Chapter 10: Ornithology

Figures

Appendices

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10 Ornithology

10.1 Executive Summary

10.1.1 The aim of this Chapter is to assess the effect of the Development upon birds. This includes birds on the open ground, those in the forested areas and those flying over the Development site. The specific aim of the Chapter is to identify and assess potential construction, operational (including collision risk) and potential decommissioning effects.

10.1.2 Birds breeding on the site of the Development were surveyed in spring 2012 and spring 2013, in a survey area defined by a buffer of 500m around the Development site boundary at that time. The results are supplemented by historical data and concurrent monitoring data from the adjacent Gordonbush Wind Farm. No bird species listed on Annex 1 of the Birds Directive or on Schedule 1 of the Wildlife and Countryside Act were found to be resident within the Development site survey area, and no raptors were found to be breeding within 2km of the site boundary. No qualifying species of the nearby Caithness and Sutherland Peatlands Special Protection Area (SPA) was found to be using the Development site. In particular, no golden plovers were recorded foraging on the Development site and only one short flight by this species was seen on the site during vantage point observations. As part of Gordonbush Wind Farm, an Appropriate Assessment was undertaken and which concluded (see Section 10.7.3 to 10.7.8) that golden plover broods were unlikely to cross from the SPA to the Gordonbush Wind Farm site.

10.1.3 The bird species found breeding in the survey area were considered to be of Local or Low conservation value, with the exception of the skylark, which was considered to have a site population of Regional conservation value. Potential effects of the Development on breeding birds within 500m of the proposed turbine positions were assessed. The potential negative effects of construction and operation of the Development, through habitat loss and disturbance (outside the bird breeding season), are considered to be of low magnitude and not significant. During the bird breeding season (March to July), the potential negative effects of construction through disturbance and risks to birds' nests are considered to be of medium magnitude and significant in the absence of mitigation. Mitigation measures which have been successful on other wind farm sites in the Highlands are proposed and are considered likely to be successful, so that any residual effects would be of low magnitude and not significant.

10.1.4 Observations of flight activity were carried out from two vantage points between April 2012 and March 2013. Three flocks of greylag geese, totalling 91 birds, and three flocks of pink-footed geese, totalling 606 birds, were recorded flying over the collision risk zone (within 253m of the proposed turbine positions) at risk height (20 – 150m). No raptors were detected flying over the Development site. As a result of the low numbers of birds recorded, a result mirrored by a concurrent survey at the adjacent Gordonbush Wind Farm, a second year's survey was not considered necessary. SNH were consulted and agreed with this assessment.

10.1.5 Collision risk analysis showed that the predicted numbers of collisions by geese were 0.33 greylag geese and 2.04 pink-footed geese per year, both less than 0.001% of the respective regional populations. Consequently, the effect of turbine operation on geese passing over the Development is considered to be of very low magnitude and not significant.

10.1.6 In summary, provided that the proposed mitigation measures are implemented, the effect of the Development on the bird populations at the site are considered to be of low magnitude and not significant. There would be no adverse effect on the bird populations or the integrity of the Caithness and Sutherland Peatlands SPA.

10.2 Introduction

10.2.1 The aim of this Chapter is to assess the effect of the Development upon birds. These include the birds on the open ground, those in the forested areas and those flying over the site. The specific aims of the Chapter are to identify and assess potential construction effects, potential operational effects (including collision risk) and potential decommissioning effects.

10.2.2 Bird species are referred to in the text by their common names; they are listed with their scientific names in Appendix 10.3.

10.3 Scope of Assessment

Study Area

10.3.1 The original bird survey area, used for surveys from April 2012 to March 2013, was based on the Development site boundary at that time (Figure 10.1). The survey area for resident birds and those flying over the site was defined by a 500m buffer around the site boundary, while the survey area for breeding raptors extended 2km from the site boundary. In spring 2013, following a northward extension of the site boundary to include a borrow pit and to make use of existing tracks, the survey areas were adjusted accordingly (Figure 10.1). The area immediately to the north of the Development site was covered by the concurrent post-construction surveys carried out on Gordonbush Wind Farm and the data have been incorporated into the present assessments.

10.3.2 The survey area is mainly open heathland, with small areas of conifer plantation at the east side and some scrub and scattered broadleaved trees in the two stream valleys at the east and west edges of the survey area. The adjacent area of the Bullburn plantation, to the west of the Development site (Figure 10.1), was clear-felled in 2010 and 2011.

10.3.3 The assessment area for potential effects of the Development on breeding birds was defined by a 500m buffer around the proposed turbine positions (the turbine assessment area, which includes the proposed new tracks) and a 200m buffer around the existing access tracks at the north edge of the Development site (the track assessment area; Figure 10.2). The assessment area for potential collision risk was defined by a 253m buffer (200m plus blade length) around the proposed turbine positions (Figures 10.3 and 10.4).

Scoping and Consultation

10.3.4 A scoping report, containing the results of the desk study and the results of the bird surveys carried out to date, was submitted in September 2013. Responses relevant to bird issues were received from Scottish Natural Heritage (SNH), the Royal Society for the Protection of birds (RSPB) and the Scottish Wildlife Trust (SWT) (Table 10.1).

Table 10.1: Scoping Responses and Action Taken

Consultee	Summary Response	Comment/Action Taken
SNH	Effects on birds breeding in the adjacent SPA must be considered.	Potential adverse effects on qualifying bird species of the SPA have been assessed in Section 10.9.
SNH	No further survey work is required to inform the EIA.	No action required.
RSPB	Map of vantage points and viewsheds required.	See Appendix 10.4 of this ES.
RSPB	Current (2014) SNH guidance on breeding bird surveys is for four visits per season, but only three were carried out. However, no further survey is required.	The surveys conformed to SNH guidance current at the time (SNH 2010). No further survey required by RSPB.
RSPB	Two years of survey are required.	A second year's breeding bird survey was carried out. SNH did not require a second year of vantage point observations.
RSPB	A schedule of mitigation measures should be included in the ES.	Full details of mitigation measures are included in Section 10.10 of this Chapter. See also Appendix 4.3 of this ES: Schedule of Mitigation Measures.
RSPB	Effects on golden plover must be considered.	Golden plovers were not recorded as resident on the Development site.
RSPB	Effects on breeding merlins must be considered.	No breeding merlins were found within 2 km of the Development site.
SWT	Effects on birds breeding in the adjacent SPA must be considered.	Potential adverse effects on qualifying bird species of the SPA have been assessed in Section 10.9.

10.4 Legislation, Policy, & Guidance

10.4.1 Resident, breeding, wintering and migratory bird populations within the UK are protected under European Legislation by the key directives on Wild Birds (EEC Directive 79/409/EEC) and Habitats (EEC Directive 92/43/EEC). These directives are implemented by the inclusion of key species with specifically detailed annexes and through the establishment of conservation areas under the umbrella of Natura 2000, notably SPA from the Birds Directive and Special Areas of Conservation (SAC) from the Habitats Directive (enacted in the UK by the Conservation (Natural Habitats, etc) Regulations 1994).

10.4.2 Wild birds are protected in the UK by the Wildlife and Countryside Act 1981 (as amended). The Act includes a number of Schedules which offer varying levels of protection to individual bird species; for example Schedule 1 lists rare breeding birds which are afforded special protection, including protection from disturbance during the breeding season. Further protection is given in the form of designated and protected Sites of Special Scientific Interest (SSSI).

10.4.3 Where there is a potential effect on a population protected through an SPA or SSSI (i.e. a qualifying species listed on the SPA/SSSI citation, or which otherwise may be deemed to contribute to the integrity of the site) the potential effect on the integrity of the SPA/SSSI itself must be assessed.

10.4.4 For bird populations protected by European site designation (SPA), whether the development is inside or outside the SPA, the relevant test is that the development should not adversely affect the integrity of the site, as outlined in Scottish Planning Policy (SPP, 2014). The impact on bird populations is therefore judged against whether the development could significantly affect the site population and its distribution.

10.4.5 Bird populations protected by SSSI designations are considered in a similar way under SPP (2014), which indicates that it should be demonstrated that the objectives of designation and overall integrity of the designated area should not be compromised by the development.

10.4.6 For birds not protected by site designation, judgment is made against a more general expectation that the development will not have a significant negative effect on the overall population, range or distribution; and that it will not interfere significantly with the flight paths of migratory birds.

10.4.7 Table 10.2 summarises the key relevant planning policy.

Table 10.2: Planning policy relevant to bird issues

Document	Source	Outline
Scottish Planning Policy 2014	Scottish Government	Sets out national planning policy considerations in relation to Scotland's natural heritage; summarises the main statutory obligations on the conservation of natural heritage; explains, as part of a wider framework for conservation and development, how natural heritage objectives should be reflected in development plans; describes the role of the planning system in safeguarding sites of national and international importance; provides guidance on the approach to be adopted in relation to local and non-statutory designations; and draws attention to the importance of safeguarding and enhancing natural heritage beyond the confines of designated areas.
Scottish Planning Policy on Renewable Energy	Scottish Government Included in SPP 2014 (above)	Defines factors to be taken into account when considering policies for renewable energy developments or applications for planning permission; includes considerations regarding international and national natural heritage designations and sites outwith these.
UK Biodiversity Action Plan	UK Biodiversity Steering Group	Sets national priorities for species and habitat conservation and details practical conservation measures.
Policy Statement No. 02/02	Scottish Natural Heritage	Strategic location guidance for onshore wind farms in respect of natural heritage.
Local Biodiversity Action Plans	Sutherland LBAP	Sets local priorities for species and habitat conservation and details practical conservation measures.

10.4.8 In addition to the above, detailed information on planning policy is contained within the Planning Statement accompanying the planning application and a summary of relevant policies is provided in Chapter 5 (Planning Policy Context) of this ES.

10.5 Methodology

Desk Study

10.5.1 Desktop searches were undertaken on SNH Sitelink to identify the presence of any SPAs, Ramsar sites and SSSIs for which birds were principal reasons for designation or notification, within 10km of the Development. Information on birds of conservation concern likely to be found in the area was sought from SNH, RSPB, surveys for the British Trust for Ornithology (BTO) Atlas of Breeding Birds 2007-11 (Balmer *et al*. 2013), data on birds in the area collated by a local bird recorder, and data on breeding raptors in the area from the Highland Raptor Study Group (HRSG).

10.5.2 Information on birds of conservation concern in the vicinity of the Development was obtained from the results of surveys carried out on the immediately adjacent Gordonbush Wind Farm site. Some of this information is contained in the original Environmental Statement (ES) and Appropriate Assessment (AA) and some in pre-construction, construction phase and post-construction surveys carried out subsequently. The conclusions of the original surveys for the ES, which were carried out between 2002 and 2006, are comprehensively summarised in the AA. The detailed results, in terms of bird numbers and distribution, are likely to be considered by SNH to be out of date by 2015. Consequently, only the results of the more recent surveys, carried out since 2009, have been considered in detail in this Chapter.

Field Survey

10.5.3 A breeding bird survey and a search for breeding raptors were carried out in the survey area by experienced ornithologists for Northern Ecological Services (NES), for two years, between March and August in 2012 and 2013. Vantage point observations were carried out for one year, between April 2012 and March 2013. It was not considered necessary to repeat the vantage point survey in 2013/14, since the observations in 2012/13 recorded very small numbers of birds and similar small numbers had been recorded on the adjacent wind farm site. SNH were consulted and agreed that further vantage point survey was not required.

<u>Breeding Bird Survey</u>

10.5.4 The breeding bird survey followed the protocol developed by Brown and Shepherd (1993), as specified in SNH guidelines current at the time of the survey (SNH 2010a). The observer walked transects across the site at 200m intervals, so that each part of the area was approached to within a maximum of 100m. Positions, transect lines and distance travelled were determined with a hand-held GPS. The observer stopped at intervals of approximately 100m to scan the surrounding area with binoculars and to listen for calls and songs. The locations of all birds detected were recorded and behaviour, such as display, carrying nest material, carrying food for young, and other activity which suggests breeding, was noted.

10.5.5 The Brown and Shepherd (1993) methodology was developed specifically for surveys of upland waders and, although commonly used to survey populations of meadow pipits, has not been found to be satisfactory for this species in recent surveys. Some (though probably not all) meadow pipits are detectable at up to 100m in early spring, when they make frequent song flights and interact conspicuously with other individuals. However,

later in the season, the birds are much more secretive and they become markedly less detectable beyond about 60m from the transect line. Consequently, meadow pipit densities were determined from line transect methodology (Bibby *et al*. 2000), by estimating the perpendicular distance of each pair from the transect line, so that the density could be calculated using Distance software (Thomas *et al*. 2004). Data on meadow pipits were collected from sample transects, totalling 15km distributed over different parts of the survey area and over the different survey periods. Pairs more than 60m from the transect line were excluded from the analysis.

Vantage Point Observations

10.5.6 Vantage point observations, following the protocol in SNH guidelines current at the time of the survey (SNH 2010a) were carried out from two points overlooking the survey area (Appendix 10.4), for a minimum of 36 hours at each point in each season (spring and winter, from April 2012 to March 2013). Observation periods included dawn and dusk, when particular attention was paid to golden plovers flying over the survey area.

10.5.7 During the vantage point observations, priority was given to bird species listed on Annex 1 of the EU Birds Directive and species listed on Schedule 1 of the Wildlife and Countryside Act, especially golden eagles, golden plovers, hen harriers, merlins, wild geese and other species of conservation concern. Their flight paths, both within and outside the survey area, were plotted on large-scale maps of the area and their flight height was estimated at 15 second intervals in three bands; 0 – 20m; 21 – 150m and over 150m. The total duration of each observed flight was recorded.

10.5.8 The numbers of other (secondary) species overflying the survey area were recorded, but their flight paths and flight heights were not documented in detail. Small birds, which would not have been visible at a distance from the vantage point, were not recorded.

Breeding Raptor Survey

10.5.9 Surveys for breeding raptors were carried out four times during the bird breeding season, (March and July inclusive), following the advice on timing in Gilbert *et al*. (1998) and Hardey *et al*. (2006). In general, the surveyor carried out a walkabout survey, following transects at 500m intervals, so that all parts of the area were approached to within 250m. Features which appeared to be likely perches, plucking posts or potential nest sites were visited by deviating from the transect lines. Some time was spent observing from suitable vantage points, to detect flight activity which might suggest breeding, such as display flights, food passes, etc. If a raptor species was detected, the specific methodology recommended in Gilbert *et al*. (1998) and Hardey *et al*. (2006) was followed.

10.6 Assessment of Effects

Sensitivity/Importance

10.6.1 The approach to the assessment of the sensitivity and importance of a bird species is first to consider the species' conservation status and the importance of the population present on the site. These are then used to assess the conservation value of the species on the site.

10.6.2 The conservation status of a bird species is based primarily on its UK status, modified by its regional status. The scheme uses a two-dimensional matrix, using UK status and regional status as the two dimensions, to give a species' resultant conservation status in a particular area.

10.6.3 The *National conservation status* of birds in the UK can be divided into five categories; (birds in a sixth category, International Union for Conservation of Nature (IUCN) globally-threatened species, are unlikely to occur on any proposed UK development site, but if they did would be considered to be of International status irrespective of their regional status). The other five categories are:

- Species given special protection under EU legislation; listed on Annex 1 of the EU Birds Directive;
- Species given special protection under UK legislation; listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Species of serious conservation concern; Red List species and UK Biodiversity Action Plan (UKBAP) Priority species;
- Species of some conservation concern; Amber List species; and
- Species for which there is little or no conservation concern; Green List species and any species common and widespread throughout the UK.

10.6.4 The *regional conservation status* of birds can be divided into three categories:

- Rare in the region and/or Local Biodiversity Action Plan (LBAP) Priority Species; species for which a Species Action Plan recommends safeguarding of all sites and species with a need to protect all populations above a certain size;
- Uncommon or patchily distributed in the region; and
- Common and/or widespread in the region.

10.6.5 The *resultant conservation status* of a bird species on the Development site will depend on the interaction between its UK conservation status and its conservation status in northern Scotland. Table 10.3 sets out the resultant conservation status of bird species. Note that the categories shown in the cells of the table may be modified according to the particular national or regional circumstances of a particular species. In Table 10.3, "National" refers to the whole UK; "Regional" refers to northern Scotland: and "Local" refers to the site and immediate environs. The four categories in Table 10.3 are considered to be the most appropriate for bird species, since population data can be obtained for the four geographical areas concerned.

Table 10.3: The resultant conservation status of bird species

National Conservation Status	Regional Conservation Status		
	Rare	Uncommon	Common
Annex 1	International	National	Regional
Schedule 1	National	National	Regional
Red List/UKBAP	National	National/Regional	Regional/Local
Amber List	Regional	Regional	Local
Green List	Regional	Local	Local

10.6.6 The *conservation value* of a bird species on a particular site depends on a combination of two factors; its conservation status (above) and the importance of its population on the site. The criteria for determining the conservation value of bird species in the survey area is set out in Table 10.4. Conservation value is increased if a species is listed as a qualifying species for a potentially affected SPA, or is listed as a notified feature of a potentially affected SSSI.

10.6.7 The site population of a resident or regularly occurring bird species is judged to be important at a particular level (National, Regional or Local) if it exceeds 1 % of that level's total population. The latter is a generally used value e.g. to decide if a species should be included as a qualifying species of a designated site. The interaction of the conservation status of a species and the importance of its site population then determines its conservation value on the site. For example; a large colony containing 10 % of the UK population of a species would be of National value, even if the species itself was not of conservation concern in the UK. Conversely, a "population" represented on site by only a few records, with no reliable evidence that the birds were resident, would be of relatively low conservation value, even if the species itself was of National conservation status.

10.6.8 A site population is regarded as Low if it forms less than 1% of the local population. In distinguishing between local and low, it is assumed that the area outside the site but within 5 – 10 km will be at least 100 times the area of the site. Consequently, if the habitat on the site is similar to that in the immediately surrounding area, a species population on the site will not exceed 1% of the population within 5 – 10 km, unless the site population is at an unusually high density relative to that in the surrounding area.

Table 10.4: Criteria for determining the conservation value of bird species in the survey area

	Conservation status				
	International	National	Regional	Local	Low
Site population					
International	International	International	International	International	International
National	International	National	National	National	National
Regional	International	National	Regional	Regional	Regional
Local	International	National	Regional	Local	Local
Low	National	Regional	Local	Low	Low

Magnitude of Effect

10.6.9 The criteria used for assessing the magnitude of effects on birds were as follows:

- Low – no reduction in numbers or change in species richness likely, but population made more vulnerable to further impacts; short term (5 years) temporary reduction in numbers or species richness, or change in species assemblage likely;
- Medium – medium term (up to 15 years), but temporary reduction in numbers or species, or change in species assemblage likely; small permanent reduction in numbers or species-richness, or change in species assemblage likely; and
- High – large permanent reduction in numbers or species-richness, or change in species assemblage likely.

Significance of Effect

10.6.10 The significance of each effect upon each valued ecological feature is assessed. An ecologically significant effect is defined as an impact on the integrity of a defined site or ecosystem and/ or the conservation status of habitats or species (IEEM, 2006). The effect is assessed within a specific geographic context i.e. at the scale at which the ecological feature was valued (e.g. local/ national/ international). The significance of effects is described as "not significant, minor, moderate or major". Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of 'major' or 'moderate' significance." Where;

- Major: effects which are likely to be important considerations at a regional or district scale but which, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision making process;
- Moderate: effects which, if adverse, while important at a local scale, are not likely to be key decision making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource;
- Minor: effects which may be raised as local issues but which are unlikely to be of importance in the decision making process. Nevertheless, they are of relevance in the detailed design of the project; and
- Not significant: no effect or no significant effect, irrespective of other effects.

10.6.11 The final prediction of the significance of an effect is completed by taking the mitigation measures into account, including both the mitigation incorporated into the design of the Development and mitigation required to address residual impacts. This requires an assessment on the likelihood of successful mitigation being achieved and the mitigation proposed needs to be qualified in terms of the probability of success. The assessment of success of mitigation can be based on both professional judgement and experience of other mitigation schemes. In general, a precautionary approach is advisable in determining the outcome.

Limitations to the Assessment

10.6.12 No significant limitations to the assessment have been identified.

10.7 Baseline Conditions

Designations

10.7.1 The Development lies immediately to the south-east of the Caithness and Sutherland Peatlands SPA (Figure 8.1). The SPA qualifies under Article 4.1 of the EU Birds Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: black-throated diver; golden eagle; golden plover; hen harrier; merlin; red-throated diver; short-eared owl; and wood sandpiper.

10.7.2 The SPA also qualifies under Article 4.2 of the EU Birds Directive (79/409/EEC) by supporting populations of European importance of the following migratory species: common scoter; dunlin; greenshank; and wigeon. One of the component parts of the SPA lies adjacent to the Development; this component is underpinned by the Coir' an Eoin SSSI, which has golden plover as a notified feature.

Desk Study

Gordonbush Wind Farm surveys prior to 2010

10.7.3 The Appropriate Assessment carried out in 2008 for the Gordonbush Wind Farm adjacent to the Development considered the following potential effects on the SPA:

10.7.4 Direct habitat loss, due to land take by wind farm bases, access tracks, electricity grid generation and ancillary structures, can lead to potential loss of important habitat for qualifying bird species which are connected with the SPA. Possible indirect habitat loss due to the displacement of birds can also occur as a consequence of construction work or proximity of wind turbines close to nesting or feeding sites or habitual flight routes. Another potential risk was loss or injury to birds as a result of collision with rotating turbine blades, overhead wires, guy lines and fencing.

10.7.5 The conclusions of the Gordonbush Wind Farm Appropriate Assessment on the qualifying bird species of the SPA were that there was no likely significant effect on any species except potentially golden plover and merlin. The assessment for these two species was as follows:

10.7.6 In relation to golden plover; *"The objectives relating to habitats within the site and their structure and function are not affected by the proposal. The remaining objectives relating to maintenance of population, distribution and avoiding significant disturbance were considered further. The proximity of the development to the SPA boundary means that there might be potential for breeding birds from the SPA to move their broods into the development site. However, the topography and stream crossing mean that this is unlikely to occur. The collision risk to birds breeding within the SPA which commute to off-site feeding areas has been assessed as unlikely, following detailed radio tracking work undertaken and the assessment of potential in-bye fields in the general area. The collision risk to birds breeding within the wind farm, and unconnected with the SPA, is also assessed as low. In light of these investigations it is concluded that all the conservation objectives for this species will be met."*

10.7.7 In relation to merlin; *"The loss of a pair of merlin connected to the SPA by collision or disturbance may reduce the occupation of this corner of the SPA, and hence the distribution within the SPA. However, if the mitigation as outlined in relation to collision risk above is applied, then it is possible to conclude that distribution within the SPA will be maintained." "The pair of merlin that is considered to be connected to the SPA may lose foraging habitat due to the construction and operation of the wind farm. However, the Habitat Management Plan (HMP), as described below, should provide adequate mitigation to be able to conclude that displacement issues will not cause significant disturbance to the species, particularly through the creation of substitute foraging territory through forest clearance."*

10.7.8 Mitigation has been carried out under the HMP by clear felling of 245 hectares of the Bullburn plantation, immediately adjacent to the SPA, to allow regeneration of heathland vegetation, more suitable as merlin foraging habitat. Monitoring of the bird populations in this area has shown progressive colonisation by meadow pipits and skylarks, which are important prey species for merlins.

Breeding raptors in the Gordonbush area

10.7.9 The HRSG stated that they had not carried out any surveys of raptors in the Gordonbush area for some years, so they were unable to provide any information.

Gordonbush Wind Farm surveys; 2010 to 2013

10.7.10 Vantage point observations at the existing Gordonbush Wind Farm were carried out by NES each spring from 2009 to 2013 and each winter from 2010/11 to 2012/13. In each period, observations were carried out for 36 hours at each of two vantage points, which covered the area within 500m of the turbine positions.

10.7.11 Breeding bird surveys of the Gordonbush Wind Farm site and surveys for breeding raptors in the area within 2km of the Gordonbush Wind Farm were carried out by NES each spring from 2009 to 2013.

10.7.12 Breeding bird surveys and vantage point observations were carried out on HMP areas at Gordonbush Estate in spring 2009 and 2010, including two 1 x 1km squares close to the Development site and also on a clear felled area at Bullburn, immediately to the west of the Development site boundary, each spring from 2010 to 2013.

10.7.13 The results of the desk study are presented principally for target species; namely species listed in Annex 1 of the EU Birds Directive, species listed on Schedule 1 of the Wildlife and Countryside Act (as amended), migratory waterfowl (especially geese and whooper swans), qualifying species of the adjacent SPA which could potentially be impacted by the Development, and other species of conservation concern (e.g. Red List and UKBAP species). The target species considered below exclude the following species, which were described in the Gordonbush Wind Farm ES as unlikely to occur at the site and which were not recorded in any of the field surveys carried out in the area from 2009 to 2013: black-throated diver, common scoter, red-throated diver, short-eared owl, wigeon and wood sandpiper.

10.7.14 The survey results are presented first for breeding raptors generally and then for each target species in turn (in alphabetic order for ease of reference).

Breeding Raptors

10.7.15 No breeding raptors were detected within 2km of the wind farm in targeted surveys carried out in spring each year from 2009 to 2013. There is a historical golden eagle nest site approximately 6km from the Development site, but it has not been occupied in recent years. There are two historical merlin nest sites near the north end of the Development, but no breeding has been detected at either of these in the five years from 2009 to 2013. Some suspected breeding activity was observed in spring 2010 in an area approximately 1km to the east of the north end of the Development site, but nesting was not confirmed.

Flights by Raptors

10.7.16 Small numbers of flights by raptors were recorded in spring and summer in the Gordonbush Wind Farm survey area (Table 10.5), with only one flight seen in both 2012 and 2013. In winter, one flight by a merlin was recorded in 2010/11, but no flights by raptors were seen within the survey area in the two subsequent winters, 2011/12 and 2012/13.

Table 10.5: Flights by raptors in the Gordonbush Wind Farm survey area in spring and summer.

Species	2009	2010	2011	2012	2013
Golden eagle	1	0	0	0	0
Hen harrier	0	3	2	1	1
Merlin	1	1	1	0	0
Osprey	0	1	0	0	0
Peregrine	0	1	0	0	0
Total	2	6	3	1	1

Flights by Wildfowl

10.7.17 Ten flocks of geese were recorded flying over the Gordonbush Wind Farm survey area in the goose wintering season (September to April) in 2010/11 (Table 10.6) and three flocks each season in the two subsequent winters. All 701 of the pink-footed geese and 364 of the greylag geese were flying at heights over 150m and so were not at risk of collision.

Table 10.6: Flights by wildfowl in the Gordonbush Wind Farm survey area.

Species	2010/11		2011/12		2012/13	
	Flocks	Birds	Flocks	Birds	Flocks	Birds
Greylag goose	9	325	3	180	3	70
Pink-footed goose	1	700	0	0	0	0
Total	10	1,025	3	180	3	70

10.7.18 A flock of 26 whooper swans was recorded flying over the wind farm at an estimated height of 500m in November 2010, but no others have been seen there in any of the surveys between 2009 and 2013.

Other Species of Conservation Concern

Crossbill

10.7.19 Crossbills were recorded at 10% of the count points in the conifer woodland in the wider HMP area at Gordonbush Estate during the breeding bird survey in 2009, but none was recorded in the woodland at Bullburn just to the west of the Development in spring in 2010, 2011 or 2013. One pair was recorded at Bullburn in spring 2012.

Golden plover

10.7.20 Golden plovers are common on the higher ground in the general locality; the wind farm survey area held 15 pairs in spring 2009, 13 pairs in 2010, nine pairs in 2011, four pairs in 2012 and one pair in 2013.

Greenshank

10.7.21 Two pairs of greenshanks were recorded in the wind farm survey area in spring 2010, one pair in 2011, one pair in 2012 but none in 2013. One pair nested in the Bullburn clear felled area to the west of the Development site in spring in 2011, 2012 and 2013. This pair was located over 1km from the nearest point of the Development site boundary.

Lapwing

10.7.22 Lapwings were recorded in the clear felled area of Bullburn, just to the west of the Development; two pairs in spring 2011, three pairs in 2012 and two pairs in 2013. The nearest of these pairs was 0.8km from the west edge of the Development site boundary.

Red grouse

10.7.23 Red grouse are widespread in the general locality, with up to 15 pairs recorded in the wind farm survey area in 2009 - 2013. One pair was found in Bullburn in 2013.

Skylark

10.7.24 Skylarks are very common in the general locality, with up to 139 pairs recorded in the wind farm survey area in 2009 – 2013.

Field Studies

Breeding Bird Survey

10.7.25 The breeding bird survey recorded 78 pairs of 16 resident bird species (excluding meadow pipits) in the breeding bird survey area in spring 2012 and 53 pairs of 10 species in spring 2013 (Table 10.7). By far the commonest species in both years was the skylark, with the other species occurring in small numbers. No resident raptors or golden plovers were recorded in either year and another species of conservation concern, the curlew, was recorded in 2012 but not in 2013 (Table 10.7).

Table 10.7: The conservation designations and conservation status of the resident bird species recorded in the breeding bird survey area in spring 2012 and spring 2013 and the number of pairs of each species. Where no designation is shown, the species is not of conservation concern

Species	Designation	Conservation status	2012	2013
Chaffinch		Low	4	4
Coal tit		Low	1	0
Common sandpiper		Local	1	1
Curlew	UKBAP	Regional/Local	3	0
Dipper		Low	1	1
Dunnock		Low	1	0
Grey wagtail		Low	1	1
Pied wagtail		Low	5	1
Red grouse	UKBAP	Regional/Local	1	1
Robin		Low	1	0
Skylark	Red List; UKBAP	Regional	45	36
Snipe		Low	1	1
Stonechat		Local	1	3
Wheatear		Low	5	4
Whinchat		Local	1	0
Willow warbler		Low	6	0
Total species			**16**	**10**
Total pairs			**78**	**53**

10.7.26 The locations of bird species of conservation concern are shown in Figure 10.2. In both years, skylarks were found throughout the central ridge of the survey area but were absent from the stream valleys at the east and west edges of the area. Red grouse were found on the high ground near the centre of the area, while curlews were found mainly in the valley at the west edge of the survey area, but they were present only in 2012 (Figure 10.2).

10.7.27 In 2012, 79 pairs of meadow pipits were detected in 15km of transect (5.27 per km) while in 2013 67 pairs were detected in 18km of transect (3.72 per km). The estimated density, calculated by Distance software (Thomas *et al*. 2004) was 0.92 pairs per ha in 2012 and 0.66 pairs per ha in 2013.

Vantage Point Observations: Target Species

10.7.28 Flights by target species identified during surveys in 2012 and 2013 (in alphabetic order) are shown in Tables 10.8 to 10.12. The data in the tables are: record identifier (shown on flight lines in the Figures); date; starting time of the observation; vantage point; number of birds; duration of the flight and number of records (at 15sec intervals) in each height band. Flights which passed through the collision risk zone (within 253m of the proposed turbine positions) at risk height (20 – 150m) are highlighted in bold font.

Golden plover

10.7.29 Golden plovers were recorded during vantage point observations only on 13th April 2012, when one bird flew into the survey area from the west and was joined by three others flying across the area from the east, before all four flew off to the north-west (Table 10.8; Figure 10.3). The birds flew at collision risk height through the collision risk zone.

Table 10.8: Flight by golden plovers within the survey area in 2012/13

Record	Date	Time	VP	Number	Duration	Records in height band		
					(Sec)	<20m	20-150m	>150m
GP1	**13/04/2012**	**08:11**	**1**	**4**	**180**	**0**	**13**	**0**

Greylag goose

10.7.30 In spring 2012, four flocks of greylag geese totalling 114 birds were recorded flying northwards over the survey area on 12th and 13th April (Table 10.9; Figure 10.4). All of the flocks were flying at a height of 20 - 150m; three of them (GJ2, GJ3 and GJ4) were within the collision risk zone and one (GJ1) was outside the zone. In autumn and winter 2012/13, two flocks, totalling 93 birds, were recorded flying northwards up the valley at the west edge of the survey area (Figure 10.4). Both flocks were flying at heights above 150m and neither flock flew within the risk zone.

Table 10.9: Flights by greylag geese within the survey area in 2012/13

Record	Date	Time	VP	Number	Duration	Records in height band		
					(Sec)	<20m	20-150m	>150m
GJ1	12/04/2012	07:07	2	23	48	0	4	0
GJ2	**13/04/2012**	**06:25**	**1**	**19**	**169**	**0**	**12**	**0**
GJ3	**13/04/2012**	**07:12**	**1**	**17**	**342**	**0**	**21**	**0**
GJ4	**13/04/2012**	**07:40**	**1**	**55**	**190**	**0**	**13**	**0**
GJ5	28/11/2012	11:20	2	39	180	0	0	13
GJ6	12/01/2013	10:13	1	54	90	0	0	7

Merlin

10.7.31 Two short flights by merlins were recorded, both on 25th August 2012 (Table 10.10; Figure 10.3). Both birds appeared to be juvenile males (probably the same bird) and were flying low over the ground, below 20m, at the west edge of the survey area and outside the Development site boundary.

Table 10.10: Flights by merlins within the survey area in 2012/13

Record	**Date**	**Time**	**VP**	**Number**	**Duration**	**Records in height band**		
					(Sec)	<20m	20-150m	>150m
ML1	25/08/2012	16:54	1	1	46	4	0	0
ML2	25/08/2012	17:33	1	1	24	2	0	0

Pink-footed goose

10.7.32 In spring 2012, three flocks of pink-footed geese, totalling 606 birds, were seen flying northwards and north-westwards over the survey area, at a height of 20 - 150m, on 16th and 18th April (Table 10.11; Figure 10.4). All three flights were within the risk zone. On 31st October 2012, three flocks, totalling 68 birds, flew westwards across the south part of the survey area, before turning southwards (Figure 10.4). All three flocks were flying at heights over 150m and none passed within the Development site boundary. Flock PG5 passed just outside the survey area boundary.

Table 10.11: Flights by pink-footed geese within the survey area in 2012/13

Record	Date	Time	VP	Number	Duration	Records in height band		
					(Sec)	<20m	20-150m	>150m
PG1	**16/04/2012**	**14:11**	**1**	**61**	**124**	**0**	**9**	**0**
PG2	**16/04/2012**	**16:45**	**1**	**195**	**76**	**0**	**6**	**0**
PG3	**18/04/2012**	**15:05**	**1**	**350**	**110**	**0**	**9**	**0**
PG4	31/10/2012	09:35	1	52	120	0	0	9
PG5	31/10/2012	09:35	1	5	150	0	0	11
PG6	31/10/2012	09:35	1	11	150	0	0	11

Whooper swan

10.7.33 One flock of 21 whooper swans was recorded flying south-eastwards across the survey area on 31st October 2012 (Table 10.12; Figure 10.4). The swans started and ended their passage over the survey area at heights over 150m, but over the higher ground in the centre of the site they flew at heights between 20m and 150m. The flock passed just outside the collision risk zone.

Table 10.12: Flight by whooper swans within the survey area in 2012/13

Record	Date	Time	VP	Number	Duration	Records in height band		
					(Sec)	<20m	20-150m	>150m
WS1	31/10/2012	10:52	1	21	120	0	4	5

Vantage Point Observations: Secondary Species

10.7.34 The secondary species most commonly recorded from the vantage points were buzzards and ravens (Table 10.13), with other species seen in very small numbers. Buzzards and ravens were much commoner in winter than in spring.

Table 10.13: The numbers of secondary species recorded during vantage point observations in spring 2012 and winter 2012/13

Species	Spring 2012	Winter 2012/13
Buzzard	15	34
Herring gull	1	0
Great black-backed gull	2	0
Kestrel	1	3
Lesser black-backed gull	4	0
Raven	12	41

Breeding Raptors

10.7.35 No raptors were found to be nesting in the survey area or within 2km of the Development site boundary in either 2012 or 2013.

Modifying Influences

10.7.36 There are no current or predicted future processes (other than the Development) which are likely to change baseline conditions with regard to birds. The planned increase in sward heterogeneity through reduced grazing pressure and the increased re-wetting of localised areas through ditch-blocking, being carried out under the existing HMP are unlikely to affect bird populations on the Development site since the sward there is already heterogeneous (see Chapter 8, Ecology and Nature Conservation). Surveys of the open ground within the HMP area in 2009/10 and 2014 showed no increase in bird numbers other than skylarks (and a large decrease in the latter species) over the five-year period, so it is considered very unlikely that bird numbers would increase on the Development site even in the absence of development.

10.8 Conservation Value of the Resident Bird Species

10.8.1 It is considered that most of the resident bird species (Table 10.7), apart from curlew, red grouse and skylark, are of Local or Low conservation status. It is also considered that the site populations of all of these species are typical of similar areas of upland habitat in the region, so that all are considered to have populations of local importance. Consequently, the conservation value of these species is assessed as Local or Low. The three species of Regional conservation status are discussed individually, below.

10.8.2 The curlew is a UKBAP species which is common in the region and so is assessed as having Regional/Local conservation status. However, only one pair was recorded within the breeding bird assessment area (within 500m of the proposed turbine positions; see section 10.3.3) in 2012 (Figure 10.2) and the species was not recorded in the survey area in 2013. Consequently, the curlew cannot be regarded as a permanent resident on the site and its conservation value there is assessed as Low.

10.8.3 The red grouse is also a UKBAP species which is common in the region and so is assessed as having Regional/Local conservation status. The red grouse population in the survey area was low, with only one pair recorded within the turbine assessment area and a further pair in the track assessment area (see section 10.3.3) in both 2012 and 2013 (Figure 10.2), so their conservation value is assessed as Local.

10.8.4 The skylark is a Red List and UKBAP species which is common in the region and so is assessed as having Regional/Local conservation status. Thirty-five pairs were recorded within the turbine assessment area in spring 2012 and 21 pairs in spring 2013 (Figure 10.2). A further nine pairs in 2012 and 17 pairs in 2013 were found in the track assessment area. This population is considered to be of Regional importance, so the species' conservation value is assessed as Regional.

10.9 Potential Effects

10.9.1 The potential negative effects of the Development on birds are habitat loss, disturbance and nest destruction during the construction phase and disturbance and collision risk

during the operational phase. The assessment of the magnitude and significance of these potential effects follows the methodology laid out in section 10.6 above. Most emphasis will be placed on resident birds of at least Regional conservation status and on raptors and geese recorded flying over the survey area. However, it is also important to assess potential negative effects on nesting birds, irrespective of their conservation status.

Construction Phase

Habitat Loss

10.9.2 Construction of the wind turbines, access tracks, and operations building would involve the loss of a very small percentage of the available habitat. Part of the construction area would be restored and part subject to permanent loss to the footprint of the wind turbine bases and access tracks. There are no critical bird habitat features, such as lochs (used for nesting by divers) or cliffs (used for nesting by raptors, such as peregrines), on or near the Development site. The effect of habitat loss is assessed as being of low magnitude and **not significant**.

Disturbance

10.9.3 Outside the breeding bird season (March to July), disturbance due to construction activities is assessed for the resident bird species as being a short-term effect of very low magnitude and **not significant**.

10.9.4 If construction is carried out during the bird breeding season, between March and July, there is a risk of disturbance to nesting birds, although no particularly sensitive species, such as raptors or waders (e.g. golden plover) were recorded breeding on the Development site. The magnitude of this effect is considered likely to be short term and of medium magnitude for all of the resident bird species. In the absence of mitigation, the effect is considered to be of **moderate significance**.

Nest Destruction

10.9.5 If construction is carried out during the bird breeding season, there is a risk that birds' nests might be destroyed by trampling or the operation of machinery. The deliberate or careless destruction of birds' nests is an offence under the Wildlife and Countryside Act. Such risks are considered to be short-term and of medium magnitude. In the absence of mitigation, the effect is considered to be of **moderate significance**.

Operational Phase

Disturbance

10.9.6 Disturbance due to the activities of personnel during the operational phase of the wind farm is assessed for the resident bird species as having an effect of very low magnitude and **not significant**.

Collision Risk

10.9.7 There is a potential risk of collision with turbines for geese flying over the Development site. Three flocks of greylag geese, totalling 91 birds (Table 10.9), and three flocks of pink-

footed geese, totalling 606 birds (Table 10.11), were recorded passing through the collision risk zone (within 253m of the turbines) at collision risk height (20 – 150m). The methodology and full workings of the collision risk calculations are shown in Appendix 10.1. This section summarises the results of the calculations and assesses the effect on the birds flying over the survey area.

10.9.8 The total number of collisions predicted for the whole goose wintering period was 0.33 greylag geese and 2.04 pink-footed geese per year (Table 10.14), assuming the current SNH-recommended avoidance rate of 99.8% (SNH 2010b).

Table 10.14: The estimated number of collisions per year by greylag and pink-footed geese

Species	Greylag goose	Pink-footed goose
Collisions per year, in the absence of avoidance	166	1,020
Collisions per year, assuming 99.8 % avoidance	0.33	2.04

10.9.9 To assess the significance of the predicted collisions by geese, it is necessary to estimate the size of the goose population affected. The geese recorded flying over the survey area occurred almost exclusively during the spring and autumn migration periods (recorded in April and October/November) and so were almost certainly on migration through the area. They were unlikely to have been on foraging flights from a nearby roost site since none is known in the area. Since the birds cannot be attributed to a local population, it is appropriate to consider the predicted number of collision casualties in relation to the size of the regional population. The counts made by the Wildfowl and Wetlands Trust in their Highland region in 2012/13 recorded 13,207 greylag geese and 33,171 pink-footed geese (Mitchell, 2013). The predicted number of collisions shown in Table 10.14 make up less than 0.001% of the regional populations of both greylag geese and pink-footed geese. This percentage is well below the value of 1% of the population generally considered to be the criterion for a significant effect. Consequently, the effect of collision is assessed as being of very low magnitude and **not significant**.

10.9.10 The single record of golden plovers flying over the survey area (Table 10.8) is considered to be an occasional occurrence, which does not provide sufficient data to establish the average number of birds which pass over the area per year. Consequently, it is not possible to estimate the collision risk for this species, but the very low level of occurrence suggests strongly that the risk of collision by golden plovers is not an issue.

Displacement

10.9.11 No sensitive species (e.g. raptors or golden plovers) were found in the development area, so there are none to be displaced. The two species of conservation concern found in the assessment area, red grouse and skylarks, are unlikely to be displaced from the site.

Decommissioning Phase

10.9.12 Impacts during decommissioning are considered likely to be broadly similar to those in the construction phase (above), although it is not possible to predict precisely what activities would take place, or what bird populations would be present, at that time. Bird surveys would be carried out prior to decommissioning, so that potential impacts can be assessed.

10.10 Mitigation

General

10.10.1 Since all of the potential effects of the Development on birds, apart from risks to nests, are assessed as being of low or very low magnitude and not significant, no mitigation apart from protection of nests, is required. Since bird numbers were found to be low on the Development site and no sensitive species were recorded there, no amendments to the existing HMP are required as a result of bird issues related to the Development.

Construction Phase

Habitat Loss

10.10.2 Since the effect of habitat loss to birds is assessed as being of low magnitude and not significant, no mitigation is considered to be necessary.

Disturbance and Destruction Risk to Nests

10.10.3 Since the effect of disturbance outside the bird breeding season is assessed as being of very low magnitude and not significant, no mitigation is considered to be necessary if construction is carried out during this period.

10.10.4 Where construction is scheduled during the nesting period (March to July inclusive), the following measures to protect nesting birds will be implemented:

- A pre-construction survey, started in March, to check whether any birds are settling to nest close to proposed access tracks or construction sites, where there might be a risk of the nest being destroyed;
- Monitoring of construction sites throughout the nesting season, to detect birds settling to nest on areas close to construction activity;
- Implementation of deterrence measures within potential construction sites to move any such birds discovered at an early stage of settling;
- Postponement of construction activities which would risk disturbance or the destruction of a bird's nest, until deterrence or nest protection measures have been put in place; and
- Protection of any nests discovered.

10.10.5 Deterrence and nest-protection measures have been developed and have been effective at recent developments at Gordonbush and Strathy North Wind Farms in Sutherland. The measures included: the provision of information to all construction personnel concerning the law relating to birds and the actions to be taken if nesting birds were detected near a construction site; moving of settling birds using scaring devices; and protection of established nests and broods by marker tape. These measures have been found to be successful in deterring birds from settling close to construction sites and in protecting already-established nests and broods. The suggested mitigation measures therefore have a substantial likelihood of success in preventing disturbance to nesting birds and the potential destruction of birds' nests, and residual effects are predicted to be not significant.

Operational Phase

Disturbance

10.10.6 Since the effect of disturbance during the operational phase is assessed as being of very low magnitude and not significant, no mitigation is considered to be necessary.

Collision Risk

10.10.7 Since the effect of collision during the operational phase is assessed as being of very low magnitude and not significant, no mitigation is considered to be necessary.

10.11 Monitoring

10.11.1 To conform to current SNH guidance and recommendations (SNH 2014), monitoring of breeding birds and flight activity within 500m of the turbines should be carried out in years 1, 2, 3, 5, 10 and 15 after wind farm construction.

10.12 Residual Effects

10.12.1 Any residual effects of habitat loss, disturbance and collision risk remaining after mitigation are assessed as being of low or very low magnitude and not significant (Table 10.15).

Table 10.15: Residual Effects

Effect	Receptor	Potential significance	Mitigation	Residual significance
Habitat loss	Breeding birds	Not significant	None required	Not significant
Disturbance (winter)	Wintering birds	Not significant	None required	Not significant
Disturbance (spring)	Breeding birds	Moderate	Nest protection	Not significant
Nest destruction	Breeding birds	Moderate	Nest protection	Not significant
Collision risk	Overflying geese	Not significant	None required	Not significant

10.13 Cumulative Effects

10.13.1 Since any residual effects on birds are assessed as being of low or very low magnitude and not significant, there would be no contribution by the Development to cumulative effects with other developments in the area. In particular, the predicted numbers of collisions by greylag geese and pink-footed geese are less than 0.001% of their respective regional populations, i.e. very close to zero effect. Consequently, the contribution to any cumulative effect of other developments would not be measurable (even to the second decimal place) and is assessed as not significant.

10.14 Effect on Existing HMP Objectives

10.14.1 As discussed in section 10.7.36 above, the planned increase in sward heterogeneity, through measures being carried out under the existing HMP, are unlikely to affect bird populations on the Development site, since the sward there is already heterogeneous (see Chapter 8, Ecology and Nature Conservation). In spite of the increased re-wetting of localised areas, adult golden plovers are unlikely to be attracted to forage in the

Development area, since studies of tagged individuals have shown that they feed mainly in grass fields in Strath Brora. The breeding bird surveys and vantage point observations have shown no indication that golden plovers are likely to colonise the Development site for breeding.

10.14.2 Surveys of the open ground within the HMP area in 2009/10 and 2014 showed no increase in bird numbers over the five-year period, in spite of measures to reduce grazing pressure, so it is considered very unlikely that resident bird numbers would increase on the Development site even in the absence of development.

10.14.3 As a consequence of the above findings, the Development is considered to be very unlikely to have a significant effect on the objectives of the HMP.

10.15 Conclusions

10.15.1 It is considered that there would be no significant negative effect of the Development on birds through habitat loss, disturbance outside the bird breeding season or collision risk. Potential disturbance of nesting birds if construction is carried out during the bird breeding season would be mitigated by appropriate deterrence and nest protection measures. Consequently, it is considered that there would be no significant residual negative effects of the Development on birds through habitat loss, disturbance or collision risk.

10.16 Statement of Significance

10.16.1 There would be no significant negative residual effects of the Development on birds through habitat loss, disturbance or collision risk. Consequently, there would be no adverse effect on the integrity or bird populations of the Caithness and Sutherland Peatlands SPA. There would also be no negative effect on the bird populations of the Gordonbush Habitat Management Plan area.

10.17 References

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