



Environmental Impact Assessment Report

Lairdmannoch Energy Park

Chapter 7: Ornithology (Additional Information)

Lairdmannoch Energy Park Ltd

wind2

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Glossary of Terms

Term	Definition
The Applicant	Lairdmannoch Energy Park Limited
The Agent	Atmos Consulting Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development.
Environmental Impact Assessment Regulations	Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017 ('the EIA Regulations')
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
<i>2025 EIA Report</i>	<i>Environmental Impact Assessment Report submitted with application ECU00004900 in May 2025</i>
The Proposed Development	Lairdmannoch Energy Park
The Proposed Development Site	The full application boundary as per Figure 1-1
Wind Farm Surveys/Wind Farm Survey Areas	The surveys carried out between 2019 -2021 in support of the development of a wind farm on the western part of the Proposed Development Site (Figure 7-1-2)
Solar Farm Surveys/Solar Farm Survey Areas	The surveys carried out in 2023 in support of the development of a solar farm on the eastern part of the Proposed Development Site (Figure 7-1-2)

List of Abbreviations

Abbreviation	Description
<i>AI</i>	<i>Additional Information</i>
BoCC	Birds of Conservation Concern
CIEEM	Chartered Institute of Ecology and Environmental Management
<i>ECU</i>	<i>Energy Consents Unit</i>
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
RSG	Raptor Study Group
NS	NatureScot
RSPB	Royal Society for the Protection of Birds
VP	Vantage point
SBL	Scottish Biodiversity List
SNH	Scottish Natural Heritage – now known as NatureScot
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TA	Technical Appendix
NHZ	Natural Heritage Zone
WCA	Wildlife and Countryside Act 1981 (as amended)

GWFG	Greenland White-fronted goose Anser albifrons
HRA	Habitat Regulations Appraisal
PVA	Population Viability Assessment
NCSA	Nature Conservation (Scotland) Act 2004
JNCC	Joint National Conservation Committee
DGRSG	Dumfries and Galloway Raptor Study Group
SRMS	Scottish Raptor Monitoring Scheme
SPP	Species Protection Plan
ECOW	Ecological Clerk of Works
CEMP	Construction Environment Management Plan
CMS	Construction Method Statement

7. Ornithology

7.1 Introduction

- 7.1.1. *In May 2025, Lairdmannoch Energy Park Limited ('the Applicant') submitted a planning application (Ref. No: ECU00004900) to the Energy Consents Unit (ECU) seeking consent under Section 36 of the Electricity Act 1989 (the 'Electricity Act') and deemed planning permission under Section 57 of the Town and Country Planning (Scotland) Act 1997 (the '1997 Act') for the construction and operation of an electricity generating station known as Lairdmannoch Energy Park (the 'Proposed Development').*
- 7.1.2. *The application included an Environmental Impact Assessment Report (the '2025 EIA Report'), prepared in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (the 'EIA Regulations').*
- 7.1.3. *This revised version of **Chapter 7: Ornithology** (May 2025) and associated Technical Appendices (TAs) form part of the supporting documentation to the Additional Information (AI) Report.*
- 7.1.4. *The Chapter text is reproduced in full and replaces the version contained within the 2025 EIA Report. New text is shown in red italics, while text replacing the original has been identified used strikethrough formatting.*
- 7.1.5. *This revised Chapter incorporates additional environmental information collated to supplement that presented in **Chapter 7: Ornithology** of the 2025 EIA Report and addresses the updates to the Proposed Development design, namely:*
- *Removal of Turbine 8 (T8); and*
 - *Decrease in tip height of Turbine 6 (T6) and Turbine 9 (T9) from 180 m to 149.9 m .*
- 7.1.6. *These design changes are hereafter collectively referred to as the 'Revised Proposed Development'.*
- 7.1.7. *As a result of the Revised Proposed Development and consultee comments received following submission of the 2025 EIA Report, the following TAs have been updated which should be read in conjunction with this Chapter:*
- *AI TA 7-1: Ornithology; and*
 - *AI TA 7-2: Ornithology Confidential Appendix*
- 7.1.8. ***TA 7-3: Population Viability Assessment Modelling** remains unchanged from the 2025 EIA Report.*
- 7.1.9. *The following figures have been produced to support the revised AI **TA 7-2** and are additional figures to those in Volume 4 of the 2025 EIA Report:*
- *AI Figure 7-1-9: Raptor survey results Access Track Survey 2025*
 - *AI Figure 7-1-10: Greenland White-fronted goose movements*
 - *AI Figure 7-1-11: RSPB Data Red kite results*
 - *AI Figure 7-1-12: RSPB Data Black grouse leks*
 - *AI Figure 7-1-13: RSPB Data Nightjar records*
- 7.1.10. This *revised* Chapter of the 2025 EIA Report evaluates the likely effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development on the ornithological receptors on and in the vicinity of the Proposed Development and the Proposed Development Site.

- 7.1.11. This Chapter has been prepared by Jenny Bell, Managing Director, Ornithology and HRA. Ms Bell has close to 30 years' experience in ornithology. She has extensive experience in assessing the impacts of wind farm developments on ornithology receptors, having been producing EIAs over the last 18 years in wind farm ornithology. Her knowledge of the ornithology of the area is also extensive having managed a large number of assessments and studies in this area.

7.2 Consultation

- 7.2.1. Table 7-1 shows the consultation carried out to date.

Table 7-1: Record of consultation around ornithology assessment

Consultee	Comment	Response
NatureScot (NS) (letter July 2019 requesting clarification around the Laughengie and Airie Site of Scientific Interest (SSSI) features)	Suggested Royal Society for Protection of Birds Scotland (RSPB) be contacted	Further information requested from RSPB and raptor study group (RSG) – this was not a formal consultation for the Proposed Development but formed part of the original feasibility work
RSPB Scotland (email August 2019 following on from NS inquiry)	RSPB/RSG were able to clarify the situation regarding the occurrence of SSSI features.	Information was included into survey requirements.
NatureScot (Scoping response)	We are broadly happy with the ornithological survey information presented in the scoping report. The report states that work has been undertaken according to NatureScot guidance, so it should be acceptable though, as no raw data is presented here, we cannot check this. This data should be presented in the Environmental Statement.	Data has been presented in AI TA 7-1 and AI TA 7-2
NatureScot (Scoping response)	We note that section 5.5.2 makes reference to access restrictions during raptor surveys. This will need to be discussed fully in the EIA and justification of the adequacy of the survey coverage given. We acknowledge the late start to the first season of breeding bird surveys due to covid restrictions, however the second season coverage started earlier so we are reasonably comfortable that overall coverage will be adequate.	Limitations are discussed in AI TA 7-1 . Atmos is confident that the surveys accurately captured the baseline conditions of the Proposed Development.
NatureScot (Scoping response)	In section 5.5.3 we note that Dumfries and Galloway Raptor Study Group are still to be contacted. We advise that as per our guidance, this should be done earlier when planning surveys. The data requested from external sources should also cover the solar aspect of the proposal.	Dumfries and Galloway Raptor Study Group provided some initial information in relation to questions around the the SSSI interests.
NatureScot (Scoping response)	We note that no flights have been recorded for Greenland white-fronted geese (GWFG) Anser albifrons during vantage point surveys, but we are aware from communication with RSPB Scotland that GWFG from the Loch Ken and River Dee Marshes Special Protection Area have been recorded from tagging studies travelling directly over the proposed location. Data should be obtained from the RSPB to determine the level of activity here and an assessment made as to the requirement for any additional work to inform the assessment.	No activity was recorded for Greenland White-fronted Geese during two years of surveys. Because of that, data was not obtained because it was felt that with extensive survey data showing no occurrence, that any such flights must be very intermittent and therefore there would not be any impacts on the population
NatureScot (Scoping response)	With respect to the specific questions in section 5.5.7 we advise that:	Population viability modelling has been undertaken for Red kite <i>Milvus milvus</i>

Consultee	Comment	Response
	- Black grouse Lyrurus tetrix and raptor surveys would have been advisable, although data from alternative sources may be available which may give adequate information. - We agree that a population viability model should be undertaken for red kite given the high level of activity recorded and potential effects that may result on the wider population. - We are happy with the species identified for collision risk monitoring (not withstanding any further data that may be obtained for Greenland white-fronted geese). - We did not find information identifying which developments have already been identified in terms of looking at the cumulative effects, but given the potential significant impacts on red kite, this coverage will likely need to be extensive and should follow our cumulative assessment Which is here in this link to Nature.scot website - cumulative assessment guidance	and results are presented both within Sections 7.7.2 and 7.8 as well as TA 7-3. Upon further detailed assessment, only activity levels for Red kite justified collision risk modelling as all other species with higher levels of flight activity were assessed as being Less than Local (Sections 7.5.2 and 7.5.3). NatureScot were contacted separately for their cumulative database and this has formed the basis of the cumulative assessment, with additional research carried out to confirm and refine information.
RSPB Scoping	We note that more than two years of field surveys has already been completed prior to Scottish Ministers issuing a Scoping Opinion for the EIA. A scoping exercise should help inform survey design and assessment of impacts: it is therefore disappointing to note that surveys have already been undertaken prior to this exercise. We would welcome information as to why this approach has been taken.	Timing of scoping is driven by many factors but the Onshore Wind Sector Deal identifies that scoping should be carried out at a time when there can be an informed focus on potentially significant effects. This does mean generally some survey work will need to be done to inform scoping and it is considered that industry practice has been followed in relation to the timing of the surveys in this application with respect to scoping.
RSPB Scoping	The proposed development is within the core foraging ranges of these qualifying species [Greylag goose and Greenland White-fronted goose]... Furthermore, the proposed development lies between a known roosting site at Loch Whinyeon loch and the Special Protection Area (SPA) overwinter ground which increases the probability that the birds will fly through the proposed development area. Likely significant effects on the SPA therefore cannot be ruled out and the competent authority must carry out an Appropriate Assessment.	The decision as to whether an Appropriate Assessment is required is one for the competent authority, as advised by NatureScot. However, given the very limited activity of Greylag goose and no observations of Greenland White-fronted goose, the SPA was scoped out from further assessment within the 2025 EIA Report.
RSPB Scoping	We recommend that survey effort as part of the EIA, which will also inform the HRA process, should include evening (dusk) and dawn survey to assess movements of SPA qualifying species Greenland White Fronted Goose in relation to roosting habitat at Loch Whinyeon in relation to this project.	Dawn and dusk surveys were carried out in the first winter of surveys; no goose flights of any species were recorded around dawn or dusk.
RSPB Scoping	We also recommend that a data request is made to confirm movements of roosting qualifying Greenland White-fronted geese between the Loch Ken and River Dee SPA	Given the absence of any sightings of Greenland White-fronted goose during surveys, it is considered there is no connectivity between the Proposed

Consultee	Comment	Response
	and Loch Whinyeon to inform the Habitats Regulations Appraisal (HRA) process	Development Site and the SPA and the request was not made.
RSPB Scoping	We note the reference to consultation with RSPB on sensitive species as part of confidential information (2019) (5.5.1). We ask that this information is provided to RSPB Scotland since we do not have record of this.	Information was provided to RSPB by letter on the 3rd of July 2024
RSPB Scoping	We note that survey effort in both years to record lekking Black Grouse was conducted outside the lekking season in year 2 which is end of March to mid-May. Although we note that the EIAR states that a lek survey in year one was carried out in May it is not specified if this was before mid-May. We therefore, recommend that this survey should be updated with formal lek survey methodology within the lekking season. The status of Black Grouse would be further informed through data request to RSPB Scotland and Forestry and Land Scotland.	Surveys in year 1 were completed before the end of mid May (final date of first visit was 13th of May 2020). Second visits were used to carry out further lek surveys given the concerns about Black grouse in the area. In year 2, surveys commenced before mid May but were not all complete. However we note for Black grouse there is not a 'lekking season' – Gilbert (Gilbert et al 1990) states grouse will be on lek sites all year round but activity peaks mid-March -mid May. Full information on survey methodology has been provided and detailed results are also provided. However, activity of Black grouse on the Proposed Development Site has been extremely limited which suggests either a very low population or no leks in proximity to the Proposed Development. A request to RSPB is pending.
RSPB Scoping	Survey work and buffer areas - We note that survey areas were identified based on buffer areas from the turbine array rather than the whole development footprint. NatureScot guidance recommends survey to encompass the entire development area	The approach was taken based on the information available when the project commenced. As a result, the survey work has covered the development area (with one exception), where necessary supplemented by further surveys to ensure guidance is met as the design of the Proposed Development has evolved. The exception is the south-west Access Track, where access was not possible during surveys across the Proposed Development Site.
RSPB Scoping	Red Kite - We agree that based on the information provided in the Scoping Report that a Population Viability Assessment (PVA) to assess impact to Red Kite is required.	Population viability modelling has been undertaken for Red kite and results are presented both within Sections 7.7.2 and 7.8, as well as TA 7-3 .
RSPB Scoping	Collision Risk Modelling - With regard to information provided in Table 9 in the Scoping Report, we are unable to confirm if any other species should be included in the collision risk modelling until we have assessed the full results of all survey effort including VP survey that will be carried out as part of the EIA. There is no detail of the results of Nightjar <i>Caprimulgus europaeus</i> survey which may require CR assessment	Given RSPB's lack of consultation on this point, despite further attempts to engage (see further explanation below), collision risk modelling has been carried out on those species, which, when evaluation of the species' occurrence on the Proposed Development was carried out, showed activity was sufficient for significant impacts to potentially occur.
RSPB Scoping	Cumulative impact assessment - We recommend that the cumulative assessment should include all projects within the search area, including new forestry/woodland creation	Further consultation was made on this point (see below), as it is not possible to include all planning applications within NHZ19 in a cumulative assessment, nor does the Applicant have sight of new forestry/woodland applications.

Consultee	Comment	Response
		Although we went back to RSPB to explain that their request was impossible to fulfil, they did not suggest an alternative scope which was possible. As a result of lack of further engagement, the cumulative assessment was carried out as described in the Scoping Request.
RSPB July 2024 – The record of consultation from 2019 was provided as requested and the issues around their response on cumulative assessment were explained and they were invited to re-engage on this point. Additional information on the timing of scoping was also provided.	Thanked for the comments and information about data consultations re-iterated.	As a result of lack of further engagement, the cumulative assessment was carried out as described in the Scoping Request.
NatureScot (August 2025)	<i>Given the above, the decision not to obtain existing tracking data for Greenland white-fronted goose, as advised in our scoping response (ref. CEA172230), is in our view a significant omission. Therefore, NatureScot objects to the proposal until these data are obtained and an assessment is made of the impacts in relation to the notified features of Loch Ken and River Dee Marshes SPA. This should be adequate to allow Energy Consents Unit as competent authority to undertake a Habitats Regulations Appraisal in line with the Habitats (Scotland) Regulations 1994.</i>	<i>Data from satellite tagged birds has been obtained (see paragraphs 7.5.30–7.5.34 of this AI Chapter and the revised AI TA 7-2), and collision risk modelling based on that data has been undertaken (see paragraphs 7.7.24–7.7.36). This modelling indicates a level of collision risk that is not considered significant, even taking into account the declining status of the population.</i>
	<i>VP's have been selected within the site boundary, which is contrary to recommended guidance as it can lead to under recording of typical activity on the site. There appears to be no justification for having adopted this approach. Although the report states that observers tried to remain inconspicuous, from the bird's perspective, this is impossible to judge and could have had an impact on bird activity and therefore results and conclusions.</i>	<i>The vantage points had to be within the Proposed Development Site, given the north and west of the Proposed Development Site is surrounded by mature forest. NS guidance (NatureScot 2017) prioritises that all of the flight activity survey area should be within 2 km of a VP. It's also worth recognising that when the work was undertaken initially, the red line boundary was much larger and it was not possible to have the VPs outside the boundary and still have the flight survey area within 2 km of a VP. Given the priority in guidance (where they must be within 2 km but are 'best located outside the survey area where possible' it was felt necessary to have them in the boundary area. Given the high levels of Red kite activity recorded in the immediate vicinity of the vantage points (Figure 7-1-4) and no apparent displacement around the observers, concerns regarding displacement impacting bird activity do not appear to be based on the evidence of flight activity.</i>
	<i>NatureScot expressed a concern that collision risk had been underestimated</i>	<i>When flight activity is gathered for each flight segment (i.e. time spent at height</i>

Consultee	Comment	Response
	because data was originally gathered based on turbines of up to 150 m height, but the actual turbine were 180 m. They suggested that the PVA should be re-run using all flights in Band C	band A, B or C) the observer estimates the average height of the bird in that segment. This is not required by guidance, but an additional data point included in our Work Instructions. When turbine height changes then data is reviewed and any segments which include an average height which would fall within the expanded collision risk height are included. Any flights with an average value close to the new tip height are also reviewed. This means that all flights which are likely to have included significant time within the new at risk height band are included. Of course, under the new collision risk methodology (NatureScot 2024, all flight activity is included in the collision risk model, and then the flight activity is assigned based on the percent of at risk flight. For the purposes of this model, the percent of at risk flight included any flight segments in Band C which also recorded a mean height of up to 200 m. Anything with a mean height of 200m and above was excluded. The highest mean flight recorded was at 250 m which clearly would be well above the swept area of the turbines. This is why the statement in AI TA 7-1 was made: 'As such, any data which has been recorded with an average height of up to 180 m would now be considered to be at risk of collision' It had been described in the methodology that the estimated average height for each sector is recorded. Given our description above, using all flights would lead to an overestimate of collision risk. It would clearly be inaccurate to include flights where the birds were being recorded as clear of even the amended tip heights (e.g. with a mean flight height of 250 m) into a collision risk model which assumed that they were at risk of collision. Artificially inflating collision risk by including birds known to be outwith the swept area means that the PVA would become less accurate, not more accurate. We consider that the approach taken to include birds at height band C, but where the average height recorded indicated that they would be at risk is a more accurate way of calculating the collision risk upon which the PVA was based.
	NatureScot expressed concerns about the different outcomes from the two PVA models and stated that there was no interpretation to	Paragraph 2 of Section 4 of TA 7-3 directly addresses the different outcomes of the models in detail, with

Consultee	Comment	Response
	<i>explain these and as a result they questioned the results</i>	<i>the following paragraphs assessing the reliability of the outcomes of both models.</i>
	<i>It also appears that nest data have not been obtained from Scottish Raptor Study Group as advised in our scoping response, which should have been included to inform the EIA process.</i>	<i>Additional data has been obtained from RSPB which includes roosting and breeding records of Red kite.</i>
	<i>Black grouse survey does not appear to have followed best practice.</i>	<i>Survey methodology followed that described in Gilbert et al 1998. This clearly sets out the use of routes (p174) to locate leks "Make one or more further visits to locate leks following a planned route..." before the final visit is undertaken to count any leks located. It is this final visit, targeted at a specific lek where observation should be from a fixed point.</i>
	<i>Given the above, we would reassert our scoping advice to obtain data from alternative sources and advise reference to RSPB Scotland for information on black grouse leks relevant to the proposal. If relevant data are available, the assessment should be updated to reflect this.</i>	<i>While we maintain that our survey methodology was consistent with Gilbert, and the approach described by NatureScot appears to be an unpublished method, a further round of Black grouse survey was undertaken along the access route and data from RSPB Scotland was obtained and reviewed in the revised assessment.</i>
	<i>NatureScot advised that pre-construction checks should not 'fall into the same pitfalls' as the surveys to inform the assessment did</i>	<i>Pre-construction checks will follow NatureScot 2025 Gilbert et al 1998.</i>
<i>RSPB Scotland (August 2025)</i>	<i>RSPB Scotland expressed concern that flight activity from Greenland White-fronted goose had been missed and that data from satellite tags should be obtained.</i>	<i>Satellite data has been obtained (see paragraphs 7.5.30–7.5.34 of this Chapter and AI TA 7-2), and collision risk modelling based on that data has been undertaken (see paragraphs 7.7.24–7.7.36). This modelling indicates a level of collision risk that is not considered significant, even taking into account the declining status of the population.</i>
	<i>Data should be obtained from the local Raptor Study Group regarding Red kite nests</i>	<i>Data was obtained from RSPB Scotland which contained further information on Red kites in addition to that obtained during surveys. Project timing made it difficult to obtain RSG data.</i>
	<i>RSPB believe that cumulative collision risk should be addressed through design changes to reduce collision risk</i>	<i>We do not consider this would be a suitable approach. The lifespan of the wind farm will be 40 years; making design changes based on what happened in two years of survey is an inherently unsafe method of trying to manage/mitigate for collision risk unless there are very clear indicators for what is driving activity, in particular locales, and we do not consider this is happening on this Site. The number and size of turbines has</i>

Consultee	Comment	Response
		<i>been reduced in the Revised Proposed Development, which has also reduced collision risk by approximately 10%.</i>
	<i>RSPB do not consider that Black grouse should be scoped out the assessment; that data should be obtained from RSPB and that further assessment and mitigation is required.</i>	<i>Additional data was purchased from RSPB which provided additional information on Black grouse. This is presented in AI TA 7-2. We still consider that further assessment is not required since the site usage, as demonstrated by the survey work, remains low but recognise there may be sensitivities with the access track so have included mitigation for this species for access track works.</i>
	<i>Regarding Nightjar, RSPB recommend that a data request is made to RSPB Scotland for data on Nightjar to inform their status in relation to the development site to inform mitigation measures as appropriate. This would include the use of buffer areas to reduce disturbance during the breeding season and loss of foraging and nesting habitat through wind farm infrastructure.</i>	<i>Data was purchased and an assessment of impacts on the species has been carried out (Section 7.7)</i>

7.3 Legislation, Planning Policy and Guidance

Wildlife and Countryside Act 1981 (as amended) & Conservation (Natural Habitats & c.) Regulations 1994 (as amended in Scotland)

- 7.3.1. The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain. All wild birds and their active nests, eggs and young are protected from damage, destruction or capture under the WCA. Bird species listed on Schedule 1 gain additional protection particularly around their nests, with disturbance listed as an offence, with special penalties for breaches of the law related to those Schedule 1 species. The WCA also provides the mechanism by which the Conservation of Wild Birds (Directive 2009/147/EC, the 'Birds Directive') is transposed into UK law, allowing for the designation of Special Protection Areas (SPAs).
- 7.3.2. The Birds Directive lays out special measures to conserve wild birds, their eggs, nests and habitats, and applies special protection to those species as listed under Annex 1 of the Directive. This is to apply special protection, in particular, to those species which are migratory and are considered to be of a shared heritage and conservation responsibility across all European Union member states.
- 7.3.3. The Conservation (Natural Habitats, &c.) Regulations 1994, or 'Habitat Regulations', are the method by which the relevant European Directives are translated into Scottish law, with the most recent modification consisting of the 2012 revision. Specifically, the Habitat Regulations transpose the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and Natural Habitats and Wild Fauna and Flora (92/43/EEC, the 'Habitats Directive') into a Scottish context.

Nature Conservation (Scotland) Act 2004

- 7.3.4. The Scottish Biodiversity List (SBL) was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) 2004 Act (NCSA) for the conservation of biodiversity. This

legislation required Scottish Ministers to publish lists of species of flora, fauna and habitats considered to be of principal importance for the purposes of biodiversity.

- Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected by making it an offence to:
- Intentionally or recklessly kill, injure or take any wild bird;
- Intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
- Intentionally or recklessly take or destroy the egg of any wild bird; and
- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young, or disturb the dependent young of such a bird without a Schedule 1 license provided by NatureScot.

Birds of Conservation Concern 5 (BoCC)

- 7.3.5. The leading government (Joint Nature Conservation Committee (JNCC)) and non-government conservation organisations in the UK jointly reviewed the population status of the 247 bird species that are regularly found within the United Kingdom using data from national monitoring schemes. This was most recently reviewed in 2021 (Stanbury, et al. 2021) with an update for seabirds provided in 2024 (Stanbury, et al. 2024).
- 7.3.6. On the basis of seven quantitative criteria, each species has been placed on one of three lists, these being:
- Red – red list species are those that are globally threatened, have had an historical population decline in the UK from 1800 -1995, a rapid ($>$ or $=$ 50%) decline in UK breeding population over the past 25 years, or a rapid ($>$ or $=$ 50%) contraction of UK breeding range over the past 25 years;
 - Amber – amber listed species are those that have had a historical population decline from 1800-1995 but are recovering (population size has more than doubled over the past 25 years), a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern; and
 - Green – green listed species are those that have no identified threat to their population status.

Ornithological Guidance and Information Sources

- 7.3.7. NatureScot (formerly Scottish Natural Heritage (SNH)) has published a number of guidance documents related to the assessment of impacts of wind farms on bird populations. The following list, which includes both NS and guidance or information produced by other organisations, was used to inform the ornithological assessment:
- Assessing the Cumulative Impacts of Onshore Wind Energy Developments (NatureScot, 2012);
 - Assessing Connectivity with Special Protection Areas (NatureScot, 2016);
 - Environmental Statements and Annexes of Environmentally Sensitive Bird Information (NatureScot, 2016);
 - Avoidance Rates for the Onshore SNH Bird Wind Farm Collision Risk Model (NatureScot, 2018);
 - Recommended bird survey methods to inform impact assessment of onshore wind farms (NatureScot, 2017);

- Assessing the Significance of Impacts from Onshore Wind Farms on Birds at Sites Outwith Designated Areas (NatureScot, 2025);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2022);
- NatureScot Pre-application Guidance for Solar Farms (NatureScot, 2025); and
- Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (NatureScot, 2025).

7.3.8. In addition, contextual data on avian populations was obtained from a number of publications, primarily the following:

- The Birds of Scotland (Forrester, 2007);
- National Heritage Zone Bird Population Estimates (Wilson, 2015);
- Scottish Raptor Monitoring Scheme Annual Report 2020 (Challis, Beckmann, et al. 2023).

7.3.9. Data on local bird records was sought from the following sources to support the ornithological assessment:

- Royal Society for the Protection of Birds (RSPB);
- Dumfries and Galloway Raptor Study Group (DGRSG).

7.3.10. Information about designated sites was obtained by accessing the following online resources:

- NatureScot Sitelink website.

7.4 Methodology and Approach

Desktop and Field Survey

7.4.1. Full details of the survey methods and a discussion on any limitations are provided in **AI TA 7-1. Table 7-2** summarises the surveys carried out in support of the Proposed Development. In 2023, surveys were carried out on the Solar Farm Survey Area because breeding bird surveys had not previously been carried out on this area; the area had been covered by raptor surveys in 2019 – 2021 and vantage point surveys are not required for solar farms (NatureScot, 2025) so the surveys were restricted to breeding bird surveys.

7.4.2. *Breeding raptor surveys and additional Black grouse surveys were carried out in 2025 along the route of the Western access track to the Proposed Development. No breeding bird surveys were carried out as the route is predominantly through plantation forestry, and largely uses existing commercial access roads. NatureScot guidance (NatureScot, 2025b) states that survey of woodland passerines in commercial forestry is generally not required.*

Table 7-2: Summary of field surveys

Survey type	Year 1 (2019 – 2020)	Year 2 (2020-2021)	Year 3 (2023)	Year 4 (2025)
Vantage point surveys	Yes	Yes	No	
Vantage point surveys (dawn/dusk additional hours)	Yes	No	No	
Breeding bird surveys	Yes	Yes	Yes	
Breeding raptor surveys	Yes	Yes	No	Yes
Black grouse surveys	Yes	Yes	No	Yes
Nightjar surveys	Yes	Yes	No	

- 7.4.3. Breeding bird surveys in 2019-2021 were carried out to inform the assessment of the impact of a wind farm in the western part of the Proposed Development Site; in 2023, surveys were carried out to inform the impact of a solar farm in the eastern part of the Proposed Development Site. **Figure 7-1-2** shows the extent of the surveys in those two periods. Because the survey areas are very different for these two periods, the surveys carried out in 2019-21 will be described as the Wind Farm Surveys, while those in 2023 will be described as the Solar Farm Surveys. This allows the context of the survey areas and the survey results to be more easily described in the context of the entire Proposed Development Site. *Those carried out in 2025 in support of the Western access track route are termed the Access Track Surveys.*
- 7.4.4. Methodology for collision risk modelling is provided in **AI TA 7-1**.

Assessment

- 7.4.5. The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2022) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this Chapter. These guidelines set out a process of identifying the value of each ecological receptor and then characterising the “impacts” that are predicted, before discussing the “effects” on the integrity or conservation status of the receptor, proposed mitigation and residual impacts.
- 7.4.6. The initial stage for assessment of impacts is to determine which features should be subject to detailed assessment. The ornithological receptors to be the subject of more detailed impact assessment should be of sufficient value that impacts upon them may be significant in EIA terms. This typically means receptors which have a nature conservation value of greater than local, although where receptors have special legal protection (i.e. listed on Schedule 1 of the Wildlife and Countryside Act 1981 as amended (WCA)) then further consideration may also be given to ensure protection is in place to prevent unlawful acts such as disturbance arising from the Proposed Development. The receptors should also be vulnerable to significant impacts arising from the development.
- 7.4.7. All designated nature conservation sites, bird species and communities that occur within the “zone of impact” of the Proposed Development are defined as potential ornithological features (as described below). The zone of impact is defined for individual receptors based upon the potential effects and if there is any research showing the range of those effects and also NatureScot guidance such as (NatureScot, 2018).

Determining Value

- 7.4.8. The CIEEM guidelines recommend that the value of ornithological features is determined based on a geographic frame of reference. For this project the following geographic frame of reference is used:
- International (nature conservation designation, habitat or populations of species of international importance, e.g. a Special Protection Area or significant numbers of a designated population outside the designated site);
 - National (nature conservation designation, habitat or populations of species of Scottish importance, e.g. a Site of Special Scientific Interest or a National Nature Reserve, a nationally important population/assemblage of a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 or Annex 1 of the Birds Directive);
 - Regional (a regionally (i.e. within Natural Heritage Zone (NHZ 19 Western Southern Uplands and Inner Solway) important population of birds which have a high conservation value (e.g. Schedule 1, Annex 1, Scottish Biodiversity List or Birds of Conservation Concern amber or red species;

- County (i.e. Dumfries and Galloway) (a population of high conservation birds which represent an important part of the county population of that species);
- Local (i.e. within 5 km) (a population of any species which is important at the local level); and
- Less than local (a population of birds which has little or no intrinsic nature conservation value).

Valuing Species

7.4.9. In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Rarity is an important consideration because of its relationship with threat and vulnerability although, because some species are inherently rare, it is necessary to look at rarity in the context of status. A species that is rare and declining should be assigned a higher level of importance than one that is rare with a stable population. Reference is made to a number of categorisations of ornithology conservation status, including;

- Annex I: Annex I of the Birds Directive on the conservation of wild birds lists species that are of conservation importance at a European level;
- Schedule 1: Rare breeding species in the UK, and / or species under threat of human persecution are listed on Schedule 1 of the WCA, which provides additional legal protection for such species at or around their nests;
- Schedule 1A: Certain Schedule 1 species are also listed on Schedule 1A of the WCA, which protects them from harassment all year round;
- Schedule A1: Certain Schedule 1 species are also listed on Schedule A1 of the WCA, which protects their nests all year round;
- UK Birds of Conservation Concern: A national classification that categorises breeding bird populations in the UK using a traffic light system to indicate an increasing level of conservation concern. Species are assessed against objective criteria such as population and distribution trends; those that have a declining range and / or population, or that are vulnerable to population effects due to their small population size are categorised as Red or Amber listed species, depending on the extent of the decline or vulnerability; and
- Scottish Biodiversity List: species which are identified as being important from a conservation viewpoint within a Scottish context are listed on the SBL.

Predicting and Characterising Impacts

7.4.10. In accordance with the CIEEM guidelines, when describing impacts, reference is made to the following, where appropriate:

- Confidence in predictions - the level of certainty that an impact will occur as predicted, based on professional judgement and where possible evidence from other schemes – this is based on a four point scale: certain/near certain; probable; unlikely; and extremely unlikely;
- Magnitude – the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e. whether impacts occur during critical life stages or seasons.

- 7.4.11. Both direct and indirect impacts are considered. Direct ornithological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ornithological impacts are attributable to an action which affect ornithological resources through effects on an intermediary ecosystem, process or receptor.

Significance Criteria

- 7.4.12. In accordance with the CIEEM guidelines, a significant impact, in ornithological terms, is defined as;
“an impact (whether negative or positive) on the integrity of a defined site or ecosystem and / or the conservation status of habitats or species within a given geographical area, including cumulative and in-combination impacts”.
- 7.4.13. The approach adopted here aims to determine an impact to be significant or not on the basis of a discussion of the factors that characterise it, i.e. the ornithological significance of an impact is not dependent on the value of the feature in question. The value of a feature that will be significantly affected is used to determine the geographical scale at which the impact is significant, e.g. an ornithologically significant impact on a feature of local importance would be considered to represent a significant impact at a local area level. This in turn is used to determine the implications in terms of legislation, policy and/or development control.
- 7.4.14. Any significant impacts remaining after mitigation (the residual impacts), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control when determining the application.

Assessment Areas

- 7.4.15. The bird surveys cover a wide area (**Figure 7-1-2**) with the survey areas based upon guidance (NatureScot, 2017; NatureScot, 2025), therefore impacts have been assessed within the zone of impact appropriate for each receptor taking into account ranging areas where published data is available (e.g. NatureScot, 2016). Additionally, the search area for historic data was larger again based upon NatureScot (2016) which identifies ranging distances for key species at risk from wind farms, and this has been used to inform the understanding of the wider area for those key species.

7.5 Baseline Conditions

- 7.5.1. Full results of surveys and the desk search results are provided in **AI TA 7-1** and **AI TA 7-2**. This section instead describes the occurrence of sensitive receptors recorded on or in the vicinity of the Proposed Development.

Designated Sites

- 7.5.2. The results of the designated site search are shown in **Table 7-3**.

Table 7-3: Results of Designated Site Search

Site	Distance and Direction from the Proposed Development	Qualifying features
Laughenghie and Airie Hills SSSI	400 m west	Non-breeding Hen harrier <i>Circus cyaneus</i> Breeding Breeding bird assemblage; species listed are Osprey <i>Pandion haliaetus</i> , Teal <i>Anas crecca</i> , Goosander <i>Mergus merganser</i> , Goldeneye <i>Bucephala clangula</i> ,

Site	Distance and Direction from the Proposed Development	Qualifying features
		Greylag goose <i>Anser anser</i> , Golden plover <i>Pluvialis apricaria</i> , Curlew <i>Numenius arquata</i> and Raven <i>Corvus corax</i> .
Loch Ken and River Dee Marshes	5.31 km east	Non-breeding Greenland White-fronted goose and Greylag goose (see Table 7-4)
River Dee (Parton to Crossmichael) SSSI	6.6 km northeast	Non-breeding Greenland White-fronted goose, Greylag goose, and Whooper swan <i>Cygnus cygnus</i> .
Cree Estuary SSSI	16.4 km west	Non-breeding Pink-footed goose <i>Anser brachyrhynchus</i>
Solway Firth SPA	16.7 km south	See Table 7-5

7.5.3. As can be seen, two SPAs were also identified within the search area; Loch Ken and River Dee Marshes SPA and Solway Firth SPA. Details of the qualifying species for these sites are in **Table 7-4** and **Table 7-5** respectively.

Table 7-4: Qualifying features of Loch Ken and River Dee Marshes SPA

Species	Scientific name	Population	Population Estimate	Current condition
Greenland white-fronted Goose	<i>Anser albifrons flavirostris</i>	Non-breeding	360 individuals	Favourable maintained
Greylag Goose	<i>Anser anser</i>	Non-breeding	1,150 individuals	Favourable maintained

Table 7-5: Qualifying features of Solway Firth SPA

Species	Scientific name	Population	Population Estimate	Current condition
Bar-tailed Godwit	<i>Limosa lapponica</i>	Non-breeding	4,800 individuals	Favourable maintained
Black headed-gull	<i>Chroicephalus ridibundus</i>	Non-breeding	13,732 individuals	Favourable maintained
Common Gull	<i>Larus canus</i>	Non-breeding	12,846 individuals	Favourable maintained
Common Scoter	<i>Melanitta nigra</i>	Non-breeding	1,588 individuals	Favourable maintained
Cormorant	<i>Phalacrocorax carbo</i>	Non-breeding	581 individuals	Favourable maintained
Curlew	<i>Numenius arquata</i>	Non-breeding	6,700 individuals	Favourable maintained
Dunlin	<i>Calidris alpina alpina</i>	Non-breeding	11,900 individuals	Favourable maintained
Golden Plover	<i>Pluvialis apricaria</i>	Non-breeding	3,380 individuals	Favourable maintained
Goldeneye	<i>Bucephala clangula</i>	Non-breeding	300 individuals	Favourable maintained
Goosander	<i>Mergus merganser</i>	Non-breeding	146 individuals	Favourable maintained
Grey Plover	<i>Pluvialis squatarola</i>	Non-breeding	720 individuals	Favourable maintained
Herring Gull	<i>Larus argentatus</i>	Non-breeding	3,034 individuals	Favourable maintained
Knot	<i>Calidris canutus</i>	Non-breeding	5,300 individuals	Favourable maintained

Species	Scientific name	Population	Population Estimate	Current condition
Lapwing	<i>Vanellus vanellus</i>	Non-breeding	5,037 individuals	Favourable maintained
Oystercatcher	<i>Haematopus ostralegus</i>	Non-breeding	33,850 individuals	Favourable maintained
Pink-footed Goose	<i>Anser Brachyrynchus</i>	Non-breeding	14,900 individuals	Favourable maintained
Pintail	<i>Anas acuta</i>	Non-breeding	1,400 individuals	Favourable maintained
Red-throated Diver	<i>Gavia stellata</i>	Non-breeding	521 individuals	Favourable maintained
Redshank	<i>Tringa totanus</i>	Non-breeding	2,100 individuals	Favourable maintained
Ringed Plover	<i>Charadrius hiaticula</i>	Non-breeding	981 individuals	Favourable maintained
Sanderling	<i>Calidris alba</i>	Non-breeding	260 individuals	Favourable maintained
Scaup	<i>Aythya marila</i>	Non-breeding	2,300 individuals	Favourable maintained
Shelduck	<i>Tadorna tadorna</i>	Non-breeding	1,600 individuals	Favourable maintained
Shoveler	<i>Anas clypeata</i>	Non-breeding	120 individuals	Favourable maintained
Svalbard Barnacle Goose	<i>Branta leucopsis</i>	Non-breeding	12,300 individuals	Favourable maintained
Teal	<i>Anas crecca</i>	Non-breeding	1,400 individuals	Favourable maintained
Turnstone	<i>Arenaria interpres</i>	Non-breeding	600 individuals	Favourable maintained
Whooper swan	<i>Cygnus cygnus</i>	Non-breeding	250 individuals	Favourable maintained
Waterfowl Assemblage	Consisting of species listed above	Non-breeding	122,000+ individuals	Favourable maintained

~~7.5.4. For Loch Ken and River Dee Marshes, the Proposed Development Site lies within connectivity distance for both species for which the SPA is designated. However, given the absence of any Greenland White-fronted goose observations, and the very low level of Greylag goose activity, some of which are attributed to local breeding populations (Section 7.5.2) there would be no adverse effects on the Loch Ken and River Dee Marshes SPA and it is scoped out of further assessment. For similar reasons, the River Dee (Parton to Crossmichael) SSSI would also be scoped out; in addition to the two species the associated SPA is designated for, there were no observations of Whooper swan so the SSSI is also scoped out of further assessment.~~

7.5.5. For Solway Firth SPA, the vast majority of species would not be connected to the Proposed Development due to the distance between the SPA and the Proposed Development. Given that distance, only Pink-footed goose would be considered as a possible species that the Proposed Development could impact on. However, given the level of activity of Pink-footed goose (section 7.5.2), there could be no adverse effects on the Solway Firth SPA, so it is scoped out of further assessment.

7.5.6. Similarly, the Cree Estuary SSSI, which is only designated for Pink-footed goose, could not be adversely affected by the Proposed Development due to the low level of activity of Pink-footed goose around the Proposed Development Site (section 7.5.2) and so the SSSI is scoped out of further assessment.

Species Accounts

Black Grouse

- 7.5.7. Black grouse are considered to be at risk from windfarms (NatureScot, 2025). They are a species which is in decline across parts of their range in Scotland – particularly southern Scotland - and are red-listed on BoCC as well as being an SBL species. The NHZ19 population is estimated at 121 males (Wilson, 2015).
- 7.5.8. No leks were identified during surveys. In 2021 they were heard calling during Black grouse surveys in an inaccessible area to the south-west of the Proposed Development Site.
- 7.5.9. There was one flight record of Black grouse (**Table 7-6**, also **Figure 7-1-4c**) and one incidental sighting during vantage point surveys when a Black grouse was flushed by a surveyor walking to a VP. Droppings were also present on the Proposed Development Site.

Table 7-6: Flight activity for Black grouse

Species	Scientific Name	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Sec-onds	At Risk Bird Sec-onds
Black grouse	<i>Lyrurus tetralix</i>	1	1	1	1	31	31

- 7.5.10. Activity was limited on the Proposed Development Site, but there was some usage. The presence of calling birds indicates the potential for leks in the wider area. *This was corroborated by data from RSPB Scotland which showed a number of leks in the wider area with one previously present on the Proposed Development itself (AI TA 7-2).* ~~as a result of this, surveys are planned for the access track due to the inability to survey this area when previous ornithology surveys were underway. The results of these surveys will provide more certainty as to the situation with Black grouse in this area.~~ At this time however, given the presence of a small level of activity on the Proposed Development Site, it would be assessed as being of Local importance for this species. However, with such limited activity within the development area, no impacts could cause a significant impact on the Black grouse population and so it is not carried forward to assessment.

Curlew

- 7.5.11. Curlew are listed as BoCC red as well as being an SBL species. They are considered at risk from windfarms (NatureScot, 2025). They are listed in the breeding bird assemblage for Laughenghie and Airie Hills SSSI.
- 7.5.12. Wilson estimates the NHZ19 population as 4,284 breeding pairs; the population may have declined further since the estimate was made.
- 7.5.13. No Curlew were recorded during wind farm surveys. However, one possible territory was recorded in the area of the solar farm surveys in 2023 (**Figure 7-1-8b**). This was present in the survey buffer, to the north-east of the Proposed Development.
- 7.5.14. With only one Curlew present within the survey area, no presence within the wind farm survey area and the single territory being outside the Proposed Development Site, the Proposed Development Site is assessed as being of Less than Local importance for this species. The species is therefore not considered for further assessment.

Golden Plover

- 7.5.15. Golden plover are an Annex I species, as well as being an SBL species. They are considered to be at risk from windfarms (NatureScot, 2025). Golden plover are listed in the breeding bird assemblage for Laughenghie and Airie Hills SSSI.

- 7.5.16. There were three flights recorded during vantage point surveys. Two flights occurred in November 2019 (with groups of 60 birds and 35 birds) and one flight in March 2021 (39 birds). This last flock was responsible for 22,776 (70%) of the at risk bird seconds shown in **Table 7-7**. In addition birds were heard calling in September 2019.
- 7.5.17. The timing of activity suggests birds are migrating/ passing through the vicinity of the Proposed Development Site, but with only four observations, it also suggests this is a relatively infrequent occurrence. There was no evidence for breeding on the Proposed Development Site and no Golden plover were observed during the surveys carried out in 2023. There were no regular observations in the winter months outside the migration periods. Flight activity is shown on **Figure 7-1-4 d**.

Table 7-7: Flight activity for Golden plover

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Golden plover	<i>Pluvialis apricaria</i>	Annex I, SBL	35	60	44.67	3	37,526	32,726

- 7.5.18. Although the species is listed within the breeding bird assemblage for the Laughenghie and Airie Hills SSSI, there was no evidence of Golden plover activity on the Proposed Development Site during the breeding season; as such, the SSSI population appears not to make use of the Proposed Development Site.
- 7.5.19. Given the infrequent occurrence of this species, and the relatively small groups of birds observed, together with the occurrence during migration periods the Proposed Development Site is considered to be of Less than Local importance for this species. Relatively large numbers of Golden plover move through the UK in autumn and spring, and because of this the infrequent occurrence of the species suggests limited value to this species. The species is therefore not considered for further assessment.

Goshawk

- 7.5.20. Goshawk *Accipiter gentilis* are on Schedule 1 of the WCA. Goshawk is considered to be at risk from wind farms (NatureScot 2018b).
- 7.5.21. The data from SRSG shows that 32 territories were checked in Dumfries and Galloway, with 22 territories occupied (Challis, Beckmann, et al., 2023). Wilson (Wilson, 2015) also estimates 31 pairs present in NHZ19.
- 7.5.22. There was one record of Goshawk during the vantage point surveys (**Table 7-8**; **Figure 7-1-4c**).

Table 7-8: Flight activity of Goshawk

Species	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Goshawk	1	1	1	1	330	0

- 7.5.23. The Proposed Development Site has limited suitability for Goshawk, which are a forest dwelling species, although the plantation forestry around the Wind Development Area of the Proposed Development may be suitable and could be the source of the observation. However there was no evidence for any breeding. Goshawk is relatively secretive so it cannot be ruled out that it may be breeding in the vicinity of the Proposed Development. However, even if it is, the incidence of activity over the Proposed Development was extremely limited, as shown in **Table 7-8**.

- 7.5.24. As a result of the low levels of activity and suboptimal habitat present on the Proposed Development Site the Proposed Development Site is considered to be Less than Local for this species. The species is therefore not considered for further assessment.

Greylag Goose

- 7.5.25. Greylag goose are considered to be at risk from windfarms (NatureScot, 2025). They are amber listed on BoCC. Large numbers winter in Scotland - Forrester estimates more than 85,000 (Forrester, 2007), but there are also native and naturalised breeding populations. South-west Scotland holds a long-established breeding population which existed before the expansion of the feral/naturalised population but also was not included within the WCA as a fully native population (Sharrock, 1976).
- 7.5.26. The species is listed or a qualifying feature on several of the designated sites identified in the designated site search. 'Non-feral' Greylag goose is listed in the breeding bird assemblage of the Laughenaghie and Airie Hills SSSI. Non-breeding Greylag goose are also a qualifying feature of the Loch Ken and River Dee Marshes SPA as well as the underlying River Dee (Parton to Crossmichael) SSSI.
- 7.5.27. Greylag goose was recorded periodically during vantage point surveys (**Table 7-9** , **Figure 7-1-4d**), but observations comprised:
- native/naturalised birds
 - two observations in late April and May of very small numbers
 - potentially migrant birds
 - two observations of groups of 40 and 41 individuals, recorded in March and January
 - observations where provenance was unclear
 - three birds seen twice on one day, so presumably the same birds, but recorded in February; the month indicates migrants but the flock size is more indicative of the naturalised population.
- 7.5.28. Greylag goose were also observed during the breeding bird surveys; there was no evidence of breeding in 2020 or 2021 on the windfarm surveys , but a possible territory was identified in 2023 on the solar farm surveys. This is likely to be from the naturalised population.

Table 7-9: Flight activity of Greylag goose

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Greylag goose	<i>Anser anser</i>	BOCC amber	2	41	15.5	6	18,541	14,220

- 7.5.29. As a result of the limited activity levels observed, the Proposed Development Site is assessed as being of Less than Local importance for this species. Given the low levels of activity, particularly from the wintering/non-breeding population there is considered to be no connectivity between the Proposed Development and the Loch Ken and River Dee Marshes SPA. The species is therefore not considered for further assessment.

Greenland White-fronted Goose

- 7.5.30. *There were no records of Greenland White-fronted goose during surveys carried out at the site. At the request of NatureScot/RSPB Scotland, records of satellite tagged birds were sought from ECO-LG Ltd.*

- 7.5.31. *That data is presented in the revised **AI TA 7-2** in detail. In summary, data comes from the period 2016/17 - 2023/24. Satellite data was sought for any tagged birds recorded as using Loch Whinyeon roost and a buffer of 10 km around that roost; for any registrations of tags within this area, the previous and following tag data was also supplied to enable an indication of the direction that birds may have entered and left the roost from.*
- 7.5.32. *Over the seven year period, there were 242 flights from a total of eight tagged birds which were considered likely to have passed through the Proposed Development or within a 500 m buffered distance of the turbine rotors (**Table 7-10**). There was a maximum of 57 flights in any one year in that period from a maximum of three individuals. Flights could involve one bird flying into and then out of Loch Whinyeon, or might involve a flight out of or into Loch Whinyeon, but the incoming/outgoing flight might not have passed through the Proposed Development or buffer; this may explain odd numbers in some years.*
- 7.5.33. *The proportion of times birds appeared to roost at Loch Whinyeon also varied through the period. Bearing in mind that a flight in or out may not have had a corresponding inbound or outbound flight, use of Loch Whinyeon varied between 0% (in 2017/18 when two birds were present for a total of 124 nights but no registrations were received from Loch Whinyeon) to a maximum of 14-28% of nights (one bird present in 2022/23 which made 22 flights (therefore between 11-22 uses of the roost) through the Proposed Development and buffers, and was present in the area for 120 days).*

Table 7-10: Summary of flight passes across the Proposed Development from tagged geese

Winter period	No of passes	No. of individuals
2016/17	22	2
2017/18	0	0
2018/19	12	3
2019/20	16	1
2020/21	55	3
2021/22	53	3
2022/23	57	2
2023/24	37	1

- 7.5.34. *While there was no usage of the Proposed Development Site by Greenland White-fronted geese, as shown by the results from the satellite tags as well as the survey data, and the interaction was of birds flying through the airspace, given the sensitivity of the species, as part of the Loch Ken and Dee Marshes SPA and given the fact these marked individuals are representative of wider but small population which are unmarked, the sensitivity of this species is considered International.*

Hen Harrier

- 7.5.35. Hen harrier are listed as an Annex I species as well as a Schedule 1 and 1A species on WCA 1981. They are red-listed on BoCC and are also a SBL species. Non-breeding Hen harrier are a reason for designation of the Laughenghie and Airie Hills SSSI.
- 7.5.36. The most recent estimate for the NHZ19 population is 18 females/pairs, although it is considered this is a likely underestimate (Wilson, 2015). The Scottish Raptor Monitoring Scheme (SRMS) reports that 12 ranges were checked and six were occupied in 2022 (Challis, Beckmann, et al. 2023).
- 7.5.37. Two flights for Hen harrier were recorded (**Table 7-11, Figure 7-1-14c**), and there were a further two incidental sightings around VP surveys. All records occurred outwith the breeding season, with the flights occurring in February and March 2020, and the incidental sightings in September and October 2019. There were no observations of the species during other surveys.

Table 7-11: Flight activity of Hen harrier

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Hen harrier	<i>Circus cyaneus</i>	Annex I, Schedule 1, BOCC red, SBL	1	1	1	2	71	0

- 7.5.38. While Hen harrier is a species of conservation concern and also a species for which the Laughenghie and Airie Hills SSSI is designated, the occurrence of Hen harrier on the Proposed Development Site was very low. There is a possibility that the observations could relate to birds from the SSSI population, and so the value of the Proposed Development Site would therefore be assessed as Local. However, because of the very low usage of the Proposed Development Site, there would be no opportunity for significant impacts to occur and so further assessment is not required.

Merlin

- 7.5.39. Merlin *Falco columbarius* are listed on Schedule 1, Annex I, are red-listed on BoCC and are an SBL species.
- 7.5.40. Wilson (Wilson, 2015) estimates the NHZ19 population as 12 breeding pairs. The SRMS report suggests 12 ranges were checked and three were occupied territories in 2022 (Challis, Beckmann, et al., 2023).
- 7.5.41. Merlin were recorded twice during surveys, both times during the vantage point surveys (**Table 7-12, Figure 7-1-4c**). Both flights were outwith the breeding season (October 2019 and September 2020) and there was no evidence of the Proposed Development Site being used for breeding.
- 7.5.42. *There was one record of Merlin seen carrying food in July during the Access Track Surveys. The habitat was not typical for breeding Merlin (see the revised AI TA 7-2 for more information); the bird could have been seen carrying its own prey rather than returning to a nest. There is thus uncertainty about whether this denotes a breeding record or not. From a precautionary point of view it has however been assessed as a possible breeding record.*

Table 7-12: Flight activity of Merlin

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Merlin	<i>Falco columbarius</i>	Annex I, Schedule 1, BOCC red, SBL	1	1	1	2	45	0

- 7.5.43. Due to the very limited use by Merlin, ~~and the absence of any evidence for breeding~~ *where the only possible breeding record was in the vicinity of the access track*, the Proposed Development Site would be assessed as being of Less than Local. *Due to the possible presence of breeding Merlin on the access track, this has been raised to Local.* The species is therefore not considered for further assessment. *Merlin does carry sensitivity as a Schedule 1 species and mitigation is described to ensure that construction activities are carried out lawfully with respect to Schedule 1 species.*

Nightjar

- 7.5.44. Surveys were carried out for Nightjar because of their presence in Dumfries and Galloway and suitable habitat associated with the Proposed Development Site and surrounding area. However, two years of surveys failed to identify any Nightjar present within the windfarm survey area and so they are not considered to be present within the Proposed Development.

- 7.5.45. *Data from RSPB Scotland suggested Nightjar have been present in woodland surrounding the Proposed Development Site (AI TA 7-2). The Proposed Development Site does not, on the basis of the survey data, appear to be used by this species regularly for foraging. There is some evidence that Nightjar in Scotland are more likely to be found in forestry than heathlands (Conway et al, 2007).*
- 7.5.46. *Nevertheless, Nightjar are an Annex I species with a very restricted range in Scotland. The Proposed Development Site has limited value to the species, due the absence of use recorded during dedicated surveys and lack of suitable habitat on site. However, this is a nationally important population because of the restricted range of the species within Scotland so from a precautionary basis, the value of the Proposed Development Site to the species has been assessed as County.*

Pink-footed Goose

- 7.5.47. Pink-footed goose are considered to be at risk from windfarms (NatureScot, 2025), and are amber listed on BoCC. They winter in large numbers in Scotland; Forrester estimates that around 200,000 pass through in October, with between 100,000 – 150,000 remaining through the winter (Forrester, 2007). Cree Estuary SSSI is designated for roosting Pink-footed goose.
- 7.5.48. Pink-footed goose were recorded on five occasions (**Table 7-13, Figure 7-1-4d**) with the largest observation being 130 birds in November 2019. All other observations were in March or September, suggesting birds passing through on migration.

Table 7-13: Flight activity of Pink-footed goose

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Pink-footed goose	<i>Anser brachyrhynchus</i>	BOCC amber	1	130	43.6	5	20,999	106

- 7.5.49. There is no suitable foraging habitat within most of the Proposed Development Site and no evidence for use by the species. Flight activity was limited and mostly of birds passing over at migration periods. As such, the Proposed Development Site would be considered to be Less than Local for this species.
- 7.5.50. Due to the limited activity, there would be considered no connectivity between the Cree Estuary SSSI and the Proposed Development. The species is therefore not considered for further assessment.

Red Kite

- 7.5.51. Red kite are listed on Annex I, Schedule 1 and are an SBL list species. They are considered to be at risk from windfarms (NatureScot, 2025).
- 7.5.52. Red kite were re-introduced to Dumfries and Galloway in 2001 and the population has expanded strongly. Wilson estimated the population as 83 pairs in 2013 (Wilson, 2015). Challis recorded 168 home ranges checked and 147 occupied in Dumfries and Galloway in 2022 (Challis, Beckmann, et al., 2023). The population is outgrowing the ability to monitor all nest locations.
- 7.5.53. Red kite were the species most commonly recorded during vantage point surveys (**Table 7-14; Figures 7-1-4a and 7-1-4b**), with 285 flights recorded during the two years of surveys. Up to four were seen at any one time. There was no obvious focus of activity across the Proposed Development, with activity generally high across the site.
- 7.5.54. There were a number of territories identified during surveys; further details of these are provided in **TA 7-2**. *Data was also received from RSPB Scotland containing information on historic breeding records; this data is also in the revised AI TA 7-2.*

Table 7-14: Flight activity of Red kite

Year	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Year 1 (Sep 2019 – Aug 2020)	<i>Milvus milvus</i>	Annex I, Schedule 1, SBL	1	4	1.2	151	28,212	21,824
Year 2 (Sep 2020 – August 2021)	<i>Milvus milvus</i>	Annex I, Schedule 1, SBL	1	4	1.05	134	27,622	21,451

- 7.5.55. Given the number of territories present, and the usage of the Proposed Development identified from the vantage point surveys, this suggests that the Proposed Development Site is used by kites from the wider area which represent an important part of the regional population. As such, it is considered to be of Regional importance to the Red kite population.

Snipe

- 7.5.56. Snipe *Gallinago gallinago* are listed as BoCC amber and are not considered to be at risk from windfarms (NatureScot, 2025). However research has shown that they can be adversely affected by windfarm developments (J. S. Pearce-Higgins, 2012).
- 7.5.57. Wilson estimates the NHZ19 population as being 1,252 pairs (Wilson, 2015).
- 7.5.58. One Snipe was observed during vantage point surveys (**Table 7-15** and **Figure 7-1-4d**). There were three territories (two possible, one probable) recorded during the 2021 breeding surveys – no territories were identified in 2020. No Snipe territories were identified during the solar farm surveys in 2023, although at least one bird was present.

Table 7-15: Flight activity for Snipe

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Snipe	<i>Gallinago gallinago</i>	BOCC amber	1	1	1	1	79	79

- 7.5.59. Given the size of the regional population, the population of Snipe on the Proposed Development Site represents a very small proportion of that population. Even allowing for the Snipe being a somewhat elusive species, it would suggest that the Proposed Development Site is no more than Less than Local for this species. The species is therefore not considered for further assessment.

Sensitive Breeding Species With Proximity to the Solar Development Area

- 7.5.60. While the baseline has focussed on those species at risk from wind farms, the development of a solar array in the eastern part of the Proposed Development has the potential to impact other bird populations, which are not particularly susceptible to wind farm developments, such as passerine and other more common species.
- 7.5.61. **Table 7-16** therefore summarises the results of the breeding bird surveys carried out within the Solar Development Area, highlighting species which are Annex I, Schedule 1, SBL or BoCC red species and which have not previously been described. This totals all confirmed, probable and possible territories to give a total estimate of territories; these are broken down in **AI TA 7-1**. Survey results are shown on **Figures 7-1-8a** (for Meadow pipit *Anthus pratensis*, Willow warbler *Phylloscopus trochilus* and Skylark *Alauda arvensis* and **Figure 7-1-8b** for less numerically common species.

Table 7-16: Summary of sensitive species within the Solar Farm Survey Area

Species	Scientific name	Conservation Designations	No. of Territories	Present within Proposed Development Site	Comments	Assessment of value
Crossbill	<i>Loxia curvirostra</i>	Schedule 1	None	Yes	Non-breeding record and limited habitat suitability within Proposed Development Site	Less than Local
Cuckoo	<i>Cuculus canorus</i>	SBL, BOCC red	5	Yes – 2 males	Likely to be feeding across wide area	Less than Local
Dunnock	<i>Prunella modularis</i>	SBL, BOCC amber	3	Yes – 1 territory		Less than Local
Herring gull	<i>Larus argentatus</i>	SBL BOCC red	None	Yes	Observed flying over	Less than Local
House martin	<i>Delichon urbica</i>	BOCC red	None	No	Observed near Loch Mannocho	Less than Local
House Sparrow	<i>Passer domesticus</i>	SBL, BOCC red	2	No	On in buildings adjacent to Proposed Development Site	Less than Local
Kestrel	<i>Falco tinnunculus</i>	Schedule 1, SBL, BOCC amber	1	No		Less than Local
Kingfisher	<i>Alcedo atthis</i>	Annex I, Schedule I, SBL	None	Yes	One sighting on Loch Mannocho, one on watercourse within Proposed Development Site	Local
Lesser Redpoll	<i>Acanthis cabaret</i>	SBL, BOCC red	1	Yes	On boundary of access track	Less than Local
Linnet	<i>Linaria cannabina</i>	SBL, BOCC red	7	Yes - 2	Both confirmed territories in vicinity of access track running to west	Less than Local
Mistle Thrush	<i>Turdus viscivorus</i>	BOCC red	5	Yes – 2	2 territories in array area	Less than Local
Reed Bunting	<i>Emberiza schoeniclus</i>	SBL, BOCC amber	13	Yes – 2	2 territories in vicinity of access track	Local – relatively high density for this species
Skylark	<i>Alauda arvensis</i>	SBL, BOCC red	9	Yes -3	2 territories in vicinity of access track and one within array	Less than Local
Spotted Flycatcher	<i>Muscicapa striata</i>	SBL, BOCC red	1	No		Less than Local
Starling	<i>Sturnus vulgaris</i>	SBL, BOCC red	2	No		Less than Local
Swift	<i>Apus apus</i>	BOCC red	None			Less than Local
Tree Pipit	<i>Anthus trivialis</i>	SBL, BOCC red	3	No		Less than Local
Twite	<i>Linaria flavirostris</i>	SBL BOCC red	3	Yes - 1	One pair on boundary of Proposed	Regional

Species	Scientific name	Conservation Designations	No. of Territories	Present within Proposed Development Site	Comments	Assessment of value
					Development, two in vicinity of Loch Mannocho	
Whinchat	<i>Saxicola rubetra</i>	BOCC red	10	No		Less than Local

7.5.62. The species range was relatively diverse across the survey area, with a number of species of higher conservation concern identified. While most species were a small population of species present in much larger numbers across the regional/county, resulting in an evaluation of Less than Local, three species were assessed as having a value greater than this:

- Kingfisher – Forrester suggests a population of between 75 – 125 pairs for Dumfries and Galloway (Forrester, 2007). Although no evidence for breeding was observed, it is considered that there may be at least one territory in the vicinity of the development. At the same time, suitable habitat is relatively limited for this species within the developable area. As such, while assessed as Local, it is scoped out of further assessment due to the lack of pathway for significant impacts. However, it is a Schedule 1 species so mitigation is included to ensure it is protected from unlawful disturbance;
- Reed bunting – relatively high population density within the survey area, which may be locally significant in Dumfries and Galloway where the density tends to be lower (Forrester, 2007). However, given there were only two territories within the Proposed Development Site and these were in proximity to the access track to the west of the Solar Development Area, there would be limited ability for significant impacts to occur and so this species is scoped out of further assessment; and
- Twite – The species has a very limited distribution in Dumfries and Galloway, with populations only known from two locations (Forrester, 2007). Additionally, while the population size is not known, Forrester describes the Mull of Galloway population as holding up to four pairs. The Proposed Development does not fall within either of the two known areas. BTO Atlas data also shows the species as absent in this area. As such, given the limited population in Dumfries and Galloway, and the number of territories recorded here, the Proposed Development Site holds a regionally significant population of this species. Further assessment is therefore required.

Receptors Brought Forward for Further Assessment

7.5.63. Receptors brought forward for assessment are those of County importance or greater, or where the receptor has been assessed as Local and there is considered to be a pathway for a significant impact to occur (in EIA terms). The impact could be either beneficial or adverse.

7.5.64. The following receptors are therefore brought forward for assessment:

- *Loch Ken and Dee Marshes SPA;*
- Laughenghie and Airie Hills SSSI;
- *Greenland White-fronted Goose;*
- *Nightjar;*
- Red kite; and
- Twite

7.6 Mitigation Measures

- 7.6.1. In line with CIEEM guidance, the impact assessment carried out in this Chapter is done on the basis that mitigation measures will be applied during the construction and operational phases of the project. This section therefore describes the ornithological receptors already taken account of during the design process and identifies mitigation and good practice measures which will be adopted during the construction and operational phases.

Design Mitigation

- 7.6.2. During Solar Development Design, a known Red kite nest which was used over several years was included as a constraint to reduce the impacts on the territory both of habitat loss and also to help prevent disturbance during the construction phase. More information is included in **AI TA 7-2**.

Construction Phase

General

- 7.6.3. A Construction and Environmental Management Plan (CEMP) and Construction Method Statement (CMS) will be developed and agreed with the local planning authority (in consultation with other stakeholders) before construction commences. An outline CEMP is presented in **TA 15-1**. This will inform the full CEMP prepared prior to construction, and will:
- Include measures to safeguard habitats and species to be implemented prior to construction, during construction and post-construction; and
 - Provide details of all pre-construction surveys required including methods and timings.
- 7.6.4. An Ecological Clerk of Works (ECoW) will be present during enabling works and throughout the construction period of the Proposed Development. They will be a suitably experienced individual, whose role would be to provide advice so that works are carried out in accordance with environmental measures as detailed in the CEMP, and to monitor compliance with relevant legislation and good practice.
- 7.6.5. The ECoW would contribute to all relevant CMS and CEMP documents.
- 7.6.6. Prior to the start of construction, contractors will be made aware of the ornithological sensitivities within the Proposed Development Site (particularly with regard to the potential presence of Schedule 1 breeding species). The ECoW will give regular Toolbox Talks to contractors regarding the status and locations of protected and sensitive species and habitats at the Site.
- 7.6.7. Where possible, vegetation clearance and ground stripping will be carried out outwith the breeding season (September – mid March, inclusive). Should this not be possible, then the ECoW will carry out pre-construction survey checks during the bird breeding season) no more than 48 hours before any vegetation stripping or excavation works to check for the presence of any breeding birds.
- 7.6.8. In addition, regular nesting checks will be carried out within 100 m of working areas for all species, increasing to 1 km for breeding Red kite.
- 7.6.9. Any active nests found will be buffered; the buffer should be based upon distances in current guidance (Goodship and Furness, 2022) (or any subsequent guidance), and with ECoW review. Where a species is not listed in Goodship & Furness (for example a non-Schedule 1 or Annex I species) then a minimum 5 m buffer would be observed, although the ECoW has discretion to increase this where they consider it necessary to protect the nest. Buffers may not be removed until the ECoW has determined that the nest is no longer in active use and/or there are no dependent young in the vicinity.

Species Protection Plan

- 7.6.10. A Species Protection Plan (SPP) will be developed. While this would primarily be targeted at Red kite and Twite, *it will also outline specific measures to protect Black grouse and Nightjar as well as mitigation and protection for all species*. It will form part of the CEMP. It will detail measures to be implemented before and during construction to protect bird species potentially breeding/using the Proposed Development Site.
- 7.6.11. As part of the SPP, in the breeding season prior to construction commencing, a breeding raptor survey, using methods in Hardey (Hardey 2013), will be carried out to establish the distribution of breeding Red kite across the area to feed into the SPP before construction commences. Monitoring will also continue during the construction period to ensure that nests *of Red kite and any other Schedule 1 species, such as Merlin*, are identified and protected.
- 7.6.12. Because of the potential for Black grouse leks to occur, particularly alongside the access track, in the breeding season prior to construction commencing and also during construction, Black grouse lek surveys should also be undertaken between mid-March and mid-May, within 500 m of the access route using methodology set out in Gilbert (1998). *Should Black grouse leks be present then depending on the location in relation to access track and other working areas, buffer areas around leks and timing of works would be set out and implemented by the Ecological Clerk of Works.*

Operational Phase

- 7.6.13. *Due to the estimated collision risk for Greenland White-fronted goose, and the need to monitor the situation to ensure that that collision risk accurately reflects that actual collision risk encountered during operation, a monitoring programme would be carried out in the first five years of the lifetime of the windfarm, with carcass searching to be carried out across the Proposed Development, between 1st October - 31st March (inclusive). The carcass monitoring programme will form part of the SPP but in outline, it would be targeted at particularly Greenland White-fronted goose, with Red kite a secondary consideration, although all carcasses would be recorded. Surveys would be carried out within this period at least monthly, with two surveys per month between November – February. A longevity trial would also be carried out annually, using carcasses similar to Greenland White-fronted goose.*
- 7.6.14. *Should there be collisions identified involving Greenland White-fronted goose, then these will be reported to NatureScot. Should estimated mortality over the five year period suggest that it will exceed the estimated collision risk identified in paragraphs 7.7.24 -34, or if three or more dead geese are found within the five year period then it is likely mitigation will be required which is likely to include curtailment at dawn and dusk to reduce risk to geese or the implementation of an automatic shutdown on demand system. The details of this would be dependent upon the circumstances of the incidents and further discussion with NatureScot.*
- 7.6.15. With the exception of the operation and general maintenance of infrastructure, there will be limited onsite activity during the operational phase, and therefore levels of disturbance will be considerably reduced relative to the construction phase.

Decommissioning

- 7.6.16. Embedded mitigation of decommissioning activities will follow those measures for the mitigation of construction activities, and will also including pre-decommissioning surveys and ecological supervision of activities.

7.7 Assessment of Effects

Construction Effects

7.7.1. The following impacts may arise during construction:

- Direct and/or indirect habitat loss during the construction stage - This is likely to be a continuous process, with impacts carrying over into the operational phase as well; and
- Disturbance and displacement as a result of human activity on the Proposed Development.

Loch Ken and Dee Marshes SPA

- 7.7.2. *There will be no direct or indirect habitat loss during the construction stage due to the distance between the Proposed Development Site and the SPA. The Proposed Development Site is 5.31 km from the SPA. As such impacts would be negligible and **Not Significant**.*
- 7.7.3. *There would be no disturbance impacts on the SPA itself; however there may be impacts on Greenland White-fronted goose but these are assessed in the section for that species, below.*

Laughenghie and Airie Hills SSSI

- 7.7.4. There will be no direct or indirect habitat loss during the construction stage due to the distance between the Proposed Development Site and the SSSI. While the boundaries of the Proposed Development and the SSSI are 400 m apart, the closest infrastructure (a turbine) is 1 km from the SSSI. The two are separated by a plantation forest and largely by a public road.
- 7.7.5. As identified in Section 7.5, activity from species associated with the SSSI was very limited and as such would mean that no significant displacement impacts would arise on the SSSI assemblage populations.
- 7.7.6. Hen harrier were recorded in the winter months but only on four occasions; there was no evidence for any roosting activity. With only four observations across two years, the level of use is so limited such that if displacement were to occur, because of the short term nature of the displacement during construction, the impact would be at most negligible and **Not Significant**.

Greenland White-fronted Goose

- 7.7.7. *Greenland White-fronted geese were recorded flying over the Proposed Development using satellite tracking of birds. No birds were observed on the Proposed Development itself, either during the surveys or as a result of the satellite tracking. As such, there will no direct or indirect habitat loss for this species. This impact would therefore be **Not Significant**.*
- 7.7.8. *There is potential for disturbance/displacement effects to occur as a result of construction activities during the construction period. However, with no use of the Proposed Development Site by this species, and the roosting site at Loch Whinyeon being approximately 1.5 km from the nearest turbine, displacement would occur most on birds flying over the site. It is not considered ground based activity would cause any more than localised disturbance; birds might alter flight paths to avoid flying over it but given the activity for the species which occurs outside the working day (when disturbance stimuli would be at its strongest) this would be a very limited effect. As such, it is considered negligible and **Not Significant**.*

Nightjar

- 7.7.9. *Given the ecology and habitats of this species, and the absence of the species during surveys, it is not known if the species makes use of the Proposed Development Site. However, in the event that*

*they do, they are likely to feed over it, meaning that the small area of habitat lost would be negligible in terms of direct or indirect effects. As such, the effect would be considered **Not Significant**.*

- 7.7.10. *In terms of displacement/disturbance impacts, Nightjar are crepuscular, preferring to feed at night. As such, even if they do use the Proposed Development Site they will not be active when construction is ongoing and when disturbance stimuli is at its greatest. Given their presence in commercial forestry plantations, it is not considered the presence of inactive machinery and construction materials on site or carrying out upgrades along the access track would create displacement. As a result the effect of disturbance/displacement would be considered negligible and **Not Significant**.*

Red Kite

- 7.7.11. Across the Proposed Development, land take is calculated to be ~~28.43~~ **25.82 ha**, of which ~~4.9~~ **1.67 ha** is considered to be temporary (works compounds etc.) and the remainder permanent/for the lifetime of the Proposed Development. Because the loss will occur during construction, it is assessed as a construction phase loss, but there is an operational element as well, due to the loss continuing across the lifetime of the Proposed Development.
- 7.7.12. The areas of loss are spread across the Proposed Development Site and represent a relatively small part of the greater area. Given the ranging nature of Red kites, and the number observed across the Proposed Development, the area is small relative to the foraging range of Red kites. Additionally, birds in this area may make use of the Red kite feeding station at Laurieston, which would explain the high density observed in this area. This would mean they are less reliant on foraging than birds without access to supplementary feeding. As a result, the habitat loss of this magnitude is assessed as negligible and **Not Significant**.
- 7.7.13. Studies carried out at the Braes of Doune wind farm (K. & Duffy, 2014) showed some reduction in use of the site during the construction period. However, results from the vantage point surveys differed from those of radio tracking birds with radio tracking results showing more use of the area – this could mean there was a temporal displacement, with birds not using the site when construction was active, but making more use of it outside the working period. Nevertheless, it would be reasonable to assume there could be some limited displacement during the construction period. This would be short term, while construction was ongoing.
- 7.7.14. Given the absence of confirmed territories in close proximity to the Wind Development Area, the displacement would occur to birds drawn from the local population, rather than directly onto a few pairs. Design mitigation was also applied to a confirmed Red kite nest in the vicinity of the Solar Development Area. As a result, it would be considered a minor and **Not Significant** impact; while use of the Proposed Development Site was high and the population is important, the short term nature, and the ability for there to be some ongoing use means it would not be considered significant.

Twite

- 7.7.15. There will be some habitat loss as a result of the development of the solar array. Two of the Twite territories were identified outwith the Proposed Development Site in wet/marshy grassland lying between the Proposed Development Site and Loch Mannoch, while the third territory was on the southern boundary of the Proposed Development Site close to the Tarff Water.
- 7.7.16. The closest territory is 100 m from the array infrastructure; the territory on the boundary of the Proposed Development is approximately 280 m from the solar array infrastructure and the third territory is 250 m from the array.

- 7.7.17. Due to the locations of territories, habitat loss for the species may be limited both due to the distance between territories and solar arrays and also the habitat present within the area of the arrays, which is mostly improved grassland. While Twite forage extensively on grass seed, reduced diversity in improved grassland can reduce seed availability and make improved grassland less suitable (Peak District National Park Authority, 2021). Large areas of grassland habitat will still remain available for the population and as such, the impact would be considered to be minor and **Not Significant**. While the loss would initially occur during the construction phase, most of it would be long term (for the life time of the Proposed Development). There would be some limited regrowth around the array following construction but seed resource would be limited. There would be no effect on likely breeding habitat.
- 7.7.18. While there would be disturbance to breeding Twite during construction, mitigation measures would ensure that nests were protected from harm. Little is known about Twite sensitivity to disturbance, but disturbance impacts during construction would be modified by the distance between areas where Twite have been recorded and active working areas. Any impacts would be temporary and short term. As a result, the impact is assessed as negligible.

Operational Effects

- 7.7.19. The following impacts are considered for the operational phase:
- Disturbance/displacement including barrier effects; and
 - Additional mortality as a result of collision risk (*excluding Twite*).

Loch Ken and Dee Marshes SPA

- 7.7.20. *There would be no direct or indirect disturbance impacts on the SPA itself; however there may be impacts on Greenland White-fronted goose but these are assessed in the section for that species, below. As such, disturbance impacts would be assessed as **Not Significant**.*

Laughenghie and Airie Hills SSSI

- 7.7.21. Paragraph 7.7.4 identifies that there would be no disturbance or displacement impacts during construction due to the distance between the Proposed Development and the SSSI, and the limited usage of the Proposed Development by birds from the SSSI.
- 7.7.22. The same would apply to operational impacts on the SSSI. The usage by the breeding bird assemblage is too limited such that there would be no significant displacement impacts as a result of the operation of the Proposed Development.
- 7.7.23. With respect to Hen harrier, there is only limited evidence for displacement of Hen harrier (Haworth, 2013), and that suggests that micro avoidance occurs, but that birds are not displaced from wind farm sites. Due to the low level of use of the Proposed Development Site during the non-breeding months, and the evidence that birds are not displaced from wind farm developments, there would be **No Significant** impact upon the Hen harrier population of the Laughenghie and Airie Hills SSSI.

Greenland White-fronted Goose

- 7.7.24. *While there were no direct observations of Greenland White-fronted geese overflying the Proposed Development Site between 2019 - 2021, for a number of individually tagged geese, it was inferred that they would overfly the Proposed Development Site based on the location of satellite fixes obtained from ECO-LG Ltd following the birds' use of the Loch Whinyeon. This could cause barrier effects to geese moving around the area. However studies of grey geese have shown that they tend to exhibit micro avoidance, altering their path to fly around turbine envelopes rather than being*

prevented from crossing the area entirely (NatureScot, 2025c; Plonczkier & Simms, 2012). While much of that evidence has been gathered in the offshore environment, there is also evidence from onshore wind developments that barrier effects on grey geese are limited (e.g. Atmos Consulting, 2023), with birds observed moving towards and away from the direction of existing wind farms.

- 7.7.25. As such, the impact of barrier effects on Greenland White-fronted geese would be considered negligible and **Not Significant**.
- 7.7.26. To assess collision risk, given the absence of observations during vantage point surveys, the data from satellite tagged birds was used to create an estimate of the number of transits birds would make annually. This enabled an estimate of collision risk to be made, using the older collision risk model based around predictable movements (i.e. the model described in NatureScot (2000), under section 1 'Regular flights through a windfarm'). While this approach is not included in current guidance, current modelling methodology would not allow a model to be derived from the data in the format in which it was available; that is an absolute estimate of the number of transverses through the operational envelope across a season.
- 7.7.27. The following assumptions were made:
- That the usage by tagged birds was representative of the usage by untagged birds. The proportion of tagged birds which were observed using Loch Whinyeon was then extrapolated into the annual estimated population (taken from Greenland White-fronted Goose Study 2025) to allow an estimate of the number of flights used by the entire population and thus collision risk for the population to be calculated.
 - The mean of the populations between 2017/18 – 2022/23 was used in 2023/24 where the estimate was not yet available. This may have led to an overestimate given the apparent population decline in the period, but it was considered precautionary to adopt this approach.
 - Since no height data was available, then all flights were assumed to be at collision risk height. This provides a worst case scenario for assessment purposes. However it unlikely to be correct given that geese typically commute at heights at and above collision risk height (NatureScot 2025c). The distance between the roost at Loch Whinyeon and the nearest turbine to it is 1.5 km. Above this distance NatureScot guidance assumes that no flight activity for other grey goose species will be at collision risk height.
- 7.7.28. **Table 7-17** shows the estimate of collision risk for all years, both for tagged birds only and then extrapolated for the entire population. This estimates that across the 40 year period of operation, a mean of 6 birds will be lost in the lifespan of the Proposed Development. The range lies between 0 – 16.5 birds.
- 7.7.29. **Table 7-18** summarises the uncertainty in the model, and allows the range within which the collision risk is likely to fall to be estimated for all years. This shows the mean lies between approximately 3 birds across the lifetime of the Proposed Development and 10 birds across the lifetime of the Proposed Development, which would equate to an annual rate of between 0.075 and 0.25 birds per year.
- 7.7.30. The global population of Greenland White-fronted geese is currently declining due to effects of climate change on the breeding population (Fox et al., 2025) and particularly breeding productivity which is not large enough to maintain the population. The population in Dumfries and Galloway is declining at approximately 4% per year. As a result, changes in adult survivorship have the potential to increase the rate of decline in the population.

- 7.7.31. *Adult mortality is currently estimated at approximately 20%. The additional mortality as a result of the Proposed Development would be between 0.04% - 0.15% per year (assuming a flock size of 165 birds; but mortality due to collision risk would likely be proportionate to the flock size since it is based on flights through the Proposed Development; a smaller flock would make fewer flights). Given the very low level of annual collision risk, the addition would lie within the natural variation of the current mortality; i.e. it would not significantly increase it.*
- 7.7.32. *Some older modelling commissioned by NatureScot on the Scottish population also indicate that the scale of additional mortality estimated would not be sufficient to have population level effects (Trinder 2015). Unfortunately the Dumfries and Galloway population was not modelled individually but additional mortality on the Scottish population as a whole would have to be considerably larger than assessed here, and even for one of the more sensitive populations – Caithness - estimates of mortality which would decrease the population by 5 % were still considerably larger than the collision risk estimated here. As a result it is therefore considered that effects of additional mortality due to collision risk would therefore be undetectable within the population.*

Table 7-17: Collision risk estimate Greenland White-fronted goose

	Annual collisions for bird at standard rate	Years per collision	Population	75% of population using Loch Whinyeon	Collisions over 40 year operational period for 75% of annual population
2016/2017	0.001	937.21	174	131	5.570
2017/2018	0.000	n/a	194	146	0.000
2018/2019	0.000	2577.32	161	121	1.874
2019/2020	0.001	687.29	165	124	7.202
2020/2021	0.002	606.43	145	109	7.173
2021/2022	0.002	606.43	161	121	7.965
2022/2023	0.002	448.23	140	105	9.370
2023/2024	0.003	294.55	163	122	16.587
Total	0.001	736.38	163	122	6.635

Table 7-18: Uncertainty in collision risk estimate for Greenland White-fronted goose

	Uncertainty				Range of annual collisions for 75% of population		Range of collisions for 40 year lifespan of project	
	Variance in flight activity	Simplifications in model	Design options	Overall	Lower range value	Upper range value	Lower range value	Upper range value
2016/2017	50%	20%	15%	56%	0.061	0.289	2.456	8.683
2017/2018	50%	20%	15%	56%	0.000	0.000	0.000	0.000
2018/2019	50%	20%	15%	56%	0.021	0.097	0.826	2.922
2019/2020	50%	20%	15%	56%	0.079	0.374	3.176	11.228
2020/2021	50%	20%	15%	56%	0.079	0.373	3.163	11.183
2021/2022	50%	20%	15%	56%	0.088	0.414	3.512	12.417
2022/2023	50%	20%	15%	56%	0.103	0.487	4.132	14.608
2023/2024	50%	20%	15%	56%	0.183	0.862	7.315	25.859
Total	50%	20%	15%	56%	0.073	0.345	2.926	10.344

- 7.7.33. *However, this is clearly a sensitive population which is already in decline. To provide confidence in this estimation, monitoring of the Proposed Development has been identified in paragraphs 7.6.13-*

14 of this Chapter while the geese are present to identify collisions of Greenland White-fronted geese with the Proposed Development. Should these incidents occur more frequently than predicted, then additional mitigation would be identified to reduce the risk to geese.

- 7.7.34. It should also be noted that the collision risk modelling has assumed that all flights occur at collision risk height. As stated above, some goose species, including those closely related to Greenland White-fronted goose, fly at heights likely to exceed collision risk height at a distance of more than 1.5 km from the roost site (NatureScot 2025c). This is Atmos' experience in carrying out vantage point surveys of geese across Scotland. The eastern edge of Loch Whinyeon lies 1.5 km from the closest turbine. It is therefore likely that the assumption overestimates the collision risk for this species; the NatureScot guidance suggests most flights would be above collision risk height. Any reduction in proportion of flights at collision risk would reduce the collision risk by the same amount; if only 50% of the flights occurred at collision risk height, then the estimated collision risk for this species would be halved.
- 7.7.35. As a result of these considerations, it can therefore be assessed that the impact of collision risk would be **Not Significant** for this species, and with the monitoring programme in place to ensure the predictions are accurate, there would therefore also be no adverse impact on the population of the SPA.

Nightjar

- 7.7.36. The results of monitoring of impacts on Nightjar from operational wind farms in plantation forests in Wales have been published, showing no detectable impacts of disturbance/displacement and a low rate of collision (Nicklin et al., 2025). Given the absence of evidence of use of the Proposed Development during dedicated surveys, suggesting that any usage will be limited, it can be concluded that the impact of operational disturbance would be negligible and therefore **Not Significant**.
- 7.7.37. The collision risk from sites where it was monitored and Nightjar were known to be actively foraging has so far been low and uncommon with two collisions identified across three sites. As Nicklin et al (2025) discuss, this level of collision aligns with other studies. Given the expected low level of usage of the Proposed Development which is likely to reduce the risk further, this would therefore be assessed as negligible and **Not Significant**.

Red Kite

- 7.7.38. The long term study at the Braes of Doune (K. & Duffy, 2014) also looked at the response of Red kites to an operational wind farm. The results were equivocal; there was evidence for a reduction in use of the wind farm area, but there was also evidence for a local change in distribution of Red kites so it was not clear if the result showing less activity was a result of displacement or altered distribution. Monitoring did not identify any behavioural aversion to turbines and birds were seen to apparently avoid blades on several occasions.
- 7.7.39. As a result, it is considered that any operational displacement would be limited and that levels of use would be similar to, or potentially slightly reduced as a result of the Proposed Development. This would result in a negligible impact which would be **Not Significant**.
- 7.7.40. **Table 7-19** shows the results of the collision risk modelling for Red kite. *This has been amended to take account of the design changes for the Proposed Development described in this revised AI Chapter.* This includes the annual values for the two years of observations together with the mean and a measure of the certainty around that estimate, as well as the likely range the collision risk lies within for the species. This shows collision risk has been estimated as **0.608 birds per year, a**

reduction from the 0.667 birds per year estimated in the 2025 EIA Report. As it is not predicted that there would be any displacement, there are no behaviour modifiers which would suggest this would be an overestimate.

Table 7-19: Collision risk results for Red kite

	Collisions at standard rate	Years per collision	Collisions over 40 year operational period	Uncertainty				Range	
				Variance in flight activity	Model Simplifications	Design options	Total	Lower range value	Upper range value
Year 1	0.426	2.34	17.04	50%	20%	15%	56%	0.188	0.664
Year 2	0.790	1.27	31.6	50%	20%	15%	56%	0.348	1.231
Mean	0.608	1.64	24.32 26.669	50%	20%	15%	56%	0.268	0.948

- 7.7.41. *Population Viability Analysis (PVA) was carried out for the level of collision risk estimated in the 2025 EIA Report. Given the reduction of collision risk, the model has not been re-run as there would not be any greater effect on the population since the collision risk has reduced.*
- 7.7.42. Full details of this are provided in **TA 7-3**. The addition of the mortality as a result of collision risk did not change the outcomes for the models. The deterministic model continued to increase in population, but the growth rate declined from 1.64% to 1.40% which over 35 years meant a population reduced by 20 females. The stochastic model however for both scenarios (collision risk/no collision risk) did not show growth; the addition of the collision risk meant the mean growth rate fell from -1.11% to -1.42%. Reasons why the stochastic model suggests a declining population when the local population is known to be still expanding are discussed in **TA 7-3**.
- 7.7.43. Because the population is thought to be still growing (estimated at 3.8% growth 2009 – 2018 (SRMS, 2023), and the population estimate used in the model may be an underestimate (it is based upon the number of home ranges reported occupied by DGRSG; however if not all home ranges are monitored then this would only reflect a proportion of the population), it is considered that the outcomes from the stochastic model are more representative of the population. As such, this level of collision risk would be considered minor and **Not Significant** and it would not have an adverse impact on the population.

Twite

- 7.7.44. Once the solar farm becomes operational there could be additional displacement owing to the limited suitable habitat within the solar arrays. There may also be some avoidance of the solar arrays as Twite are species of open ground, and so could avoid structures which could increase their risk from predation. As such, the habitat loss initially identified within the Construction Phase could be enhanced by displacement effects. However, given the distance between the territory locations and the likely range associated with these species, combined with the habitat still available to them, this effect would be assessed as negligible and **Not Significant**.

Decommissioning Effects

- 7.7.45. It is difficult to predict what the baseline will be at the time of the Proposed Development's decommissioning; however it is envisaged that effects would be similar to those identified during the Construction Phase. This would be verified by pre-decommissioning surveys undertaken as part of a Decommissioning Plan.

7.8 Assessment of Cumulative Effects

- 7.8.1. Cumulative impacts of wind farms on ornithological features may be categorised into two areas:
- Larger scale effects of displacement and/or disturbance; and
 - Increased mortality across a larger area due to collision risk.
- 7.8.2. Collision risk modelling is a broad-brush tool, the results of which provide an indication rather than a definitive risk calculation. Other factors such as disturbance and displacement, whether in the breeding season or winter, may carry as much weight, or more, in terms of realistic impacts. The greatest theoretical risks of significant cumulative effects are on species of National or International importance from a high volume of wind farms being present in a relatively small area. Current guidance suggests that the highest priority for cumulative impact assessment is for species that are declining and/or not in favourable conservation status, and that species of very high conservation importance or those vulnerable to wind farm developments should be targeted for cumulative assessments (NatureScot, 2012).
- 7.8.3. The context in which cumulative impacts are considered also depends upon the ecology of the species in question. For example, it may be appropriate to consider cumulative collision risk to geese associated with a SPA within the context of their wider foraging range. For other receptors, such as breeding waders, it may be appropriate to consider the impacts on the local population in the context of any planned wind farms in the immediate vicinity which have the potential to cause additional displacement on a much more localised population.
- 7.8.4. Cumulative impact assessments are often complicated by limited availability of ornithological impact assessments for other wind farm developments; where this information is available, survey periods and methods may differ between sites. Furthermore, some wind farm developments may have been operational or in planning for many years, and thus data may no longer be valid due to age of data and/or changes in bird populations since the time of survey, or have been assessed using different standards (for example, on older wind farm sites, collision risk avoidance rates may be different from those used currently and the EIA may not be explicit about what avoidance rate was used). Furthermore, figures used to calculate cumulative collision risk generally do not take into account proposed mitigation or compensation. Therefore, it is reasonable to assume, where agreed with NatureScot, that implementation of mitigation and compensation measures will reduce the overall impacts.
- 7.8.5. With respect to Laughenghie and Airie Hills SSSI, the Proposed Development is the only renewable energy development currently proposed which could affect the SSSI; as such, there are no cumulative effects to consider.
- 7.8.6. For the purposes of this cumulative assessment, there is no information available on potential cumulative impacts on Twite. Given the isolated and localised distribution, there would be limited opportunity for effects on one locale to have any non significant effects which would become significant due to in-combination effects. As such, given the finding of **Not Significant** effects on the Twite population, this would also be the finding of the cumulative assessment.
- 7.8.7. That leaves Red kite where the impact with potential to be significant cumulatively would be collision risk.
- 7.8.8. To allow assessment of cumulative collision risk, data was requested from NatureScot for the cumulative database they maintain for NHZ19. **Table 7-20** shows the results of that search, detailing the wind farms included in the database and the collision risk they reported (corrected where necessary for current avoidance rates).

Table 7-20: Summary of wind farms within NHZ19 reporting collision risk for Red kite

Wind Farm	Status	Reported collision risk rate for Red kite (99% avoidance)
Bodinglee ¹	Application	0.0701
Cornharrow	Approved	0.089
Daer	Application	0.100
Fell	Approved	0.147
Glenshimmeroch	Consented, Variation submitted	0.070
Little Gala	Appealed	0.004
M74 West Renewable Energy Park	Application	0.058
Mochrum Fell	Approved	0.160
North Kyle	Approved	0.007
Overhill	Consented, Variation submitted	0.020
Sanquhar II	Approved	0.377
Shepherd's Rig	Approved	0.020
Stranoch 2	Approved	0.003
Troston	Approved	0.140
Windy Rig	Operational	0.006

7.8.9. There is currently an outstanding question regarding the accuracy of the estimate of this particular site; it may be subject to underestimation.

7.8.10. **Table 7-21** provides the total estimate for regional collision risk for this species, broken into whether the developments are consented (which includes those with variations submitted) or in application (which includes Little Gala which is subject to appeal).

Table 7-21: Cumulative collision risk for Red Kite

Site state	Total	Total including Proposed Development
Approved	1.039	1.657
Application	0.232	0.85
All sites	1.271	1.889

7.8.11. The cumulative collision risk was also modelled using the rate for all approved sites (**TA 7-3**). The results from the deterministic model showed that the population continued to grow, although the growth rate had declined from the baseline of 1.64% to 1.23%.

7.8.12. As with the other stochastic models variants, including cumulative collision risk also showed population decline; the population grown declined from -1.11% for the baseline no collision risk model to -1.9% for the cumulative collision risk.

7.8.13. Given the previous reservations about the stochastic model, more reliance is placed on the deterministic model. This continues to show population growth, albeit reduced after the inclusion of cumulative collision risk. The cumulative collision risk would therefore be classed as a minor impact but it would be considered **Not Significant**.

7.9 Residual Effects

7.9.1. **Table 7-19** summarises the residual effects of the impact assessment.

Table 7-22: Summary of residual effects

Receptor	Evaluation	Assessment carried out	Construction		Operational	
			Habitat loss	Disturbance	Disturbance	Collision risk
Loch Ken and River Dee Marshes SPA	International	Yes	Negligible – not significant	Negligible – not significant	Negligible – not significant	Negligible – not significant
Solway Firth SPA	International	No				
Laughengie and Airie Hills SSSI	National	Yes	Negligible – not significant	Negligible – not significant	Negligible – not significant	N/A
River Dee (Parton to Crossmichael) SSSI	National	No				
Cree Estuary SSSI	National	No				
Black grouse	Local	No				
Curlew	Less than Local	No				
Golden plover	Less than Local	No				
Goshawk	Less than Local	No				
Greenland White-fronted goose	International	Yes	Negligible – not significant	Negligible – not significant	Negligible – not significant	Negligible – not significant
Greylag goose	Less than Local	No				
Hen harrier	Local	No				
Merlin	Less than Local	No				
Nightjar	County	Yes	Negligible – not significant	N/A	Negligible – not significant	N/A
Pink-footed goose	Less than Local	No				
Red kite	Regional	Yes	Negligible – not significant	Minor – not significant	Negligible – not significant	Minor – not significant
Snipe	Less than Local	No				
Sensitive breeding species:						
Twite	Regional	Yes	Minor – not significant	Negligible – not significant	Negligible – not significant	N/A
Kingfisher	Local	No				
Reed bunting	Local	No				
All other species	Less than Local	No				

7.10 Summary and Statement of Significance

- 7.10.1. The ornithological receptors on and in the vicinity of the Proposed Development Site have been identified and described. Nature conservation evaluations were carried out and ~~three~~ **six** receptors – **Loch Ken and Dee Marshes SPA**, Laughengie and Airie Hills SSSI, **Greenland White-fronted goose**, **Nightjar**, Red kite and Twite taken forward for impact assessment.

- 7.10.2. Mitigation was identified to manage the potential for harm to occur to sensitive populations as well as ensuring that works will be undertaken in line with wildlife legislation.
- 7.10.3. Effects considered were habitat loss, construction and operational disturbance/displacement and additional mortality as a result of collision risk.
- 7.10.4. **No significant** effects have been identified as a result of this process and thus the Proposed Development could proceed without significant adverse impact on ornithological receptors.

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