ScottishPower Renewables

Hare Hill Windfarm Repowering and Extension

Environmental Impact Assessment Report

Volume 1

Chapter 8: Ornithology

November 2025

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Abbreviations

Abbreviation	Description
BTO	British Trust for Ornithology
CIEEM	Chartered Institute of Ecology and Environmental Management
DCEMP	Decommission Environment Management Plan
DGRSG	Dumfries and Galloway Raptor Study Group
EIA	Environmental Impact Assessments
EnvCoW	Environmental Clerks of Works
EIA	Environmental Impact Assessments
ES	Environmental Statement
EZOI	Ecological Zone of Influence
FAS	Flight Activity Survey
FLS	Forestry and Land Scotland
GEMP	General Environmental Management Plans
ha	hectares
HMP	Habitat Management Plan
HRA	Habitats Regulations Appraisals
IEF	Important Ecological Features
IOF	Important Ornithological Features
LDP	Local Development Plan
MBBS	Moorland Breeding Bird Survey
NHZ	Natural Heritage Zone
NNR	National Nature Reserve
NPF4	National Planning Framework 4
PCH	Potential Collision Height
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SBL	Scottish Biodiversity List
SBS	Scottish Biodiversity Strategy
SOTE	Species on the Edge
SPA	Special Protection Area
SOC	Scottish Ornithologists' Club
SRMS	Scottish Raptor Monitoring Scheme
SSRSG	South Strathclyde Raptor Study Group
SSSI	Site of Special Scientific Interest

8. Ornithology

8.1. Statement of Competence

1. The author is a Principal ornithologist specialising in planning and executing bird surveys with over 30 years' experience in ornithology. Graham Sparshott has worked within the ecology and environmental consultancy sector since 2009. During this time, he has planned and undertaken bird surveys, managed data, and produced ornithological technical reports, Environmental Impact Assessments (EIA) chapters and Habitats Regulations Appraisals (HRA) screenings for numerous windfarm projects, power line developments. He is an Associate Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

8.2. Introduction

2. This Chapter of the Hare Hill Windfarm Repowering and Extension (the 'proposed Development') EIA Report addresses the impacts of the proposed Development on ornithology. This Chapter is supported by the following appendices: **Technical Appendix 8.1: Ornithology Baseline and Technical Appendix 8.2: Collision Risk Modelling Report.**

3. This Chapter should be read in reference to the following figures, presented in Volume 2a of this EIA Report:

    - **Figure 8.1.1: Ornithological Designated Sites within 10km;**
    - **Figure 8.1.2: Flight Activity Survey Area 2022;**
    - **Figure 8.1.3: Flight Activity Survey Area 2023-2024;**
    - **Figure 8.1.4: Scarce Breeding and Black Grouse Survey Area 2022;**
    - **Figure 8.1.5: Scarce Breeding and Black Grouse Survey Area 2023-2024;**
    - **Figure 8.1.6: Flight Activity Results Breeding Season 2022 – Raptors;**
    - **Figure 8.1.7: Flight Activity Results Breeding Season 2022 - Other Species;**
    - **Figure 8.1.8: Flight Activity Results Non-Breeding Season 2022-2023 – Raptors;**
    - **Figure 8.1.9: Flight Activity Results Non-Breeding Season 2022-2023 - Other Species;**
    - **Figure 8.1.10: Flight Activity Results Breeding Season 2023 – Raptors;**
    - **Figure 8.1.11: Flight Activity Results Breeding Season 2023 - Other Species;**
    - **Figure 8.1.12: Flight Activity Results Non-Breeding Season 2023-2024 – Raptors;**
    - **Figure 8.1.13: Flight Activity Results Non-Breeding Season 2023-2024 – Other Species;**
    - **Figure 8.1.14: Flight Activity Results Breeding Season 2024 – Raptors;**
    - **Figure 8.1.15: Flight Activity Results Breeding Season 2024 – Other Species;**

- **Figure 8.1.16: Scarce Breeding Bird Survey Results 2022 – 2024; and**
- **Confidential Figure 8.1.17: Barn Owl Nest Site.**

4. Bird survey data was collected to inform this assessment across a three-year period between April 2022 and August 2024. Data was collected within the last five years in line with NatureScot guidance on survey data longevity (NatureScot, 2017).
5. There have been changes to the application boundary across the three-year period including areas which no longer form part of the final iteration of the proposed Development. When referring to distances of features from the Site, the Site is defined as: the area within the finalised application boundary within which the proposed Development lies.

Confidentiality

6. Barn owl was recorded in a barn owl box in proximity to the Site. The exact location of the box is shown on **Confidential Figure 8.1.17**. This figure is not for public viewing purposes. Viewing of the figure will be restricted to those for whom viewing is essential to progress assessment of the proposed Development:
    - Council employees;
    - Royal Society for the Protection of Birds (RSPB); and
    - NatureScot.

8.3. Legislation

7. This assessment has been compiled with reference to the following relevant nature conservation legislation, planning policy and guidance documents from which the protection of sites, habitats and species is derived in Scotland:
    - UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021;
    - European Commission Directive on the Conservation of Wild Birds (2009/147/EC) (the Birds Directive);
    - Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna (the Habitats Directive);
    - The Conservation of Habitats and Species Regulations 2017) (the Habitats Regulations);
    - Wildlife and Countryside Act 1981 (as amended);
    - Nature Conservation (Scotland) Act 2004 (as amended);
    - Wildlife and Natural Environment (Scotland) Act 2011 (as amended);
    - The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and

- Town and Country Planning (Scotland) Act 1997.

National Policy

8. Scottish National Planning Framework 4 (NPF4) (updated 2024) provides a policy direction which aims to secure positive effects on biodiversity. The policy direction specifically of relevance to this Chapter is:

    - Policy 3 Biodiversity, which intends to protect biodiversity, reverse biodiversity loss, deliver positive effects from development and strengthen nature networks, and is relevant with a proposed change to the baseline of the Site.

    - Policy 4 Natural places, which intends to protect, restore and enhance natural assets making best use of nature-based solutions.

    - Scottish Biodiversity Strategy (SBS) to 2045, which sets out an ambition for Scotland to be Nature Positive by 2030 and to have restored and regenerated biodiversity by 2045.The SBS to 2045 refers to a series of overarching targets and indicators. It references the Species on the Edge (SOTE) Programme which aims to deliver nine species recovery projects. The following would be relevant to the proposed Development, based on the Site location, land-use, habitats and species present:

        - SOTE - Farming horizons – lapwing *Vanellus vanellus* and curlew *Numenius arquata*.

Local Policy

9. The East Ayrshire Local Development Plan 2 (LDP2) was adopted on 8 April 2024 and contains the following policies relevant to this assessment.

10. "*Policy NE 5: Protection of areas of nature conservation interest. There will be a presumption against development which could adversely impact areas of international importance designated or proposed by Scottish Ministers for designation as Special Protection Areas or Special Areas of Conservation (European sites). Any development likely to have a significant effect on a European site which is not directly connected with, or necessary for, its conservation management must be subject to a 'Habitats Regulations Appraisal' or an 'appropriate assessment' of the implications for the conservation objectives. Such development will only be approved if the appraisal shows there will be no adverse effect on the integrity of the site.*"

11. "*Any development affecting sites of national importance for biodiversity and geodiversity, such as a Site of Special Scientific Interest (SSSI), will only be permitted where it will not adversely affect the integrity of the area or the qualities for which it has been designated or where any significant adverse effects on the qualities for which it is designated are clearly outweighed by social, environmental or economic benefits of national importance*".

12. "*There will be a presumption against any development which could have a significant adverse impact on the integrity of a site of local importance (i.e. Local Nature Conservation Sites and Local Nature Reserves) or the qualities for which it has been identified.*"

13. *"Policy NE6: Vulnerable, threatened, and protected species. Development that would have a significantly adverse effect on priority habitats or species set out within the Ayrshire Local Biodiversity Action Plan will not be permitted unless it can be demonstrated that the impacts are clearly outweighed by social, environmental or economic benefits of local importance."*

14. *"The Council will not support development which would have an unacceptable adverse impact on protected species."* For the purposes of this ornithology assessment the relevant definitions of protected species within the LDP2 are:

    - Birds listed on Schedule 1 of the Wildlife and Countryside Act (1981, as amended).
    - Bird species detailed within the SBL.

15. The Dumfries and Galloway LDP2 was adopted in 2019 and has the following policies relevant to this assessment.

16. *"Policy NE4: Sites of International Importance for Biodiversity. Development proposals likely to have a significant effect on an existing or proposed Special Protection Area (SPA), existing or candidate Special Area of Conservation (SAC) or Ramsar Site, including developments outwith the site, will require an appropriate assessment and will only be permitted where:*

    - *the development does not adversely affect the integrity of the site; or*
    - *there are no alternative solutions; there are imperative reasons of overriding public interest, including those of a social or economic nature; and compensatory measures have been identified and agreed to ensure that the overall coherence of the Natura network is protected."*

Guidance

17. The following guidance documents have been used to inform this assessment:

    - Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK And Ireland, hereafter the 'CIEEM EcIA Guidelines' (CIEEM, 2024);
    - Advice note on the lifespan of ecological reports and surveys (CIEEM, 2019); and
    - Competency Framework (CIEEM, 2021).

18. Additional guidance, including good practice survey guidelines for protected species, is referenced throughout this Chapter as applicable.

8.4. Consultation Undertaken to Date

Consultation responses relevant to ornithology interests are presented in Table 8.1 below.

Table 8.1 Consultation responses relevant to ornithology

Contact	Method and Topic	Comments	Subsequent Actions
NatureScot	Scoping opinion Protected Areas: Ailsa Craig Special Protection Area (SPA)	The proposal could affect the Ailsa Craig Special Protection Area (SPA), classified for its migratory gannet and lesser black-backed gull and seabird assemblage. The proposal site is located approx. 76 km from the SPA which is within the mean maximum foraging distance of lesser black backed gull *Larus fuscus* and potentially within the foraging distance of herring gull *Larus argentatus*. The status of the SPA means that the requirements of the Conservation (Natural Habitats, &c.) Regulations 1994 as amended (the "Habitats Regulations") or, for reserved matters, The Conservation of Habitats and Species Regulations 2017 apply. Consequently, Scottish Ministers will be required to consider the effect of the proposal on the SPA before it can be consented (commonly known as Habitats Regulations Appraisal). The scoping report does not mention whether lesser black-backed gull or herring gull (a component of the SPA's seabird assemblage) have been recorded during flight activity. Surveys. Our advice is that at present it is not possible to determine if the proposal is therefore likely to have a significant effect on lesser black-backed gull and herring gull qualifying interests of site.	Lesser black-backed gull and herring gull were recorded as secondary species during the flight activity surveys as we considered that the location of the proposed Development and the habitats within the Site meant these species were unlikely to commute across or forage within the proposed Development in significant numbers. The secondary species methodology does not include the recording of flight heights. However, the secondary species methodology[1] allows a measure of abundance. Across the three years of survey effort there were six individuals of herring gull, five individuals of lesser black-backed gull, two individuals of great black-backed gull and two individuals of common gull. The above records indicate an extremely low rate of occurrence considered highly unlikely to result in significant effects on populations potentially linked to the SPA. This rationale is presented in **Table 8.8.**

[1] *Secondary species methodology: Each watch is divided into five-minute periods, at the end of which the number and activity of all secondary species observed is recorded. A minimum number for each secondary species is recorded for the five minute period along with the activity observed, bird in flight or perched.*

		Consequently, Scottish Ministers, as competent authority, will be required to carry out an appropriate assessment in view of the site's conservation objectives for its qualifying interests. To help you do this, we propose to carry out an appraisal to inform your appropriate assessment. To enable us to carry out this appraisal, the following information is required as part of the EIA Report: An assessment of potential collision risk for lesser black-backed and herring gulls and how this may affect the viability of the relevant species' SPA population. We advise that this information should include showing flight lines from Vantage Point watches.	
NatureScot	Scoping opinion Protected Areas: Muirkirk and North Lowther Uplands SPA.	The Muirkirk and North Lowther Uplands SPA is designated for its breeding and wintering populations of hen harrier Circus cyaneus, and breeding populations of merlin Falco columbarius, peregrine Falco peregrinus, short-eared owl Asio flammeus, and golden plover Pluvialis apricaria and is located within approximately 4 km of the nearest boundary of the proposal site. At c.4 km distant, the proposed development has potential connectivity to the Muirkirk & North Lowther Uplands SPA, primarily in relation to the breeding merlin qualifying interest. We acknowledge the rationale for scoping out the SPA as presented at Section 11.8 of the scoping report, but rather than scoping it out now we advise that the applicant provides information at application stage to inform Habitats Regulations Appraisal, in light of all the latest survey results. At this point, based on the information provided in the March 2023 scoping report, it appears that there is unlikely to be an adverse effect on site integrity, but it would be better to cover this within the EIA report, and informed by full survey results and appraisal, to be certain.	Following collection and analysis of the baseline data further consideration has been given to the qualifying interests of the SPA. We propose to scope out several qualifying species based on factors such as their low rate of occurrence across the three years of survey: hen harrier, peregrine, short-eared owl and merlin. Golden plover has been taken forward for assessment. Further details can be found in **Section 8.15 Sensitive Receptors.**

8.5. Defining the Ecological Zone of Influence

19. CIEEM Guidelines for EcIA define the Ecological Zone of Influence (EZoI) as the area over which ecological features may be subject to significant effects because of the proposed Development. This could extend beyond the footprint of the proposed Development.

20. The EZoI will vary for each ecological feature due to the mobility range of the features being assessed. For example, the EZoI for birds (which are more mobile) will be greater than the EZoI for habitats (which are sedentary).

21. Other factors such as supporting habitat, connectivity, and sensitivity to disturbance are considered when determining if a feature falls within the proposed Development's EZoI.

8.6. Method of Baseline Data Collation

22. A desk-based study to identify designated sites within and surrounding the proposed Development was undertaken. Statutory designated sites at European or International level were identified within a provisional search area of 10 km beyond the Site boundary during scoping. This search area was determined using professional judgement, informed by studies predicting factors such as maximum foraging ranges for sensitive species. During subsequent consultation NatureScot highlighted potential connectivity with Ailsa Craig SPA, which is located approximately 76 km from the Site. Typically, this distance would be considered beyond the EZoI of a development but studies (Woodward et al, 2019) indicate that the Site is within the mean maximum foraging distance of lesser black-backed gull and potentially within the foraging distance of herring gull from the SPA. Therefore, Ailsa Craig SPA is considered within the baseline conditions for this assessment.

23. In addition, a review was undertaken of the ornithological findings from the original Hare Hill Windfarm Environmental Statement (ES) and the ESs which supported other windfarm development within 2 km of the Site. The following ESs were included in the review:

    - Sandy Knowe Windfarm (ERG, 2016);
    - Sanquhar ii Community Windfarm (Community Windpower, 2019); and
    - Euchanhead Windfarm (SPR, 2020).

24. A high-level summary of the target species recorded at each of the above sites is provided for context in **Section 8.11**.

25. A review of ornithological monitoring data for the operational Hare Hill Windfarm Extension was also undertaken.

26. Data requests for records of sensitive species were made for the following organisations:

    - Royal Society for the Protection of Birds (RSPB);
    - Forestry and Land Scotland (FLS);
    - South Strathclyde Raptor Study Group (SSRSG); and
    - Dumfries and Galloway Raptor Study Group (DGRSG).

27. Full details of survey methodology are provided in Technical Appendix 8.1. A summary of the survey methods used to inform this assessment is provided in Table 8.2 below.

Table 8.2 Summary of ornithological survey methods

Survey Type	Guidance	Survey Area	Survey Years
Flight Activity Survey (FAS)	NatureScot (2017)	Airspace over the Site and a surrounding buffer of 500 m.	2022, 2023, 2024
Moorland Breeding Bird Survey (MBBS)	Brown and Shepherd (1993)	Site and a surrounding buffer of 500 m, where access permitted.	2022, 2023, 2024
Scarce breeding raptor survey	Hardey et al. (2013) and Gilbert et al. (1998)	Site and a surrounding buffer of up to 2 km, where access permitted.	2022, 2023, 2024
Black grouse surveys	Gilbert et al. (1998)	Site and a surrounding buffer of up to 1.5 km, where access permitted.	2022, 2023, 2024

28. Survey efforts from the 2022- 2023 non-breeding season onwards included an extension to the Site boundary to the east in the Corserig Hill area. This area was not covered by the first year of breeding season surveys in 2022. In 2024, FAS, MBBS and scarce breeding raptor surveys were only undertaken across the eastern extension to account for the lack of coverage in 2022 and ensure two years of coverage across all parts of the study area. Please refer to Figures 8.1.2-8.1.5 for survey area extents.

29. Owing to changes to the Site boundary after surveys had finished, the survey areas also include some land that has been removed from the Site, now forming an enclave in the north of the Site. In the north west, where some land was added to the Site, buffer areas do not reach a full 500 m / 1.5 km / 2 km from the Site in all areas. However, the amount added is less than the amount removed, and all areas of the Site itself were surveyed. Considering this, the survey coverage is considered fit for its intended purpose of helping inform the ornithological value of the Site and surrounding areas.

8.7. Assessment Modelling

30. It is broadly accepted that the significance of an effect reflects the relationship between two factors:

- The value, importance or sensitivity of the resource or system that might be impacted; and
- The magnitude of the impact on that resource and system, (i.e., the actual change taking place to the environment).

31. The Guidelines for EcIA advise that a significant effect is broadly an effect which either

- supports or undermines the biodiversity conservation objectives; or
- conservation status of the Important Ecological Features (IEFs)

and merits assessment.

32. The significance of an effect has been defined as either beneficial or adverse. An effect of moderate or greater significance is considered 'significant' in terms of the EIA Regulations.

33. For adverse effects relating to species, conservation status defined in the Guidelines for EcIA is "*determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area*".

34. A beneficial effect would be considered ecologically significant if the proposed Development causes:

    - Restoration of desired conservation status for a species population; and/or
    - Restoration of a site's integrity (where this has been undermined).

35. A matrix approach has not been applied to this assessment, in line with Guidelines for EcIA; this assessment of significance has been prepared using professional judgement. The level of importance and sensitivity of each IEF alongside the magnitude of impacts has been used to assess significance. Table 8.3 shows the criteria for assigning effect significance.

Table 8.3 Effect significance

Level of Effect	Criteria/example
Major Beneficial or Major Adverse	Where the proposed Development would cause a significant improvement (or deterioration) to the existing baseline; considerable effects (by extent, duration or magnitude) or of more than local significance or breaching identified standards or policy.
Moderate Beneficial or Moderate Adverse	Where the proposed Development would cause a noticeable improvement (or deterioration) to the existing baseline; limited effects which may be considered significant.
Minor Beneficial or Minor Adverse effect	Where the proposed Development would cause a small or barely perceptible improvement (or deterioration) to the existing baseline; slight, very short or highly localised effects.
Neutral or Negligible	No discernible improvement or deterioration to the existing baseline.

36. The significance has been quantified on a geographical scale which does not necessarily equate to the geographical context in which an IEF has been considered important (see Determining Magnitude of Change and Sensitivity of Receptors). For example, although a habitat type may represent 20% of the resource at a regional level and hence be considered of value at this scale, the proposed Development might affect only a portion of the habitat representing 1% of the resource in the Region hence the effect would not be considered significant at this scale. However, that 1% may represent 20% of the resource at a Local scale and therefore the effect at this geographic scale would be considered significant.

8.8. Determining Magnitude of Change and Sensitivity of Receptors

37. In accordance with Guidelines for EcIA, the sensitivity or importance of ecological receptors, hereafter referred to as ecological features, is determined by considering factors including but not limited to naturalness, rarity, contribution to the functioning of ecosystems, size (of habitat or species population), irreplaceability, connectivity, habitats or species in decline, and large concentrations of species or habitat types considered rare in a wider context. A level of importance is assigned to each ecological feature using the geographical frame of reference set out in Table 8.4 below.

Table 8.4 Evaluation criteria for level of ecological importance

Geographical context	Criteria/example
International (Europe)	Extremely rare (endangered), potentially extremely vulnerable to change, of international importance or recognition, very limited potential for substitution. For example: SPA, Wetland of International Importance (Ramsar); or area meeting the criteria for designation as such, as a candidate or proposed site. Any regularly occurring population of an internationally important species, which is threatened or rare in the UK, i.e., IUCN 'Red List' species, or any species of uncertain conservation status or of global conservation concern. A regularly occurring significant population/number of any internationally important species.
National (Scotland)	Rare, of national importance or recognition, limited potential for substitution, highly vulnerable to change. For example: SSSI, National Nature Reserve (NNR), National Park. Notified species/habitats of a nationally designated site. SBL habitats covering viable area, or a smaller area which is vital for the viability of a larger area. A regularly occurring significant population/ number of any nationally important species, e.g., listed on Wildlife and Countryside Act 1981 (as amended). Species present in nationally important numbers (e.g., >1% UK population).
Regional (Dumfries and Galloway)	Somewhat rare or vulnerable, difficult to substitute. For example: SBL species regularly occurring in moderate to large populations/numbers. Species present in regionally important numbers (e.g., >1% of the regional population).
County	A regularly occurring, viable population of an SBL species or one which is scarce in the County area. Species present in important numbers (>1% of the county population).
Local	Locally important, difficult to substitute at a local level, rare or unusual at the local level but well represented elsewhere. For example:

	Regularly occurring, substantial population of a species scarce in the local area. Habitats or species considered to enrich the ecological resource within the local context.
Neighbourhood. Site (including immediate vicinity, such as areas of habitats contiguous with or linked to Site)	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species with limited legal protection.
Negligible	No intrinsic nature conservation value associated with habitat or species. Generally, these are areas of hard standing or buildings with no nature conservation interest. Invasive and non-native species which threaten native habitat or species are also included here.

38. An explanation of how magnitude of change is assessed in this Chapter is provided in Table 8.5 below.

Table 8.5 Magnitude of Change

Magnitude	Description
High	Total loss or major alteration to key elements/features of the baseline conditions to the extent that post-development the character or composition of baseline conditions will be fundamentally changed.
Medium	Partial loss or alteration to one or more key elements/features of the baseline conditions to an extent that post-development character represents a material change from baseline conditions.
Low	Minor shift away from the baseline conditions. Changes arising will be detectable / discernible but not material; the underlying character or composition of the baseline conditions will be like the pre-development situation.
Negligible	Very slight change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.

8.9. Mitigation, Residual Effects and Monitoring

39. The mitigation hierarchy (avoid, mitigate, compensate, enhance) has been applied, with Chapter 3: EIA Process and Methodology presenting information relevant to the first stage. The purpose of mitigation is to reduce or compensate for likely significant effects. With respect to protected species, there may also be a legal obligation to provide mitigation even where there is no significant effect.

40. Primary, secondary, and tertiary mitigation have been defined as follows:

- Primary (inherent or design) – measures that are made during the pre-application phase and that are an inherent part of the project (i.e., do not require additional action, including assessment, to be taken).
- Secondary (additional or foreseeable) – actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or because of environmental assessment.

- Tertiary (inexorable) – actions that would occur with or without input from the environmental assessment feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.

41. After the application of secondary mitigation, a review of residual effects has been undertaken. This EIA Report has concluded residual effects to be significant or not significant using the criteria discussed in **Section 8.6 and 8.7.**

42. Monitoring has been proposed where a residual significant effect has been identified and there is a level of uncertainty that the mitigation and / or compensation measures cannot be relied upon (e.g., novel, limited conservation evidence, not industry standard). This aligns with expectations set out in the CIEEM EcIA Guidelines.

8.10. Limitations and Assumptions

43. Across all years of survey effort, access to the south and east of the Site beyond the red line boundary was restricted. This effected survey coverage for MBBS, scarce breeding raptor surveys and black grouse surveys. However, observations of those areas were made from *ad hoc* vantage points looking outwards from the Site boundary. The baseline data collection for those areas is considered sufficiently robust to inform assessment.

8.11. Baseline Conditions

8.11.1. Desk Study

44. Two statutory designated sites with ornithological interests were identified as relevant to the proposed Development. These are detailed in **Table 8.6**. North Lowther and Muirkirk Uplands SSSI/ SPA is illustrated in relation to the Site in **Figure 8.1.1**.

Table 8.6 Designated Site Information

Designated Site Name	Approximate Distance from the Site	Qualifying Interests
North Lowther and Muirkirk Uplands SSSI/ SPA	4 km	Muirkirk and North Lowther Uplands SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex 1 species: hen harrier (between 1994 and 1998, an average of 29.2 breeding females, 6% of the GB population and between 1991 and 1995, an average of 12 individuals, 2% of the GB population); short-eared owl (between 1997 and 1998, an average of 26 pairs, 3% of the GB population); merlin (between 1989 and 1998, an average of 9 pairs, 0.7% of the GB population and selected as one of the most suitable sites for merlin in GB); peregrine (between 1992 and 1996, an average of 6 pairs, 0.5% of the GB population and selected as one of the most suitable sites for peregrine in GB); and, golden plover (1999, an estimated minimum of 154 pairs, 0.7% of the GB population and selected as one of the most suitable sites for golden plover in GB).

Ailsa Craig SPA	76 km	Ailsa Craig SPA qualifies under Article 4.2 by regularly supporting populations of European importance of the migratory species; Northern gannet *Morus bassanus* (23,000 pairs 8.7% of the world biogeographic population) and lesser black-backed gull (1,800 pairs, 1.4% of the total *Larus fuscus graellsii* biogeographic population). Ailsa Craig SPA also qualifies under Article 4.2 by regularly supporting more than 20,000 individual seabirds. It regularly supports 65,000 seabirds including nationally important populations of the following species: common guillemot *Uria aalge* (3,350 pairs, 0.5% of the GB population), black-legged kittiwake *Rissa tridactyla* (3,100 pairs, 0.6% of the GB population) and herring gull (2,250 pairs, 1.4% of the GB population).

8.12. Review of Environmental Statements

45. A review of ESs from development sites within 2 km of the Site and the original ES for Hare Hill was undertaken to inform the ornithological baseline. The review is summarised below:

- Occasional flights from golden eagle, merlin, red kite and hen harrier without evidence of breeding for most sites.
- Confirmed breeding for merlin and red kite was recorded at Sanquhar II Community Windfarm.
- Regular flight activity for goshawk from surveys at Euchanhead Windfarm and Sanquhar II Community Windfarm.
- Peregrine breeding activity recorded in the study areas for most development sites. Exact breeding locations are not known, but flight activity survey results suggest that breeding locations are over 1 km south west of the proposed Development Site.
- A small number of lekking black grouse over 1 km east or south east of the proposed Development Site. This includes lekking recorded in the same general area during surveys to inform the Hare Hill Windfarm Extension in 2006 and the Sandy Knowe Windfarm in 2012.
- Passage and wintering flocks of golden plover at all sites. Breeding golden plovers were recorded in the Hare Hill Windfarm Extension study area in 2006, but not from any other sites.
- Generally low, single figures of territories for curlew were recorded at all sites except for in the study area at Sanquhar II Community Windfarm, where 12 territories were recorded. This probably reflects the presence of more favourable habitat for this species within this site. Many of the territories were on lower-lying wet moorland over 5 km from the proposed Development.
- No evidence of important flyways for swans and geese from any site.

8.13. Data Requests

8.13.1. RSPB

46. Provided six records of black grouse, the closest of which was a lekking male approximately 2.6 km north east of the Site in 2016. The most recent record involved a group of four individuals (sex of birds not recorded) approximately 3 km north east of the Site in September 2022.

8.13.2. FLS

47. Provided one record of lekking black grouse from 2005 of an unspecified number of birds approximately 5 km north east of the Site.

8.13.3. South Strathclyde RSG and Dumfries and Galloway RSG

48. No response.

8.13.4. Hare Hill Windfarm Extension Operational Monitoring

49. As part of Planning Condition 19 attached to the sites consent, monitoring of black grouse and golden plover was undertaken in 2018, 2019, 2020 and 2021.

50. Golden plover surveys comprised weekly visits between mid-March and late May and again between early September and late October to establish the presence of roosting and foraging migrant golden plovers within a 500m buffer of the turbines from two vantage points. The number of birds observed in flight and on roost sites varied between two and 500, with the maximum numbers occurring in late April and late October. Results from all years show a consistent use of roost sites, and golden plover appeared to be comfortable roosting amongst and flying around and over operating turbines.

51. Black grouse lek surveys were undertaken in March, April and May 2018, 2019, and 2021 (2020 was missed due to COVID restrictions) following methods outlined in Gilbert *et al*. (1998). These surveys consisted of walkovers of suitable habitat while stopping periodically to listen and scan for birds displaying. Surveys were undertaken within the turbine envelope and up to 1.5 km where land access permissions were granted. No black grouse were observed during dedicated surveys, but there was an incidental record of one juvenile flushed in October 2020 within the footprint of the proposed Development.

52. In relation to planning consent discharge, barn owl monitoring and installation of a barn owl box in a shed were also undertaken in 2016. The shed is approximately 500 m from the nearest turbine location and 600 m from the nearest access track comprising the design freeze stage of the proposed Development. Barn owls had previously bred at the location in 2006. RPS, in fulfilling the role of ECoW at Hare Hill Windfarm Extension, carried out an inspection of this building in early 2016. Large numbers of pellets were found on the floor of the building and on dislodged roof panels. In addition, faecal splashing was noted on the metal frame of the building. However, none of the pellets were found to be fresh, and it was concluded that it was likely that the shed was only occasionally used as a roost site. Continued monitoring of the building by the ECoW during the on-going construction of the windfarm confirmed that it was not being used

for breeding by barn owls in 2016. As one of the commitments within the Habitat Management Plan (HMP) for the Hare Hill Windfarm Extension, a barn owl box was then installed on 27 August 2016 within the shed. Surveys to inform assessment of the proposed Development noted barn owl presence here in 2022. This is discussed under **Section 8.14** below.

8.14. Ornithological Survey Results

53. A summary of field survey results is provided here. Full details are provided in **Technical Appendix 8.1 Ornithological Technical Report** and accompanying **Figures 8.1.1-8.1.17**.

Flight Activity Survey

54. A total of 153 flights by 14 target species involving 3,337 individuals were recorded over and around the Site between April 2022 and August 2024. A summary of flight activity results is provided below and should be cross referenced with **Figures 8.1.6-8.1.15 – (Flight Activity Survey Results**).

55. Golden plover. A total of 59 flights involving 3,011 individuals with the largest flock size of 670 birds. Following changes to the Site boundary, 45 flights with a total flight time of 687,387 seconds are of relevance to the Site. Flight activity was concentrated into the north west of the Site between Blackcraig Hill and Hare Hill. Observations involved non-breeding birds wintering within and near the Site and birds on spring and autumn migration.

56. Red kite. A total of 53 flights involving 54 individuals. More than half of the total flights were during the breeding season (March-August inclusive). Following changes to the Site boundary, 29 flights with a total flight time of 3,810 seconds are of relevance. Flights were widely distributed across the Site.

57. Pink-footed goose. A total of seven flights involving 144 individuals, with the largest flock size of 50 birds. The total flight time at Potential Collision Height (PCH) was 1,395 seconds.

58. Peregrine falcon. A total of seven flights involving seven individuals. The total flight time at PCH was 150 seconds.

59. Merlin. A total of five flights involving five individuals. No time at PCH.

60. Grey heron. A total of four flights involving four individuals. The total flight time at PCH was 75 seconds.

61. Snipe. A total of three flights involving four individuals. The total flight time at PCH was 165 seconds.

62. Hen harrier. A total of two flights involving two individuals. No time at PCH.

63. Curlew. A total of two flights involving two individuals. The total flight time at PCH was 150 seconds.

64. Lapwing. Two flights involving the same flock of 31 individuals during the non-breeding season in 2022. The total flight time at PCH was 15,810 seconds.

65. Greylag goose. One flight involving two individuals. The total flight time at PCH was 150 seconds.

66. Goosander. One flight involving one individual. The total flight time at PCH was 30 seconds.

67. Whooper swan. One flight involving 20 individuals. No time at PCH.

Scarce Breeding Raptor Survey and MBBS

68. Table 8.7 below summarises the breeding bird survey results and the results are illustrated on Figure 8.1.16.

Table 8.7 Breeding Bird Survey Results

Species	2022	2023	2024
Snipe	-	Seven estimated territories.	-
Curlew	-	Three estimated territories.	Two estimated territories.
Barn owl	A barn owl was noted occupying a barn owl box in July 2022 situated within a shed approximately 500 m from the nearest turbine location and 600 m from the nearest access track. Breeding possible but not confirmed.	-	-
Golden eagle	A single flight across the western part of the Site in April 2022 the only record.	-	-
Red kite	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.
Merlin	A single flight across the Site in July 2022.	Incidental observation of a single female in July, flushed while the surveyor was driving off site.	No observations.
Peregrine falcon	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.
Golden plover	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.	Observed foraging and commuting across the Site with no evidence of breeding within 2 km of the Site.

Species	2022	2023	2024
Goshawk	-	-	One flight outwith the Site.

69. The variation in presence/absence of curlew and snipe territories between survey years reflects the differing areas of survey coverage because of an extension to the Site. Further details are provided in **Section 8.6. Method of Baseline Data Collation.**

Black Grouse Survey

70. There was no evidence of black grouse within the Site or within 1.5 km of the Site during the targeted black grouse surveys. There was an incidental sighting of a female in August 2024 seen in flight in the central part of the Site by the surveyor as they were leaving after a flight activity survey.

8.15. Sensitive Receptors

71. Table 8.8 below highlights those receptors that have been taken forward as Important Ornithological Features (IOFs) and those receptors that have been scoped out. A rationale is provided for scoping in/out and for the conservation valuation.

Table 8.8 Features Scoped In and Out

Important Ornithological Feature	Conservation Value in Context of the Site	Scoped in/Out	Rationale
Ailsa Craig SPA	Negligible	Out	Lesser black-backed gull and herring gull were recorded as secondary species during the flight activity surveys. This is because it was considered that the location of the proposed Development and the habitats within the Site meant these species were unlikely to commute across or forage within the proposed Development in significant numbers. Habitat within the site and surrounding dominated by upland grassland/moorland and forestry is suboptimal habitat for foraging gulls. The nearest landfill site, Garlaff Landfill, is approximately 13 km north west of the Site; this is likely to be more attractive to foraging gulls, and the nearby town of Cumnock may provide scavenging opportunities too. To reach this area from Ailsa Craig, gulls do not need to commute across the Site. The secondary species methodology does not include the recording of flight heights. However, the secondary species methodology allows a measure of abundance. Across the three years of survey effort there were six individuals of herring gull, five individuals of lesser black-backed gull, two individuals of great black-backed gull and two individuals of common gull. Considering the low rate of occurrence and suboptimal habitat within and surrounding the Site, the proposed Development is highly unlikely to cause significant effects on gull populations potentially linked to the SPA. The other qualifying interests of the SPA are specialist marine species for which the habitats within and surrounding the Site are wholly unsuitable.

Important Ornithological Feature	Conservation Value in Context of the Site	Scoped in/Out	Rationale
Muirkirk and North Lowther Uplands SPA.	Local	In (golden plover only)	The Muirkirk and North Lowther Uplands SPA is designated for its breeding and wintering populations of hen harrier, and breeding populations of merlin, peregrine, short-eared owl and golden plover and is located within approximately 4 km of the nearest boundary of the Site. • Short-eared owl. There were no records of short-eared owl across the three-year period. This species is **Scoped Out**. • Merlin. There was no evidence of breeding within 2 km of the Site and only five flights across the three-year survey period with none involving time at PCH. All observations came from 2022 with none in 2023 or 2024. Considering the low rate of occurrence this species is **Scoped Out.** • Hen harrier. There was no evidence of breeding within 2 km of the Site and only two flights across the three-year survey period. Considering the very low rate of occurrence this species is **Scoped Out.** • Peregrine. No evidence of breeding within 2 km of the Site and only seven flights across the three-year period. Considering the low rate of occurrence this species is **Scoped Out**. • Golden Plover. No evidence of breeding within 2 km of the Site. The SPA is designated for its breeding population. Although the maximum predicted breeding season foraging range is 11 km, the core breeding season foraging range for golden plover is predicted to be 3 km (NatureScot, 2016). As the Site is approximately 4 km from the SPA it unlikely that the Site would be an important foraging resource for breeding golden plovers from the SPA considering the predicted core foraging range. Further to this, most observations of this species were out with the breeding season. Considering the above, this species is **Scoped Out** in the context of a qualifying interest of the SPA. The species has been scoped in with respect to non-SPA populations as discussed below.
Golden plover (Non-SPA Population)	Local	In	Golden plover is a common winter visitor to coastal Dumfries and Galloway, one of the relevant regions incorporating the Site. Data taken from the Scottish Ornithologists' Club (SOC) online bird report resource[2] for 2018 shows a monthly maxima table for eight selected sites involving a

[2] *SOC Website. Online Scottish Bird Report. https://www.the-soc.org.uk/pages/online-scottish-bird-report*

Important Ornithological Feature	Conservation Value in Context of the Site	Scoped in/Out	Rationale
			total of 27,636 birds and a peak monthly count from an individual site of 3,000 birds. For the other relevant region incorporating the Site, Ayrshire, the wintering population is lower. The last five available annual bird reports from the online bird report resource show an annual peak count of 420 birds, with flocks of 150-200 birds more typical. Generally, larger flocks occurred at coastal locations rather than inland, upland habitats like those within and surrounding the Site. Forrester et al (2007) estimated the Scottish wintering population to be in the range of 25,000-35,000 individuals. The peak count in the study area of 670 represents 3% of the lowest estimate of the Scottish wintering population. Golden plover is a SBL species and listed within Annex 1 of the Birds Directive. Considering all the above factors, golden plover is **Scoped In** as of **National Importance**.
Peregrine	Negligible	Out	Justification as given when considering this species as a qualifying interest of Muirkirk and North Lowther Uplands SPA: low rate of occurrence.
Hen harrier	Negligible	Out	Justification as given when considering this species as a qualifying interest of Muirkirk and North Lowther Uplands SPA: low rate of occurrence.
Merlin	Negligible	Out	Justification as given when considering this species as a qualifying interest of Muirkirk and North Lowther Uplands SPA: low rate of occurrence.
Goshawk	Negligible	Out	There was single observation of a bird in flight during breeding bird surveys in July 2024. There was no evidence of this species breeding within 2 km of the Site.
Red kite	Local	In	There were 53 flights; this was the second most numerous species recorded during the FAS after golden plover. Over half of those flights occurred in the breeding season. However, there was no evidence of active nest sites within 2 km of the Site. A proportion of flight activity in the breeding season may have related to red kites nesting further than 2km from the Site considering the predicted core and maximum foraging breeding season ranges of 4 km and 6 km respectively (NatureScot, 2016). Alternatively, breeding season flight activity could involve non-breeding immature red kites. Red kites usually start to breed at two to three years old (Davis et al., 2001). Immature red kites may hold non-breeding territories in their first summer prior to breeding elsewhere in later years, up to 30 km away (Newton et al., 1989).

Important Ornithological Feature	Conservation Value in Context of the Site	Scoped in/Out	Rationale
			WSP undertook a review of wind farm development ESs within 2 km of the Site. The review noted there were occasional red kite flights at all sites, but breeding was only confirmed at Sanquhar ll Community Windfarm in 2018. The exact nest site location is unknown but was likely >4 km from the Site boundary based on flight activity results. Historic data from other windfarm developments and baseline data to inform assessment of the proposed Development suggest that the population of red kites using the Site and surrounding area for foraging is low in the context of the Dumfries and Galloway regional breeding population. Results from the Scottish Raptor Monitoring Scheme (SRMS) for 2022 (Challis et al., 2023) show 396 pairs occupying home ranges in Scotland and 151 pairs occupying home ranges in the Dumfries and Galloway and Ayrshire Regions. It is not possible to be certain if the 53 flights related to a single breeding pair on foraging flights, more than one breeding pair, several wandering non-breeding immatures or a combination of non-breeding and breeding birds. However, it is reasonable to assume that the number of individuals involved is low in the context of the number of breeding individuals in the wider area surrounding the Site. Red kite is a SBL species and a Schedule 1 species. Considering all the above factors, red kite is scoped in as of **Local Importance**.
Breeding Wader Assemblage	Negligible	Out	All species recorded a low number of flights during the FAS: redshank one flight, snipe three flights, lapwing two flights, and curlew two flights. The estimated numbers of breeding territories for waders within the study area was low, with a maximum of seven territories for snipe and three territories for curlew across the three-year survey period. There was no evidence of territories held for redshank and lapwing. Considering the very low rate of occurrence this species assemblage is **Scoped Out**.
Migratory geese and swans	Negligible	Out	All species recorded a low number of flights during the FAS: seven, five and one flight for pink-footed Goose, greylag goose, and whooper swan respectively. Considering the very low rate of occurrence this species assemblage is **Scoped Out**.
Breeding Passerines (Songbirds)	Negligible	Out	Passerines are not generally considered at significant risk of impacts from windfarm developments (NatureScot, 2017). This species assemblage is **Scoped Out**.

Important Ornithological Feature	Conservation Value in Context of the Site	Scoped in/Out	Rationale
Barn Owl	Negligible	Out	A single bird was noted occupying a barn owl box approximately 500 m from the nearest turbine location and 600 m from the nearest access track (shown on **Confidential Figure 8.1.17**). No evidence to confirm breeding. The distances from the proposed Development are significantly greater than the predicted maximum disturbance distance of 175 m for breeding barn owl from construction activities (Shawyer, 2011). Overall, there is no evidence that wind turbines have a significant impact on barn owls in the UK through collision risk. Barn Owls hunt at low levels (to hear their prey), typically less than 3 metres above the ground, below the rotor sweep of a wind turbine. This species is **Scoped Out.**

72. The following IOFs are taken forward for assessment:

- Golden plover; and
- Red kite.

8.16. Effects Scoped In and Out

8.16.1. Construction Phase

73. The following potential effects are scoped in for the construction phase:

- Disturbance and displacement from foraging habitat. The construction programme is anticipated to last 23 months for Phase 1 in 2030 and 15 months for Phase 2 from 2036 until 2038. Consequently, the effects of construction activities could occur on a medium-term basis with birds being displaced from parts of their home range across a period of up to 8 years. This effect increases competition for resources with the populations of the IOFs in the wider area, which could result in reduced breeding productivity.

74. The following potential effects are scoped out for the construction phase:

- Loss of nests sites. The IOFs taken forward for assessment, golden plover and red kite, were not recorded nesting within 2 km of the Site.
- Disturbance and displacement from nest sites. The IOFs taken forward for assessment, golden plover and red kite, were not recorded within an EZoI of the proposed Development for disturbance and displacement effects to active nest sites.

8.16.2. Operational Phase

75. The following potential effects are scoped in for the operational phase:

- Collision risk. Flying birds may collide with turbines. Collision of a bird with turbine rotors usually results in the death of the bird. Birds may also be injured or killed by flying into other components of turbines. The effect of an individual loss on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration) and mortality rate (the natural rate of losses due to death) and emigration. In general, the effect of an individual lost from the population would be greater for species that occur at low density, are relatively long-lived and reproduce at a low rate (e.g. larger raptors like the IOF red kite). Conversely, the effect would often be insignificant for short-lived species with high reproductive rates found at high densities, including most passerines.
- Disturbance and displacement from foraging areas. The footprint of the proposed Development is significantly larger than the current area occupied by the Hare Hill Windfarm and Hare Hill Windfarm Extension. Therefore, the operational proposed Development may increase the area over which foraging birds are disturbed and displaced, potentially affecting breeding condition, survival rates and productivity.

- Loss of foraging habitat. Permanent loss of foraging resources, at least on a short-term basis (one breeding season) while birds relocate. Also, potential long-term implications (reduced breeding success) as this effect increases competition for resources with the populations of the IOFs in the wider area.

8.17. Assessment of Effects, Mitigation and Residual Effects

8.17.1. Mitigation by Design

76. The footprint of the proposed Development avoids statutory designated sites of natural heritage interest and priority habitats, wherever possible.

8.17.2. Design Solutions and Assumptions

77. Effective, industry-standard mitigation measures will be embedded within the project, detailed within the Principal Contractor's CEMP and ScottishPower Renewables (UK) Limited's (the Applicant) General Environmental Management Plans (GEMP). A relevant Outline Decommissioning and Construction Environment Plan is included as **Appendix 5.1**.

78. An Environmental Clerk of Works (EnvCoW) will be appointed for the duration of the works to ensure compliance with wildlife legislation and adoption of best practice.

79. Species Protection Plans (SPPs) have been developed by the Applicant and will be agreed with NatureScot. The SPPs include bird protection plans which will include the following measures to reduce effects to sensitive species:

- Pre-construction surveys and construction monitoring to update the status of the IOFs;
- Disturbance protection zones around confirmed nest sites; and
- Seasonal working restrictions where required.

8.18. Assessment of Construction Phase Effects

Golden Plover

Disturbance and Displacement from Foraging Areas

80. Golden plover was the most frequently recorded species during the flight activity surveys. Most observations involved circling flocks, suggesting foraging birds that had been temporarily disturbed from foraging areas within or near the Site rather than birds simply commuting across the Site. This assumption is further supported by observations of flocks landing after a period of circling. Five of the six observations where the surveyor specified that a flock had landed involved birds landing within the Site.

81. The five observations of golden plover flocks landing within the Site indicated that this species was relatively tolerant of the existing, operational Hare Hill Windfarm and Hare Hill Windfarm Extension in terms of noise generation from the turbines, the physical presence of the turbines and associated maintenance work involving personnel and

vehicles. Of the five observations of flocks landing within the Site, the closest landing point to an operational turbine was approximately 70 m, while the maximum was 900 m, with a mean distance of 290 m.

82. However, during the construction phase it is expected that disturbance and displacement effects will occur across a larger area and more frequently. This is because the construction phase will involve a larger number of vehicles, machinery and personnel compared to the current baseline. Based on studies (Goodship and Furness 2022) the predicted disturbance distance range for golden plover is 200 m to 500 m. Considering this disturbance distance range, the size of the Site, and the sequential nature of the works to facilitate the proposed Development, it is predicted that there will be some disturbance free foraging areas across the Site during the construction phase. Golden plover observations during surveys to inform assessment of the proposed Development suggests a degree of habituation to the operational Hare Hill Windfarm and Hare Hill Windfarm Extension. This habituation may increase the tolerance of the local golden plover population to the construction phase works. Finally, whilst the construction phase disturbance effects are considered temporary on a medium-term basis; upland grassland habitat suitable for foraging golden plover is extensive beyond the Site. Availability of foraging habitat beyond the Site will ameliorate the effects of temporary disturbance and displacement from within the Site.

83. Considering all the above, the effects of disturbance and displacement from foraging habitat to golden plover during the construction phase have been assessed as **'Likely'**, **'Minor Adverse'**, temporary, of low spatial extent at a Site level and therefore **'Not-Significant'**.

Red Kite

Disturbance and Displacement from Foraging Areas

84. Red kite was the second most frequently recorded species during the Flight Activity Surveys after golden plover with a total of 53 flights. There were no well-defined clusters of activity; red kite flight activity was widely spread across the Site. Of the 53 flights, there was a reference in the accompanying survey notes to foraging or hunting behaviour for 34 flights, suggesting that the Site is relatively important as a foraging resource for red kites. Red kites have a varied diet. Considering the habitats within and surrounding the Site dominated by upland grassland and moorland, it is predicted that rodents and reptiles will be frequent sources of prey in these areas, albeit with seasonal restrictions for reptiles. One observation of red kite noted a bird stealing a vole from a common buzzard *Buteo buteo*.

85. As with golden plover, it is likely that red kites have a degree of habituation to the existing baseline of disturbance from the operational Hare Hill Windfarm and Hare Hill Windfarm Extension. However, as discussed for golden plover, disturbance and displacement effects to red kite have the potential to occur across a larger area and more frequently during the construction phase. Based on studies the disturbance distance range for non-breeding red kite is 150-300 m (Goodship and Furness, 2022). Nonetheless, this relates to roosting red kites where the sensitivity to disturbance has been assessed as the same as that for a nesting red kite. It is predicted that foraging red kites will be far more tolerant of construction works based on their known foraging strategies. In agricultural areas, this species may associate closely with tractors

ploughing the ground to take earthworms, farmyards where they scavenge for waste, and roads where they scavenge for roadkill (Wildman *et al*., 1998).

86. Considering all the above, the effect of disturbance and displacement from foraging habitat to red kite during the construction phase has been assessed as **'Likely'**, **'Minor Adverse'**, temporary, of low spatial extent at a Site level and therefore **'Not-Significant'**.

8.19. Assessment of Operational Phase Effects

Golden Plover

Permanent Loss of Foraging Habitat

87. Golden plover forage on grassland habitats which are extensive within the Site. The permanent loss of foraging habitat within the Site is small relative to the size of the Site. Land-take because of the proposed Development will mainly comprise crane pads, laydown areas and turning areas with a cumulative total area of 17 hectares (ha). This equates to 1% of the total area of the Site. Additionally, new access tracks will be required but given these are relatively narrow, linear features, land-take for access tracks is considered negligible in the context of the size of the Site and the relative abundance of suitable foraging habitat for golden plover. Extensive use will be made of existing access tracks reducing the requirement for new access track construction. Further to this, upland grassland habitat suitable for foraging golden plover is extensive beyond the Site.

88. In addition, a peatland restoration plan is proposed, which is likely to provide improved foraging habitat for golden plover. Improved quality of habitat out with the permanent footprint of the Proposed Development is likely to outweigh the negligible extent of permanent habitat loss. Considering all the above, the effects of permanent loss of foraging habitat to golden plover during the operational phase have been assessed as **'Certain'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant'**.

Disturbance and Displacement from Foraging Areas

89. As discussed for the construction phase, the local golden plover population is likely to have a degree of tolerance to operational turbines and associated operational maintenance activities. Observations from the ornithological surveys to inform this assessment include flocks of golden plover landing within approximately 70 m of turbines comprising the operational Hare Hill Windfarm and Hare Hill Windfarm Extension. Operational monitoring of golden plover for the Hare Hill Windfarm Extension from 2018-2021 (SPR, 2022) noted a consistent use of roost sites in all years involving a peak of 500 birds, and golden plover appear to be comfortable roosting amongst and flying around and over operating turbines.

90. Further to this, the configuration of the turbine array for the proposed Development is far less closely spaced, involving fewer turbines than the operational Hare Hill Windfarm. Additionally, the requirement for the proposed Development to avoid peat restoration areas is also likely to benefit golden plover in this respect.

91. Considering all the above, the effects of disturbance and displacement from foraging habitat to golden plover during the operational phase have been assessed as **'Unlikely'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant'**.

Collision risk

92. Golden plover was the most frequently recorded species during the flight activity surveys with a total of 59 flights involving 3,011 individuals with a maximum flock size of 670 birds. The total flight time was 687,387 seconds, of which approximately 55% was at Potential Collision Height (PCH).

93. A study of avoidance rates for the closely related American golden plover *Pluvialis dominica* concluded that this species was able take to take avoiding action in over 99% of potential collision events (Whitfield, 2007). It is reasonable to assume that the golden plover will have a similar high avoidance rate. Survey data indicates this species frequently flew close to and within the existing wind farm. CRM results for the Hare Hill Windfarm Extension (SPR, 2007) estimated between 6.8 and 10.4 potential collisions per year, yet no recorded fatalities have been found during carcass searches since 2011. Given this site-specific evidence, an avoidance rate of 99% has been assessed as reasonable.

94. CRM predicts collision mortality rates of 1.3 to 3.2 birds per year and 65 to 159 individuals over 50 years (assumed lifespan of the proposed wind farm).

95. The worst-case predicted annual collision mortality rate of 3.2 birds per year is a non-significant increase to the annual mortality rate of 0.013%, based on the lowest estimate of the Scottish wintering population (25,000 individuals) when considering a background mortality rate of 27% (British Trust for Ornithology (BTO) Website: Bird Facts. Golden plover). I.e., the typical proportion of adults not surviving each year is 27% and the predicted additional mortality of up to 3.2 birds per year because of collision risk is not considered significant relative to the size of the Scottish wintering population.

96. Further to this, the large spacing between the turbines (typically >500 m) is expected to reduce the collision risk for golden plover. Finally, the Applicant has conducted weekly carcass searches of the operational Hare Hill Wind Farm since 2011 and no golden plover fatalities have been recorded.

97. Considering all the above, the effects of collision risk to golden plover during the operational phase have been assessed as **'Certain'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant.'**

Red Kite

Permanent Loss of Foraging Habitat

98. The assessment of this effect for red kite includes the same rationale as golden plover above i.e., the relatively small area of permanent habitat loss in the context of the size of the Site is highly unlikely to cause significant effects. This rationale is reinforced by consideration of red kite ecology, i.e., the species' eclectic diet and adaptive foraging strategies (Wildman et al., 1998).

99. In addition, a peatland restoration plan is proposed which is likely to provide improved foraging habitat for red kite. Improved quality of habitat out with the permanent footprint of the proposed Development is likely to outweigh the negligible extent of permanent habitat loss.

100. Considering all the above, the effects of permanent loss of foraging habitat to golden plover during the operational phase have been assessed as **'Certain'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant'**.

Disturbance and Displacement from Foraging Areas

101. As discussed for the construction phase, the local red kite population is likely to have a degree of tolerance to operational turbines and associated operational maintenance activities. Observations from the ornithological surveys to inform this assessment included several observations of red kites foraging within the footprint of the operational Hare Hill Windfarm. There was no indication of any red kite roosts in proximity to the Site. Although specific roost surveys were not undertaken, other baseline data including three years of flight activity survey coverage and a review of data from surrounding developments is considered sufficient to reach this conclusion. Therefore, the sensitivity levels to disturbance align with foraging birds. As already mentioned, red kite foraging strategies indicate a greater degree of tolerance to human activity in comparison to birds attending nest and roost sites.

102. Considering all the above, the effects of disturbance and displacement from foraging habitat to red kite during the operational phase have been assessed as **'Unlikely'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant'**.

Collision risk

103. Red kite was the second most frequently recorded species during the flight activity surveys with a total of 53 flights. The total flight time was 3,810 seconds, of which approximately 60% was at PCH.

104. NatureScot guidance on avoidance rates (NatureScot 2018b) includes information on red kite. Red kite is predicted to have a high avoidance rate of 99%. Carcass monitoring by the applicant from 2011 to the present for the operational Hare Hill Windfarm recorded a single red kite carcass beneath an operational turbine in 2023. Baseline survey data indicates this species frequently flew close to and within the existing windfarm. Given this site-specific evidence, CRM used a reduced avoidance rate of 98% for red kite.

105. CRM predicts a collision mortality rate of 0.1 birds per year and 5 individuals over 50 years (assumed lifespan of the proposed windfarm). The predicted annual collision mortality rate of 0.1 constitutes 0.03% of the regional population estimate of 151 pairs. This is non-significant when considering a background mortality rate of 50% for juveniles surviving their first year of life and a mortality rate of 39% for the typical proportion of adults surviving each year (BTO Website: Bird Facts. Red kite). I.e., the predicted mortality rate because of collision risk is not significant when considering the predicted survival rates for this species due to all causes of mortality.

106. Further to this, the large spacing between the turbines (typically >500 m) comprising the proposed Development is expected to reduce the collision risk for red kite in comparison to the larger number of closely spaced turbines comprising the current baseline.

107. Considering all the above, the effects of collision risk to red kite during the operational phase have been assessed as **'Certain'**, **'Minor Adverse'**, permanent, of low spatial extent at a Site level and therefore **'Not-Significant.'**

8.20. Cumulative Effects

108. The above sections have considered the implications of the proposed Development on the IOFs in isolation from potential effects of other projects and activities. However, the EIA Regulations also require the potential for cumulative effects to be assessed.

109. According to the relevant NatureScot guidance (NatureScot, 2018a) an assessment of cumulative effects associated with a specific development proposal should encompass the effects of the proposal in combination with:

- Developments that are already operational, and those that are consented, and likely to be built should be considered first as the impacts arising from these (once mitigation has been factored in) are unavoidable; and
- Applications that have been formally submitted to a planning authority or Scottish Government but have yet to be determined, consented and built developments applications should then be factored in. Confidential data (e.g. on Schedule I species) from such assessments would not necessarily be in the public domain.

110. For windfarms which do not influence designated sites, NatureScot guidance highlights the relevance of the Natural Heritage Zone (NHZ) as the basis for the geographical range in the identification of cumulative effects. It is considered that the collection of information on all development projects across this large area is out of proportion to the scale of the proposed Development. With regards to the IOFs, it has been considered that the most relevant geographic scale at which to assess impacts is the predicted maximum foraging ranges for the two IOFs based on studies[13,14]. Therefore, this cumulative impact assessment has considered the effects of all other developments within 12 km of the proposed Development for golden plover and 6 km for red kite.

111. Based on this range of assessment the following development sites have been scoped into this cumulative impact assessment as shown in Table 8.9.

Table 8.9 Development Sites Scoped Into Cumulative Assessment

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
Wether Hill	Operational	Y	Y	ES not available.
Whiteside Hill	Operational	Y	N	ES not available.
Twentyshilling Hill	Approved	Y	Y	**Golden plover:** five flights recorded. Effects of collision risk assessed as negligible. **Red kite:** none recorded.
Sanquhar	Approved	Y	Y	ES not available
Sandy Knowe	Approved	Y	Y	**Red kite:** not recorded **Golden Plover:** 10 golden plover flights recorded relating to 170 individuals.

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
				CRM predicted that 0.013 collisions would occur annually giving an effect of negligible significance.
North Kyle	Approved	Y	Y	**Red kite:** only one flight recorded during surveys to inform assessment. **Golden plover:** Observations indicated up to 140 birds wintering in 2016/2017 and 2017/2018. Predicted an annual collision rate of 2.57 individuals. Modelling of cumulative effects was undertaken based on an estimate of the Scottish non-breeding population. The assessment also considered the UK resident breeding population, a component of the wintering population, which was increasing, with a population increase in the UK of 19% between 2000 and 2005. The assessment predicted no significant cumulative effects from collision risk.
Enoch Hill	Consented	Y	Y	**Golden Plover:** 72 flights with a peak flock size of 220. Predicted an annual collision rate of 4.4 individuals. Assessed that the loss of 4.4 birds per year would be a negligible increase to the annual mortality rate of 0.018% based on the lowest estimate of the Scottish wintering population (25,000 individuals) when considering a background mortality rate of 27%. **Red kite:** Not recorded**.**
South Kyle	Consented	Y	Y	Original ES not available; summary of results from South Kyle 2 Scoping Report. **Golden plover**: A collision risk assessment included golden plover and concluded there would be a negligible impact in the long-term for this species.

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
				Red kite: red kite not mentioned as a species of concern.
Kype Muir and Extension	Consented	Y	Y	ES for original site not available. Non-technical summary for the extension. **Golden plover:** notes the presence of golden plover. Following detailed assessment, it was concluded that construction and operation of the development would not have a significant effect on birds and any habitat loss arising from the construction is not significant. **Red kite:** Noted very low frequencies of foraging flights for the species.
Pencloe	Consented	Y	Y	**Golden plover:** no golden plover flights recorded. Small flocks of one, three, four and six golden plovers were present on Ewe Hill (1 km west and north west of the application site) on three occasions during a walk out to a vantage point location in October/November 2010. **Red kite:** not recorded.
Afton	Consented	Y	Y	ES not available.
Windy Standard Phase 2	Consented	Y	Y	ES not available.
Windy Standard 3	Consented	Y	Y	**Red kite:** only one flight recorded and no evidence of breeding. **Golden Plover:** a single flight (three birds) was recorded during a preliminary VP survey in July 2009, and there were two flights during the 2012 breeding raptor surveys (4 birds in March and a single bird in May). Recorded in low numbers with no significant effects predicted.
Shepherds Rig	Consented	Y	Y	**Golden plover:** no records. **Red kite:** two active nest sites were noted in 2017; one located within 2 km of

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
				the proposed Development. Using the accepted avoidance rate of 99% for red kite, the CRM predicted one bird colliding with a turbine approximately every 36 years (approximately 0.69 over the 25-year life of the development).
Lethans	Consented	Y	Y	**Red kite:** no records. **Golden plover:** four flights totalling 49 birds. Low rate of occurrence with no requirement for CRM.
Manquhill	Appeal decided	Y	N	**Golden plover:** no records.
Cornharrow	Appeal lodged	Y	N	**Golden plover:** not recorded.
Windy Standard 1 Repower	Determination	Y	Y	**Red kite:** only one flight recorded, no evidence of breeding. **Golden plover:** only one golden plover flight recorded.
Lorg	Application	Y	Y	**Red kite:** Worst-case annual predicted collisions amount to 0.08% of the NHZ population, with a maximum loss of four birds predicted during the lifetime of the proposed Development. Assessed as not significant. **Golden plover:** three flights (comprising between one and 50 birds) recorded during VP surveys. Two records of calling birds in 2018 indicating a possible breeding territory. One incidental record in 2019. Low rate of occurrence and not scoped in for assessment.
Euchanhead	Application	Y	Y	**Red kite:** although red kite was recorded, the rate of occurrence was low. The assessment predicted no potential for an adverse effect on regional or national populations because of construction, operational or decommissioning activities. **Golden plover:** no breeding golden plover were found

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
				within the 500 m study area. Three flights by a total of 78 golden plover. Collision risk not calculated due to low rate of occurrence.
Herds Hill	Application	Y	Y	**Red kite:** not recorded. **Golden plover:** not recorded.
Rowancraig	Application	Y	Y	**Red kite:** CRM predicted that the number of birds potentially killed annually was very low and represented 0.011% of the local population. **Golden plover:** low rate of occurrence with no requirement for CRM.
Sanquhar II	Scoping	Y	Y	**Golden Plover:** A total of 216 flights recorded with a peak flock size of 80 birds. The CRM predicted collision mortality to be one bird every 36.5 years at Blacklorg East, one bird every 4.44 years at Blacklorg West, one bird every 4.6 years at Glenmanna and one bird every 14.12 years at East of Sanquhar Wind Farm. This was an estimated 0.957, 7.89, 7.61 and 2.48 birds during the 35-year lifetime of the wind farm This mortality rate was assessed against the upper estimate of the Scottish wintering population of 30,000 birds and equates to 0.063% of a loss of the wintering population. The effects of collision were considered negligible. **Red kite:** red kite have been recorded breeding approximately 5 km from the development. A total of 53 flights were recorded. The collision risk has been calculated to be one bird approximately every 57.9 years at Blacklorg West and every 2.78 years at Glenmanna. Over the lifetime of the wind farm of 35 years this would be

Windfarm	Status	Relevant to Golden Plover Search Area (12 km)	Relevant to Red Kite Search Area (6 km)	Baseline Conditions
				approximately 0.6 and 12.6 birds at risk from collision. The assessment concluded this was a loss of 12.57% of the regional breeding population. In terms of the Scottish population, this was assessed as a loss of 4.6%. However, it was concluded that the Scottish population was doubling every four to six years, and the percentage loss is likely to be significantly lower. The impact was considered to be of moderate significance.
Drum	Scoping	Y	Y	No information available
Cloud Hill Wind Farm	Planning Application Submitted	Y	Y	**Golden plover:** low flight activity. Negligible predicted risk of collision. **Red kite:** low flight activity. Negligible predicted risk of collision.
Knockshinnoch Wind Farm	Planning Permission Granted	Y	Y	Only a summary available in Scoping Report. No significant effects predicted to ornithological interests.
Greenburn Wind Park	Planning Permission Granted	Y	N	**Golden plover**: low flight activity. No significant effects predicted.

Golden Plover

Permanent loss of foraging habitat

112. None of the assessments for the development sites concluded any significant effects. Golden plover foraging habitat comprising upland grassland is common and widespread in the Dumfries and Galloway and Ayrshire regions. The loss of such habitat within all development sites is predicted to be low relative to its overall abundance. **No significant cumulative effects** predicted.

Disturbance and displacement from foraging areas

113. None of the assessments for the development sites concluded any significant effects. Construction activities may cause temporary disturbance. During the operational phase of the development sites, it is likely that golden plover will have a degree of tolerance to operational activities based on observations from surveys to inform assessment of the proposed Development: golden plover flocks were present in relative proximity to the operational Hare Hill Windfarm and Hare Hill Windfarm Extension. **No significant cumulative effects** predicted.

Collision Risk

114. None of the assessments for the development sites concluded any significant effects. The highest predicted annual mortality rate from the development sites was 4.4 birds per year from Enoch Hill Windfarm, which was not considered significant in the context of the Scottish wintering population estimated in the range of 25,000-30,000 individuals.

115. CRM for the proposed Development alone predicts a mortality rate of 1.3 to 3.2 birds per year. This is not considered to represent a significant contribution to any cumulative effects. **No significant cumulative effects** predicted.

Red Kite

Permanent loss of foraging habitat

116. None of the assessments for the development sites concluded any significant effects. Red kites have varied hunting strategies and forage in a wide variety of landscapes. The loss of habitat within all development sites is predicted to be negligible relative to the overall extent of foraging habitat available to red kite. **No significant cumulative effects** predicted.

Disturbance and displacement from foraging areas

117. None of the assessments for the development sites concluded any significant effects.

118. As assessed for the proposed Development alone, the local red kite population is likely to have a degree of tolerance to construction activities, operational turbines and associated operational maintenance activities. Observations from the ornithological surveys to inform this assessment included several observations of red kites foraging within the footprint of the operational Hare Hill Windfarm. There was no evidence of roost sites in proximity to the Site. Sensitivity to disturbance and displacement while foraging is considered to be the relevant sensitivity in the context of the proposed Development. As already mentioned, red kite foraging strategies indicate a greater

degree of tolerance to human activity in comparison to birds attending nest and roost sites. **No significant cumulative effects** predicted.

Collision Risk

119. Most assessments determined no significant effects from collision risk. For Sanquhar 2 Community Windfarm there was a predicted loss of up to 13.2% of the regional red kite population across the 35-year lifespan of the development. This was assessed as of moderate significance. Considering that its development site is alongside the proposed Development, a proportion of red kites foraging within the Site are highly likely to be the same birds as those flying across the development site.

120. To reduce the risk to red kite, the assessment for Sanquhar 2 stipulated that a specific Red Kite Protection Plan (RKPP) will be written and agreed with the RSPB and NatureScot. This will include contributing to conservation work at the Upper Nithsdale Wood Special Area for Conservation at Chanlockfoot. Woodlands in this area have the potential for red kites to nest. Red kites will be monitored each year prior to construction to help assess their movement into this area. With red kites still heavily persecuted, the RKPP will work with the RSPB to contribute to the education of landowners and gamekeepers in the area.

121. CRM for the Proposed Development alone predicts a mortality rate of 0.1 birds per year (0.03% of the regional population) and 5 birds over 50 years (assumed lifespan of the proposed windfarm). **No significant cumulative effects** predicted.

8.21. Conclusions

122. This Chapter has considered how, in the absence of mitigation, the proposed Development's construction and operational phase would affect the above IOFs by the loss of and disturbance from foraging habitat, and how the operational phase would affect the above IOFs through collision risk. Through the successful application of embedded and industry-standard mitigations, this Chapter concludes that the proposed Development would not result in a residual significant effect on any sensitive ornithological receptors. As part of the proposed mitigation, a peatland restoration plan will likely have positive benefits for the IOFs through improved quality of foraging habitat.

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