scoped out.	Noted.
	RSPB Scotland is pleased to note that a 2-year survey period has been given, in line with updated NatureScot guidance	Noted.
	Additional mitigation/enhancement measures to support the [golden] eagles and their prey species would also be welcome.	Mitigation and enhancement measures are presented within the OBE-HMP (Appendix 6.10).

7.4 Approach to the Assessment

Baseline Methodology

Desk Study

7.4.1 A desk-based study, including a review of data from surveys undertaken for the existing wind farm and post-construction monitoring reports, was undertaken to collate existing bird records/data. Distribution and abundance data were collected from published sources and consultees.

- NatureScot Sitelink (online information about designated sites).
- UK Biodiversity Action Plan (BAP).
- The Birds of Conservation Concern (BoCC) (Stanbury *et al.*, 2021).
- International Union for the Conservation of Nature (IUCN, 2022) Red list of threatened species.
- Scottish Biodiversity List (Scottish Biodiversity Forum, 2013).

- National Biodiversity Network (NBN) Gateway website (https://data.nbn.org.uk/), and
- ARSG; information on scarce breeding raptors including current and historical survey records throughout the survey period.

7.4.2 Results from the desk-based study and consultation informed the field survey design.

Field Surveys

7.4.3 NatureScot guidance (SNH, 2017) was used to inform the initial survey design and a range of baseline ornithological surveys commenced within the OSA and surrounding area in September 2020. These continued until end of August 2022, providing two years of baseline survey.

7.4.4 The study area was defined with reference to the OSA and encompasses a series of buffers of up to 6 km radius from the OSA, with buffer size dependent on the sensitivity of key species to potential effects associated with the Proposed Development (**Volume 4, Appendix 7.1: Figure 1**).

7.4.5 Survey methods follow contemporary best practice guidance; further details of the survey methods and results are provided in **Volume 4, Appendix 7.1: Ornithology Technical Report**.

7.4.6 In addition to the baseline surveys, monitoring of golden eagle and white-tailed eagle breeding success was undertaken in 2023 and 2024. Further details of the survey methods and results are provided in **Volume 4, Appendix 7.6**: **Eagle Breeding Success 2023 & 2024**.

7.4.7 The assessment has been informed by the following baseline surveys:

- Flight Activity Surveys (September 2020 to August 2022; within the OSA and 500 m buffer);
- Moorland Bird Surveys (four visits, April to July 2021 and April to July 2022; within the OSA and 500 m buffer);
- Scarce Breeding Bird Surveys (February to August 2021 and February to August 2022; within the OSA and buffer extending up to 6 km depending on species).
- Black Grouse Surveys (April and May 2021 and April and May 2022; within the OSA and buffer extending up to 1.5 km);
- Winter Walked Transects (September 2020 to March 2021 and September 2021 to March 2022; within the OSA and 500 m buffer); and
- Eagle Monitoring (January to December 2023 and 2024).

Assessment Methodology

7.4.8 The assessment follows the process set out in the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') and Scottish Government guidance on the implementation of the Birds and Habitats Directives. The process of evaluating the effects of the Proposed Development on birds ensures that the consenting authority has sufficient information to determine whether the Proposed Development (either alone or in combination with other projects) is likely to have a significant effect on bird interests.

7.4.9 The assessment determines the potential effects of the Proposed Development and considers the likelihood of their occurrence. Effect is defined as change in the assemblage of bird species present as a result of the impacts accrued by the Proposed Development. Change can occur either during or beyond the life of the Proposed Development. Where the response of a population has varying degrees of likelihood, the probability of these differing outcomes is considered. Note effects can be adverse, neutral or beneficial.

7.4.10 In assessing whether an effect is significant or not, three factors are considered:

- the Nature Conservation Importance of the species involved,
- the magnitude of the likely effect, and
- the conservation status of the species.

7.4.11 The significance of potential effects is then determined by integrating the assessments of these factors in a reasoned way. The magnitude of likely effects involves consideration of their spatial and temporal magnitudes. In making judgements on significance by this integration, consideration is given to the national and regional trends of the potentially affected species, and how the integrated effects may impinge on the conservation status of the species involved at these geographical levels. Further details of the process underlying the assessment and the determination of significance follow.

Nature Conservation Importance

7.4.12 The Nature Conservation Importance of each species potentially affected by the Proposed Development is defined according to **Table 7.2**.

Table 7.2: Nature Conservation Importance

Importance	Description
High	Species listed in Annex 1 of the EU Birds Directive.
	Breeding species listed on Schedule 1 of the WCA.
Moderate	Species on the BoCC 'Red list' (Stanbury *et al*., 2021) or IUCN Red List of Threatened Species (IUCN, 2022).
	Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the Proposed Development.
	Species present in regionally important numbers (>1 % regional population).

7.4.13 Species listed in Local Biodiversity Action Plans (LBAPs) are considered moderately important only if the Proposed Development supported as least 1 % of the regional population.

7.4.14 All other species are considered of low Nature Conservation Importance and are not considered further in this assessment.

Magnitude

7.4.15 Magnitude is determined by consideration of the spatial and temporal nature of each potential effect. There are five levels of spatial magnitude (**Table 7.3**) and four levels of temporal magnitude (**Table 7.4**). In the case of non-designated sites, spatial magnitude is assessed in respect of populations within the appropriate ecological unit; in this case the appropriate unit is taken to be the Argyll West and Islands Natural Heritage Zone (NHZ 14), as defined by NatureScot (SNH, 2000b).

Table 7.3: Levels of spatial magnitude

Magnitude	Description
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: > 80 % of regional population affected.
High	Major reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 21-80 % or regional population affected.
Moderate	Partial reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 6-20 % of regional population affected.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 1-5 % of the regional population affected.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Reduction barely discernible, approximating to the 'no change' situation. Guide: < 1 % of regional population affected.

Table 7.4: Levels of temporal magnitude

Magnitude	Description
Permanent	Impacts continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period (e.g., the replacement of mature trees by young trees which need > 25 years to reach maturity, or restoration of ground after removal of a development). Such exceptions can be termed very long effects.
Long-term	Approximately 15-25 years or longer (refer to above).
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.

7.4.16 The magnitude of an effect can be influenced by when it occurs. For example, operations undertaken in daylight hours may have little temporal overlap with the occupancy of birds' night-time roosts; and seasonality in a bird population's occupancy of a site may mean that impacts are unlikely during certain periods of the year.

7.4.17 A population's behavioural sensitivity may also be considered when assessing the magnitude of effects. Behavioural sensitivity may be judged as being high, moderate or low according to the species' ecological function and behaviour. Behavioural sensitivity can differ even between similar species, and, for a particular species, some populations and individuals may be more sensitive than others, and sensitivity may change over time, e.g. species are often more sensitive during the breeding season.

7.4.18 Importantly, in determining sensitivity and its contribution to an effect, where such information exists from monitoring sites, data on the responses of individual birds and bird populations to wind farms and similar developments are taken into account, along with knowledge of how rapidly the population or performance of a species is likely to recover following loss or disturbance (e.g. birds being recruited from other populations elsewhere).

Conservation Status

7.4.19 Where the available data allows, the conservation status of each potentially affected population is considered within the NHZ. For these purposes, conservation status is taken to mean the sum of the influences acting on a population which may affect its long-term distribution and abundance. Conservation status is considered to be favourable where:

- a species appears to be maintaining itself on a long-term basis as a viable component of its habitats,
- the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and
- there is (and will probably continue to be) sufficient habitat to maintain the species' population on a long-term basis.

Significance

7.4.20 Following the classification of each species' Nature Conservation Importance and consideration of the magnitude of each effect, professional judgement is used to make a reasoned assessment of the likely effect on the conservation status of each potentially affected species.

7.4.21 In accordance with the EIA Regulations, each likely effect is evaluated and classified as either significant or not significant. The significance levels of effect on bird populations are described in **Table 7.5**. Detectable changes in the conservation status of regional populations of Nature Conservation Importance are automatically considered to be significant effects for the purposes of the EIA Regulations (i.e., no distinction is made between effects of "major" or "moderate" significance). Non-significant effects include all those which are likely to result in barely detectable (minor) or non-detectable (negligible) changes in conservation status of regional (and therefore national) populations. If a potential effect is determined to be significant, measures to avoid, reduce or remedy the effect are suggested wherever possible.

Table 7.5: Significance criteria

Significance	Description
Major	Detectable changes in regional populations of Nature Conservation Importance that would have a severe impact on conservation status.

Significance	Description
Moderate	Detectable changes in regional populations of Nature Conservation Importance that would likely have an impact on their conservation status.
Minor	Small or barely discernible changes that would be unlikely to have an impact on the conservation status of regional populations of Nature Conservation Importance.
Negligible	No or non-detectable changes in the conservation status of regional populations of Nature Conservation Importance.

Cumulative Effects

7.4.22 The potential for cumulative impacts with other proposals has been assessed following current Chartered Institute of Ecology and Environmental Management (CIEEM) and NatureScot guidance (CIEEM, 2018; SNH, 2018b). This part of the assessment focuses on those receptors where there is considered to be a realistic potential for cumulative effects to occur. The assessment includes consideration of operational projects; projects under construction; consented projects which are not yet under construction; and projects for which planning applications have been submitted and for which sufficient information is publicly available (as of January 2024).

7.4.23 Cumulative effects, from two or more development proposals, can be additive (i.e. the effect of each of the proposals can be summed), antagonistic (i.e. the combined effects are less than if they were summed) or synergistic (i.e. the combined effects are greater than if they were summed). In relation to combined collision mortality estimates the approach has been to assume, on a precautionary basis, that the effect on key receptor populations would be additive. However, combining collision mortality estimates from a number of different projects is likely to lead to over-estimates, as individual birds taken from a population, as a result of collision mortality, can be removed only once and this then reduces the number of birds subject to collision risk from other sources. Also, birds that are lost to the population as a result of wind turbine collision may have died anyway from other causes (i.e. compensatory mortality).

7.4.24 The relevant spatial scale is also an important consideration in determining the scope of the cumulative assessment. The assessment of potential cumulative effects has been restricted to those projects that have the potential to interact with the same key receptor populations at a similar scale or influence as the Proposed Development, at the regional or NHZ scale.

Difficulties and Uncertainties

7.4.25 The available information on bird populations at the NHZ and regional level is limited, and available information on the results of monitoring, mitigation and enhancement work at other existing and proposed developments is sparse. Therefore, as is standard with these assessments, use is necessarily made of the available literature and professional judgement to inform the assessment.

7.4.26 General and project-specific uncertainties have been accounted for in this impact assessment, where appropriate, by assuming reasonable 'worst cases' where relevant in the evaluation of receptor sensitivity and the assessment of the potential effects of the

Proposed Development. These are highlighted and discussed, where relevant, within the assessment sections of this Chapter.

7.4.27 The methods adopted for this assessment follow current best practice and have been agreed in consultation with NatureScot. There are considered to be no methodological limitations, specific to this assessment, that appreciably affect the reliability or robustness of its conclusions.

7.5 Existing Environment

Designated Sites

7.5.1 There are no statutory nature conservation designations with an ornithological interest within the OSA. **Table 7.6** lists the sites designated for their ornithological features within 20 km of the Proposed Development.

Table 7.6: Designated sites within 20 km of the Proposed Development

Designation	Name	Designated for	Distance from Proposed Development
SPA	Glen Etive & Glen Fyne	Golden eagle 19 active territories in 2003, more than 4.2% of the GB population	5.3 km north-east

7.5.2 Following current NatureScot guidance (SNH, 2016a) on the connectivity of SPA populations with supporting habitats in the wider environment, the distance to the SPA shown in **Table 7.6** is within the reported range/connectivity distance for the qualifying species listed for the SPA. However, the distance between the Site and SPA breeding sites are greater than the reported range/connectivity distance for the qualifying species (SNH, 2016a). Furthermore, as the Site forms part of non-qualifying golden eagle territory it is unlikely that golden eagle from the SPA utilise habitats within the Site. As such, likely significant effects on the Glen Etive & Glen Fyne SPA are considered unlikely and are not considered further within this assessment.

Baseline Bird Populations

Divers

7.5.3 Red-throated diver is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded regularly during both breeding seasons of baseline surveys. During 2021, two pairs of red-throated diver were confirmed to have attempted to breed within the scarce breeding bird survey area; both pairs were successful, fledging a single juvenile each (**Volume 4, Appendix 7.2: Confidential Ornithology**). During 2022, three pairs of red-throated diver were confirmed to have attempted to breed within the scarce breeding bird survey area; one pair was successful, fledging a single juvenile whilst the other two pairs failed (**Volume 4, Appendix 7.2**).

7.5.4 Baseline Flight Activity Surveys recorded three flights by red-throated divers, none of which passed within the FASA (**Volume 4, Appendix 7.1**).

7.5.5 Therefore, as no breeding sites of red-throated diver were found within 1 km of the Proposed Development and due to no flight activity being recorded within the FASA (**Volume 4, Appendix 7.3: Collision Risk Modelling**), no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), red-throated diver is not considered further in this assessment.

7.5.6 Black-throated diver is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded once during the study period (**Volume 4, Appendix 7.1**).

7.5.7 Therefore, as no breeding sites of black-throated diver were found and due to no flight activity being recorded within the FASA (**Volume 4, Appendix 7.3**), no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), black-throated diver is not considered further in this assessment.

Wildfowl

7.5.8 Whooper swan was recorded infrequently during baseline surveys. A total of two flights were recorded during Flight Activity Surveys, involving a total of 37 birds (**Appendix 7.1**). Given the lack of flight records by this species within the FASA over all baseline non-breeding seasons no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), whooper swan is not considered further in this assessment.

7.5.9 Other wildfowl species recorded of lesser conservation concern included greylag goose, pink-footed goose, goosander, mallard and teal. Pink-footed goose and greylag goose are regular migratory species and as such are afforded protection under the Birds Directive and are of moderate Nature Conservation Importance. Other species of wildfowl are considered to be of low Nature Conservation Importance. Due to the very low numbers and level of flight activity it is considered unlikely that the Proposed Development will result in significant effects under the EIA Regulation therefore none of these species are considered further in this assessment.

Waders

7.5.10 Greenshank is a species of high Nature Conservation Importance (**Table 7.2**) and were recorded during both breeding seasons in the study period. These breeding season records coupled with bird behaviour, including copulation, display flights, agitated alarm calling and territorial singing, suggests two pairs attempted to breed in 2021 and four pairs attempted to breed in 2022 within the scarce breeding bird survey area. Results of the 2021 and 2022 Moorland Bird Survey and Scarce Breeding Bird Survey indicate that no greenshank territories lie within 1 km of the Proposed Development. One flight by greenshank was recorded which did not pass within the FASA **Volume 4,** (**Appendices 7.1** & **7.3**). Therefore, due to the low numbers, no breeding sites of greenshank were found within 1 km of the Proposed Development and that no flight activity was recorded that would place greenshank at risk of collision, no significant effects are considered likely

and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), greenshank is not considered further in this assessment.

7.5.11 Golden plover is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded regularly during the breeding season but infrequently during the non-breeding season. During the non-breeding season 23, observations were made with a mean flock size of seven birds (range 1 - 24). In 2021, four breeding territories were confirmed within the moorland bird survey area. In 2022, three breeding territories were confirmed within the moorland bird survey area. Twenty-two flights by golden plover were recorded during Flight Activity Surveys, involving a total of 116 birds (**Volume 4, Appendix 7.1**). Results of the 2021 and 2022 Moorland Bird Survey indicate that no golden plover territories lie within 500 m of the Proposed Development. Five flights by golden plover, involving a total of 44 birds, were recorded within the FASA (**Volume 4, Appendix 7.3**). Therefore, due to the low numbers, no breeding sites of golden plover were found within 500 m of the Proposed Development and the low level of flight activity recorded within the FASA, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), golden plover is not considered further in this assessment.

7.5.12 Whimbrel is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded once during the study period (**Volume 4, Appendix 7.1**). No evidence of breeding was found during the study period. No flights involving whimbrel were recorded during baseline Flight Activity Surveys. Therefore, due to the very low numbers and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the EIA Regulation. Hence, whimbrel is not considered further in this assessment.

7.5.13 Curlew is a species of moderate Nature Conservation Importance (**Table 7.2**) and was recorded infrequently during both breeding seasons. In 2021 and 2022, a small number of pairs of curlews were holding territory but all were beyond 1 km of the Proposed Development. No flights involving curlew were recorded during baseline Flight Activity Surveys (**Volume 4, Appendix 7.1**). Therefore, due to the very low numbers, no breeding sites of curlew were found within 1 km of the Proposed Development and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the EIA Regulation. Hence, curlew is not considered further in this assessment.

7.5.14 Woodcock is a species of moderate Nature Conservation Importance (**Table 7.2**). A single woodcock was flushed during the course of Winter Walked Transects (**Volume 4, Appendix 7.1**). No evidence of breeding was found during the study period. No flights involving woodcock were recorded during baseline Flight Activity Surveys. Therefore, due to the very low numbers and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the EIA Regulation. Hence, woodcock is not considered further in this assessment.

7.5.15 Other wader species recorded of lesser conservation concern included common sandpiper and snipe (**Volume 4, Appendix 7.1**). Both species are considered to be of low Nature Conservation Importance and are not considered further in this assessment.

Scarce Raptors and Owls

7.5.16 Golden eagle, a species of high Nature Conservation Importance (**Table 7.2**), was present throughout the study period and was recorded regularly in flight in and around the OSA (**Volume 4, Appendix 7.1**). An active breeding site (EA1) and an historic alternative breeding site (EA2) are located within 6 km of the Proposed Development. In 2021, the territory was occupied by an adult pair and nest refurbishment was recorded in March 2021 at EA1. Chick(s) had hatched during the third week of May 2021, and the pair successfully fledged one chick. By January 2022 the resident male has disappeared (presumed dead) and a near-adult male had taken up residence. The pair were observed undertaking nest refurbishment at EA1 and EA2 during March and April 2022, however no breeding attempt was made (**Volume 4, Appendix 7.2**). Given the potential for displacement from foraging areas and the potential for collision mortality golden eagle is considered further in this assessment.

7.5.17 White-tailed eagle, a species of high Nature Conservation Importance (**Table 7.2**), was present throughout the study period and was recorded regularly in flight in and around the OSA (**Volume 4, Appendix 7.1**). Two known breeding territories are located within 6 km of the Proposed Development (WE1 and WE2). In 2021, both territories were occupied by adult pairs. Chicks had hatched by mid-May 2021 and both pairs successfully fledged one chick. In 2022, both territories were occupied by adult pairs. By May 2022 the breeding attempt at WE1 had failed. The breeding attempt at WE2 was successful, fledging one chick (**Volume 4, Appendix 7.2**). Given the potential for collision mortality white-tailed eagle is considered further in this assessment.

7.5.18 Red kite is a species of high Nature Conservation Importance (**Table 7.2**) and was observed on six occasions during the study period. No evidence of breeding by red kite was obtained during the study period, despite extensive searches in potential breeding habitat. Five flights were recorded during Flight Activity Surveys, four of which passed within the FASA at potential collision risk height for a total duration of 350 seconds (**Volume 4, Appendix 7.3**). Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of red kites were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), red kite is not considered further in this assessment.

7.5.19 Goshawk is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded on two occasions during the study period. An adult female was observed on 08 January 2021 during the course of a Winter Walked Transect and an adult male was seen in flight on 1 July 2022 during a Scarce Breeding Bird Survey. No flights were recorded during Flight Activity Surveys (**Volume 4, Appendix 7.1**). Therefore, due to the low numbers, no flight activity recorded within the FASA, and no breeding sites of goshawk were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), goshawk is not considered further in this assessment.

7.5.20 Hen harrier is a species of high Nature Conservation Importance (**Table 7.2**) and was observed on 42 occasions during the study period, with the majority of observations (25

records) being made during the 2022 breeding season. Evidence of breeding by hen harrier was obtained at one location in 2022, however no breeding site was found. Eighteen flights were recorded during Flight Activity Surveys, 12 of which were recording during the 2022 breeding season. Two flights, totalling 23 seconds, passed within the FASA (**Volume 4, Appendix 7.3**). Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of hen harriers were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), hen harrier is not considered further in this assessment.

7.5.21 Osprey is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded infrequently during the breeding season. In 2021, evidence of breeding by osprey was obtained at one site located greater than 2 km from the OSA. No flights were recorded during Flight Activity Surveys (**Volume 4, Appendix 7.1**). Therefore, due to the low numbers, no flight activity recorded within the FASA, and no breeding sites of osprey were found within 2 km of the Proposed Development, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), osprey is not considered further in this assessment.

7.5.22 Peregrine is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded on four occasions during the study period (**Volume 4, Appendix 7.1**). No evidence of breeding by peregrine was obtained during baseline surveys, despite extensive searches in potential breeding habitat within the OSA and 2km buffer. Two flights were recorded within the FASA for a total of 54 seconds (**Volume 4, Appendix 7.3**). Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of peregrine were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), peregrine is not considered further in this assessment.

7.5.23 Merlin is a species of high Nature Conservation Importance (**Table 7.2**) and was recorded on 29 occasions during the study period with the majority of observations being made in the breeding season. In 2021 and 2022, evidence of breeding by merlin was suspected at one location however no breeding site was ever found. A successful breeding site was located, fledging a minimum of three young (**Volume 4, Appendix 7.2**). Nine flights were recorded during Flight Activity Surveys for a total duration of 781 seconds. Three flights were recorded within the FASA for a total duration of 79 seconds (**Volume 4, Appendix 7.3**). Therefore, due to the low numbers, very low flight activity recorded within the FASA, and no breeding sites of merlin were found within 2 km of the Proposed Development, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), merlin is not considered further in this assessment.

7.5.24 Short-eared owl was recorded on two occasions during the study period. A single bird was seen in flight on 2 December 2021 and 11 May 2022. No evidence of breeding by

short-eared owl was obtained during the study period, despite extensive searches in potential breeding habitat. No flights by short-eared owl were recorded during Flight Activity Surveys (**Volume 4, Appendix 7.1**). Therefore, due to the low numbers, no flight activity recorded within the FASA, and no breeding sites were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), short-eared owl is not considered further in this assessment.

7.5.25 Barn owl was recorded once during the study period. On 15 February 2022 a pair were roosting in a nest box in an abandoned farm building (**Volume 4, Appendix 7.2**). No flights by barn owl were recorded during Flight Activity Surveys (**Volume 4, Appendix 7.1**). Therefore, due to the low numbers, no flight activity recorded within the FASA, and no breeding sites were found within 2 km of the Proposed Development, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their high Nature Conservation Importance (**Table 7.2**), barn owl is not considered further in this assessment.

7.5.26 Other raptor species recorded of lesser conservation concern included buzzard, kestrel and sparrowhawk. These species are considered to be of low Nature Conservation Importance and are not considered further in this assessment.

Black Grouse

7.5.27 Black grouse is a species of moderate Nature Conservation Importance (**Table 7.2**) and was recorded once within the OSA and infrequently within study area (i.e. within 1.5 km buffer of the OSA) throughout the study period.

7.5.28 Targeted surveys for 'lekking' (displaying) birds in April and May 2021 located one lekking area (**Volume 4, Appendix 7.1: Figure 13a**). The maximum count of males attending this lek site was three males. Observations were also made of highly dispersed and mobile single displaying males, so called 'singletons'. Therefore, the population of male black grouse within the study area is likely to be in the region of four males. The lekking area is at a distance greater than 1 km from the Proposed Development.

7.5.29 Targeted surveys for lekking birds in April and May 2022, did not locate any lekking areas within 1.5 km of the OSA (**Volume 4, Appendix 7.1: Figure 13b**) and fewer observations of black grouse were made in general. A lek site holding two males was located to the west of the 1.5 km buffer. This lekking area is at a distance greater than 2 km from the Proposed Development.

7.5.30 No flights by black grouse were recorded within the FASA during Flight Activity Surveys (**Volume 4, Appendix 7.1**).

7.5.31 Therefore, due to the separation distance between the 2021 'core' lekking area and all elements of the Proposed Development, together with no flight activity being recorded within the FASA, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the EIA Regulations. Hence, despite their moderate Nature Conservation Importance (**Table 7.2**), black grouse are not considered further in this assessment.

7.6 Design Considerations

7.6.1 The following considerations relating to ornithological interests have been incorporated into the Proposed Development design as embedded mitigation:

- All waterbodies used by breeding red-throated diver during baseline surveys have been buffered by more than 1000 m;
- All black grouse lek sites recorded during baseline surveys holding two or more males have been buffered by more than 1000 m;
- All golden eagle breeding sites recorded during baseline surveys have been buffered by more than 1000 m;
- All white-tailed eagle breeding sites recorded during baseline surveys have been buffered by more than 1000 m; and
- The final turbine layout has been designed to minimise potential effects on golden eagle by avoiding the creation of turbine strings and outliers, and by maintaining a turbine cluster (Prospective guidance from Natural Research to NatureScot (NatureScot, 2021)).

7.7 Best Practice Measures

7.7.1 To conform with the Wildlife and Countryside Act (WCA), surveys to locate nests of birds listed in Schedule 1 of the WCA and Annex 1 of the Birds Directive would be undertaken prior to construction operations during the breeding period as part of a Bird Protection Plan (BPP) which would be overseen by an Ecological Clerk of Works (ECoW). If it is judged that these activities are likely to disturb breeding attempts, then appropriate exclusion zones (Goodship & Furness, 2022) or other protection measures would be agreed with NatureScot prior to recommencing works.

7.7.2 The assessment has been undertaken on the basis that a Bird Protection Plan (BPP), devised in consultation with NatureScot, will be in place prior to the onset of construction activities. The BPP will describe survey methods for the identification of sites used by protected birds and will detail protocols for the prevention, or minimisation, of disturbance to birds as a result of activities associated with the Proposed Development.

7.7.3 The BPP will describe surveys to locate the nests or other key sites (e.g. roosts) of birds listed in Schedules 1 and 1A of the WCA, in advance of construction works progressing. In the event that an active nest or roost of a Schedule 1 or Schedule 1A species is discovered within distances given by Goodship & Furness (2022) (or within a 500 m radius for Schedule 1 species not listed), a disturbance risk assessment will be prepared under the BPP. The disturbance risk assessment will detail any measures considered necessary to safeguard the breeding attempt or roost (e.g., exclusion zones or restrictions on timing of works) and will be submitted to NatureScot before recommencing work. Similarly, although the species is not listed on Schedule 1, surveys to locate black grouse lek sites will be undertaken with potentially suitable habitats, and appropriate measures to safeguard relevant lek sites will be agreed with NatureScot (over and above those already included in the BPP, if necessary).

7.8 Scope of the Assessment

Effects Assessed in Full

7.8.1 The assessment of effects is based upon the Proposed Development description outlined in **Chapter 3** and is structured as follows:

- construction effects of the Proposed Development.
- operational effects of the Proposed Development, and
- cumulative effects of the Proposed Development.

7.8.2 Potential effects are evaluated in respect of regularly occurring species of high and moderate Nature Conservation Importance, whose regional populations could be potentially affected by the Proposed Development as set out in **Table 7.7: Nature Conservation Importance of potentially affected species**. Consideration has been given to the criteria in **Table 7.2** when assigning the Nature Conservation Importance of potentially affected species.

Table 7.7: Nature Conservation Importance of potentially affected species

Importance	Species
High	Golden eagle, white tailed eagle
Moderate	N/A

Effects Scoped Out

7.8.3 On the basis of the desk based and field survey work undertaken (see **Volume 4, Appendix 7.1**), the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment. Specifically, following due consideration of the potential for the Proposed Development to give rise to significant effects on relevant ornithological interests, it has been concluded that significant effects are unlikely. Therefore, a detailed assessment is not required under the EIA Regulations. Hence, the topic areas scoped out of this assessment are national / international designated interests and all bird species, as follows:

- Effects on European and national designated sites of ornithological importance: The Proposed Development is not covered by any statutory nature conservation designations for ornithological interests nor is it within the vicinity of any statutory nature conservation designation which could be adversely affected as a result of the construction or operation of the Proposed Development. The nearest European and national designated sites of ornithological importance is the Glen Etive & Glen Fyne Special Protection Area (**Table 7.6**). Since the cited bird species at this site are unlikely to exploit habitats in the vicinity of the Proposed Development due to the separation distances involved, there is no likelihood of adverse effects as a consequence of the Proposed Development. Therefore, effects on European and national designated sites of ornithological importance are not considered further in the ornithological assessment.
- Effects on the following bird species: whooper swan, greylag goose, pink-footed goose, greenshank, golden plover, lapwing, curlew, woodcock, red kite, goshawk, hen harrier, osprey, peregrine, merlin, short-eared owl, barn owl and black grouse. Baseline studies recorded all of these species which are considered to be of high

or moderate Nature Conservation Importance (**Table 7.2**). Although these species were present, they were recorded infrequently, and/or in relatively small numbers (see **Existing Environment: Baseline Bird Populations** and **Volume 4, Appendix 7.1**). Hence, their reliance on habitats (e.g., for breeding, roosting or foraging) and airspace in the vicinity of the Proposed Development was considered low, and the Proposed Development will have no significant effects on relevant populations of these species. Consequently, given regional abundance and/or behavioural sensitivity there is considered to be no potential for any adverse effect on regional populations as a result of construction or operational activities. Therefore, these species are not considered further in the ornithological assessment.

7.9 Assessment of Effects

Decommissioning of Existing Wind Farm

7.9.1 The existing turbines would be removed with foundations remaining in place to minimise potential environmental impacts resulting from their removal. The same protocols to those followed during construction will be followed with regard to the avoidance of disturbance to breeding birds and important sites (nests, leks and roosts) of other key bird species will be safeguarded under a BPP. Disturbance effects due to decommissioning would last for a shorter time and be of lower intensity than during construction, and so effects would be similar in nature but of lower magnitude, both temporally and spatially, during decommissioning.

7.9.2 The magnitude of decommissioning effects on all species is considered to be **negligible**. Even in the case of species of highest Nature Conservation Importance these effects are judged **not significant** under the terms of the EIA Regulations

Construction Effects

Direct Habitat Loss

7.9.3 Full details of habitat loss as a result of the construction of the Proposed Development are presented in **Volume 2, Chapter 6: Ecology**. In summary, habitat loss as a result of construction of the Proposed Development would amount to up to 21.52 hectares which comprises primarily blanket bog, and modified bog and wet heath habitats. There is an abundance of similar habitats within the Site, and these are not considered to be of critical value to potentially affected bird species (**Table 7.7**). Further, the effect of this habitat loss is spatially negligible in relation to the home range requirements of all potentially affected bird species. Hence, there would be no change in the conservation status of potentially affected species as a result of habitat loss and the effects of direct habitat loss on all ornithological interests are deemed **negligible** and therefore **not significant** under the EIA Regulations.

Displacement

7.9.4 The construction activities of the Proposed Development, including the construction of the Site access tracks, turbine hard-standings and erection of the turbines is expected to last up to 23 months. The number of bird breeding seasons potentially disrupted by construction activities will depend on the month in which construction works begin and

the components of the Proposed Development. For the purposes of this assessment a worst-case scenario is assumed: i.e., that construction work will start during a bird breeding season and, for any given species, breeding would be potentially affected for up to two seasons. Breeding could also be affected along the main access route used by construction traffic to access the turbines. An indicative two-phase construction programme, which takes into account potential ornithological constraints and other potential restrictions, is set out in Table 2.2, **Volume 2, Chapter 2: Proposed Development and Design Evolution.**

7.9.5 The impacts on birds most likely to occur during the construction phase comprise indirect habitat loss due to displacement of birds through disturbance by activity of people and machines in the vicinity of the Proposed Development. It is likely that noise and visual disturbance associated with construction activities could temporarily displace some of the breeding and foraging birds present, dependent on their behavioural sensitivity to human activities. Birds that are disturbed at breeding sites are vulnerable to a variety of potential effects on breeding performance, including the chilling or predation of exposed eggs/chicks, damage to or loss of eggs/chicks caused by panicked adults and the premature fledging of the young. Birds disturbed when foraging during the breeding season may also feed less efficiently and thereby breed less successfully. These impacts may lead to a short-term reduction in the productivity of bird populations.

Disturbance effects on breeding birds would be confined to areas in the locality of the turbine layout and associated infrastructure, with different species varying in their sensitivity. Larger bird species, those higher up the food chain e.g., most raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex or closed habitats (e.g., woodlands) (Hill *et al*.,1997).

Golden Eagle

7.9.6 All construction will be undertaken at distances greater than 1000 m from the nearest known golden eagle nest site. However, any breeding attempts by golden eagle within the vicinity of proposed construction activities will be identified during pre-construction surveys detailed in the BPP for the Proposed Development (see **Best Practice Measures**). The BPP will then detail appropriate measures to avoid disturbance to any breeding attempt in compliance with legislation. All drilling and blasting which are located at distances less than 2 km from golden eagle breeding sites would take place outside the breeding season (February - August), unless checked and confirmed by the ECoW that such activities can progress.

7.9.7 Wind farm construction activities have been shown to displace non-breeding golden eagles, with lower levels of flight activity recorded during construction years than found prior to construction (Haworth & Fielding, 2013). In addition, but in relation to breeding birds, there is also some evidence that golden eagles in the Beinn an Tuirc Wind Farm (Beinn an Tuirc) breeding range shifted their activity away from Beinn an Tuirc following construction, although targeted habitat management aimed at providing better foraging opportunities away from the turbines makes interpretation of these results more difficult (Walker *et al*., 2005). Also, it is unclear whether this effect, if it occurred, was attributable to the construction activities, or resulted from the operation of Beinn an Tuirc windfarm.

7.9.8 Nevertheless, assuming that construction activities lead to the displacement of golden eagles, away from nesting sites, foraging and roosting golden eagles have a suggested

disturbance buffer of up to 500 m (Goodship & Furness, 2022). The precise distance over which a displacement effect occurs is unknown but will probably depend on the nature and frequency of the activity and environmental characteristics including habitat, topography and weather conditions. As a result, any displacement arising from construction disturbance over the short-term will not result in a substantial reduction in the area of available foraging habitat for golden eagles. Given the small area of potentially suitable foraging habitat affected, it is considered unlikely that short-term displacement from suitable foraging habitats would elevate mortality rates or reduce reproductive rates in the golden eagle population to the extent that the population trajectory in the region would be affected.

7.9.9 The potential for displacement from roost sites associated with the Proposed Development during construction has been assessed through roost use analysis of the resident pair of golden eagles using satellite tag data (**Volume 4, Appendix 7.5: Roost analysis using satellite tag data from a resident pair of golden eagles**). On average, the female used 89 different roost locations per year of study. Of these, 51 roosts were used on only one night, 33 roosts were used occasionally (between 2 and 10 nights) and five were multi-use roost sites (used on more than 10 nights). No multi-use roost sites were located at distances where disturbance/displacement effects would occur. A small number of nights per year (<1 %) would potentially be affected. It is therefore considered reasonable to assume that any displacement from roost sites would be moderated by birds roosting in less disturbed areas. Furthermore, construction works undertaken in daylight hours may have little temporal overlap with the occupancy of night-time roosts.

7.9.10 In summary, measures set out in the BPP coupled with the distances at which nesting attempts have occurred in the past, mean that displacement from suitable breeding sites is considered unlikely during construction. Any short-term displacement from suitable foraging and roosting habitats is not considered to be sufficient to affect regional productivity or survival rates and hence the trajectory of the regional population and its conservation status would be unaffected. Given the above, construction effects on golden eagle are predicted to be **negligible** and **not significant** under the EIA Regulations.

White-tailed Eagle

7.9.11 All construction will be undertaken at distances greater than 1000 m from the nearest known white-tailed eagle nest sites. However, any breeding attempts by white-tailed eagle within the vicinity of proposed construction activities will be identified during pre-construction surveys detailed in the BPP for the Proposed Development (see **Best Practice Measures**). The BPP will then detail appropriate measures to avoid disturbance to any breeding attempt in compliance with legislation. All drilling and blasting which are located at distances less than 2 km from white-tailed eagle breeding sites would take place outside the breeding season (February - August), unless checked and confirmed by the ECoW that such activities can progress.

7.9.12 Any potential for the indirect loss of foraging habitat to white-tailed eagles is difficult to quantify. Foraging distances from nest sites are understood to be in the region of 10 km, extending up to 13 km (SNH, 2016a), and on this basis indirect habitat loss resulting from temporary construction activities is likely to be of low magnitude and negligible significance at the level of the NHZ.

7.9.13 Foraging birds would be potentially displaced from localised areas around construction areas such as the turbine locations, connecting tracks, site access route, lay-down areas and substation. However, these species have large foraging ranges relative to the scale of any displacement. Moreover, there is no evidence to suggest that the localised areas around the construction work sites are critical to the performance of white-tailed eagles (i.e. foraging habitat does not appear to be limiting for the territories in question, and there is no reason to believe that the potential displacement area provides unusually profitable foraging opportunities). Furthermore, range use by breeding white-tailed eagles is skewed because they forage in the habitats which are most profitable for food and the most profitable habitats are not equally distributed around nest sites (Mirski & Anderwald, 2023).

7.9.14 During the non-breeding period, when foraging birds are not constrained by nest site location, it is considered reasonable to assume they would accommodate any displacement by more intensively exploiting less disturbed areas.

7.9.15 In summary, measures set out in the BPP coupled with the distances at which nesting attempts have occurred in the past, mean that displacement from suitable breeding sites is considered unlikely during construction. Any short-term displacement from suitable foraging habitats is not considered to be sufficient to affect regional productivity or survival rates and hence the trajectory of the regional population and its conservation status would be unaffected. Given the above, construction effects on white-tailed eagle are predicted to be **negligible** and **not significant** under the EIA Regulations.

Proposed Mitigation

7.9.16 As no construction effects are deemed significant, no mitigation is proposed. Measures set out in the BPP will ensure that disturbance to sites used by protected bird species is avoided.

Residual Construction Effects

7.9.17 Any disturbance and/or displacement to golden eagle and white-tailed eagle would be temporary and both the magnitude and significance of any effects as a result of disturbance and displacement from foraging habitats generated by construction are therefore anticipated to be **negligible** and **not significant** under the EIA Regulations.

Operational Effects

Displacement

7.9.18 The presence and operation of wind turbines could potentially displace birds from nesting and foraging areas. Existing information (e.g., de Lucas *et al*., 2007; Douglas *et al*., 2011; Haworth & Fielding, 2013; Fielding *et al*., 2021; Fielding *et al*., 2022) and reviews of effects (e.g., Madders & Whitfield, 2006; Hötker *et al*., 2006; Gove *et al*., 2013) suggest that most birds are affected only slightly, if at all, although these effects require further study. For example, breeding birds have not been found to be completely displaced at distances greater than 300 m from a turbine (e.g., Gill *et al*., 1996; Percival, 1998; Hötker *et al*., 2006; Fielding *et al*., 2021; Fielding *et al*., 2022) although other studies suggest partial displacement effects at greater distances (Pearce-Higgins *et al*., 2009). However, wind turbines might displace birds from much larger areas if they act as a barrier to bird

movements, or if availability of suitable habitat is restricted. In addition, displacement effects may vary over time, as birds habituate to the operation of turbines or site-faithful individuals are lost from the population.

7.9.19 The evidence suggests that impacts vary between species and sites (see discussion for raptors in Madders & Whitfield, 2006). There is potential for some disruption to feeding and nesting due to increased human activity for maintenance purposes. However, this would be relatively infrequent, involve low levels of disturbance and would be restricted to areas of the Proposed Development accessible by tracks. Therefore, the overriding source of disturbance and displacement of birds during the operational period is considered to be the turbines operating (Pearce-Higgins *et al*., 2009).

Golden eagle

7.9.20 Breeding sites used by golden eagle between 2021 and 2024 inclusive were located at distances greater than 1000 m from the nearest turbine and associated infrastructure (**Volume 4, Appendix 7.2** and **Appendix 7.6: Eagle Breeding Success 2023 & 2024**).

7.9.21 On the basis of the above and given the distances at which nesting attempts have occurred in the past, disturbance from suitable breeding sites is considered unlikely during operation. The effects of operational disturbance on golden eagle breeding sites are predicted to be **negligible** and **not significant** under the EIA Regulations.

7.9.22 The central consideration, therefore, is the potential for displacement effects on the range-holding pair of golden eagles and how displacement may affect their productivity and/or survival, or whether the range would remain functionally sustainable.

7.9.23 The direct loss of habitat resulting from the Proposed Development is small and therefore any impact is unlikely to affect productivity or survival. However, there is a growing body of evidence from satellite tagged eagles that golden eagles will avoid areas developed for turbines resulting in additional habitat loss (indirect habitat loss). Therefore, assuming that the areas between turbines are unlikely to be available to foraging golden eagles on the basis of avoidance of turbines, displacement and loss of habitat has been calculated using a 300 m radius buffer around each turbine (Fielding *et al*., 2021; Fielding *et al*., 2022; Prospective guidance from Natural Research to NatureScot (NatureScot, 2021)).

7.9.24 NatureScot recommend the use of the Golden Eagle Topography (GET) model to inform potential habitat loss to golden eagle ranges in the vicinity of wind farms (NatureScot, 2021). The GET model predicts that 134 hectares (ha) of preferred (GET 6+) habitat is not available due to the existing wind farm and that the Proposed Development will overlap the nearest golden eagle range by an additional 77 ha, of which 66 ha of preferred GET 6+ habitat will be lost (**Volume 4, Appendix 7.4: Golden Eagle Topography (GET) Modelling**).

7.9.25 Baseline empirical evidence shows that the area in which the turbines are proposed is used by the range-holding pair. During 892 hours of Flight Activity Surveys, golden eagle was observed in flight for 16,394 seconds, of which 837 seconds of flight activity was seen within 500 m of the proposed turbines (FASA) (**Volume 4, Appendix 7.1** & **7.3**). This equates to approximately 5 % of all flight activity observed.

7.9.26 It is considered therefore that the area in which the turbines are proposed is functionally important for the maintenance of the territory and to sustain the range-holding pair

(survivorship) or a breeding attempt (productivity). The loss of parts of the home range of resident golden eagles can have adverse effects on breeding success and/or territory occupancy (Whitfield *et al*. 2001, 2007). Whitfield *et al.* (2007) showed that the response of golden eagles to range loss was highly variable between pairs, with some pairs abandoning their territories when less than 5 % of their territory was lost. Given the additional loss of 1.68 % of functional habitat, it is considered that this is not sufficient to cause a decline in survivorship or productivity and the territory would remain viable.

7.9.27 The potential for displacement from roost sites associated with the Proposed Development during operation has been assessed through roost use analysis of the resident pair of golden eagles using satellite tag data (**Volume 4, Appendix 7.5**). On average the female used 89 different roost locations per year of study. Of these, 51 roosts were used on only one night, 33 roosts were used occasionally (between 2 and 10 nights) and five were multi-use roost sites (used on more than 10 nights). No multi-use roost sites were located at distances where disturbance/displacement effects would occur, and no multi-roost sites would be lost due to the presence and operation of the Proposed Development. A small number of nights per year (<1 %) would potentially be affected, and a maximum of two transient roosts may be lost. It is therefore considered reasonable to assume that the loss of transient roost sites within 300 m of proposed turbines would be moderated by birds roosting in less disturbed areas. It is considered that the loss of two transient roost sites is not sufficient to cause a decline in survivorship and the territory would remain viable.

7.9.28 Any negative effects on breeding success or survival rates are not considered to be sufficient to affect regional productivity and the trajectory of the regional population. Hence, the conservation status of golden eagle within NHZ 14 will not be affected. Given the above, effects of operational disturbance and displacement on golden eagle are predicted to be **minor** in magnitude and **not significant** under the EIA Regulations.

White-tailed eagle

7.9.29 Breeding sites used by white-tailed eagle between 2021 and 2024 inclusive were located at distances greater than 1000 m from the nearest turbine and associated infrastructure (**Volume 4, Appendix 7.2** and **Appendix 7.6**).

7.9.30 On the basis of the above and given the distances at which nesting attempts have occurred in the past, disturbance from suitable breeding sites is considered unlikely during operation. The effects of operational disturbance on white-tailed eagle breeding sites are predicted to be **negligible** and **not significant** under the EIA Regulations.

7.9.31 Overall, the evidence from Norway (e.g., Dahl *et al*., 2013), Finland (e.g., Tikkanen *et al*., 2018) and Germany (e.g., Heuck *et al*., 2019) in particular, suggests that white-tailed eagles do not consistently show strong displacement from wind farms in terms of flight behaviour. This is consistent with their apparent vulnerability to collision.

7.9.32 As discussed previously, white-tailed eagles have large foraging ranges. The range of breeding white-tailed eagles will be skewed to those habitats most profitable for food to sustain a breeding attempt. Whereas non-breeding birds are more opportunistic foragers and wander more widely being less constrained by providing for nestlings. Prey remain analysis conducted at WE1 and WE2 during 2021 (Grant, 2022) shows clear preferences in diet, driven by prey availability and abundance. Prey remains at WE1 consisted of 41 %

bird species, 31 % mammals and 28 % fish. Prey remains at WE2 consisted of 32 % bird species and 68 % mammals. Of the bird species identified, other than red grouse, none breed within 500 m of the Proposed Development, indeed some species are entirely associated with the marine environment (e.g., fulmar and guillemot). Of the mammal species, rabbit and lamb made up the majority of items identified. Small quantities of deer and sheep carrion were found but only made up 7 % and 4 % of prey remains identified respectively. As rabbits and lambs are not present within 500 m of the Proposed Development then clearly the habitats surrounding the Proposed Development are not profitable for food to breeding birds and are not favoured foraging areas, a conclusion supported by the empirical evidence gathered on Site, where very low levels of flight activity was recorded by the resident, adult breeders.

7.9.33 For non-breeding white-tailed eagles, it is considered reasonable to assume they would accommodate any displacement by more intensively exploiting less disturbed areas.

7.9.34 In summary, any long-term displacement from suitable foraging habitats is not considered to be sufficient to affect regional productivity or survival rates and hence the trajectory of the regional population and its conservation status would be unaffected. Given the above, operational displacement effects on white-tailed eagle are predicted to be **negligible** and **not significant** under the EIA Regulations.

Collision risk

7.9.35 Birds that are not displaced would be potentially vulnerable to collision with the turbines. The level of collision with wind turbines is presumed to be dependent on the amount of flight activity over the Proposed Development and the ability of birds to detect and manoeuvre around rotating turbine blades. Birds that collide with a turbine are likely to be killed or fatally injured. This may in turn affect the maintenance of bird populations.

7.9.36 Flight activity by golden eagle and white-tailed eagle was recorded within the 500 m buffer of the proposed turbine layout at heights that put them at risk of collision with turbine blades. As such, collision risk modelling (CRM) for these species was undertaken (see **Volume 4, Appendix 7.3**).

Golden eagle

7.9.37 The speed used in the collision risk calculations was 14.1 m / sec for golden eagle. Collision risks have been calculated assuming 99 % avoidance (SNH, 2018d). Full details of the calculations are shown in **Volume 4, Appendix 7.3**. Applying an accepted avoidance rate of 99 % for golden eagle, this equates to one bird colliding with a turbine approximately every 104 years.

7.9.38 The CRM process is inherently precautionary, and the usefulness of its predictions should be treated with a high degree of caution as modelling low levels of activity infers a false level of accuracy in an imprecise model. Furthermore, there is a growing body of satellite-tag data that shows range-holding golden eagles avoid entering wind farms and collisions are very rare events (Fielding *et al*., 2021; Fielding *et al*., 2022); on this basis the potential loss of one golden eagle over a 104-year period is considered to be highly precautionary.

7.9.39 The NHZ 14 golden eagle population was determined by Whitfield *et al*. (2008) to be in favourable conservation status. The population effect of the potential loss of one golden eagle every 104 years is difficult to measure, (bearing in mind that any such loss would

comprise one out of 11,232 adult eagles (54 x 2 x 104) plus an unknown number of non-breeding birds), as it would be impossible to separate the effects of collision mortality from environmental and demographic processes that are subject to stochastic variability. Moreover, the predicted rate of additional mortality is beyond any practical possibility of empirical measurement that it would not be scientifically credible to consider that such rates could contribute to population effects. Therefore, based on professional judgement, the loss of one golden eagle every 104 years will not contribute to population effects.

7.9.40 With a breeding population of at least 54 pairs within NHZ 14, overall impacts on golden eagles arising from collision mortality are considered to be of low magnitude and negligible significance at the scale of the NHZ.

7.9.41 Since we know (Fielding *et al.* 2021, 2022, 2023) that the basic response of golden eagles to wind farms in Scotland is avoidance (and hence functional habitat loss is the primary impact) then collision risk (prospective mortality) is de facto far less of a concern. For this reason, and the fact that the modelling predicts a very low level of collision mortality, population modelling of the effects on the NHZ population has not been undertaken.

7.9.42 Given the above, the effect of collision mortality on golden eagle is predicted to be **negligible** and **not significant** under the EIA Regulations.

White-tailed eagle

7.9.43 The speed used in the collision risk calculations was 13.4 m / sec for white-tailed eagle. Collision risks have been calculated assuming 95 % avoidance (SNH, 2018d). Full details of the calculations are shown in **Appendix 7.3**. Applying an accepted avoidance rate of 95 % equates to one adult bird colliding with a turbine approximately every 18.6 years and one sub-adult bird colliding with a turbine approximately every five years.

7.9.44 The most sensitive demographic parameter for population growth for long-lived species is adult survival (Sæther & Bakke, 2000). This means that changes in the survival rate of adults have a disproportionately large impact on the overall population growth rate compared to changes in other demographic parameters like productivity or sub-adult survival, and a relatively minor increase in adult mortality (3–5%) can lead to significant population declines over time (Whitfield *et al*., 2004). The loss of 0.055 adult white-tailed eagles per year is so small that it would be impossible to separate the effects of collision mortality from environmental and demographic processes that are subject to stochastic variability. Moreover, the predicted rate of additional mortality is beyond any practical possibility of empirical measurement that it would not be scientifically credible to consider that such rates could contribute to population effects. Therefore, based on professional judgement, the loss of one adult white-tailed eagle every 18.6 years will not contribute to population effects.

7.9.45 Similarly, the loss of one sub-adult white-tailed eagle every five years would reduce sub-adult survival rates for NHZ 14 from 0.508 (Sansom *et al*., 2016) to 0.500. This in effect would mean that one less adult would enter the NHZ population every 6 to 10 years, depending on the age of the sub-adult birds killed. Such diminutive mortality rates would only serve to marginally reduce the annual growth rate to a level that would be undetectable due to environmental and demographic processes that are subject to stochastic variability.

7.9.46 Given the above, the effect of collision mortality on white-tailed eagle is predicted to be **negligible** and **not significant** under the EIA Regulations.

Proposed Mitigation

7.9.47 As no operational effects are deemed significant, no mitigation is required.

Proposed Enhancement Measures

7.9.48 The Proposed Development includes an Outline Biodiversity Enhancement and Habitat Management Plan (OBE-HMP) (**Appendix 6.10**). The measures in the OBE-HMP will be finalised in consultation with Argyll & Bute Council (A&BC), NatureScot and other relevant stakeholders. Amongst a suite of beneficial measures, this will include for a grazing management strategy within the OBE-HMP Study Area, aimed at the improvement of moorland habitat quality as a result overgrazing by sheep and deer, and which is recognised as the main constraint impacting on golden eagles in NHZ 14 (Whitfield *et al*., 2008). The grazing management strategy will seek to improve and monitor habitat quality, and prey availability for golden eagles, in areas away from operational infrastructure, over the lifetime of the Proposed Development.

7.9.49 Additional measures to improve habitats, particularly the maintenance, restoration and re-wetting of modified peat areas will also form part of the OBE-HMP for the Proposed Development. Peatland restoration will improve the quality and diversity of bog habitats providing suitable habitats for a range of bird species including golden eagle. It will also improve the quality of suitable habitat for a range of mammal and reptile species, which in turn optimises the prey availability for golden eagle.

7.9.50 The OBE-HMP also proposes the planting of broadleaved and riparian woodland which will provide benefits for a range of upland bird species including black grouse and woodland mammals such as red squirrel, which in turn will optimises the prey availability for golden eagle. Annual monitoring will be undertaken to check the effectiveness of habitat management for golden eagles, including monitoring of breeding success (see **Monitoring**).

7.9.51 The grazing management strategy, restoration of peatland and the increase in native woodland, would, over time, have long lasting benefits in terms of general biodiversity. The diversity of flora and fauna would improve, and the area is likely to become ecologically richer, benefiting golden eagle and the foraging quality of the territory in the long-term.

7.9.52 The OBE-HMP also includes an Operational Carcass Recovery Scheme (OCRS) which will be agreed and implemented, in consultation with NatureScot, by way of a planning condition. The OCRS would include protocols and the frequency for the search and removal of livestock and deer carcasses from within 135 m of operational turbine locations. The OCRS will be agreed prior to the commissioning of the Proposed Development. Monitoring of white-tailed eagle fatalities within the wind farm will be undertaken to check the effectiveness of the OCRS.

Residual Operational Effects

7.9.53 Following the implementation of enhancement measures the residual effects for the NHZ 14 golden eagle and white-tailed eagle populations as a result of the Proposed

Development are considered to be **negligible** and therefore **not significant** in the context of the EIA Regulations.

7.10 Cumulative Effects

7.10.1 The EIA Regulations require the cumulative effects of the Proposed Development with other relevant projects to be assessed. NatureScot guidance (NatureScot, 2025c) on assessing cumulative effects has been followed. In considering cumulative effects, it is necessary to identify any effects that are minor (or greater) in isolation (**Table 7.5**) but that may be major or moderate, and therefore significant, cumulatively. Predicted adverse effects on birds arising from the construction and operation of the Proposed Development have the potential to contribute to cumulative effects upon wider regional populations, in this case populations within NHZ 14.

7.10.2 Species for consideration were taken to be those species of high or moderate Nature Conservation Importance (**Tables 7.2** and **7.7**) for which there was some indication of a potential effect as a result of the Proposed Development, which may be exacerbated cumulatively.

7.10.3 However, given that no significant effects of the Proposed Development were identified, and all residual effects on all bird species were deemed to be of negligible significance (**Table 7.5**), the predicted in-isolation effects of the Proposed Development are considered to have no potential to contribute to cumulative effects and are, therefore, negligible across all species.

7.10.4 In conclusion, for all bird species, the cumulative effects of the Proposed Development in-combination with other projects in the NHZ are likely to be **negligible** and deemed to be **not significant** under the terms of the EIA Regulations.

Cumulative Effects on the G/LAW1 Golden Eagle Territory

7.10.5 Golden eagles require extensive upland areas for nesting, roosting and foraging, and the species exhibits high territorial fidelity. The loss of functional habitat within a golden eagle territory can lead to reduced productivity, reduced territory occupancy, and, in some cases, territory abandonment (Whitfield *et al.*, 2007).

7.10.6 Other projects of immediate relevance to the consideration of cumulative effects upon G/LAW1 include the proposed Corr Chnoc Wind Farm and the proposed Cruach Clenamacrie Wind Farm. The Proposed Development and the two proposed developments interact with the same single golden eagle territory, G/LAW1. Effects relate to combined displacement from important foraging and roosting habitat, and potential cumulative disturbance.

7.10.7 The cumulative impact on golden eagle arises primarily due to predicted effects from the proposed Corr Chnoc Wind Farm, which contributes the majority of the cumulative habitat and roost site loss within the G/LAW1 territory (Appendices 7.4 & 7.5). The Proposed Development and the proposed Cruach Clenamacrie Wind Farm have individually negligible and minor impacts respectively. While all three projects interact with the same eagle territory, the incremental effect of the Proposed Development is minimal and does not materially alter the overall risk profile. As such, although the total cumulative effect would be significant, the contribution of the Proposed Development is assessed as

negligible and not significant. It would be the incremental effect of Corr Chnoc Wind Farm that would create a significant issue for this eagle pair.

7.11 Additional Enhancement Measures

7.11.1 A number of additional enhancement measures are proposed within the OBE-HMP to improve conditions for a range of bird species. These would be secured by way of appropriately worded planning conditions. These include:

- Fence marking a 1 km stretch of deer fence to reduce the potential for black grouse collisions.
- Installation of rafts for breeding red-throated divers to improve breeding distribution, the number of breeding pairs and improve breeding success.
- Provision of nest boxes for woodland passerines such as redstart and pied flycatcher, and
- Installation (subject to landowner agreement) of an artificial white-tailed eagle nest to encourage breeding away from the Proposed Development.

7.12 Additional Monitoring

7.12.1 The OBE-HMP includes a proposal to monitor breeding raptor populations and to help evaluate the additional enhancement measures. These include:

- Breeding bird surveys, including breeding diver species and nest box use; and
- Monitoring of the location and breeding performance of eagle species within 6 km of the Proposed Development.

7.13 Summary of Effects

7.13.1 The likely ornithological effects of the Proposed Development were evaluated in accordance with the methodology described in this chapter. It is concluded that the likely effects of the Proposed Development on all bird species are **not significant** under the terms of the EIA Regulations.

Table 7.88: Summary of effects

Species	Sensitivity	Description of potential impact	Proposed mitigation	Proposed enhancement measures	Residual effect	Significance of residual effect
Construction and Decommissioning Phases						
Golden eagle	High	Disturbance and habitat loss	Best Practice Measures	Implementation of OBE-HMP	Negligible	Not significant
White-tailed eagle	High	Disturbance and habitat loss	Best Practice Measures	Implementation of OBE-HMP	Negligible	Not significant
All other bird species	Low, Moderate and High	Disturbance and habitat loss	None required above Best Practice Measures	Implementation of OBE-HMP	Negligible	Not significant
Operational Phase						
Golden eagle	High	Displacement	None required	Implementation of OBE-HMP	Negligible	Not significant

Species	Sensitivity	Description of potential impact	Proposed mitigation	Proposed enhancement measures	Residual effect	Significance of residual effect
		Collision risk	None required	None required	Negligible	Not significant
White-tailed eagle	High	Displacement	None required	Implementation of OBE-HMP	Negligible	Not significant
		Collision risk		Implementation of OBE-HMP	Negligible	Not significant
All other bird species	Low, Moderate and High	Displacement and collision risk	None required	None required	Negligible	Not significant
Cumulative Effects						
Golden eagle and white-tailed eagle	High	Disturbance and habitat loss during construction	None required	None required	Negligible	Not significant
		Displacement during operation	None required	None required	Negligible	Not significant
		Collision risk during operation	None required	None required	Negligible	Not significant
All other bird species	Low, Moderate and High	Cumulative effects of construction, operation and decommissioning	None required	None required	Negligible	Not significant

7.14 References

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