

CONTENTS

8.	ORNITHOLOGY	8-2
8.1	Introduction	8-2
8.2	Scope of the Assessment	8-2
8.3	Assessment Methodology	8-6
8.4	Baseline Conditions	8-11
8.5	Issues Scoped Out	8-16
8.6	Potential Effects	8-16
8.7	Assessment of Effects	8-17
8.8	Mitigation	8-23
8.9	Monitoring	8-24
8.10	Residual Effects	8-24
8.11	Assessment of Potential Cumulative Effects	8-24
8.12	Summary	8-25

Figures (Volume 3)

- Figure 8.1: Ornithology Survey Areas
- Figure 8.2: Vantage Point Locations and Viewsheds
- Figure 8.3: Internationally Designated Sites of Conservation Importance
- Figure 8.4: Nationally Designated Sites of Conservation Importance
- Figure 8.5: Breeding Bird Territories
- Figure 8.6: Target Species Flightlines
- Figure 8.7: At Risk Flightlines All Species
- Figure 8.8: Black Grouse Survey
- Figure 8.9: CONFIDENTIAL: Breeding Raptor and Owl Survey
- Figure 8.10: CONFIDENTIAL: Breeding Greenshank Territories
- Figure 8.11: CONFIDENTIAL: Breeding Diver Survey and VP Flightlines

Appendices (Volume 4)

- Appendix 8.1: Ornithology Field Survey Methodology
- Appendix 8.2: Baseline Survey Results
- Appendix 8.3: Ornithology Field Survey Weather Conditions
- Appendix 8.4: Assessment of Ornithological Receptors of Local Value
- Appendix 8.5: CONFIDENTIAL: Sensitive Bird Records
- Appendix 8.6: CONFIDENTIAL: Report to Inform the Appropriate Assessment for SPAs

8. ORNITHOLOGY

8.1 Introduction

- 8.1.1 This chapter evaluates the importance of the nature conservation interest (ornithological) and the potential impacts associated with the Proposed Development.
- 8.1.2 This chapter outlines the methodologies used to assess potential effects on sensitive ornithological receptors, both within the footprint of the Proposed Development and the surrounding area. It presents an assessment of the significance of potential impacts, along with suggested mitigation measures to avoid or reduce the impacts; and an assessment of predicted residual impacts of the Proposed Development after mitigation measures have been implemented.
- 8.1.3 The assessment has been prepared by a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM), at Blairbeg Consulting Ltd, based in Inverness-Shire, Scotland. The assessment has been carried out in line with CIEEM's code of conduct and relevant standards and guidance. Field surveys were carried out by Adam Fraser (MCIEEM), Helen Chance (MCIEEM) and Tom Cole of Blairbeg Consulting Ltd.
- 8.1.4 This chapter is supported by:
- **Appendix 8.1:** Ornithological Field Survey Methodology;
 - **Appendix 8.2:** Baseline Survey Results;
 - **Appendix 8.3:** Ornithology Field Survey Weather Conditions;
 - **Appendix 8.4:** Assessment of Ornithological Receptors of Local Value; and
 - **Appendix 8.5:** confidential appendix of Sensitive Bird Records; and
 - **Appendix 8.6:** confidential appendix of Report to Inform the Appropriate Assessment for SPAs.
- 8.1.5 **Figures 8.1 – 8.11** are referenced in the text where relevant.

8.2 Scope of the Assessment

Study Area

- 8.2.1 The Study Area for this assessment is the area within which ornithological baseline surveys were undertaken, as shown in **Figure 8.1:** Ornithology Survey Areas and **Figure 8.2:** Vantage Point Locations and Viewsheds, comprising of the following:
- Vantage Point (VP) Surveys: viewsheds extended to 2 km from VP locations;
 - Breeding Raptor and Owl Surveys: all suitable breeding habitat within 2 km of the Proposed Development;
 - Black Grouse lek survey: suitable lek habitat within 2 km of the Proposed Development;
 - Upland Breeding Bird Survey (BBS): within the area of open ground north of the Dalchork Forest; and
 - Breeding Diver Survey: suitable lochs and lochans within 2 km of the Proposed Development.
- 8.2.2 Survey areas, including the locations of VPs and the extent of the breeding bird survey area, were agreed in advance between Scottish Natural Heritage (SNH) and the Applicant, as discussed in **Chapter 4:** EIA Consultation.
- 8.2.3 The entire length of the Proposed Development is not covered by VP viewsheds; instead targeted VP surveys were undertaken to cover areas that provide suitable habitat for the qualifying interest species of the nearby Special Protection Areas (SPAs) and lie within connectivity distance for those species.

8.2.4 Similarly, breeding bird surveys were recommended for the open moorland providing suitable habitat for waders in the northern section of the site. The BBS area, shown on **Figure 8.1: Ornithology Survey Areas**, is a 500 m buffer around the preferred route at the time of undertaking the surveys. Since completion of all route appraisals, the route has undergone minor realignment in this section of the site. The current route alignment remains within the breeding bird survey area, but is not buffered to 500 m in all places as shown in **Figure 8.1: Ornithology Survey Areas**.

Scoping and Consultation

8.2.5 Key points raised by consultees through the consultation process which are of relevance to the subject area of ornithology are detailed in **Table 8-1:**

Table 8-1: Ornithology Issues Raised During Consultation

Consultee	Issue	Action
Scottish Natural Heritage (SNH) – Pre-application	<p>Several protected areas could be affected by the proposal. SNH advise that the route should seek to avoid protected areas, or, where this is not possible, to minimise impacts on protected areas.</p> <p>SNH are broadly in agreement with the proposed scope of Vantage Point surveys, however advise that Vantage Point 2 be rotated to the south-west to ensure coverage of the loch complex around Lochan na Brice Moire within Cnoc An Alaskie SSSI, and that Loch Beannach be included within diver surveys to inform flight lines and activities from this SPA loch.</p>	<p>The Proposed Development follows an alignment designed to avoid, as far as practicable, designated areas.</p> <p>Vantage Point 2 was rotated to the south-west, and diver surveys included Loch Beannach (Loch 11 on Figure 8.1: Ornithology Survey Areas).</p>
SNH – Scoping Response	<p><u>European (Natura) Protected Areas</u> The EIA should include a Habitat Regulations Appraisal (HRA) for each Natura site, and if necessary, an Appropriate Assessment should also be undertaken.</p> <p><u>Caithness & Sutherland Peatlands SPA</u> We welcome the revised route and note no poles will be placed within the SPA but it is not clear whether vehicles will need to access this location. We consider this detail should be included within the EIA.</p> <p>The red-throated divers using Loch Duch Cul na Caplich should be considered to be part of the qualifying interest of the SPA. We advise appropriate mitigation to avoid impacts on the divers including restricting the LOD past the loch to ensure the line doesn't move closer to the loch during construction.</p> <p><u>Lairg & Strath Brora Lochs SPA</u></p>	<p>This chapter identifies the protected areas within the vicinity of the Proposed Development in Section 8.4 and assesses the potential effects it may have on designated sites in Section 8.7.</p> <p>HRA for the Natura sites is discussed in Section 8.7 with full details provided in Appendix 8.6.</p> <p>Potential effects on red-throated diver present within the Study Area and appropriate mitigation measures are considered and described in Confidential Appendix 8.5.</p> <p>Potential effects on black-throated diver present within the Study Area and appropriate mitigation measures are considered and described in Confidential Appendix 8.5.</p> <p>Potential effects on hen harrier present within the Study Area and appropriate mitigation measures are considered</p>

Consultee	Issue	Action
	<p>Black-throated divers could be affected by the proposal as the line lies between the SPA and Loch Shin which is an important foraging area.</p> <p><u>Strath Carnaig & Strath Fleet Moors SPA</u></p> <p>As the southern section of the line is only just out with the 2 km core range for hen harrier, birds from the SPA could be affected by the proposal.</p> <p>Pre-construction surveys for hen harrier should be carried out prior to construction commencing. We advise that a hen harrier species protection plan should accompany the EIA.</p> <p><u>Protected Bird Species</u></p> <p>Prior to construction commencing, a survey for protected breeding birds should be undertaken and if any species are considered to be affected by the proposal, mitigation should be identified in a Species Protection Plan supplied with the ES.</p> <p>Where a protected species does not have connectivity to an SPA, the EIA should demonstrate the significance of the impacts in relation to the favourable conservation status of the Natural Heritage Zone (NHZ) population.</p>	<p>and described in Confidential Appendix 8.5.</p> <p>The Applicant has developed General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs) for construction works that may negatively impact upon ornithological receptors.</p> <p>The majority of ornithological features identified within the Study Area are considered to have connectivity to one of the surrounding SPAs. Where this is not the case (e.g. black grouse), significance of impacts have been measured against the population status in NHZ 5.</p>
<p>SNH – Additional Consultation (Gate Check Report)</p>	<p>In addition to the advice provided in the pre-application and Scoping advice detailed above, the following guidance was provided:</p> <p>Loch Dubh Cùl na Capulich</p> <p>We welcome the intention to move the line further from this loch to reduce collision risk and that the limit of deviation through this section will be restricted. We advise that this should be shown on maps submitted with the application.</p> <p>We note that the proposal does not intend to line mark this section. We advise that line marking will be required to further reduce collision risk to red-throated divers.</p>	<p>The limits of deviation are shown on Figure 3.1: The Proposed Development.</p> <p>Mitigation proposals including appropriate line marking are included in Section 8.4.6 – 8.4.9 of Confidential Appendix 8.5.</p>
<p>Royal Society for the Protection of Birds (RSPB) – Scoping Response</p>	<p>The RSPB highlight the potential for connectivity to nearby SPAs including the Caithness and Sutherland Peatlands SPA; the Lairg and Strath Brora SPA and the Strath Carnaig and Strath Fleet Moors SPA. After a review of the initial survey work undertaken they have highlighted the following concerns:</p>	<p>Survey areas including Vantage Point locations and viewsheds are shown in Figure 8.1: Ornithology Survey Areas and Figure 8.2: Vantage Point Locations and Viewsheds.</p> <p>Ramboll Environ Consultants working on behalf of the Applicant agreed methodologies for survey work for</p>

Consultee	Issue	Action
	<ul style="list-style-type: none"> No map showing bird survey areas or vantage point viewsheds were provided with the Scoping Report making it difficult to assess whether adequate survey work has been undertaken to inform the assessment. As survey work for divers did not commence until July, early failed breeding attempts may have been missed. Similarly for raptors, surveys did not commence until May, potentially missing failed breeding attempts. <p>The impacts of the proposal should be assessed in combination with other proposed and consented developments within the area (e.g. the Lairg to Loch Buidhe OHL) as well as proposed wind farms, particularly in relation to black-throated divers and hen harriers.</p> <p>We would urge undergrounding to be considered as mitigation where there is potential for collision risk and appropriate line marking as an alternative.</p>	<p>divers in advance with SNH. This required two visits, once in May and once in July. Surveys on lochs identified in Figure 8.1: Ornithology Survey Areas commenced in late May 2018.</p> <p>Due to a delay in commissioning ornithological survey work, the first visit for breeding raptors and owls was carried out in early May. Although it is possible early breeding attempts may have been missed, it is likely that birds failing early in the season may have attempted to breed again and would have been picked up with surveys commencing in May. Prior to construction commencing a full suite of pre-construction ornithological surveys will be undertaken to identify the locations of any nests and implement appropriate mitigation to avoid any disturbance.</p> <p>A cumulative assessment of effects has been undertaken as detailed in Section 8.11.</p> <p>Appropriate mitigation measures are detailed in Section 8.8.</p>
<p>RSPB – Additional Consultation (Gate Check Report)</p>	<p>We note that helicopters may be used during construction, the Highland Raptor Study Group (HRSG) should be contacted for information regarding Golden eagle territories in the wider area so flight routes avoid disturbance to breeding birds.</p> <p>Loch Cùl na Capulich</p> <p>We recommend construction near the loch is undertaken out with the breeding season. We also recommend moving the alignment further from this loch or consider undergrounding in this area.</p>	<p>Requirement to contact HRSG included in Chapter 7: Ecology, Section 7.9.14.</p> <p>No works would be undertaken within 1.5 km of suitable breeding diver lochs prior to pre-construction diver surveys as detailed in Section 8.4.6 – 8.4.8 of Confidential Appendix 8.5. The proposed alignment has been derived from numerous environmental surveys and assessment, and other constraints, such as large areas of deep peat, prevent the OHL from moving further north-east from the Loch. Due to the results of the ornithology assessment presented within this chapter and its associated appendices, no significant impacts are likely for diver species using the loch. Notwithstanding this, further mitigation in the form of line marking has been proposed to further reduce likely effects. Consequently, it has not been</p>

Consultee	Issue	Action
		deemed necessary to underground the connection in this area.

8.2.6 Based on the consultation responses and the known environmental sensitivities, this assessment considers the following:

- potential effects on the ornithological features of nearby SPAs;
- removal of habitat (including breeding, foraging and roosting) during construction activities;
- disturbance during construction activities;
- nest destruction during construction activities; and
- collision risk of birds with the Proposed Development, notably raptors and divers.

8.3 Assessment Methodology

Desk Study

8.3.1 Baseline data on the ornithological interest of the Study Area and its surroundings, including information on sites designated for nature conservation and species records, were sought from the following sources:

- information gathered for the Creag Riabhach Wind Farm Environmental Statement¹;
- information gathered for the Dalchork Substation Environmental Appraisal²;
- Joint Nature Conservation Committee (JNCC) website (<http://www.jncc.gov.uk/>);
- SNH Site Link website (<http://gateway.snh.gov.uk/>); and
- large-scale 1:10,000 Ordnance Survey (OS) maps in conjunction with colour 1:25,000 OS map (to determine the presence of ponds and other features of nature conservation interest).

8.3.2 Further information on the potential ornithological features that have potential to be affected by the Proposed Development was obtained through searches of internet sources (e.g. UK Biodiversity Action Plans (UKBAP), Scottish Biodiversity List (SBL), Local Biodiversity Action Plans (LBAP)) and the relevant published literature (i.e. relevant guidance documents and scientific papers).

Field Survey

8.3.3 Surveys were conducted between April 2018 and March 2019. Methodologies and survey effort for field surveys are provided in **Appendix 8.1** and are summarised below.

8.3.4 Following consultation and desk study, the following target species were identified:

- all wild goose, swan and duck species, with the exception of Canada goose and mallard;
- all raptors and owls listed on Annex I of the Birds Directive³ or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)⁴;
- all wader species;
- all skua species; and
- all diver species.

¹ Creag Riabhach Wind Farm Ltd. (2013). Creag Riabhach Wind Farm: Environmental Statement.

² Scottish and Southern Energy Networks (2019). Dalchork Substation: Environmental Appraisal.

³ Bird species listed on Annex I of the EC Directive of the Conservation of Wild Birds (Birds Directive) – http://ec.europa.eu/environment/nature/conservation/wildbirds/threatened/index_en.htm

⁴ Bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) - <https://www.legislation.gov.uk/ukpga/1981/69/schedule/1>

- 8.3.5 Flight information on other species e.g. gulls, were also recorded in a shortened form, noting the species and whether it crossed the Proposed Development at collision risk height.
- 8.3.6 VP watches were undertaken between May and September 2018 and also during March and April 2019 to collect data on flight activity for target species. The surveys followed standard guidance for onshore wind farms⁵. Seven VP locations were established to monitor the site, the locations of VPs are shown in **Figure 8.2: Vantage Point Locations and Viewsheds**. The VPs were selected through a mix of GIS analysis and field trials, maximising ground visibility within the flight activity Study Area. Six hours of watches were completed at each VP location per month. No VP surveys were undertaken during the non-breeding season.
- 8.3.7 In addition to the seven VPs used to monitor flight activity within proximity to the Proposed Development route, an additional location was surveyed from in July and August 2018 to ensure full coverage of Loch Dubh Cùl na Capulich. A total of 12 hours of survey was carried from this additional VP, specifically to further assess use of the Study Area by divers.
- 8.3.8 Where suitable habitat for target raptor and owl species was present within 2 km of the Proposed Development, specific surveys for these target species were carried out using a combination of walkover surveys combined with miniature VPs in accordance with methods described in Hardey *et al.*, 2013⁶. Four survey visits for breeding raptors and owls were undertaken between May and July 2018. In addition, any raptor flight data from the VP surveys that was indicative of breeding was used to help target the walkover surveys.
- 8.3.9 Two BBS visits using a version of the Brown and Shepherd⁷ method were carried out between in June and July 2018, targeting the open ground north of Dalchork Forest.
- 8.3.10 Two walkover surveys were undertaken to search for black grouse in May 2018.
- 8.3.11 Diver surveys were undertaken at the 11 lochs identified in **Figure 8.1: Ornithology Survey Areas**, with four survey visits carried out between June and August 2018.

Determining Magnitude of Change and Sensitivity of Receptors

- 8.3.12 The assessment has been undertaken according to the current guidance detailed by CIEEM⁸.
- 8.3.13 The assessment of the significance of predicted impacts on ornithological receptors is based on both the 'sensitivity' of a receptor and the nature and magnitude of the effect that the Proposed Development will have on it. A key consideration in assessing the effects of any development on ornithological features is to define the species that need to be considered. In identifying these receptors, it is important to recognise that a development can affect ornithological features directly (e.g. destruction of nests) and indirectly, by affecting land beyond the development site (e.g. if birds are displaced through noise generation during the construction phase).
- 8.3.14 It is impractical for such an assessment to consider every species that may be affected, instead it should focus on valued ornithological receptors. These are species that are valued in some way and could be affected by the Proposed Development. Where there is no potential for valued receptors to be affected significantly, it is not necessary for them to be considered in the assessment.

⁵ Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment onshore wind farms (Version 2). SNH Guidance. SNH, Battleby

⁶ Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013) Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.

⁷ Brown, A.F. & Shepherd, K.B. (1993) A method for censusing upland breeding waders. *Bird Study*, **40**: 198 – 195.

⁸ Chartered Institute of Ecology and Environmental Management (2018). Guidelines for ecological impact assessment in the United Kingdom. Winchester. Chartered Institute of Ecology and Environmental Assessment.

8.3.15 Ornithological features have been valued using the scale set out in **Table 8-2** below, with examples provided of criteria used when defining the level of value.

Table 8-2: Approach to valuing ornithological receptors

Sensitivity of Receptor	Examples (Guidance to Evaluation)
Very High (International)	A species listed as a qualifying feature of an internationally designated site (e.g. SPA). A regularly occurring, substantial population of an internationally important species (listed on Annex I of the Birds Directive), or regularly occurring migratory species listed under Annex II of the Birds Directive connected to an SPA designated for this species.
High (National)	A species listed as a qualifying feature of a nationally designated site (e.g. Site of Special Scientific Interest (SSSI)). Species present in nationally important numbers (>1% UK population) Ecologically sensitive species such as rare birds (<300 breeding pairs in the UK)
Medium (Regional)	A species listed under Schedule 1 of the Wildlife and Countryside Act or Annex I of the Birds directive. Species present in regionally important numbers (>1% of the regional population) Species occurring within SPAs but not crucial to the integrity of the site.
Low (Local)	Species described above but which are present very infrequently or in very low numbers. A regularly occurring, substantial population of a nationally scarce species, including species listed on the UK and Local BAPs e.g. skylark.
Negligible	All other species that are widespread and common and which are not present in locally important numbers and which are considered to be of low conservation concern (e.g. UK Birds of Conservation Concern (BoCC) Green List species).

8.3.16 Within the context of the EIA and in line with current SNH guidance⁹, the top three geographical tiers (international, national and regional) are the most important. This means that if there is an effect at this population level, it is considered 'significant' in terms of the EIA regulations. For breeding bird species, SNH uses Natural heritage Zones (NHZ) as the appropriate regional biogeographical unit of assessment. Twenty-one zones covering Scotland have been drawn to reflect biogeographical differences between zones. The Proposed Development lies within the Peatlands of Caithness and Sutherland NHZ 5. Recently, the Scottish Wind Farm Bird Steering Group published a review of NHZ bird populations across Scotland (Wilson *et al.*, 2015)¹⁰. The regional population estimates used in this EIA are mostly derived from this reference but have been superseded where more up-to-date population data are available for individual species.

8.3.17 Another key consideration in assessing the effects of any development on ornithological receptors is to define the areas of habitat and the species that need to be considered. This requires the identification of a potential zone of influence, which is defined as those areas and resources that may be affected by biophysical changes caused by project activities, however remote from a site

8.3.18 The zone of sensitivity for ornithological features varies according to the characteristics of the feature and the nature of the potential impact. In this assessment, impacts are assessed for within the site (defined as the Study Area) and the zones as displayed on **Figure 8.1: Ornithology Survey Areas**.

⁹ SNH (2018) Assessing significance of impacts from onshore wind farms outwith designated areas. (Version 2). SNH

¹⁰ Wilson, M.W., Austin, G.E., Gillings, S., and Wernham, C.V. (2015) Natural Heritage Zone Population Estimates. SWBSG Commissioned Report: 1504.

8.3.19 The behavioural sensitivity of ornithological receptors is also important when assessing potential impacts. Different species respond differently to stimuli, making some particularly sensitive to development activities and others less so. By way of example, sensitivity is determined according to species behaviour, using broad criteria set out in **Table 8-3** below. Sensitivity can vary dependent on the activity the species is undertaking, for example, a species is likely to be less tolerant of disturbance close to its nest during the breeding season than at other times of the year. Thus, sensitivity changes with both space and time.

Table 8-3: Behavioural Sensitivity Criteria

Magnitude	Definition
High	Species occupying remote areas away from human activities and exhibiting strong and long-lasting reactions to disturbance events. Examples include divers, greenshank, eagles, merlin and hen harrier.
Medium	Species that appear to be warily tolerant of human activities and exhibiting short-term reactions to disturbance events. Examples include black grouse, curlew and golden plover.
Low	Species occupying areas subject to frequent human activity and exhibiting mild and brief reaction to disturbance events. Examples include greylag goose and kestrel.

Characterising Potential Effects on Receptors

8.3.20 Effects on ornithological receptors are judged in terms of magnitude and duration. Magnitude refers to the size of an impact, and is determined on a quantitative basis where possible. Magnitude is assessed within four levels as detailed below in **Table 8-4**. Effects can be permanent or temporary; direct or indirect; adverse or beneficial, and can be cumulative. Effects can vary according to scales of size, extent, duration, timing and frequency of impacts. These factors are brought together to assess the magnitude of the effect on the conservation status of the receptor and on the integrity of the habitats that support them:

- Integrity is the coherence of the ecological structure and function of a site or habitat that enables it to sustain its plant and animal communities and populations; and
- Conservation status is the ability of an animal community or population to maintain its distribution and/or extent.

Table 8-4: Magnitude of Effect

Magnitude	Definition
Major (High)	A permanent or long-term effect on the integrity of a site or conservation status of a species assemblage / community, population or group. If adverse, this is likely to threaten its sustainability; if beneficial, this is likely to enhance its conservation status
Moderate (Medium)	A permanent or long-term effect on the integrity of a site or conservation status of a species assemblage / community, population or group. If adverse, this is unlikely to threaten its sustainability; if beneficial; this is likely to be sustainable but is unlikely to enhance its conservation status.
Minor (Low)	A short-term but reversible effect on the integrity of a site or conservation status of a species assemblage / community, population or group that is within the range of variation normally experienced between years.
Negligible	A short-term but reversible effect on the integrity of a site or conservation status of a species assemblage / community population or group that is within the normal range of annual variation.

Determining Significance of Potential Ornithological Effects

- 8.3.21 Having followed the process of attributing a value to an ornithological receptor, determining its sensitivity and characterising potential effects, the significance of the effect is then determined. The CIEEM guidelines use only two categories to classify effects: “significant” or “not significant”. The significance of an effect is determined by considering the value of the receptor and the magnitude of the effect and applying professional judgement as to whether the integrity of the receptor will be affected.
- 8.3.22 Assessing the significance of potential effects on ornithological receptors broadly follows the principles set out in Chapter 5: Methodology and the matrix in **Table 5-1: Matrix for determining significance of effects**. In addition, factors such as the behavioural sensitivity of each receptor as described in **Table 8-3** are also considered.
- 8.3.23 Effects are more likely to be considered significant where they affect receptors of higher conservation value or where the magnitude of the effect is high. Effects not considered to be significant would be those where the integrity of the receptor is not threatened, effects on receptors of lower conservation value, or where the magnitude of the effect is low.
- 8.3.24 It is noted that some potential effects are not considered significant in EIA terms. Where such effects are identified no specific mitigation is required, however good practice would be to control these effects as far as practicable.

Collision Risk Assessment

- 8.3.25 In line with current guidance from SNH¹¹, a generic collision risk modelling approach, typically carried out for wind farm developments, has not been undertaken as part of this assessment as this is considered to be less appropriate for assessing collision risk with power lines. Instead, current guidance recommends that emphasis is put on mitigation where the assessment has indicated potential risks. Results of baseline surveys are analysed to identify any ‘hot-spots’ where mitigation may be required.

Appropriate Assessment Screening

- 8.3.26 Under the Conservation (Natural Habitats, &c.) Regulations 1994, as amended (the Habitats Regulations) any development that is concluded to have a likely significant effect (LSE) on the qualifying features of a SPA either alone or in combination with other projects requires an Appropriate Assessment (AA) to be carried out by the relevant Competent Authority, to determine whether or not the development would have an adverse effect on the integrity of the SPA.
- 8.3.27 In line with the HRA process, before an AA is initiated, screening is undertaken to determine whether any of the predicted impacts of the Proposed Development will result in a LSE.
- 8.3.28 The Scoping Response from SNH advised that the Proposed Development may have a significant effect on the qualifying interests of the Caithness and Sutherland Peatlands SPA, the Lairg and Strath Brora Lochs SPA and the Strath Carnaig and Strath Fleet Moors SPA due to the distance between the Proposed Development and the SPAs. Consequently, it can be ascertained that there is connectivity between the SPA birds and the Proposed Development.
- 8.3.29 A report to inform the AA is provided in **Appendix 8.6**, taking account of the potential for connectivity with between the Proposed Development and the SPAs.

¹¹ SNH (2016) Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. (Version 1). SNH

Limitations and Assumptions

8.3.30 Bird surveys are based on sampling techniques and results give an indication of numbers and activities of birds at the particular times that surveys were carried out. The surveys for the Proposed Development were distributed by time of day and by date throughout the year to give a representation of the range of activity, but were limited occasionally by inclement weather, though this did not compromise overall survey effort. No gaps were identified in the baseline data that would prevent assessments being undertaken for the purposes of determining likely significant effects as is required by the EIA Regulations.

8.4 Baseline Conditions

Designated Sites

8.4.1 Five statutory sites with international designations for ornithological features were identified within 20 km of the Proposed Development:

- Caithness and Sutherland Peatlands SPA and Ramsar site;
- Lairg and Strath Brora Lochs SPA;
- Strath Carnaig and Strath Fleet Moors SPA;
- Foinaven SPA; and
- Dornoch Firth and Loch Fleet SPA.

8.4.2 A summary of their citations is provided in **Table 8-5** below and their locations shown in **Figure 8.3**: Internationally Designated Sites of Conservation Importance.

Table 8-5: Summary of Internationally Designated Sites

Site Name	Distance from Application Site and Direction	Designation Interest
Caithness and Sutherland Peatlands SPA / RAMSAR	0 km The Proposed Development crosses this SAC and RAMSAR site at the northerly extent of the route.	Breeding: <ul style="list-style-type: none"> • Black-throated diver (<i>Gavia arctica</i>); • Wigeon (<i>Anas penelope</i>); • Common scoter (<i>Melanitta nigra</i>); • Red-throated diver (<i>Gavia stellata</i>); • Hen harrier (<i>Circus cyaneus</i>) • Golden eagle (<i>Aquila chrysaetos</i>) • Golden plover (<i>Pluvialis apricaria</i>); • Dunlin (<i>Calidris alpina</i>); • Greenshank (<i>Tringa nebularia</i>); • Wood sandpiper (<i>Tringa glareola</i>); • Short-eared owl (<i>Asio flammeus</i>); and • Merlin (<i>Falco columbarius</i>).
Lairg and Strath Brora Lochs SPA	1.5 km east	Breeding: <ul style="list-style-type: none"> • Black-throated diver. <p>All eight oligotrophic lochs which comprise this SPA are within 20 km of the Proposed Development. Loch Beannach is the closest, situated 1.5 km east.</p>

Strath Carnaig and Strath Fleet Moors SPA	1.9 km south-east	This SPA is an area of upland moorland between Dornoch and Lairg, designated for its nationally important population of breeding hen harrier.
Foinaven SPA	15.6 km north-west	The Foinaven SPA is a large predominantly upland site encompassing the foothills and mountains of Foinaven, Arkle and Cranstackie, designated for regularly supporting a population of European importance of golden eagle.
Dornoch Firth and Loch Fleet SPA	18.4 km south-east	Breeding: <ul style="list-style-type: none"> • Osprey (<i>Pandion haliaetus</i>); and • Bar-tailed godwit (<i>Limosa lapponica</i>). Wintering bird assemblage: <ul style="list-style-type: none"> • Greylag goose (<i>Anser anser</i>); • Wigeon; • Curlew (<i>Numenius arquata</i>); • Teal (<i>Anas crecca</i>); • Scaup (<i>Aythya marila</i>); • Redshank (<i>Tringa totanus</i>); • Dunlin; • Oystercatcher (<i>Haematopus ostralegus</i>)

8.4.3 Five statutory sites with national designations for ornithological features were identified within 5 km of the Proposed Development. All of these SSSIs are components of the internationally designated SPAs listed in **Table 8-5** above:

- Cnoc an Alaskie SSSI;
- Ben Klibreck SSSI;
- Lairg and Strath Brora Lochs SSSI;
- Strath Carnaig and Strath Fleet Moors SSSI; and
- Grudie Peatlands SSSI.

8.4.4 A summary of their citations is provided in **Table 8-6** below and their locations shown in **Figure 8.4**: Nationally Designated Sites of Conservation Importance.

Table 8-6: Summary of Internationally Designated Sites

Site Name	Distance from Application Site and Direction	Designation interest
Cnoc an Alaskie SSSI	0 km The Proposed Development crosses this SSSI at the northerly extent of the route.	Breeding: <ul style="list-style-type: none"> • Greenshank. Component SSSI of the Caithness and Sutherland Peatlands SPA, designated for many bird species as listed in Table 8-4 above.
Ben Klibreck SSSI	0 km The Proposed Development crosses this SSSI at the	Designated for its nationally important geology, alpine heath, blanket bog, lochs and woodland. Discussed in more detail in Chapter 7: Ecology.

	northerly extent of the route.	
Lairg and Strath Brora Lochs SSSI	1.5 km east	Breeding: <ul style="list-style-type: none"> Black-throated diver. Component SSSI of the Lairg and Strath Brora Lochs SPA.
Strath Carnaig and Strath Fleet Moors SSSI	1.9 km south-east	Breeding: <ul style="list-style-type: none"> Hen harrier. Component SSSI of the Strath Carnaig and Strath Fleet Moors SPA,
Grudie Peatlands SSSI	3.6 km south-west	Breeding: <ul style="list-style-type: none"> Greenshank; Golden plover; and Dunlin. Component SSSI of the Caithness and Sutherland Peatlands SPA.

Species

- 8.4.5 A total of 13 species of conservation concern (Schedule 1 / Annex I species, Red and Amber listed in BoCC) were recorded as breeding within the Study Area; full details are contained in **Appendix 8.2**, with territory locations displayed in **Figure 8.5**. Territory locations of Schedule 1 species are displayed in confidential **Figure 8.10: Breeding Greenshank Territories**.
- 8.4.6 Flight activity surveys recorded a total of 43 flights of 10 species overflying the Study Area, full details on each flight are contained in **Appendix 8.2**, with all flights displayed in **Figure 8.6: Target Species Flightlines** and 'at risk' flights (those recorded at Potential Collision Height¹² (PCH), crossing the proposed alignment of the OHL) displayed in **Figure 8.7: At Risk Flightlines All Species**.
- 8.4.7 Two target species (hen harrier and sparrowhawk) were recorded during the breeding raptor and owl surveys, details are provided in Confidential **Appendix 8.5** and **Figure 8.8: Black Grouse Survey**.
- 8.4.8 Black grouse surveys identified five lek locations within the Study Area and a further lek just out with the 2 km buffer, full details are contained in **Appendix 8.2**. Locations are displayed in **Figure 8.8: Black Grouse Survey**.
- 8.4.9 Breeding diver surveys identified breeding red-throated and black-throated divers within the Study Area; further information is contained in confidential **Appendix 8.5** and confidential **Figure 8.11: Breeding Diver Survey and VP Flightlines**.
- 8.4.10 Following the results of the desk study and baseline surveys outlined in Section 8.3, a number of Valued Ornithological Receptors (VORs) have been identified. These VORs and their assessment values are shown in **Table 8-7** below.

Table 8-7: Summary of Valued Ornithological Receptors (VORs) within the Survey Area.

Value	VORs	Justification
International	Black-throated diver; red-throated diver; hen harrier; golden plover; dunlin; greenshank; short-eared owl.	Designated feature of an SPA and Ramsar site within 20 km of the Proposed Development, recorded within the Study Area.

¹² Potential Collision Height (PCH) considered to be flight height band 1: 0 – 20 m. Height of the proposed wood poles is 16m,

Regional	Pink-footed goose; greylag goose; whooper swan; honey buzzard; black grouse.	Not a designated feature of and SPA or Ramsar site within 20 km of the Proposed Development, however probable connectivity with SPAs in wider area and recorded within Study area in significant numbers.
Local	Lapwing; snipe; cuckoo; passerine species of medium / high conservation concern (lesser redpoll, skylark, meadow pipit, dunnoek, willow warbler, pied flycatcher, grey wagtail).	Target species of high conservation concern (SBL / LBAP / UK BoCC Red and Amber list species) that are present in locally important numbers but are not a qualifying feature of any statutory sites within 10 km of the Proposed Development.
Negligible	Secondary raptor species (buzzard, sparrowhawk, kestrel); gulls (common); corvids (raven, hooded crow); woodpigeon; passerine species of low conservation concern (chaffinch, coal tit, goldcrest, pied wagtail, robin, siskin, stonechat, swallow, wren).	Generally common and widespread non-target species of low conservation concern (i.e. species on the UK BoCC Green List that are not afforded any special protection) that are not a designated feature of any statutory sites within 10 km of the Proposed Development.

8.4.11 Receptors of negligible conservation value are not considered further in this assessment as these receptors are generally common and widespread species and none were recorded within the Study Area in numbers considered to be locally, regionally, nationally or internationally important.

8.4.12 Results from all relevant surveys have been compiled to produce baseline descriptions for each receptor detected. Receptors of regional or higher value are discussed individually; those assessed as being of local value are included in **Appendix 8.4**.

Black-throated diver

8.4.13 Details of black-throated divers within the Study Area are contained within Confidential **Appendix 8.5**.

Red-throated diver

8.4.14 Details of red-throated divers within the Study Area are contained within Confidential **Appendix 8.5**.

Greylag goose

8.4.15 Greylag goose was the most frequently recorded target species during flight activity surveys. A total of 15 flights totalling 144 birds were recorded in May 2018, March and April 2019, with flock size varying from one to 25 birds. All flights were recorded above PCH.

8.4.16 No records of greylag goose were made during breeding bird surveys. However, an incidental record of four birds were recorded within the Study Area during a breeding diver survey in August 2018 near Loch Dubh Cùl na Capulich. No young were recorded.

Whooper swan

8.4.17 No flights of whooper swan were recorded during the flight activity surveys. A group of 11 birds was recorded on one of the small lochans to the east of Loch an Fheòir during a VP survey in March 2019. The birds remained on the loch for the duration of the survey.

Pink-footed goose

8.4.18 Two flights of Pink-footed goose were recorded on the same date in August 2018. The two flights were of flocks of 33 and 130 birds. Both flights were recorded flying north over the open ground to the east of Cnoc an Alaskie, see **Figure 8.6: Target Species Flightlines**. Neither flight crossed the Proposed Development.

8.4.19 No records of pink-footed goose were made during breeding bird surveys.

Hen harrier

8.4.20 Details of hen harriers within the Study Area are contained within Confidential **Appendix 8.5**.

Short-eared owl

8.4.21 During the flight activity surveys, one flight of an individual bird was recorded within the Study Area, see **Figure 8.6: Target Species Flightlines**. The flight was of a bird hunting over open ground north of Loch Gaineamhach in April 2019. No flights were recorded crossing the Proposed Development at PCH.

8.4.22 No flights or evidence of breeding short-eared owl was found within the breeding raptor and owl survey area.

Honey buzzard

8.4.23 During the flight activity surveys, three flights of individual birds were recorded in August 2018, see **Figure 8.6: Target Species Flightlines**. Two flights recorded on 9th August over Dalchork Forest were of the same bird which flew perched on a tree for nearly half an hour before flying over the plantation. Neither of these flights crossed the Proposed Development at PCH. A further flight was recorded on 27th August, further south over the felled plantation close to the proposed Dalchork Substation. The bird then landed on a standing deadwood tree where it remained for the remainder of the survey (130 minutes). This flight was recorded at PCH crossing the current proposed alignment, see **Figure 8.7: At Risk Flightlines All Species**.

8.4.24 No evidence of breeding honey buzzard was found within the breeding raptor and owl survey area.

Golden plover

8.4.25 A single flight of an individual bird was recorded in April 2019 to the south-east of Loch an Fheoir, see **Figure 8.6: Target Species Flightlines**. No flights were recorded crossing the Proposed Development at PCH.

8.4.26 Two breeding territories of golden plover were identified within the Study Area, both close to the River Tirry, see **Figure 8.5: Breeding Bird Territories**. The nearest territory to the Proposed Development is 440 m.

8.4.27 In addition to the records described above, golden plover were heard calling but not seen during surveys at VP 2, 2B, 3 and the diver VP.

Dunlin

8.4.28 Four flights of individual birds were recorded during flights activity surveys in May and October 2018; and April 2019, see **Figure 8.6: Target Species Flightlines**. Three flights were recorded around the small lochans east of Loch an Fheoir. The fourth flight was of a bird circling Loch Gaineamhach. No flights were recorded crossing the Proposed Development at PCH.

8.4.29 Two breeding territories of dunlin were identified within the Study Area. One around Loch Gaineamhach, the other close to the River Tirry. Both territories were further than 700 m from the Proposed Development, see **Figure 8.5: Breeding Bird Territories**.

8.4.30 In addition to the records described above, dunlin were heard calling but not seen during surveys at VP 2 and VP 5.

Greenshank

8.4.31 Details of greenshank within the Study Area are contained within Confidential **Appendix 8.5**.

Black grouse

8.4.32 Black grouse were not recorded during flight activity surveys. Black grouse surveys identified five lek locations within the Study Area and a further lek just out with the 2 km buffer, see **Figure 8.8: Black Grouse Survey**. The number of displaying males at each location ranged between one and three birds. Single females were recorded at two of the six locations. No leks were located within 500 m of the Proposed Development, however two leks are located within 150 m of existing access tracks which may be utilised as access routes for the Proposed Development.

8.5 Issues Scoped Out

8.5.1 Due to the Proposed Development not being within close proximity to any SPA designated for wintering bird species, it was not considered necessary to survey during the winter months, as agreed with SNH prior to the commencement of bird survey work.

8.6 Potential Effects

8.6.1 The enabling and construction works, forestry felling, the installation of temporary access routes and the installation and operation of the Proposed Development all have the potential to impact upon ornithological features.

8.6.2 Based on the consultation responses and known environmental sensitivities, this assessment considers the following potential effects:

- the direct loss and fragmentation of bird habitats due to 'land take' by the Proposed Development, which may reduce the quantity and quality of available breeding, roosting and foraging habitat for bird species including raptors, waders and wildfowl. This effect may also include the permanent removal of trees / scrub as part of the wayleave associated with the OHL;
- the modification of bird habitat due to hydrological change should construction activities disrupt hydrological pathways and processes. This may have a potential effect on quality of breeding and foraging habitat for waders and wildfowl;
- impacts on the qualifying features of the nearby SPAs through connectivity between the SPA and the Proposed Development;
- the permanent or temporary displacement of birds during construction and operations phase which may result from noise, lighting and vehicular movements. This effect may include affecting breeding, roosting and foraging behaviour of raptors, waders and wildfowl; and
- the accidental mortality of individual birds due to collision risk resulting from contact with the pole structures and OHL.

Electrocution

- 8.6.3 Birds can be at risk of electrocution from contact with unprotected wires and associated metal infrastructure. Large birds are generally more vulnerable to electrocution by OHLs because of the greater risk of spanning between two phase conductors or energised and earthed structures with outreached wings or other body parts¹³. Many bird species (particularly raptors) are attracted to OHLs and their supports, especially in open un-forested areas, as they provide lookout posts, as well as being used generally for perching, nesting and roosting. Ground nesting species (such as hen harrier) rarely use OHL supports for perching / hunting and are therefore at less risk from electrocution¹⁴.
- 8.6.4 Studies carried out to investigate avian electrocution in Europe, associated with wooden poles, concluded that wingspan was the key biometric associated with the possibility of being electrocuted¹⁵. If the distance between conductor phases is small, if only short upright insulators are used or if protective gaps (e.g. arcing horns for lightning strikes) are installed on a wood pole, even small birds can be electrocuted.
- 8.6.5 The configuration of the wires and poles of the Proposed Development means that it is not possible for a bird to be able to touch a conductor while it is perched on an earthed tower, touch a conductor and the earth wire simultaneously or touch two conductor wires simultaneously due to the gaps between the conductors and perch points being greater than any bird wing span found within the Study Area (2.5 m).
- 8.6.6 There should therefore be no risk of electrocution to birds from the Proposed Development.

8.7 Assessment of Effects

- 8.7.1 Potential disturbance / displacement effects and potential collision effects arising from the construction and operational phases of the Proposed Development are considered for each VOR detected.

Caithness and Sutherland Peatlands SPA

- 8.7.2 Qualifying species of the SPA that were identified within the Study Area are black-throated diver, red-throated diver, hen harrier, golden plover, dunlin, short-eared owl and greenshank. Due to the proximity of the Proposed Development to the SPA, the qualifying interests of the SPA found breeding within and overflying the Study Area could be considered to be part of the SPA assemblage.
- 8.7.3 It is not predicted that the Proposed Development would result in a significant effect on the qualifying features for the SPA. More information on this assessment is given in **Appendix 8.6**.

Lairg and Strath Brora Lochs SPA

- 8.7.4 Qualifying species of the SPA that were identified within the Study Area are black-throated diver. Due to the proximity of the Proposed Development to the SPA, the qualifying interests of the SPA found breeding within and overflying the Study Area could be considered to be part of the SPA assemblage.
- 8.7.5 It is not predicted that the Proposed Development would result in a significant effect on the qualifying features for the SPA. More information on this assessment is given in **Appendix 8.6**.

¹³ Lehman, R., Kennedy, P. and Savidge, J. (2007) The state of the art in raptor electrocution research: A global review. *Biological Conservation* 136 159-174

¹⁴ Haas, D., Nipkow, M., Fielder, G., Schneider, R., Haas, W. and Schurenberg, B. (2005) Protecting birds from powerlines. *Nature and Environment*, 140. Council of Europe Publishing, Strassbourg

¹⁵ Janss, G. and Ferrer, M. (1999) Avian electrocution on power poles: European experiences. *Birds and Power Lines: Collision, Electrocution and Breeding*. Quercus, Madrid, Spain, pp. 145 – 164.

Strath Carnaig and Strath Fleet Moors SPA

- 8.7.6 Qualifying species of the SPA that were identified within the Study Area are hen harrier. Due to the proximity of the Proposed Development to the SPA, the qualifying interests of the SPA found breeding within and overflying the Study Area could be considered to be part of the SPA assemblage.
- 8.7.7 It is not predicted that the Proposed Development would result in a significant effect on the qualifying features for the SPA. More information on this assessment is given in **Appendix 8.6**.

Foinaven SPA

- 8.7.8 As the qualifying species of the Foinaven SPA (golden eagle) were not recorded during surveys carried out within the Study Area, it is not considered likely that the Proposed Development would have a significant effect on the qualifying features of the SPA. This VOR is not considered further in this assessment.

Dornoch Firth SPA

- 8.7.9 As the qualifying breeding species of the Dornoch Firth SPA, breeding osprey and bar-tailed godwit were not recorded during surveys and the wintering bird assemblage are of birds with foraging ranges that are not considered to be within connectivity distance of the Proposed Development, it is not considered likely that the Proposed Development would have a significant effect on the qualifying features of the SPA. This VOR is not considered further in this assessment.

Black-throated diver

- 8.7.10 Assessment of effects on black-throated divers is contained within confidential **Appendix 8.5**.

Red-throated diver

- 8.7.11 Assessment of effects on red-throated divers is contained within confidential **Appendix 8.5**.

Greylag goose

- 8.7.12 Greylag goose is included on the UK BoCC Amber list due to the large numbers that winter in the UK and its restricted distribution¹⁶. Greylag goose is considered a regular breeder, winter visitor and passage migrant in Sutherland. Breeding greylag goose is a non-qualifying feature of the Caithness and Sutherland Peatlands SPA.

Potential Disturbance / Displacement Effects

- 8.7.13 No observations of greylag goose were made during breeding bird surveys. An incidental record of four greylag geese on Loch Dubh Cul na Capùlich was made in late August 2018, no young were observed at the time, which may indicate that these were non-breeding birds that remained in the area for the summer, or early returning migratory birds. Although it is possible that small numbers of foraging and breeding birds may be displaced due to construction of the Proposed Development, the effects will be temporary and reversible. There is alternative foraging and breeding habitat available in the surrounding area, therefore it is likely that any displaced birds would relocate to other suitable habitat nearby. As such, displacement due to disturbance is considered to be of negligible magnitude and therefore **not significant** for greylag goose.

¹⁶ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708-746

Potential Collision Effects

- 8.7.14 Low flight activity of greylag goose during the spring and autumn migration periods indicate that the Proposed Development is not situated close to a migratory flight path for this species. Of the 15 flights recorded during flight activity surveys, all were above PCH indicating that the collision risk to greylag geese is of negligible magnitude and therefore **not significant**.

Whooper swan

- 8.7.15 Whooper swan is an Annex I and Schedule 1 species, it is also an SBL priority species and is included on the UK BoCC Amber List due to its small UK breeding population and localised populations in winter¹⁷. It is described as a regular passage winter visitor in Sutherland and Caithness, favouring agricultural lands and associated lochs in the north-eastern part of the county, with greatest numbers present in the early winter period¹⁸. The most recent estimate of peak winter abundance in the two relevant NHZ is 190 in The Peatlands of Caithness and Sutherland¹⁹. Whooper swan does not feature as a qualifying species for any SPA within 20 km of the Proposed Development.

Potential Disturbance / Displacement Effects

- 8.7.16 One single record of whooper swan was made of a group of 11 birds landing on a lochan in March, 1.5 km from the Proposed Development, recorded during flight activity surveys. Due to the low numbers identified within the Study Area, the displacement of foraging and roosting birds during the breeding season due to disturbance is considered to be of negligible magnitude and therefore **not significant**.

Potential Collision Effects

- 8.7.17 No whooper swan were recorded flying within the Study Area during flight activity surveys, indicating that the Proposed Development is not situated close to a migratory flight path for this species. Due to the infrequency of flights within the Study Area, the impact of collision mortality is considered to be of negligible magnitude and consequently **not significant** for this species.

Pink-footed goose

- 8.7.18 Pink-footed goose is included on the UK BoCC Amber List due to the large numbers that winter in the UK and its restricted distribution²⁰. Pink-footed goose is described as a regular passage and winter visitor in Sutherland and Caithness. The large majority of pink-footed geese pass through Sutherland during the spring and autumn migration periods, with relatively few remaining during the mid-winter months. The most recent estimate of peak winter abundance in the two relevant NHZ is 2,070 in The Peatlands of Caithness and Sutherland²¹. There are no sites designated for pink-footed geese in Sutherland, the nearest SPA being Moray and Nairn Coast SPA (approximately 50 km south-east).

¹⁷ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708-746

¹⁸ Davey, P., Manson, S., Maughan, E., Omand, D., Smith, J. and Munro, K. (eds.) et al., (2015) Birds of Caithness 2015. The Caithness branch of the Scottish Ornithologists' Club

¹⁹ Wilson, M., Austin, G., Gillings, S. and Wernham, C. (2015) Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number 1504. Available from: www.swbsg.org

²⁰ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708-746

²¹ Wilson, M., Austin, G., Gillings, S. and Wernham, C. (2015) Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number 1504. Available from: www.swbsg.org

Potential Disturbance / Displacement Effects

- 8.7.19 No birds were observed during the breeding bird surveys or breeding diver surveys within the Study Area. As such, displacement due to disturbance is considered to be of negligible magnitude and consequently **not significant** for this species.

Potential Collision Effects

- 8.7.20 Low flight activity of pink-footed goose during the spring and autumn migration periods indicate that the Proposed Development is not situated close to a migratory flight path. Of the two flights recorded during flight activity surveys, both were recorded above PCH indicating that the collision risk to this species is of negligible magnitude and consequently **not significant**.

Hen harrier

- 8.7.21 Assessment of effects on hen harriers is contained within Confidential **Appendix 8.5**.

Short-eared Owl

- 8.7.22 Short-eared owl is an Annex I and SBL priority species and is included on the UK BoCC Amber List due to its status as a Species of European Conservation Concern¹⁷. In Scotland, they are a restricted resident breeder, with birds typically moving between separate breeding and wintering areas. In Sutherland and Caithness, short-eared owl is described as a regular breeder, passage migrant and winter visitor. The most recent estimate of breeding pairs in the relevant NHZ is approximately 55 in the Peatlands of Caithness and Sutherland¹⁹. The Caithness and Sutherland Peatlands SPA is designated for 30 breeding pairs, representing 2% of the UK population. Breeding numbers vary widely from year to year in response to population cycles of key prey species.

Potential Disturbance / Displacement Effects

- 8.7.23 No evidence was found of breeding activity within the Study Area. Together with the low frequency of flights recorded during flight activity surveys, it is unlikely that the Study Area currently falls within a core breeding or foraging range for this species, therefore the risk of displacement due to disturbance during the construction phase is predicted to be of negligible magnitude and therefore **not significant** for this species.

Potential Collision Effects

- 8.7.24 Short-eared owl flight activity recorded within the Study Area during flight activity surveys was low, with only one flight recorded in April. This flight did not cross the Proposed Development. Due to the low frequency of flights within the Study Area, the impact of collision mortality is considered to be of negligible magnitude and consequently **not significant** for short-eared owl.

Honey Buzzard

- 8.7.25 Honey buzzard is a scarce passage migrant and very rare summer breeder to Scotland. They are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Breeding pairs arrive in the UK in the second half of May, with young fledging in August. Passage birds typically occur along the east coast usually between late May to the end of September. Records of breeding honey buzzard are confidential and not widely publicised. However, a survey conducted in 2000 located 14 probable pairs in Scotland²².

Potential Disturbance / Displacement Effects

²² Ethridge, B. (2007). European honey-buzzard. *In* The Birds of Scotland. The Scottish Ornithologists Club. Aberlady. Pp 442 – 445.

8.7.26 Honey buzzard was recorded on two separate occasions in August. No sightings were made of young and no calls from young were heard during these surveys. It is unlikely that this bird was part of a pair that attempted to breed within Dalchork Forest as it is likely their presence would have been observed on previous surveys earlier in the breeding season. It is possible that this may one bird from a failed breeding attempt, or it could have been a bird stopping off before migrating further south. Due to the low frequency of activity within the Study Area and the lack of evidence of breeding, the displacement of breeding birds due to disturbance is considered to be of negligible magnitude and therefore **not significant**.

Potential Collision Effects

8.7.27 Three flights of Honey buzzard were recorded within the Study Area during flight activity surveys. One flight was recorded at PCH crossing the Proposed Development. Due to the infrequency of flights within the Study Area, the impact of collision mortality is considered to be of negligible magnitude and consequently **not significant** for this species.

Golden plover

8.7.28 Golden plover is listed on Annex I of the Birds Directive and is an SBL priority species. It was recently moved from the UK BoCC Green List to Amber List due to the international importance of non-breeding birds in the UK²³. In Sutherland, golden plover is considered a widespread breeder on the moors and upland habitats which primarily occur in the south and west of the county, and in winter is found at coastal sites around the county, occasionally in large flocks. The most recent estimate of the number of breeding pairs in the relevant NHZ is c. 3, 125 in The Peatlands of Caithness and Sutherland²⁴. The Caithness and Sutherland Peatlands SPA is designated for 1,064 pairs of breeding golden plover, representing 5% of the UK population.

Potential Disturbance / Displacement Effects

8.7.29 Golden plover were found breeding within the Study Area at low frequency (two territories north of the Dalchork Forest). One territory is within 500 m of the alignment. Research at operational wind farms in Scotland has shown that the population density of waders within 500 m of wind farms can be reduced by up to 80 % for golden plover²⁵, although some wind farms have apparently shown no negative impact on the species²⁶. On this basis, the Proposed Development has the potential to displace up to one golden plover territory, representing 0.03% of the NHZ population of 3,125 pairs and 0.09 % of the Caithness and Sutherland Peatlands SPA. Although it is possible that small numbers of foraging and breeding birds may be displaced due to construction of the Proposed Development, the effects would be temporary and reversible. There is alternative foraging and breeding habitat is available in the surrounding area, therefore it is likely that any displaced birds would relocate to other suitable habitat nearby. As such, displacement due to disturbance is considered to be of low magnitude and therefore **not significant** for golden plover.

Potential Collision Effects

8.7.30 A single flight of an individual bird was recorded within the Study Area. This flight did not cross the Proposed Development. Due to the infrequency of flights within the Study Area, the impact of collision mortality is considered to be of negligible magnitude and consequently **not significant** for golden plover.

²³ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015) Birds of Conservation Concern 4: The Population Status of Birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708-746

²⁴ Wilson, M., Austin, G., Gillings, S. and Wernham, C. (2015) Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number 1504. Available from: www.swbsg.org

²⁵ Sansom, A., Pearce-Higgins, J.W. & Douglas, D.J.T (2016). Negative impact of wind energy development on a breeding shorebird assessed with a BACI study design. Ibis 158 (3), 541 – 555.

²⁶ Fielding, A. H. and Haworth, P.F. (2013). Farr wind farm: A review of displacement disturbance on golden plover arising from operational turbines – 2013 update. Hawrth Conservation, Mull.

Dunlin

- 8.7.31 Dunlin is listed on the Amber List of the UK BoCC, having been recently downgraded from Red-listed status. The species is widely distributed through Britain and Ireland in the winter, but the breeding population is concentrated primarily in Scotland. The population estimate of the number of dunlin breeding pairs in the relevant NHZ is c. 2,196²⁴. Breeding dunlin is a notified feature of the Caithness and Sutherland Peatlands SPA site, as it supports an internationally important population of this species (1,860 pairs, 20% of the UK population).

Potential Disturbance / Displacement Effects

- 8.7.32 Dunlin were found breeding within the Study Area at low frequency (two territories north of the Dalchork Forest). Both territories are further than 700 m from the Proposed Alignment. Due to the distance from the Proposed Development, displacement due to disturbance is considered to be of negligible magnitude and therefore **not significant**.

Potential Collision Effects

- 8.7.33 Four flights of individual birds were recorded during flights activity surveys. No flights were recorded crossing the current alignment at PCH therefore, the impact of collision mortality is considered to be of negligible magnitude and consequently **not significant** for this species.

Greenshank

- 8.7.34 Assessment of effects on hen harriers is contained within Confidential **Appendix 8.5**.

Black grouse

- 8.7.35 Black grouse is a Red-Listed species on the BoCC. Sutherland holds a regionally important population with 30 displaying males in the NHZ. Black grouse tend to fly low and keep close to the ground, as a result this species is particularly vulnerable to flying into deer fences, so are probably susceptible to unmarked low lying wires and cables. Research on grouse species in Norway has shown collisions with power lines to be a regular source of mortality for black grouse²⁷. The species is sensitive to disturbance at lekking sites, consequently, lekking sites close to areas where construction is planned are vulnerable to disturbance. Disturbance distances where birds take to flight are estimated between 300 – 500 m for lekking males.

Potential Disturbance / Displacement Effects

- 8.7.36 Six lek locations were identified within or just outwith the Study Area. A total of 11 displaying males were counted between these six leks (representing a third of the NHZ population). Although all the lek locations are located further than 500 m away from the Proposed Development, two leks are located within 150 m of an existing forestry access track which may be utilised during construction as access routes for the Proposed Development. Four displaying males were recorded at the two leks within 150 m of the existing access track (representing 13.3% of the NHZ population). The effects would be temporary and reversible. Due to the potential for affecting more than 1 % of the regional population, the risk of unmitigated displacement due to disturbance during the construction phase is predicted to be of moderate magnitude and **significant** for this species.

Potential Collision Effects

- 8.7.37 No flights of black grouse were recorded during the flight activity surveys. Although this species is susceptible to collisions with power lines, no lek sites are located within 500 m of the Proposed Development, therefore the

²⁷ Bevanger, K. (1998) Biological and conservation aspects of bird mortality caused by electricity power lines: a review. *Biol. Conserv.* 86: 67-76.

potential effects as a result of collision risk is considered to be of low magnitude and therefore **not significant** for this species.

Other Ornithological Receptors

8.7.38 Assessment of ornithological receptors of local value are presented in **Appendix 8.4**.

8.8 Mitigation

8.8.1 Good practice management measures are proposed in order to limit and further minimise potential impacts on ornithological features across the site and ensure legal compliance during the construction phase.

Mitigation by Design

8.8.2 The Applicant's approach to the EIA process has been to prioritise and implement mitigation in a hierarchical way. This approach focuses on developing a design through the consideration of alternative routes to avoid likely significant adverse effects as far as possible, as discussed in Chapter 2 of this EIA Report.

General mitigation measures

8.8.3 The Applicant has developed GEMPs and SPPs for construction works that may negatively impact upon VORs. The SPPs outline the procedures that must be followed where there is a potential for breeding birds to be present. Each SPP outlines the responsibilities of the Applicant and their Contractors, legislative protection for the protected species, best practice measures to follow and an approved methodology for carrying out certain mitigation activities. This suite of SPPs has been approved by SNH and would be adopted where relevant to the project.

8.8.4 A Construction Environmental Management Plan (CEMP) will be developed by the Principal Contractor detailing measures to manage, control and monitor the potential effects of noise, dust, litter, pollution and personnel / vehicular movements. Best practice pollution control measures, with reference to the Scottish Environmental Protection Agency (SEPA) and Control of Substances Hazardous to Health (COSHH) guidelines, will be included in the CEMP. Particular reference will be made to managing handling, storage and use of hazardous chemicals and fuels used during the construction process. A detailed spill response plan will be developed and fully-briefed to all site operatives and forms part of the CEMP.

8.8.5 Construction (including enabling works and felling) should avoid being undertaken in the breeding bird season (later March to end of July inclusive), if possible, to minimise disturbance to nesting birds. As the construction of the Proposed Development is anticipated to take approximately 22 months to complete, it may not be possible for all works to be undertaken outwith the breeding bird season. As detailed in Confidential **Appendix 8.5**, the programme will take into account measures to prevent disturbance to breeding birds.

8.8.6 Where it is not possible to schedule all works out with the breeding bird season, the appointed Environmental Clerk of Works (ECoW), or suitably qualified ornithologist, would undertake pre-construction surveys to identify the presence of protected bird species and nests. Should a nest of any bird be located during pre-construction surveys, the ECoW would: recommend suitable mitigation measures (including appropriate buffer zones depending on the species); implement any requirements of the SPP and provide toolbox talks to contractors to ensure accidental / reckless disturbance of the nesting bird is avoided. The ECoW / suitably qualified ornithologist would undertake regular monitoring of birds present within proximity to works to ensure any nests are promptly located, identified and suitably protected from damage or disturbance.

Measures Specific to Black Grouse

- 8.8.7 Prior to the commencement of construction, black grouse lek surveys would be carried out at the appropriate time of year by a suitably qualified ornithologist in accordance with standard survey methodologies²⁸. Black grouse are considered to have moderate behavioural sensitivity to disturbance, but they are most at risk from disturbance whilst displaying at lek sites. Two leks are located within 150 m of an existing forestry access track which may be utilised during construction as an access route for the Proposed Development.
- 8.8.8 The construction programme should consider the timing of works within 500 m of the lek locations, to completely avoid the use of this section of track during the peak lekking period of late March to the end of May. If this section of access track requires upgrading as part of enabling works for the Proposed Development, this must be undertaken out with March to May. If it is not considered possible to completely avoid the use of this section of access track between March and May to facilitate access to construct the Proposed Development, access should be limited to avoid disturbance to lekking birds (i.e. no vehicle access will be permitted along the access track within 500 m of lek sites for two hours after sunrise). These measures will be included in the black grouse SPP for the Proposed Development, which the ECoW will implement and monitor compliance with.

8.9 Monitoring

- 8.9.1 Construction phase monitoring would be carried out by the appointed ECoW, to ensure compliance with environmental legislation and effective delivery of mitigation measures.

8.10 Residual Effects

- 8.10.1 An assessment has been undertaken of the residual effects; those remaining following the implementation of the proposed mitigation as detailed in Section 8.8 above.
- 8.10.2 The implementation of mitigation measures to protect red-throated divers, hen harrier and black grouse during construction and operation of the Proposed Development includes pre-construction surveys to identify breeding / lekking locations within proximity to construction works, the employment of an ECoW to establish and monitor any works exclusion zones during construction and line marking as detailed in **Appendix 8.5**. The residual effects on these VORs are not significant.
- 8.10.3 No other significant effects (pre-mitigation) were identified. Nevertheless, good practice management measures have been identified, as detailed in Section 8.8 above, to further avoid and reduce effects. The residual effects on ecological receptors are not significant.

8.11 Assessment of Potential Cumulative Effects

- 8.11.1 There are two aspects of cumulative effects to consider:
- the cumulative effect of two or more developments on an individual animal or home range / territory; and
 - the cumulative effect of a number of developments within a region on the local / regional population of a species or the distribution of a habitat.
- 8.11.2 Other similar developments nearby include the consented Dalchork Substation and Lairg to Loch Buidhe 132 kV overhead line, running from Loch Buidhe substation to Dalchork Substation. Also considered is the Creag Riabhach Wind Farm.

²⁸ Gilbert, G., Gibbons, D.W. and Evans, J. (2011) Bird Monitoring Methods. RSPB/BTO

Lairg to Loch Buidhe 132 kV Overhead Line Reinforcement

8.11.3 This proposed project would connect to the consented Dalchork Substation, as such it overlaps the with the southern extent of the Study Area. Potential effects of this project are predicted from disturbance during the construction phase for black-throated diver, hen harrier and merlin²⁹. Potential effects from collision risk are predicted for black-throated diver, greylag goose, curlew and lapwing. With the implementation of appropriate mitigation including species protection plans for black-throated diver, hen harrier and merlin, no significant residual effects are likely for this project. Line marking, as proposed by SNH, is proposed as an additional mitigation measure to further reduce potential impacts on diver species,.

Dalchork Substation

8.11.4 This proposed project is the terminal point for the Creag Riabhach Wind Farm Grid Connection, as such it overlaps with the southern extent of the Study Area. The ecology and ornithology chapter of the Environmental Appraisal for the substation³⁰ has been redacted to remove most species names, however due to the nature of the project it is likely that the impacts on ornithological receptors will be limited to disturbance of nesting birds during the construction of the substation. The Applicant for the substation and the Proposed Development are the same, therefore the Applicants GEMPs and SPPs described in Section 8.8 will be the same for both projects. Implementation of these general mitigation measures will limit impacts to nesting birds. The effects on ornithological features were likely to be negligible and not significant.

Creag Riabhach Wind Farm

8.11.5 The consented Crag Riabhach Wind Farm overlaps with the northern extent of the Study Area. The EIA for the project identified a potential effect on black grouse during the construction phase of the project, although this was not considered to be a significant effect³¹. Effects on all other VORs were considered to be negligible and not significant.

8.11.6 The black grouse leks identified within proximity to the Proposed Development that have potential to be affected during construction are located further than 14 km from the Creag Riabhach Wind Farm. As such, even if the projects are constructed concurrently, cumulative impacts upon black grouse are not likely to be significant.

Summary of Cumulative Impacts

8.11.7 The addition of the effects identified as a result of the Proposed Development are of a sufficiently low magnitude that the effects associated with other developments nearby are **not likely to result in significant cumulative effects**.

8.12 Summary

8.12.1 An assessment has been made of the predicted significance of effects of the Proposed Development on ornithological interests. This assessment identified no significant effects, following mitigation, of the Proposed Development on ornithological interests.

8.12.2 The impact assessment for the Proposed Development on ornithological interests has been assessed under CIEEM Guidelines on Ecological Impact Assessment in the United Kingdom³². This determines which

²⁹ Lairg to Loch Buidhe Reinforcement EIA Report (2019). Scottish and Southern Energy Networks

³⁰ Dalchork Substation Environmental Appraisal Report (2019). Scottish and Southern Energy Networks

³¹ Creag Riabhach Wind Farm EIA Report (2013). Creag Riabhach Wind Farm Ltd.

³² Chartered Institute of Ecology and Environmental Management (2018). Guidelines for ecological impact assessment in the UK and Ireland. Winchester: CIEEM

ornithological receptors are significant within a geographical context before the assessment of the effects of the Proposed Development on significant receptors is undertaken.

- 8.12.3 A desk study, flight activity surveys, breeding bird surveys and species-specific surveys (black grouse, diver, raptors and owls) were undertaken in order to establish the baseline, from which the ornithological receptors of the Proposed Development could be identified. A summary of the results of the ornithological baseline is provided in the main body of this Chapter, along with associated figures and supporting information provided in **Appendix 8.2** and **Appendix 8.3**.
- 8.12.4 The assessment identified potentially significant effects from displacement due to disturbance for black grouse, hen harrier and red-throated diver. Potentially significant effects from collision mortality were identified for red-throated diver.
- 8.12.5 Proposals for mitigation relevant to identified receptors includes adherence to best practice construction methods as detailed in a project CEMP, pre-construction checks to update the ecological baseline, line marking of a 1.2 km section of line where it passes a potentially sensitive area for red-throated divers, SPPs, and the employment of an ECoW to provide environmental guidance and monitoring throughout the course of the construction period.
- 8.12.6 Residual effects on receptors of ornithological value are not likely to be significant.
- 8.12.7 A detailed assessment of the potential effects of the Proposed Development on the surrounding Natura 2000 sites is provided in **Appendix 8.6**. The assessment concludes that after the implementation of proposed mitigation as detailed in Section 8.6 of **Appendix 8.6**, no activities associated with the construction or operation of the Proposed Development are likely to have a significant impact on qualifying species of the SPAs. Furthermore, no construction related activities are contrary to the conservation objectives set out for each SAC to safeguard the integrity of each site.