

# 8. Ornithology

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## 8. Ornithology

### 8.1 Abstract

- 8.1.1 This chapter considers and provides an assessment of the potential effects of the Proposed Development on ornithology in terms of the Proposed Development site ('the site') and the surrounding area ('the Study Area'). In particular, this chapter considers the potential effects of the Proposed Development on habitats and protected and/or notable species, with particular focus on Valued Ecological Receptors (VERs). The potential effects on other ecological receptors are considered separately in Chapter 7 (Ecology and Nature Conservation).
- 8.1.2 Should the Proposed Development not be consented, the "do-nothing scenario" will apply to the current baseline environment, in that the Applicant will construct the Consented Development. The Consented Development was environmentally assessed and consented in 2015 and the assessment is reported within the Sandy Knowe Wind Farm Environmental Statement (2015).
- 8.1.3 This chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment. As such, reference should be made (where applicable) to the other chapters of this EIA Report.
- 8.1.4 The baseline data used to inform the assessment for this application was collected as part of the Section 36 Application submitted in 2013 (surveys were undertaken between 2011 and 2013). Consultation with Scottish Natural Heritage (SNH) in 2015 and 2017 has confirmed the suitability of this data for this assessment (refer to Appendix 4.4).
- 8.1.5 This chapter outlines the potential ecological effects of the Proposed Development and an assessment is provided based on the value of the receptor and the magnitude of the impact giving the significance of the effect. Where appropriate, mitigation measures to enhance, prevent, minimise or control identified ecological effects are presented. These include both generic mitigation (such as the appointment of an Ecological Clerk of Works and repeat ecological surveys prior to construction) and specific mitigation (such as lekking exclusion zone). Following the implementation of the mitigation all adverse effects would be reduced to negligible significance.
- 8.1.6 The predicted residual significant effects for the Proposed Development are exactly the same as those which would arise from the 'do-nothing scenario', which would result in the implementation of the Consented Development.
- 8.1.7 The EIA Regulations, at Schedule 4, require the EIA Report to provide a

*"description of the likely significant effects of the development on the environment resulting from, inter alia:*

*... (e) the cumulation of effects with other existing and/or approved development, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;"*

- 8.1.8 In this regard, the Proposed Development would be indiscernible from the Consented Development.

## 8.2 Legislation, Policy and Relevant Guidance

### ***Legislation***

- 7.1.1 Relevant legislation documents have been taken into account as part of this ecological assessment. Of particular relevance are:

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- Salmon and Freshwater Fisheries Act 2003 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended); and
- Nature Conservation (Scotland) Act 2004 (referencing the Convention on Biological Biodiversity (1992) and the Scottish Biodiversity Strategy which are implemented through Biodiversity Action Plans (BAP), namely the UK Biodiversity Action Plan (UKBAP) and Local BAP).

### ***Planning Policy***

- 8.2.1 Chapter 5 of the EIA Report sets out the planning policy framework that is relevant to the EIA process. The policies set out include those from the Dumfries and Galloway Local Development Plan (LDP) (2014), those relevant aspects of Scottish Planning Policy (SPP), Planning Advice Notes and other relevant guidance. Of relevance to the ecology and nature conservation assessment presented within this chapter, regard has been had to the following policies:

- Scottish Planning Policy (SPP) 2014 (Scottish Government, 2014);
- Planning Advice Note (PAN) 60: Planning for Natural Heritage (amended in 2008); and
- LDP Policies:
  - IN1 Renewable Energy;
  - NE5 Sites of National importance for Biodiversity and Geodiversity;
  - NE6 Forestry and Woodland; and
  - NE7 Trees and Development.

### ***Best practice Ecological Guidance***

- 8.2.2 Relevant legislation and guidance documents have been taken into account as part of the ecological assessment. A full description of legislation and guidance is presented in Appendix 7.1; however, of particular relevance to ornithology are:

- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (UK Government, 1994);
- The Wildlife and Countryside Act 1981 (as amended) (UK Government, 1981);
- The Wildlife and Natural Environment (Scotland) Act 2011 (as amended) (Scottish Government, 2011a);

- Nature Conservation (Scotland) Act 2004 (Scottish Government, 2004) (referencing the Convention on Biological Biodiversity (1992) and the Scottish Biodiversity Strategy which are implemented through Biodiversity Action Plans (BAP), namely the UKBAP and Local BAP);
- Guidelines for Ecological Impact Assessment (Institute of Ecology and Environmental Management (IEEM), 2006);
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2005);
- Windfarms and Birds: Calculating a Theoretical Collision Risk Assuming No Avoiding Action (SNH, 2000);
- Survey Methods for Use in Assessing the Impacts of Onshore Wind Farms on Bird Communities (SNH, 2005); and
- SNH Avoidance Rate Information and Guidance Note. Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model (SNH, 2010).

## 8.3 Methods

8.3.1 This section identifies the ‘key ornithology and nature conservation issues’ to be considered as part of the Ecological Impact Assessment (EclA) and with an understanding of these issues, describes the methods used to establish baseline conditions and assess the magnitude and significance of the ecological effects of the Proposed Development.

### ***Consultation***

8.3.2 Statutory consultees and other relevant non-statutory organisations have been consulted throughout the Proposed Development’s history, to identify the key ecology and nature conservation matters to be assessed as part of the Proposed Development and to obtain existing data/information to supplement and inform the ecological assessment. Responses were sought from the following organisations:

- Dumfries and Galloway Council (DGC);
- Energy Consents and Deployment Unit (ECDU);
- Scottish Ornithologist Club (SOC);
- Dumfries and Galloway Raptor Study Group;
- Royal Society for the Protection of Birds (RSPB); and
- Dumfries and Galloway Ecological Records Centre.

### ***Desk Study***

8.3.3 A desk study was undertaken of web-based resources to identify baseline data for the Proposed Development site and wider area. Where relevant, the desk study was supplemented by consultation with relevant non-statutory organisations for a 5 km radius of the Proposed Development site, as recommended in IEMA’s Guidelines for Baseline Ecological Assessment (1995) and supported by IEEM.

### **Baseline Methods**

8.3.4 The scope of the ornithology surveys including field survey methods and vantage point locations were developed and agreed between the Applicant and SNH taking cognisance of best practice guidance (SNH, 2005). Ornithology field surveys for the Proposed Development commenced in April 2011. Full details of the field survey methods are provided in Appendix 8.1 (Ornithology Technical Report) and are summarised below:

- flight activity vantage point surveys (focussed on diurnal raptors, gulls and crepuscular species);
- breeding walkover survey;
- winter walkover survey;
- breeding raptor survey;
- black grouse survey; and
- woodland point counts.

8.3.5 It should be noted that dedicated migratory waterfowl surveys were not undertaken due to limited number of recorded observations which supported the conclusion that these surveys were not required, as discussed and agreed with SNH.

8.3.6 All surveys were undertaken by suitably qualified ecologists with membership/affiliation to the relevant professional body.

### **Study Area**

8.3.7 Appropriate study areas for each survey were derived from best practice guidance (SNH, 2005) and are provided below:

- flight activity vantage point surveys (the Proposed Development site boundary plus 200 m);
- breeding walkover survey (the Proposed Development site boundary plus 500 m);
- winter walkover survey (the Proposed Development site boundary plus 500 m);
- breeding raptor survey (the Proposed Development site boundary plus 2000 m);
- black grouse surveys (the Proposed Development site boundary plus 1500 m); and
- woodland point counts (the Proposed Development site boundary plus 200 m).

### **Identification and Assessment of Valued Ecological Receptors (VERs)**

8.3.8 Current CIEEM guidelines support the focus of an ecological assessment on VERs, that is, those ecological receptors assessed as being of greatest value/sensitivity present within a 'Proposed Development'. For the purpose of this ecological assessment, VERs were identified and assigned an ecological value in accordance with the criteria presented in Table 8.1 below.

**Table 8.1 – Ecological Value Criteria**

Scale of Ecological Value	Examples
International/European	Presence of a qualifying species of an internationally designated area as described in Appendix 7.1 i.e. Special protection Area (SPA) or provisional SPA or Ramsar site.

Scale of Ecological Value	Examples
	Considerable population of a priority species listed in Annex 1 of the Council Directive 2009/147/EC on the conservation of wild birds (Birds Directive). A regularly occurring, nationally important population of any internationally important species.
National	A regularly occurring, regionally or county significant population of an internationally/nationally important species. A population of more than 1% of the UK population of a European or nationally protected species (e.g. hen harrier), or an otherwise important population (e.g. a population on the edge of its natural range).
Regional / Authority Area	Species populations identified as being of regional importance, e.g. occurrence of a European or nationally protected species (e.g. goshawk).
Local	Species considered to appreciably enrich the ecological resource within the local context e.g. common raptors including buzzards.
Less than local	Species that are of limited ecological value (green list species) and enrich the habitat resource at a site level.

8.3.9 It should be noted that assigning a value to an ecological receptor is often more straightforward for designated areas, due to the fact that the designations in their own right imply a value level in accordance with the scale of the designation. As part of this ecological assessment professional judgment was exercised and other criteria consulted and considered (where applicable) such as the National Guidelines for the Selection of Biological Sites of SSSI, where appropriate, with explanations provided of how a receptor has been valued.

### ***Assessment of Potential Ecological Effects***

8.3.10 The magnitude of any impact on VERs was categorised according to the criteria outlined in Table 8.2, which is based on a table presented in the IEEM (2006) guidelines. The concept of integrity refers to coherence of ecological structure and function and includes both temporal and spatial considerations.

8.3.11 The significance of the ecological effect was determined as a function of the sensitivity of the VER (value level) and the magnitude of the impact. The matrix presented in Table 8.2 outlines how these criteria are combined to determine ecological significance. This table is adapted from the matrix provided in IEEM (2006). As outlined above, a degree of professional judgment was exercised to attribute ecological significance within the ranges in the matrix.

**Table 8.2 – Ecological Magnitude / Significance Criteria**

Magnitude of change/ effect	Change / effect Characterisation	Level of Ecological Value			
		International/ National	Regional/ Authority Area	Local	Less than Local
<b>High</b>	A permanent or long-term effect on the distribution and/or abundance of a habitat, species assemblage/community or population.	Major	Major - Moderate	Moderate - Minor	Minor

Magnitude of change/ effect	Change / effect Characterisation	Level of Ecological Value			
		International/ National	Regional/ Authority Area	Local	Less than Local
	If negative this would have implications for the integrity of the receptor and its conservation status, and if positive would result in an improvement to the conservation status of the receptor.				
<b>Medium</b>	A permanent or long-term effect on the distribution and/or abundance of a habitat, species assemblage/community or population. If negative this would have negligible implications for the integrity of the receptor and its conservation status, and if positive would result in an improvement to the conservation status of the receptor.	Major	Moderate	Minor	Negligible
<b>Low</b>	A short-term reversible effect on the distribution and/or abundance of a habitat, species assemblage/community or population and within normal fluctuations observed within the ecology of the receptor.	Moderate - Minor	Minor	Minor - Negligible	Negligible
<b>Negligible</b>	A short-term reversible effect on the distribution and/or abundance of a habitat, species assemblage/community or population unlikely to be detectable by monitoring.	Negligible	Negligible	Negligible	Negligible

8.3.12 For the purpose of this assessment, adverse effects which are assessed to be major, major-moderate or moderate will be considered significant ecological effects. Effects which are

assessed to be moderate-minor, minor, minor-negligible or negligible are not considered to be significant such that bespoke detailed mitigation would be typically required.

### **Requirements for Mitigation**

- 8.3.13 Following the determination of ecological value and assessment of potential ecological effects, professional judgement was used, coupled with an understanding of the legal requirements of the statute outlined in Section 8.2 (Legislation, Policy & Guidance), to assess and determine the requirements for appropriate mitigation.
- 8.3.14 Mitigation will follow a hierarchical approach that should, where possible, be adopted in the following order:
- avoid adverse impacts in the first instance;
  - where avoidance is not possible, reduce the adverse impact with the aim of avoiding or reducing effects; and
  - where significant adverse residual impacts remain, measures to offset the adverse effects at a site specific level may be required.

### **Residual Effects**

- 8.3.15 Residual effects have been assessed using the same methods as the potential effects but taking into consideration the proposed mitigation.
- 8.3.16 In order to fully assess and appreciate the significance of residual ecological effects, further consideration is given to two additional criteria, these being: the type of impact, i.e. whether it is positive, negative, neutral or uncertain and the probability of the impact occurring using a scale of certain, likely or unlikely.

### **Limitations to Assessment**

- 8.3.17 No limitations to the survey work were encountered.

## **8.4 Consultation**

- 8.4.1 Consultation has been undertaken with statutory consultees and other relevant organisations as part of the EIA Scoping, refer to Table 8.3.

**Table 8.3 – Consultee Responses**

<b>Consultee</b>	<b>Response to the Consented Development Application</b>	<b>Scoping Response 2017</b>	<b>Applicant Action</b>
Dumfries and Galloway Council – Biodiversity Officer	Concur with the findings of the Environmental Statement and do not object to the Proposed Development subject to a CDEMP and OEMP are prepared and agreed with DGC and an ECoW oversees their implementation.	No response.	No action
Scottish Natural Heritage (SNH)	The surveys and assessments presented in these sections make use of data collected in 2012 for the previous ES. As there has been no material change in habitat extent or	We do not require any further ecological/ ornithological assessments over and	No additional surveys were undertaken for this 2018 application.

Consultee	Response to the Consented Development Application	Scoping Response 2017	Applicant Action
	<p>quality of the site since this time they are content that these assessments are appropriate.</p> <p>I agree therefore that the conclusion of no significant impact on the bat population remains valid.</p>	above that already undertaken or proposed in the April 2017 Scoping Report (pre-construction surveys)	
RSPB	No response.	We are content with the applicant's proposal to rely on earlier baseline ornithological monitoring, as agreed with SNH in January of this year. We have no additional ornithological survey information to supplement what was gathered in support of the original application	No additional surveys were undertaken for this 2018 application.

8.4.2 Consultation has also previously been undertaken with non-statutory stakeholders to gain baseline information (refer to Table 8.4).

**Table 8.4 – Baseline Consultation**

Consultee	Response to the Consented Development Application
SOC	<p>The group provided records of the following species within the 5 km from the Proposed Development:</p> <p>Wild Bird Directive Annex 1:  Black grouse (<i>Tetrao tetrix</i>);  Peregrine falcon (<i>Falco peregrinus</i>);  Short eared owl (<i>Asio flammeus</i>); and  Golden plover (<i>Pluvialis apricaria</i>).</p> <p>WCA 1981 Schedule 1:  Crossbill (<i>Loxia spp.</i>).</p> <p>Red Listed species (Eaton et al, 2009):  Tree pipit (<i>Anthus trivialis</i>).</p> <p>Amber Listed species (Eaton et al, 2009):  Kestrel (<i>Falco tinnunculus</i>);  Redstart (<i>Phoenicurus phoenicurus</i>); and  Red grouse (<i>Lagopus lagopus</i>).</p>
Dumfries and Galloway Raptor Study Group	Dumfries and Galloway Raptor Study Group was consulted regarding the Proposed Development. The group confirmed the absence of any rare raptor breeding sites within 2 km of the Proposed Development site.
RSPB	The response from the Royal Society for the Protection of Birds (RSPB) stated that the main issue regarding development at the Proposed Development site would concern impacts to black grouse, and noted there were are several leks within the Proposed Development site. The society further noted that that the Forest Commission for Scotland had bought a large area of land adjacent to the Proposed

Consultee	Response to the Consented Development Application
	<p>Development site (Corserig) in order to create a community woodland and significantly enhance black grouse habitat and suggested that any proposal would need to demonstrate that it would conserve and enhance habitat for black grouse. The RSPB additionally noted that the development site would be of low-moderate value for hen harrier and peregrine in winter, and noted that merlin breed on the forest edge a few kilometres to the southwest of the Proposed Development site and may forage over this area throughout the year. The response however noted that the nearest breeding peregrine is approximately 10 km from the Proposed Development site. Additional information was provided in respect to golden plover, noting that large numbers have previously been found to use the Proposed Development site in winter and that the species breed at nearby Hare Hill and gather in the Proposed Development site in large numbers in late summer/autumn.</p>
<p>Dumfries and Galloway Ecological Resource Centre</p>	<p>The Dumfries and Galloway Resource Centre provided records of following species within 5 km of the site:</p> <p>Barn owl (<i>Tyto alba</i>);  Barn swallow (<i>Hirundo rustica</i>);  Black grouse;  Cuckoo (<i>Cuculus canorus</i>);  Curlew (<i>Numenius arquata</i>);  Grey wagtail (<i>Motacilla cinerea</i>);  Golden plover;  Hen harrier (<i>Circus cyaneus</i>);  House martin (<i>Delichon urbicum</i>);  Lapwing (<i>Vanellus vanellus</i>);  Mallard (<i>Anas platyrhynchos</i>);  Northern Wheatear (<i>Oenanthe oenanthe</i>);  Pink-footed goose (<i>Anser brachyrhynchus</i>);  Reed bunting (<i>Emberiza schoeniclus</i>);  Redshank (<i>Tringa totanus</i>);  Short eared owl;  Skylark (<i>Alauda arvensis</i>);  Sandpiper (<i>Actitis hypoleucos</i>);  Song thrush (<i>Turdus philomelos</i>);  Starling (<i>Sturnus vulgaris</i>);  Snipe (<i>Gallinago gallinago</i>);  Whinchat (<i>Saxicola rubetra</i>); and  Whooper swan (<i>Cygnus Cygnus</i>).</p>

## 8.5 Baseline Conditions

### **Desk Study Results**

- 8.5.1 The results of a search of NBN Atlas for bird species records between 2007 and 2017, recorded within 5km of the Proposed Development, is presented in Table 8.5. The search highlighted the potential presence of two species listed on Annex 1 of the Conservation of Wild Birds Directive 2009/147/EC (the Birds Directive) and seven Wildlife and Countryside Act 1981 (as amended) Schedule 1 species of which, two were also Annex 1 species. An additional 41 bird species listed on the Red and Amber List (Eaton et al, 2009) were additionally returned.

**Table 8.5 – Desk Study results (BD Annex 1 and WCA Schedule 1 Species)**

Common Name	Species	Date of Record	Legal Status
Hen Harrier	<i>Circus cyaneus</i>	–Last recorded 2014	BD Annex 1 and WCA (Schedule 1)
Whooper Swan	<i>Cygnus Cygnus</i>	Last recorded 2012	BD Annex 1 and WCA (Schedule 1)
Barn Owl	<i>Tyto alba</i>	Last recorded 2009	WCA (Schedule 1)
Brambling	<i>Fringilla montifringilla</i>	Last recorded 2011	WCA (Schedule 1)
Fieldfare	<i>Turdus pilaris</i>	Last recorded 2008	WCA (Schedule 1)
Peregrine Falcon	<i>Falco peregrinus</i>	Last recorded 2010	WCA (Schedule 1)
Redwing	<i>Turdus iliacus</i>	Last recorded 2009	WCA (Schedule 1)

- 8.5.2 A search of publicly available mapping resources identified the presence of Muirkirk & North Lowther Uplands SPA located approximately 5.2 km to the north of the Proposed Development site. The SPA is designated for its breeding population of hen harrier (6 % of the Great Britain population), short-eared owl (3 % of the Great Britain population), merlin (*Falco columbarius*) (0.7 % of the Great Britain population), peregrine (0.5 % of the Great Britain population) and golden plover (0.7 % of the Great Britain population), and non-breeding population of hen harrier (2 % of the Great Britain population). The SPA is additionally listed as an Important Bird Area (IBA) by Birdlife International. A second IBA was recorded 6.4 km to the north of the site (Airds Moss & Muirkirk Uplands IBA) which is listed for its remaining continuous block of un-forested moorland in south-west Scotland.

### **Ornithology Field Survey Results**

- 8.5.3 Full details of the field survey results are provided in Appendix 8.1 with a summary of relevant results used to inform the assessment of ecological effects provided below. Flight lines of target species are presented in Appendix 8.1 and are shown on Figures 8.4a-c.

#### **Wildfowl and Gulls**

- 8.5.4 During the non-breeding season (September 2011 to March 2012 inclusive) pink-footed goose were recorded as part of the vantage point surveys. In addition mallard, teal and goldeneye (*Bucephala clangula*) were recorded during the winter walkover surveys. No species of wildfowl were recorded during the breeding season surveys (April 2011 to August 2011 inclusive).
- 8.5.5 Two species of gull (lesser black back gull (*Larus fuscus*) and herring gull (*Larus argentatus*)) were recorded during the breeding and non-breeding season surveys. A third species of gull (common gull (*Larus canus*)) was observed during the winter walkover surveys. Table 8.6 below provides details of the flight activity for all wildfowl and gull species observed.

**Table 8.6 – Flight times of Wildfowl and Gulls**

Species	Status	No. of flights	No. of birds	Total flying time (s)	<10 m	10 - 35 m	36 - 125 m
Pink-footed goose	amber-listed	4	181	640	0	0	610
Herring gull	red-listed UK BAP species	1	4	Unknown			

Species	Status	No. of flights	No. of birds	Total flying time (s)	<10 m	10 - 35 m	36 - 125 m
Unidentified goose species	-	2	3	Unknown			
Lesser black back gull	amber-listed	3	8	Unknown			

### Raptors and Owls

- 8.5.6 Four species of scarce raptor and owl were recorded during breeding season surveys undertaken: hen harrier, merlin and long-eared owl (*Asio otis*). The common raptor species, buzzard (*Buteo buteo*), kestrel and sparrowhawk (*Accipiter nisus*) were also recorded. All species were also recorded during the non-breeding season with the exception of long-eared owl. In addition peregrine falcon and merlin were also recorded during the non-breeding season surveys.
- 8.5.7 All flights were observed within HB1 with the exception of one peregrine falcon flight which was observed within HB2.
- 8.5.8 Breeding raptor surveys undertaken in 2012 did not identify any evidence of scarce raptor or owl species utilising the site or Wider Study Area for breeding.
- 8.5.9 The breeding raptor surveys did identify a derelict livestock shed used by barn owl for roosting. The shed is located near Crockroy Cottage (NS 7061512160) approximately 730 m from the boundary of the Proposed Development. The shed is not considered to be used as a nesting site; no evidence of breeding by any scarce raptors or owl species was identified during the breeding raptor surveys within the 2 km study area. Table 8.7 below provides details of the flight activity for all scarce raptor and owl species observed.

**Table 8.7 – Flight times of raptors and owls**

Species	Status	No. of flights	No. of birds	Total flying time (s)	<10 m	10 - 35 m	36 - 125 m
Hen harrier	BD Annex 1 WCA Schedule 1 red-listed	17	18	1770	1770	0	0
Peregrine falcon	BD Annex 1 WCA Schedule 1 green listed	1	1	25	10	15	0
Merlin	BD Annex 1 WCA Schedule 1 red listed	2	2	310	310	0	0
Long-eared owl	green listed	1	1	75	75	0	0

### Black Grouse

- 8.5.10 Black grouse were observed predominately in the east and north-east of the site adjacent to Libry Moor Plantation, White Knowe and Hay Knowe during VP survey. Six flights involving seven individuals were recorded totalling 260 seconds. Of this 240 seconds were observed within HB1 and 20 seconds within HB2.

- 8.5.11 Following these observations dedicated black grouse surveys were undertaken in March and April 2012 which identified two leks comprising of a single displaying male at each. The first lek was recorded at Hay Knowe, to the north-east of White Hill (NS 69514 10645) approximately 100 m from the Proposed Development. The second lek was located north of Hay Knowe on the west bank of the Polneul Burn (NS 69503 11894) within the Proposed Development boundary. In addition, five females were observed flying east across the Proposed Development site landing (NS 70277 10164) adjacent to the met mast. This area was surveyed but did not record the presence of a lek.

#### **Woodland Birds**

- 8.5.12 Woodland point count surveys conducted during the 2011 breeding season identified that the Proposed Development supports an assemblage of breeding bird species typical of developing plantation woodland within the southern uplands of Scotland. Twenty-three species were recorded by the surveys including six red-listed species of conservation concern:

- lesser redpoll (*Carduelis cabaret*);
- cuckoo;
- mistle thrush (*turdus viscivorus*);
- starling;
- song thrush; and
- spotted flycatcher (*Muscicapa striata*).

- 8.5.13 All of these species, except mistle thrush, in addition to dunnoek (*Prunella modularis*) and bullfinch (*Pyrrhula pyrrhula*) are listed on the UK Biodiversity Action Plan (UKBAP).

- 8.5.14 Woodland point count surveys conducted during the non-breeding season also identified that the Proposed Development supports an assemblage of breeding bird species typical of developing plantation woodland within the southern uplands of Scotland. Twelve species were recorded by the surveys including one red-listed species of conservation concern (song thrush) and two amber-listed species dunnoek and bullfinch which are also UKBAP species.

#### **Waders**

- 8.5.15 Eight species of wader of conservation concern were recorded: dunlin (*Calidris alpina*), golden plover, lapwing, snipe, redshank, oystercatcher (*Haematopus ostralegus*), curlew and woodcock (*Scolopax rusticola*). Golden plover and dunlin are listed on Annex 1 of the Birds Directive. Curlew, dunlin and lapwing are red-listed species of conservation concern; golden plover, snipe, redshank and oystercatcher are additionally amber-listed species of conservation concern (Eaton *et al.*, 2009).

- 8.5.16 Ten golden plover flights were recorded across the study area over the course of the VP surveys. Activity was predominantly observed in the west of the study area over White Hill and Hay Knowe. A total flight time of 1135 seconds of flight activity was recorded across the study area involving a total of 170 individuals. Four hundred and eighty seconds of flight was observed at HB3 and the remainder (655 seconds) occurred within HB1 and HB2. In addition, a flock of five golden plover were observed during the winter walkover survey carried out in October 2011. As this was not part of the VP surveys details of flight duration and flight line location and direction were not recorded.

- 8.5.17 Two probable pairs of curlew were recorded within the Proposed Development with two territories established on White Knowe and in the south-west corner of the study area near Polnagrie burn. It is considered that the two territories failed as no young birds were observed. This was the only evidence of breeding by waders within the Proposed Development.

#### **Other Moorland Birds**

- 8.5.18 Other moorland species of conservation concern recorded during the breeding walkover surveys included the red-listed skylark, grasshopper warbler (*Locustella naevia*), linnet (*Carduelis cannabina*), whinchat and fieldfare (*Turdus pilaris*) and the amber-listed reed bunting, meadow pipit and wheatear.. Fieldfare is also listed on Schedule 1 of the Wildlife and Countryside Act (1981) as amended.
- 8.5.19 A very large flock of fieldfares (estimated to be between 1,000 and 1,200 individuals) was recorded flying west over Libry Moor Plantation on the evening of the 8 May 2011. In addition, large numbers were recorded lingering around Libry Moor Plantation on 09 May 2011. Fieldfares were observed during all the winter walkover surveys carried out over winter 2011/12. The largest single flock recorded comprised 41 individuals; however, flocks of between 10 and 20 birds were additionally recorded.
- 8.5.20 Five grasshopper warbler territories were identified (from singing males) within the study area, in addition to three reed bunting territories. Two wheatear territories and two whinchat territories were also identified in the north of the study area with breeding confirmed in all four territories.

## **8.6 Evaluation**

### ***Pink-Footed Goose***

- 8.6.1 Pink-footed goose was recorded utilising the airspace above the Proposed Development site. A limited number of flights were recorded and the Proposed Development was not used for any activity other than commuting (Appendix 8.1). However, the presence of pink-footed goose and the use of the Proposed Development to access areas of higher value within the wider ecological area increase the biodiversity value of the site. Consequently, pink-footed goose is considered to be of Local Ecological Value.

### ***Gull Species***

- 8.6.2 Common gull, herring gull and lesser black back gull were all recorded by the field surveys within the Proposed Development. All three gull species are of conservation concern as a result of their inclusion in the red and amber lists of the document, 'Birds of Conservation Concern 3' (Eaton *et al*, 2009). Flights of gulls through the Proposed Development were infrequently recorded; herring gull and lesser black back records occurring during only 0.02% of the surveyed time (Appendix 8.1). Further to this, the site was not observed to be used for breeding or foraging (only commuting) and therefore is of limited value to all three species. Due to the low frequency of flights and the limited use of the habitat by gull species it is considered that their presence increases the biodiversity resource of the Proposed Development site only and therefore these species are considered to be Zone of Influence Value.

### ***Other Wildfowl Species***

- 8.6.3 The Proposed Development affords limited suitable habitat for wildfowl (Chapter 7 and Figure 7.3) and consequently few numbers of other wildfowl species were recorded on the Proposed Development. The infrequent presence of goosander, grey heron, mallard duck and teal does however enrich the biodiversity resource at a local level and therefore wildfowl are considered to be of Local Ecological Value.

### ***Hen Harrier***

- 8.6.4 Hen harriers are listed on Annex 1 of the Birds Directive 1979 and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and therefore receive protection at both an international and national level. The Proposed Development is not considered to support breeding of this species. Hen harrier, however, have been recorded utilising the Proposed Development site predominately during the autumn which corresponds with the dispersal of juvenile birds. Most flights involved individuals with only two observations of flights involving two males (Appendix 8.1). It is therefore considered that the Proposed Development is used by a low density of individuals. As a result of the legal and conservation status of the species, coupled with the low number of flights recorded, hen harriers are considered to be of Regional Ecological Value.

### ***Peregrine Falcon***

- 8.6.5 Peregrine falcon is listed on Annex 1 of the Birds Directive 1979 and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and therefore receives protection at both an international and national level. The Proposed Development is not considered to support breeding of this species and does not appear to offer habitat to support regular foraging or commuting. It is considered that the individual observed hunting may have extended its usual foraging range during the winter period (Appendix 8.1). It is therefore considered that the Proposed Development is not regularly used by peregrine falcon but as a result of the legal and conservation status of the species, coupled with the low number of recorded flights, peregrine falcon is considered to be of Regional Ecological Value.

### ***Merlin***

- 8.6.6 Merlin is also listed on Annex 1 of the Birds Directive 1979 and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). The Proposed Development is not considered to support breeding of this species. Two flights of merlin were recorded within the Proposed Development (Appendix 8.1) and it is therefore considered that the Proposed Development is used by a low density of individuals. As a result of the legal and conservation status of the species, coupled with the low number of recorded flights, merlin is considered to be of Regional Ecological Value.

### ***Long-eared Owl***

- 8.6.7 Long-eared owls are not afforded specific legal protection as a Schedule 1 species of the Wildlife and Countryside Act 1981 (as amended). In addition, the species is not considered to be of conservation concern owing to its inclusion as a green list species (Eaton *et al*, 2009) due to a recovering or stable population. No evidence was identified to indicate that the Proposed Development supports breeding by this species. It is considered that the Proposed Development is utilised for infrequent foraging and commuting (Appendix 8.1). The infrequent presence of long eared owl within the Proposed Development however does

enrich the biodiversity of the wider ecological area and consequently this species is considered to be of Local Ecological Value.

### ***Common Raptors***

- 8.6.8 Buzzard, sparrowhawk and kestrel have all been recorded utilising the site in all seasons; however, no evidence was recorded of breeding (either within the Proposed Development or wider area). Both buzzard and sparrowhawk are included within the green list (Eaton *et al*, 2009) and are likely to have a recovering or stable population. Kestrel however, is amber-listed as a result of its status as a European species of conservation concern (Eaton *et al*, 2009). Although these species are afforded no species specific legal protection, their presence enriches the biodiversity of the wider ecological area and are therefore considered to be of Local Ecological Value.

### ***Black Grouse***

- 8.6.9 Black grouse is also listed on Annex 1 of the Birds Directive 1979 and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Black grouse is also a red listed species of conservation concern (Eaton *et al*, 2009) with the population considered to be currently in decline. A national survey undertaken in 2005 identified a 49 % decline in the population in Dumfries and Galloway since the previous survey of 1995/96 (SNH, Undated). As a result, and due to the presence of two recorded lekking sites, black grouse are considered to be of National Ecological Value.

### ***Woodland Bird Assemblage***

- 8.6.10 Twenty-three species of woodland bird were recorded during the 2012 breeding season in comparison to 12 species recorded during the non-breeding season. This assemblage is considered to be of a level that is typical of developing plantation woodland in the southern uplands of Scotland; containing a limited number of species listed on the red list (Eaton *et al*, 2009) (six breeding and one non-breeding) and a limited number of species included within the UKBAP (six breeding and one non-breeding). The assemblage does enrich the biodiversity of the Proposed Development and the local area and therefore the woodland bird assemblage is considered to be of Local Ecological Value.

### ***Golden Plover***

- 8.6.11 The Muirkirk & North Lowther Uplands SPA is designated for its breeding population of golden plover which represents 0.7 % of the Great Britain breeding population. The greatest frequency of flights within the Proposed Development was recorded in April 2011 (a time typically associated with this species moving from wintering habitats to breeding areas). In addition, golden plover is listed on Annex 1 of the Birds Directive and an amber-listed species of conservation concern (Eaton *et al*, 2009). It should be noted that the field surveys undertaken do not provide data to definitively identify the destination of the golden plover recorded over the Proposed Development but are reasonably suspected to be part of the above SPA population. That aside, the close proximity of the SPA supports the likelihood that observed golden plover form part of the breeding population associated with the SPA. Consequently, golden plover is considered to be of International Ecological Value.

## ***Waders***

- 8.6.12 A limited number of waders (eight species) utilised the Proposed Development. Although listed on Annex 1 of the Birds Directive, dunlin was only observed during the initial walkover survey in March 2011 and again as part of the wintering bird survey in which they were recorded in low densities. The Proposed Development is considered to support two curlew territories despite both pairs failing to breed in 2011. The presence of waders is considered to increase the biodiversity at a local level and therefore waders are considered to be of Local Ecological Value.

## ***Other Moorland Birds***

- 8.6.13 A limited number of moorland bird species (eight species) utilised the Proposed Development. The Proposed Development is considered to support four confirmed breeding territories. The presence of moorland birds is considered to increase the biodiversity at a local level and therefore waders are considered to be of Local Ecological Value.

## **8.7 Assessment of Do-Nothing Scenario**

- 8.7.1 Should the Proposed Development not be consented, the “do-nothing scenario” will apply to the current baseline environment, in that the Applicant will construct the Consented Development.
- 8.7.2 The Consented Development was environmentally assessed and consented in 2015 and the assessment is reported within the Sandy Knowe Wind Farm Environmental Statement (2015).

## **8.8 Assessment of Proposed Development Potential Effects**

### ***Introduction***

- 8.8.1 While the do-nothing scenario is construction of the Consented Development, ECU have requested that the EIA assess the Proposed Development against the current baseline. As the reader will see this assessment confirms that the effects of Proposed Development and Consented Development are identical.
- 8.8.2 The development of wind farms results in a range of researched and well documented ecological effects associated with their construction, operation and decommissioning. This section assesses the potential ecological effects of the Proposed Development to VERs identified above.
- 8.8.3 The calculation of habitat loss and the assumptions made are outlined in Chapter 7, and are used to inform the assessment of the impacts on VERs within this chapter.
- 8.8.4 For the purpose of the assessment it is assumed that ecological effects associated with decommissioning will be comparable to construction effects although of a shorter duration. Consequently, potential decommissioning effects are assessed alongside potential construction effects.

## **Construction**

### **Hen Harrier**

- 8.8.5 Potential impacts on hen harrier during construction would be limited to temporary disturbance as a result of woodland felling and an increase in noise and vibration. The potential for disturbance may result in the displacement of hen harrier from the areas of construction and felling and the wider area adjacent to it. As such, the magnitude of the potential disturbance impact is low. Construction would also result in the loss of open habitat; however, this is not considered to be significant (Chapter 7). Hen harrier do utilise this habitat, although infrequently and not for breeding, and as such it is not considered vital for the maintenance of a viable territory. The magnitude of the potential impact of habitat loss is negligible. The effect from disturbance is considered to be of **minor significance** and the effect from habitat loss is considered to be of **negligible** significance.

### **Common Raptors**

- 8.8.6 Potential impacts on the common raptor species, buzzard, kestrel and sparrowhawk during construction would be limited to temporary disturbance as a result of woodland felling and an increase in noise and vibration. The potential for disturbance may result in the displacement of the common raptors from the areas of felling and construction and the wider area adjacent to them. This impact would be limited to the duration of the construction works and is therefore considered short term. As such, the magnitude of the potential disturbance impact is low. Construction would also result in the loss of open habitat; however, the area to be lost is not considered to be significant (Chapter 7). Common raptors do utilise this habitat, although infrequently and not for breeding, the habitat is therefore not considered vital for the maintenance of a viable territory. The magnitude of the potential habitat loss impact is negligible. The effect from disturbance is considered to be of **minor – negligible** significance and the effect from habitat loss is considered to be of **negligible** significance.

### **Black Grouse**

- 8.8.7 Potential impacts on black grouse during construction would include temporary disturbance as a result of woodland felling and an increase in noise and vibration. The potential for disturbance may result in the displacement from the areas of felling and construction and the wider area adjacent to them. Although, limited in duration these works could displace or disturb lekking males and as a result lead to breeding failure. As such, the potential disturbance impact is of medium magnitude. Construction would also result in the loss of open habitat; however, the area to be lost is not considered to be significant (Chapter 7). In addition, lekking areas will be lost to construction activities and a limited area adjacent to the woodland edge would be lost (Chapter 7). The potential habitat loss impact is of a low magnitude. The effect from disturbance is considered to be of **major** significance and the effect from habitat loss is considered to be of **moderate-minor** significance.

### **Woodland Bird Assemblage**

- 8.8.8 Potential impacts on the woodland bird assemblage during construction would include potential mortality as a result of felling activities, temporary disturbance as a result of woodland felling and increased noise and vibration and temporary habitat loss. Mortality may result if felling activities are undertaken within the woodland during the bird breeding season where nests and chicks may be destroyed. The magnitude of this mortality impact

would be high. The potential disturbance may result in displacement from the areas of felling and a wider area adjacent to it. Additionally, if the disturbance occurs during the breeding season this may result in the abandonment of nests or breeding territories. The disturbance impact would be of low magnitude. The temporary loss of woodland habitat associated with the construction phase would be minimal and as such the impact is considered to be of negligible magnitude. The effect of mortality would be of **moderate-minor** significance and the effect of disturbance is considered to be of **minor-negligible** significance. The effect of habitat loss is considered to be of **negligible** significance.

#### **Golden Plover**

- 8.8.9 Potential impacts on golden plover during construction would be limited to temporary disturbance as a result of woodland felling and increased noise and vibration. The potential for disturbance may result in the displacement of golden plover from the areas of construction and the wider area adjacent to it. As such, the magnitude of the potential disturbance impact is low. The effect from disturbance is considered to be of **moderate – minor** significance.

#### **Waders**

- 8.8.10 Potential impacts on the waders during construction would include potential mortality as a result of construction activities, temporary disturbance as a result of woodland felling and increased noise and vibration and temporary habitat loss. Mortality may result if construction activities are undertaken during the bird breeding season where nests and chicks of curlew may be destroyed. The magnitude of this mortality impact would be high. The potential disturbance may result in displacement from the areas of felling and a wider area adjacent to it. Additionally, if the disturbance occurs during the breeding season this may result in the abandonment of nests or breeding territories. Disturbance impacts would be of low magnitude. The temporary loss of woodland habitat associated with the construction phase would be minimal and as such is considered to be an impact of negligible magnitude. The effect of mortality would be of **moderate-minor** significance and the impact of disturbance is considered to be of **minor-negligible** significance. The effect of habitat loss is considered to be **negligible** significance.

### **Operation**

#### **Pink-footed Goose**

- 8.8.11 To assess potential collision risk of pink-footed goose with the Proposed Development, an analysis of collision risk was undertaken following best practice guidance (SNH, 2000 and SNH, 2010). The collision risk analysis was informed by the recorded flight lines (Figure 8.4b); full details of the calculations are provided in Appendix 8.2. It is predicted that 0.222 collisions will occur annually and that over the lifetime of the Proposed Development (25 years) this will result in 5.55 collisions. The UK population of pink-footed geese is considered to fluctuate between 160,000 and 260,000 (Trinder *et al*, 2005). The regional population in southern Scotland is considered to have a mean of 10,404 (WWT, 2009), and mortality predicted represents 0.002 % of the regional population. Therefore, the direct mortality impact as a result of turbine collision is considered to be of negligible magnitude at the population level and will have an effect of **negligible** significance.
- 8.8.12 When operational, the Proposed Development may result in habitat fragmentation as a result of a barrier effect. However, the infrequent use of the Proposed Development site by

geese supports the view that it is unlikely to form part of a traditional spring or autumn migratory routes. Additionally, no evidence was recorded to indicate that overwintering geese use the Proposed Development site as part of frequently used routes between roosting and foraging habitats. The magnitude of habitat fragmentation impact is therefore negligible and the effect is considered be of **negligible** significance.

#### **Hen Harrier**

- 8.8.13 It is considered unlikely that hen harrier would collide with operational turbines. The Proposed Development site is used infrequently by the species and hen harrier flights recorded were noted to be below HB2 and HB3. Therefore, direct mortality impacts as a result of turbine collision are of negligible magnitude and the effect significance is **negligible**.
- 8.8.14 Hen harrier are not considered to be displaced from foraging habitat by operational wind farms (Ruddock and Whitfield, 2007). No evidence of breeding hen harrier was identified during the suite of ornithology surveys either within the Proposed Development site or the wider 2 km study area. As such, it is considered that the Proposed Development site is utilised by this species only for foraging, as observed through the recording of flights in autumn and early winter 2011/12 (Appendix 8.1). Consequently, it is considered effects of displacement / disturbance during the operational phase would be of negligible magnitude and **negligible** significance.
- 8.8.15 Muirkirk & North Lowther Hills SPA is designated for both breeding and over wintering hen harrier populations. The suite of ornithological surveys did not record any flights of hen harrier during the breeding season nor did it identify any breeding locations within 2 km of the site boundary (refer to Appendix 8.1). As such, it is considered unlikely that the site is utilised by breeding hen harrier for breeding or provisioning of young. Therefore, it is considered unlikely that the construction or operation of the Proposed Development will result in disturbance to breeding individual and as such would not affect the breeding population of the SPA.
- 8.8.16 Flights of hen harrier were predominately recorded during the autumn period when dispersal of individuals is most common. Due to the low frequency of occurrence of the species on site (Appendix 8.1) it is considered that construction activities may result in a short term reversible effect to the utilisation of the site by dispersing individuals therefore the effect of disturbance is considered of low magnitude and minor significance.
- 8.8.17 As stated above, operational wind farms are not considered to displace foraging hen harrier and consequently it is considered that the residual effects of displacement / disturbance during the operational phase are of negligible magnitude and no significance. As such it is considered extremely unlikely that there will be any effect on the wintering population (12 individuals) of the SPA.

#### **Peregrine Falcon**

- 8.8.18 It is considered unlikely that peregrine falcon would collide with operational turbines. The Proposed Development site has been used only once by the species and the flight was recorded in HB1 and HB2. Therefore, direct mortality impacts as a result of turbine collision are of negligible magnitude and the effect significance is **negligible**.
- 8.8.19 In respect to peregrine falcon, due to their infrequent use of the Proposed Development site for foraging, coupled with an absence of breeding records either within the Proposed Development site or wider study area (Appendix 8.1), it is considered extremely unlikely that

the infrequent maintenance visits would result in any measurable displacement or disturbance. Consequently, it is considered that the residual effects of displacement / disturbance during the operational phase are of negligible magnitude and no significance.

#### **Merlin**

8.8.20 It is considered unlikely that merlin would collide with operational turbines. The Proposed Development site has been used only twice by the species and the flight was recorded below HB2. Therefore, direct mortality impacts as a result of turbine collision are of negligible magnitude and the effects significance is **negligible**.

8.8.21 As with peregrine falcon, due to their infrequent use of the Proposed Development site for foraging, coupled with an absence of breeding records either within the Proposed Development site or wider study area (Appendix 8.1), it is considered extremely unlikely that the infrequent maintenance visits would result in any measurable displacement or disturbance. Consequently, it is considered that the residual effects of displacement / disturbance during the operational phase are of negligible magnitude and no significance.

#### **Long-eared Owl**

8.8.22 It is considered unlikely that long-eared owl would collide with operational turbines. The Proposed Development site has been used only once by the species and the flight was recorded below HB2. Therefore, direct mortality impacts as a result of turbine collision are of negligible magnitude and the effect significance is **negligible**.

8.8.23 Similarly, due to their infrequent use of the Proposed Development site for foraging, coupled with an absence of breeding records either within the Proposed Development site or wider study area (Appendix 8.1), it is considered extremely unlikely that the infrequent maintenance visits would result in any measurable displacement or disturbance. Consequently, it is considered that residual effects of displacement / disturbance during the operational phase are of negligible magnitude and no significance.

#### **Golden Plover**

8.8.24 An analysis of collision risk was undertaken following best practice guidance (SNH, 2000 and SNH, 2010). The collision risk analysis was informed by the recorded flight lines (Figure 8.4c); full details of the calculations are provided in Appendix 8.2. It is predicted that 0.012 collisions will occur annually and that over the lifetime of the Proposed Development (25 years) this will result in 0.3 collisions. The breeding population of the SPA is cited at 0.7 % of the UK total breeding population equating to approximately 316 individuals. The mortality predicted represents 0.004 % of the SPA population and is therefore not considered to be significant. Thus the impact of mortality is considered to be of negligible magnitude at the level of the SPA population level, giving an effect of **negligible** significance.

8.8.25 Operational wind farms have been shown to have little effect of displacement and disturbance of golden plover in general, with localised displacement from the area immediately adjacent to the turbines observed (Pearce Higgins *et al.*, 2012). During the suite of ornithology surveys golden plover were recorded on three separate occasions with no evidence identified to indicate the Proposed Development site was utilised for breeding. Consequently, it is considered that effects of displacement / disturbance during the operational phase is assessed as being of negligible magnitude and **negligible** significance.

### **Black Grouse**

- 8.8.26 The location of Turbine 10 would be within 200m of the southern black grouse lek throughout the operational phase. Recent research has indicated that the construction of wind turbine within 500 m of lek results in the local displacement of the lek (Zwart, M.C *et al*, 2015). Therefore, it is considered that in the short term the effect of displacement may be of low magnitude and **moderate** significance. Longer term, with the likelihood of the lek remaining although locally relocated, the effect of displacement may be of low magnitude and **negligible** significance.
- 8.8.27 Infrequent maintenance visits undertaken during the operational phase may result in an increased human presence within 200 m of a lek site, within the range for active disturbance distances recommended for a lek (300-500 m) (Ruddock and Whitfield, 2007). In the absence of mitigation, effects are assessed as being of low magnitude and **moderate** significance.

### **Waders**

- 8.8.28 Potential impacts on the waders during operation would be limited to permanent habitat loss. One curlew territory where breeding behaviour was identified although breeding had subsequently failed will be lost due to permanent access tracks. The impact of habitat loss is considered to be medium magnitude and the effect of **minor** significance.

### **Other Moorland Birds**

- 8.8.29 Potential impacts on the other moorland bird species during operation would be limited to permanent habitat loss. One reed bunting, one whinchat and two grasshopper warbler territories with possible breeding will be lost due to permanent access tracks. The impact of habitat loss is considered to be medium magnitude and the effect of **minor** significance.

## **8.9 Mitigation**

- 8.9.1 This section of the assessment details the mitigation measures that are recommended to ameliorate identified effects associated with the construction and operational phase of the Proposed Development. These measures are aimed to prevent, reduce or offset any likely significant effects of the Proposed Development on identified ornithological receptors. This approach is in accordance with best practice guidance and UK, Scottish and Local Government environmental, planning and sustainability policies.
- 8.9.2 The principles and objectives for mitigation associated with the Proposed Development have been developed through an iterative process with the Applicant's design team and through discussion with SNH and other stakeholders.
- 8.9.3 Mitigation includes best practice methods and principles applied to the Proposed Development as a whole (generic measures) as well as site specific mitigation measures applied to individual locations (specific measures).
- 8.9.4 All ecological mitigation will be incorporated into a Construction and Decommissioning Environmental Management Plan (CDEMP). This CDEMP will outline all required mitigation and provide details on timelines for undertaking mitigation for each identified ecological receptor. This CDEMP will also outline timetable of actions and form part of the contract documents to ensure delivery of mitigation specified in this EIA Report. In addition, the CDEMP should incorporate the provision of an Ecological Clerk of Works (ECoW) to oversee the implementation of recommended mitigation.

## ***Generic Mitigation***

8.9.5 Generic mitigation measures that apply to all ecological receptors across the Proposed Development are outlined below:

- Not more than 12 months prior to construction of the Proposed Development, the Applicant will engage a Suitably Qualified Ecologist (SQE) to undertake a series of repeat ecological surveys to update the baseline information reported in this Ecological Impact Assessment (EiA). The aim of these surveys would be to provide up to date information in order to finalise the mitigation proposals in addition to completing a final check prior to construction for protected species and would be discussed and agreed with Scottish Natural Heritage (SNH).
- Avoidance of unnecessary disturbance to habitats by minimising the extent of ground clearance and other construction practices as far as practicable.
- Plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby minimising damage to habitats and potential direct mortality and disturbance to species.
- Works compounds, storage sites and access tracks will avoid, as far as practicable, areas of woodland and wetland or any other habitat identified as being of ecological value by the ECoW.
- Regular ecological toolbox talks will be given to all construction personnel on the potential presence of protected species and any measures that need to be undertaken should such species be discovered during construction activities.

8.9.6 As part of the Proposed Development proposals it will be necessary to develop and implement a Site Restoration Plan (SRP) as part of the CDEMP to ensure the regeneration of those areas of habitat that have been temporarily lost through development.

8.9.7 In order to facilitate restoration, disturbed ground will be restored as soon as practicably possible using materials removed during the construction of access tracks, excavation of cable trenches and turbine foundations. To achieve this any excavated soil will need to be stored in such a manner that is suitable to facilitate retention of the seed bank. This will aid site restoration and help conserve the pre-construction floristic interests at the site.

## ***Specific Mitigation***

8.9.8 In addition to the provision of generic mitigation measures, the following specific measures designed to avoid, reduce and offset identified ecological effects are proposed. These are outlined and discussed below under the respective ornithological receptor heading.

### **Black Grouse**

8.9.9 The lekking sites have been avoided as part of the design process where possible and during the construction phase a temporal exclusion of works will also be established whereby no works will be undertaken from one hour before sunset to one hour after sunrise within a 750 m exclusion zone from April to mid-May inclusive. In addition, a dedicated black grouse survey will be required in the lekking season immediately prior to construction and decommissioning and for every subsequent lekking season falling within the construction or decommissioning programme in order to ensure that disturbance and damage to lekking sites is minimised.

- 8.9.10 Habitat management and enhancement has been proposed (Chapter 7) which will directly benefit black grouse by providing a range of suitable habitats within the Proposed Development site for lekking (black grouse only), nesting and provisioning young. Of particular relevance to black grouse is the mitigation proposed in respect to management of woodland (Chapter 17), scrub, flush, blanket bog and dry modified bog habitats. These habitats are collectively known to play an important role in providing suitable conditions for breeding black grouse. An outline proposal is presented which seeks to manage at least 25 ha of degraded / modified bog habitat with the management of these habitats for black grouse to be included within the Habitat Management Plan. Planting will be undertaken to create a transitional habitat between the retained coniferous plantation woodland and the moorland habitats (Chapter 7 and Chapter 17).

#### **Woodland Bird Assemblage**

- 8.9.11 Specific mitigation for the woodland bird assemblage will focus on the avoidance of direct mortality and disturbance during the bird breeding season. Consequently, all vegetation clearance will be undertaken out with this period. If this is not possible the adverse impacts will be reduced by undertaking detailed surveys of areas earmarked for clearance. Should a nest be located at this time an ECoW will enforce a suitable stand-off area in which no works will take place.

#### **Waders**

- 8.9.12 Specific mitigation for waders will focus on habitat improvement and avoidance of direct mortality and disturbance. As outlined in Chapter 7, a Habitat Management Plan (HMP) will be produced detailing the approach to improve degraded habitats throughout the Proposed Development. This management will include the improvement of habitat in the south east of the Proposed Development in which both curlew territories are located. All vegetation clearance will be undertaken out with the bird breeding season. If this is not possible the adverse impacts will be reduced by undertaking detailed surveys of areas earmarked for clearance. Should a nest be located at this time an ECoW will enforce a suitable stand-off area in which no works will take place.

## **8.10 Assessment of Proposed Development Residual Effects**

- 8.10.1 Table 8.10 presents an assessment of the residual ecological effects after the implementation of mitigation outlined in Section 8.9, which responds to the construction, operation and decommissioning phases of the Proposed Development.
- 8.10.2 As described in Section 8.5 of this chapter, the significance of the ecological effect is a product of the value of the ornithological receptor (within a geographical context) and the magnitude of the impact in relation to the resource that has been evaluated.
- 8.10.3 All identified potential significant effects will be mitigated so that all residual effects will be reduced to negligible significance.

## **8.11 Assessment of Proposed Development Cumulative Effects**

- 8.11.1 The cumulative assessment of effects to receptors takes into consideration other operational, under construction and in planning developments. The assessment does not

assess developments in scoping. The assessment takes into account all types of developments, not just other wind farms.

8.11.2 This section provides an assessment of the potential cumulative ecological residual effects on ecology and nature conservation resulting from construction, operation and decommission of the Proposed Development in-combination with other developments proposed, consented or operational within 10 km of the Proposed Development.

8.11.3 Seventeen wind farm developments were identified within 10 km of the Proposed Development, as follows:

- Hare Hill Wind Farm (operational);
- Hare Hill Extension (operational);
- Sunnyside Wind Farm (operational);
- Whiteside Hill Wind Farm (operational);
- Afton Wind Farm (consented);
- Glenmucklock Wind Farm (consented);
- Sanquhar Community Wind Farm (consented)
- Sanquhar Six Wind Farm (consented);
- High Park Farm (consented);
- Twentyshilling Hill Wind Farm (consented);
- Lethans Wind Farm (in planning);
- Ulzieside Wind Farm (in planning);
- High Park Farm Extension (in planning);
- Ashmark Farm Wind Farm (in planning);
- Pencloe Wind Farm (in planning);
- Lorg Wind Farm (in planning); and
- Enoch hill Wind Farm (in planning).

8.11.4 Of these the ornithology assessment of the EIA was not available for the following wind farms:

- Afton Wind Farm;
- Hare Hill Wind Farm;
- High Park Farm;
- High Park Farm Extension;
- Pencloe Wind Farm.

8.11.5 Table 8.8 provides a summary of the findings of the ornithological assessments for the above developments where available.

**Table 8.8 – Cumulative Assessment of Potential Ecological Effects: Wind Farm Development within 10 km of the Proposed Development.**

Site Name	Distance from Proposed Development	Stage	Details / Description of Significant Residual Effects
Afton Wind Farm	7.5 km / south-west	Consented	Afton Wind Farm comprises a development of 27 turbines. The ES for this development is no longer publicly available.
Ashmark Hill Windfarm	7.5 km / west	In Planning	Ashmark Hill Wind Farm comprises of 7 turbines. The ornithological assessment did not identify any adverse residual ornithological effects, and identified beneficial effects on ground-nesting birds, including curlew and black grouse are predicted.
Glenmuckloch Wind Farm	4 km / north	Consented	The development supports eight wind turbines. The baseline surveys for this site identified goshawk, hen harrier, merlin, peregrine falcon and a large number of herring gull. Although no residual effects were predicated as part of the assessment mortality through collision was calculated annually to be, 0.012 per annum in breeding season for goshawk, 0.018 and 0.027 for breeding and non-breeding seasons for hen harrier, 0.26 and 0.023 for breeding and non-breeding seasons for peregrine falcon and 0.023 for merlin during non-breeding season.
Sanquhar Community Wind Farm	1.8 km / south	Consented	Sanquhar Community Wind Farm comprises a development of 18 turbines. Ornithology surveys were undertaken between 2007 and 2009 and included vantage point surveys, breeding bird walkover surveys, owl surveys and breeding raptor walkover surveys. Target Species recorded from vantage point surveys including hen harrier, goshawk, brent goose, curlew and snipe. Breeding bird walkover surveys recorded nesting barn owl, goshawk while a single black grouse was recorded lekking within the site.. No significant residual ecological effects upon floral and faunal species were predicted as a result of the proposed development.
Hare Hill	1.6 km / west	Operational	The wind farm has been operational since 2000 and comprises a development of 20 turbines. A summary of information regarding the wind farm development can be reviewed at: <a href="http://www.scottishpowerrenewables.com/pages/hare_hill.asp">www.scottishpowerrenewables.com/pages/hare_hill.asp</a> . The EIA for the original wind farm is no longer publicly available and therefore no information regarding the assessment of significant residual ecological effects is available.
Hare Hill (Extension)	1.8 km / south-west	Operational	The extension would increase the size of the development to 59 turbines. The baseline for this site identified a small population of golden plover breeding within the site (one pair) and immediate surrounds and a pair of merlin breed adjacent to the site. Migrant golden plover, dotterel, whooper swan were recorded over the site and hen harrier, peregrine falcon and occasionally goshawk were recorded foraging on the site. Small numbers of lekking black grouse were recorded adjacent to the site. Small numbers of curlew and snipe breed in the site and a pair of barn owl nest adjacent to the site. No collision risk analysis was undertaken and all residual

Site Name	Distance from Proposed Development	Stage	Details / Description of Significant Residual Effects
			effects except for black grouse for all species was assessed as low/negligible. Residual effects with habitat mitigation for black grouse was assessed as low. The most significant residual effects are predicted to be the displacement of breeding golden plover and black grouse during construction and operation with temporary displacement of hen harrier and peregrine falcon predicted during construction.
High Park Farm	6km / west	Consented	The EIA for the original wind farm is no longer publicly available and therefore no information regarding the assessment of significant residual ornithological effects is available
Lethans Wind farm	3.5km / north	In Planning	The development comprises 26 wind turbines. The ornithological assessment considered displacement of black grouse unlikely. Collision risk modelling was undertaken for Goshawk, Hen Harrier, Merlin and Peregrine. Additional scenario modelling was carried out using a theoretical model to investigate likely impacts of changes in habitat in the post construction environment on Hen harrier and the collision risk that would result. This estimated that there would be a small increase in collision risk as flight activity would increase somewhat over felled forest, but that this would not be sufficient to cause a significant or adverse impact on the SPA population, provided that the proposed habitat management plan is implemented. Collision risk analysis results were as follows (hen harrier breeding season – 0.0068, hen harrier non-breeding season – 0.0033, peregrine falcon - 0.034, merlin – 0.0014 while no impacts were predicted for golden plover and short eared owl).
Sunnyside Wind farm	6.3 km / east	Operational	The development comprises 2 turbines. Ornithological surveys recorded hen harrier, merlin, pink-footed goose, curlew, barn owl, lapwing. The ornithological assessment identified no significant residual ornithological effects.
Twentysilling Hill Wind farm	9.2 km / south east	Consented	The development comprises of 9 turbines. The ornithological assessment considered hen harrier, short-eared owl, black grouse and curlew to be the species at risk. Collision risk modelling was undertaken for curlew and pink-footed goose, the results are summarised below :- Pink-footed goose (95% avoidance – 25.03, 98% - 10.01, 99% - 5.01) Curlew – conservative model (95% avoidance – 0.12, 98% - 0.05, 99% - 0.02) Curlew – non-conservative model (95% avoidance – 0.04, 98% - 0.02, 99% - 0.01) It was summarised that the windfarm would have no significant impacts on all species during all phases of the windfarm with the exception of short-eared owl and black grouse where the potential impacts would be negated through habitat management mitigation.

Site Name	Distance from Proposed Development	Stage	Details / Description of Significant Residual Effects
Ulzieside Wind farm	4.3km / south east	In Planning	Ulzieside Wind Farm comprises a 12-turbine development. It was predicted that some loss of ground nesting birds would occur if summer time construction was to take place; however, these effects were assessed as being negligible and short term. Short-term displacements of black grouse were also predicted, but it was assessed that this effect should be balanced by the habitat enhancement. A low level of collision was predicted over the lifespan of the wind farm development for species such as golden plover, buzzard and kestrel. It is possible that displacement of black grouse from one of their alternative leks closest to the Glen Burn may take place and this has the potential to have an effect on the local population. During construction the impact on Schedule 1 species of the Wildlife and Countryside Act 1981 was found to be a low impact and not significant, high impact but low significance on black grouse, low impact and not significant for golden plover, and low to moderate impact with no significance on curlew. During the operational phase of the development displacement effects were found to be low for Schedule 1 species, black grouse, golden plover and curlew and not significant for all species. Bird strikes were identified as being of low impact and not significant, and for decommissioning also low impact and not significant.
Whiteside Wind farm	4.4 km / south	Operational	Whiteside Hill Wind Farm is a ten-turbine scheme. The two key issues relating to birds and wind farms are the effects of indirect habitat loss, i.e. the displacement of birds due to the proximity of the wind turbines, and the effects of collision with rotating turbine blades, overhead wires, guy lines and fencing. The use of the site by species of a high nature conservation value is low and there is considerable amount of suitable habitat near to the wind farm site, therefore displacement effects are considered to be not significant. Collision risk modelling indicated that none of the raptors recorded at Whiteside Hill are at risk of collision with turbines during the life of the wind farm. Pink-footed geese, greylag geese and golden plover are theoretically at risk during the anticipated life of the wind farm. However, due to the low estimated collision rates the effects are considered to be not significant.
Sanquhar Six	2.7 km / south	Consented	Sanquhar Six Wind Farm comprises a six-turbine development. Overall the ornithology surveys of Sanquhar six windfarm concluded the residual impacts would be of a low or negligible magnitude with the only possible significant impact being on breeding merlin during construction which was to be mitigated by undertaking construction outside the breeding season.
High Park Farm (Extension)	5.2 km / west	In Planning	High Park Farm Extension is a two-turbine development. The ornithological assessment is not publicly available.
Pencloe	7.5 km /south-west	In Planning	The ornithology chapter of the environmental statement is not publicly available and therefore no information regarding the assessment of significant residual ecological effects is available

Site Name	Distance from Proposed Development	Stage	Details / Description of Significant Residual Effects
Lorg	7.5 km / south	In Planning	Lorg Wind Farm is a nine turbine development. The ornithological assessment identified low numbers of black grouse, active barn owl and peregrine territories and low densities of waders including curlew and snipe. No significant residual effects are predicted.
Enoch hill	8.4 km / south-west	In Planning	Enoch Hill Wind Farm is a 16 turbine development. The ornithology assessment recorded a small black grouse population, small numbers of wintering golden plover and merlin, barn owl and curlew nests within the site. Small numbers of flights of pink-footed goose, greylag goose, whooper swan, barnacle goose, hen harrier, goshawk and peregrine falcon were also recorded. No residual significant effects on birds were predicted as a result of the development or cumulatively in combination with other developments.

## **Golden Plover**

- 8.11.6 An assessment of the potential cumulative ecological effects specifically on golden plover resulting from construction, operation and decommissioning of the Proposed Development in combination with other wind farm developments is presented below.
- 8.11.7 The presence of golden plover was identified at six wind farm sites, in addition to the Proposed Development, these comprised: Hare Hill Extension, Twentysilling, Ulzieside, Whiteside, Sanquhar Six and Enoch Hill.
- 8.11.8 At this Hare Hill Extension, predicted effects in respect to golden plover were assessed as being low – negligible for all stages in the wind farm development with overall residual and cumulative effects considered not to be significant.
- 8.11.9 Five flights of golden plover were recorded at Twentysilling Wind Farm site, all flights were recorded in the non-breeding season and none of the flights were recorded at potential collision risk height. The ES predicted effects resulting from collision and displacement which were not considered to be significant.
- 8.11.10 Golden plover were recorded intermittently at the Ulzieside Wind Farm site where the species was recorded on three occasions and was not confirmed to have bred within the wind farm site. A low level of collision mortality was predicted in respect to golden plover and was considered to have an effect on the local population. During construction, operation and decommissioning, effects were assessed as being low and not significant.
- 8.11.11 Surveys undertaken at Whiteside Wind Farm recorded a single pair of golden plover within the wind farm site. The ES predicted effects resulting from collision and displacement which were not considered to be significant.
- 8.11.12 Five flights of golden plover were recorded at Sanquhar Six Wind Farm site, neither of the flights were recorded potential collision risk height and the total flight time recorded was 82 seconds. The ES predicted effects resulting from collision and displacement which were not considered to be significant.
- 8.11.13 A total of 72 golden plover flights, with a peak count of 220 individuals, were recorded across the entire survey period (five seasons from 2011–2014) at Enoch Hill Wind Farm site. There was no evidence of breeding on, or in the vicinity of, the Development Site. Nonetheless, it was considered that this level of activity indicates that the site is of Medium importance for this species during winter.
- 8.11.14 The ES outlined that the golden plover present at the Enoch Hill comprised roosting rather than feeding flocks and as such the large swathes of suitable roosting habitat both within the site and nearby were identified that could hold roosting golden plover. As such, impact magnitude would be expected to be Negligible. Even under a worst-case scenario of the entire displacement of the peak count of individuals recorded (220 in winter 2013/14) would represent 0.9% the lower estimate of the 25-35,000 overwintering individuals in Scotland. Under the unlikely event of the displacement of all golden plover from the site and adjacent areas, other similar sites are available in the wider area and impact magnitude was considered to be Low at worst. In the context of an assessed nature conservation importance of site for this species of Medium, and a Low magnitude impact at worst, the level of effect was considered to be Slight.
- 8.11.15 Notwithstanding the degrees of impact assessment reported within each respective ES, an assessment of potential effects did not predict any significant effects for each wind farm site

in its own right. Following the criteria outlined in Table 8.2 the cumulative residual effects of all seven wind farms in combination (where impacts to golden plover were identified) is assessed as being of low magnitude and minor to moderate significance since it is unlikely that construction, operation and decommissioning of all seven developments (not taking into consideration the overlap between construction and decommissioning) will result in a permanent and long-term impact to the distribution and/or abundance of the regional golden plover population such that identified effects would compromise the integrity and conservation status of this species.

### **Black Grouse**

- 8.11.16 For the Proposed Development six flights involving seven individual black grouse were recorded totalling 260 seconds of flight time. Of this 240 seconds was observed at Height Band 1 with 20 seconds recorded at Height Band 2. In addition, two black grouse leks were recorded at NS 69514 10645 and NS 69503 11894; however, no nesting females were recorded as part of the black grouse survey, breeding bird walkover survey and/or vantage point surveys.
- 8.11.17 An evaluation of the species determined black grouse as being of National Value.
- 8.11.18 An assessment of the potential cumulative ecological effects specifically on black grouse resulting from construction, operation and decommissioning of the Proposed Development, in combination with other wind farm developments is presented below.
- 8.11.19 The presence of black grouse was identified at eight of the wind farm sites, comprising: Sanquhar Community, Hare Hill Extension, Lethans, Twentyshilling, Ulzieside, Whiteside Hill, Sanquhar Six and Enoch Hill.
- 8.11.20 Three of the wind farms (Sanquhar Community, Hare Hill Extension and Twentyshilling) predicted no significant residual effects on black grouse after the implementation of mitigation. The assessment for Ulzieside Wind Farm identified short term displacement effects as a result of construction activities and as such have identified a potential effect on the carrying capacity of black grouse in the region. The assessment for Whiteside Hill recorded only one flight of black grouse and as such predicted no significant residual effect on black grouse. The assessment for Lethans considered displacement of black grouse unlikely due to the distance of the known leks from the site. The assessment at Enoch Hill identified small lek sites within the site and immediate vicinity however none were within 500 m of any construction work and as such no disturbance was anticipated.
- 8.11.21 In order to determine the cumulative effect on black grouse from the Proposed Development it is necessary to put the site in the context of the wider region. It is known that traditionally Dumfries and Galloway was a stronghold for black grouse in Scotland; however, in recent decades the population has declined for a variety of reasons including over grazing and changes in land management practices compounded by collisions with fencing and predation. As a result, the population of black grouse in Dumfries and Galloway has become fragmented and isolated (Black Grouse UK, 2007). The 2005 national survey indicated that the population in Dumfries and Galloway had contracted by up to 49 % with the most recent estimate of numbers of lekking males in the region of 200 individuals (Black Grouse UK, 2007). Therefore, the leks at the Proposed Development site with two males present would represent 1 % of the regional population.

- 8.11.22 The lekking sites have been avoided as part of the design process for the Proposed Development and as such have been retained in situ. After the implementation of mitigation it is considered that there will be negligible effects to the lekking site from disturbance or displacement. It is therefore considered unlikely that the Proposed Development would in combination with other developments result in significant cumulative effects with regards to lekking. The Proposed Development therefore would not result in significant effects on the reproductive success of the regional population of black grouse.
- 8.11.23 As no nesting black grouse were recorded at the Proposed Development site it is not possible to determine the likely effects upon breeding hens; however, it is known that hens will disperse more widely than males; dispersing anywhere up to 29 km from the natal area (Warren and Baines, 2002; Caizergues and Ellison, 2002). Therefore, assuming that female black grouse are present within the region and that each wind farm development has potential to hold a population of female grouse then the Proposed Development has the potential to effect black grouse through the loss of suitable nesting habitat. However, the permanent loss of habitat to the footprint of the Proposed Development is not considered significant and taken together with the HMP it is considered that a beneficial residual effect is likely. All developments which identified black grouse as part of the ornithological surveys predicted no significant residual impacts on black grouse including hens.
- 8.11.24 Therefore, it is considered unlikely that, following the implementation of the proposed mitigation that the Proposed Development would result in significant cumulative effects through habitat loss. As such, with regards to nesting habitat, would not result in significant effects on the reproductive success of the regional population of black grouse.

#### **Pink-footed Goose**

- 8.11.25 Four flights of pink-footed goose were recorded throughout the 12-month survey period, involving 181 individuals and totalling 640 seconds, of which 610 was at Height Band 3 and 30 seconds at Height Band 4.
- 8.11.26 An evaluation of the species determined pink-footed goose as being of Local Value.
- 8.11.27 An assessment of the potential cumulative ecological effects specifically on pink-footed goose resulting from construction, operation and decommissioning of the Proposed Development in combination with other wind farm developments is presented below.
- 8.11.28 The presence of pink-footed goose was identified at six wind farm sites, comprising: Sanquhar Community, Sunnyside, Twentyshilling, Ulzieside, Whiteside Hill and Enoch Hill. Due to the limited number of flights (Sanquhar Community five flights, Sunnyside three flights, Twentyshilling three flights, Ulzieside two flights, Whiteside Hill three flights and Enoch Hill two flights) no significant effects were predicted in the ES chapters for any of these developments.
- 8.11.29 As a result of the low level of flights and the predicted low mortality at all wind farms in combination there is low potential for construction, operation and decommissioning of all four developments (not taking into consideration the overlap between construction and decommissioning) to result in a permanent and long-term impact to the distribution and/or abundance of pink-footed goose. Following the criteria outlined in Table 8.2 the cumulative effect of the six developments on pink-footed goose is assessed as being of negligible magnitude and significance

**Table 8.9 – Cumulative Assessment of Potential Ecological Effects: Open Cast Developments within 5 km of the Proposed Development**

Site Name	Distance from Proposed Development	Developer	Stage	Details / Description of Significant Residual Effects
The Rigg South OCCS	Immediately adjacent to site north site boundary	ATH Resources PLC	Consented (not operational)	<p>The proposed scheme is an open cast coal development that will occupy a total site area of about 146 ha. The proposal has been granted planning consent however construction and operation has not yet commenced. The non-technical summary of the Environmental Statement can be reviewed at: <a href="http://www.ath.co.uk/archive/RiggOCCS.pdf">http://www.ath.co.uk/archive/RiggOCCS.pdf</a></p> <p>No effects have been predicted on the Muirkirk and Lowther Uplands SPA. Impacts on habitat within the site include the loss of 1 km<sup>2</sup> semi improved grassland, 10 ha of semi improved acid grassland, 12 ha of improved grassland and a minimal area of marshy grassland. After operation the restoration of the site has been predicted to improve biodiversity and there for there is predicted to be no long term residual impacts. The operation of the mine will result in the loss of 5 ha of wet modified bog which cannot be restored after operation. The losses of all other habitats are considered to be not significant.</p> <p>There is not predicted to be any significant impacts on any protected species.</p>
Rigg North, Kirkconnel	1.8 km / north	ATH Resources PLC	Planning application	<p>The Rigg North, Kirkconnel surface mine comprises an area of approx. 167 ha. The surface mine is currently operational and the Environmental Statement can be reviewed at <a href="http://eaccess.dumgal.gov.uk/online-applications/applicationDetails.do?activeTab=documents&amp;keyVal=_DUMF_DCAPR_99102">http://eaccess.dumgal.gov.uk/online-applications/applicationDetails.do?activeTab=documents&amp;keyVal=_DUMF_DCAPR_99102</a></p> <p>The majority of the area comprises of semi-improved and improved grassland, in addition to rush pasture and flushes.</p> <p>Short term minor significant impacts were predicted for all habitat types due to habitat loss as a result of the operational stage.</p> <p>After operation there is likely to be a restoration programme which will result in a neutral effect on all receptors in the long term.</p>

Site Name	Distance from Proposed Development	Developer	Stage	Details / Description of Significant Residual Effects
Glenmuckloch Surface Coal Mine and Eastern Extension		ATH Resources PLC	Operational Currently being reinstated	<p>Glenmuckloch surface coal mine is an operational surface mine north of the Proposed Development. The original ES is no longer publically available however the non-technical summary for the proposed extension of the mine is still available at :  <a href="#">Glenmuckloch20surface20mine20proposed20east20extension20nts20june20202010.pdf</a></p> <p>The extension site was noted to be covered by a range of heath, mire and grassland habitats over peat of varying depths, with limited larger areas of standing water present towards the centre, eastern and western boundaries of the site. Smaller bog pools and wet flushes are also present throughout the wetter areas of the site, particularly towards the south-east. To the west, habitats are dominated by acid grassland; such habitats are common within upland and northern Britain and widespread within the Muirkirk uplands. No significant impacts were predicted for protected species. The site was considered to be of local value for the bird population however the NTS does not provide information on the significance of impacts on birds pre or post mitigation.</p> <p>It was considered that no adverse impact on the integrity of the SPA would result from the development.</p>

- 8.11.30 As outlined in Table 8.9 above, three open cast mine developments (in planning, consented and operational) are present within 5 km of the Proposed Development. All three developments predict no long-term residual effect as a result of restoration plans post operation. However, during the operational phases of the schemes there is predicted to be impact on ornithology in the short term. Cumulatively, a loss of 8 pairs of breeding curlew is predicted as a result of disturbance and habitat loss. Studies have indicated that after the initial disturbance of construction the breeding density remains depressed during the operational phase of the scheme (Pearce-Higgins *et al.*, 2009). Therefore, this effect is considered to be of high magnitude and moderate – minor significance at a local level in the medium term. Due to a lack of regional level data on the population of curlew it is not possible to provide a quantitative assessment of the impacts at this scale. However, this loss is likely to be a negligible effect at a national level.
- 8.11.31 There are considered to be significant short to medium term cumulative effects of the Proposed Development in combination with Glenmuckloch, the Rigg OCCS and the Rigg North coal mines, in particular, for upland bird species such as skylark, black grouse and meadow pipit. It should be noted that the significance of these impacts will be most pronounced if the operational periods of the mines and the Proposed Development overlap. However, in the long-term and with the conclusion of extraction at the above mining sites and establishment of the restoration plan, the significance of the above impacts is likely to decrease to negligible significance following restoration and enhancement of habitats.
- 8.11.32 This effect of continued depression of breeding densities after the construction of a wind farm has not been observed in other species such as skylark, meadow pipit and black grouse (Pearce-Higgins *et al.*, 2009). Therefore, if the schemes were adopted concurrently, the effect is likely to remain in the short term (operational phase of the mines) and not into the medium term (the operational phase of the Proposed Development).

## 8.12 Conclusion

- 8.12.1 The ornithology study area varies dependent on the bird survey undertaken, however all surveys were carried out in accordance with relevant legislation and best practice guidelines.
- 8.12.2 The following birds were recorded on site:
- Wildfowl – four species during the non-breeding season, none during the breeding season.
  - Gull – two species during both the breeding and non-breeding seasons, and a third during the winter surveys.
  - Raptors and owls - four species of scarce raptors and owls and three species of common raptor during the breeding season, although none were recorded breeding.
  - Black grouse - one lek was identified next to the Polneul Burn, a second was identified in the vicinity of the western access.
  - Woodland bird – 23 species of woodland bird were recorded.
  - Wader - eight species of waders were recorded.

- 8.12.3 Other moorland birds - species of conservation concern recorded during breeding surveys included the red-listed skylark, grasshopper warbler, linnet, whinchat and fieldfare and the amber-listed reed bunting, meadow pipit and wheatear,
- 8.12.4 An ECoW will oversee the implementation of mitigation measures including the application of best practice guidance and the avoidance of site clearance during the bird breeding season and the black grouse lekking season. Should nests be discovered then they will be clearly demarcated and buffer zones established around nesting sites to prevent damage to the nests and disturbance of adults caring for young. When all mitigation measures are implemented, negligible effects on birds are anticipated due to the Proposed Development.
- 8.12.5 Taking into consideration other wind farm developments the Proposed Development is not expected to result in cumulative ecological effects greater than those predicted for the Proposed Development alone.
- 8.12.6 There are considered to be significant short to medium term cumulative effects of the Proposed Development in combination with Glenmuckloch Surface Coal Mine and the proposed Rigg South OCCS and Rigg North Surface Coal Mines, in particular, for upland bird species such as curlew, skylark, black grouse and meadow pipit. It should be noted that the significance of these effects will be most pronounced if the operational periods of the above mines and the Proposed Development overlap. However, in the long-term and with the conclusion of extraction at the above mining sites, the significance of the above effects is likely to decrease to negligible significance following restoration and enhancement of habitats.
- 8.12.7 The predicted residual significant effects for the Proposed Development are exactly the same as those which would arise from the 'do-nothing scenario', which would result in the implementation of the Consented Development.
- 8.12.8 The EIA Regulations, at Schedule 4, require the EIA Report to provide a  
*"description of the likely significant effects of the development on the environment resulting from, inter alia:*  
*... (e) the cumulation of effects with other existing and/or approved development, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;"*
- 8.12.9 In this regard, the Proposed Development would be indiscernible from the Consented Development.

**Table 8.10 – Summary of Proposed Development Effects**

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
<b>Construction and decommissioning</b>							
Hen Harrier	Direct mortality	Negligible unlikely	Negligible	Neutral	Generic mitigation	Negligible	Adverse
	Habitat loss	Negligible Certain	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Low Likely	Minor	Adverse		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Common Raptors	Direct Mortality	Negligible unlikely	Negligible	Neutral	Generic mitigation.	Negligible	Adverse
	Habitat Loss	Negligible Certain	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Low Likely	Minor-Negligible	Adverse		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Black Grouse	Direct Mortality	Negligible unlikely	Negligible	Neutral	All vegetation clearance and construction activities within 750 m of any lekking site will be undertaken out with this period. Dedicated black grouse survey will be required in the lekking season immediately prior to construction and for every subsequent lekking season	Negligible	Adverse
	Habitat Loss	Low Certain	Moderate - Minor	Adverse		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Medium Likely	Major	Adverse		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
					falling within the construction programme Pre-construction survey in advance of construction; exclusion of roosts under terms of development licence if avoidance and reduction mitigation strategies are not practicable. Watching brief by EcoW during clearance of areas of woodland		
Woodland bird assemblage	Direct Mortality	High Unlikely	Moderate-Minor	Adverse	Generic mitigation measures. Felling operations to be undertaken out with the bird breeding season (March – July inclusive). If vegetation clearance must be undertaken during the breeding bird season a detailed survey will be undertaken. Should a nest be located at this time an SQE will enforce a suitable stand-off area in which no works will take place.	Negligible	Adverse
	Habitat Loss	Negligible Certain	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Low Likely	Minor-negligible	Adverse		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Golden Plover	Direct Mortality	Negligible Unlikely	Negligible	Adverse	Generic mitigation. Removal of in-stream obstacles outside construction periods. Avoidance of in-channel works during spawning, incubation and migration periods. Design and installation of bridges and where this is not practicable, installation of	Negligible	Adverse
	Habitat Loss	Negligible Certain	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Adverse		Negligible	Adverse
	Disturbance	Low Likely	Moderate-minor	Adverse		Negligible	Adverse
	Pollution	Negligible	Negligible	Adverse		Negligible	Adverse

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
		Unlikely			bottomless culverts in order to retain bankside profiles. EMP and HMP must include measures to prevent sedimentation of water courses and reduce potential for pollution incidents, provision of spill kits, and outline on-going monitoring of water quality and fish stocks.		
Waders	Direct Mortality	High	Moderate-Minor	Adverse	Generic mitigation measures. Vegetation clearance operations to be undertaken out with the bird breeding season (March – July inclusive). If vegetation clearance must be undertaken during the breeding bird season a detailed survey will be undertaken. Should a nest be located at this time an SQE will enforce a suitable stand-off area in which no works will take place.	Negligible	Adverse
	Habitat Loss	Negligible	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible	Negligible	Neutral		Negligible	Adverse
	Disturbance	Low	Minor-negligible	Adverse		Negligible	Adverse
	Pollution	Negligible	Negligible	Neutral		Negligible	Adverse
<b>Operation</b>							
Hen Harrier	Direct Mortality	Negligible Unlikely	Negligible	Neutral	No mitigation proposed.	Negligible	Adverse
	Habitat Loss	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Pollution	Negligible	Negligible	Neutral		Negligible	Adverse

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
		Unlikely					
Peregrine Falcon	Direct Mortality	Negligible Unlikely	Negligible	Neutral	No mitigation proposed.	Negligible	Adverse
	Habitat Loss	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Long eared Owl	Direct Mortality	Negligible Unlikely	Negligible	Neutral	No mitigation proposed.	Negligible	Adverse
	Habitat Loss	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Golden Plover	Direct Mortality	Negligible Likely	Negligible	Neutral	No mitigation proposed.	Negligible	Adverse
	Habitat Loss	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Waders	Direct Mortality	Negligible Unlikely	Negligible	Neutral	Habitat restoration plan to provide suitable nesting habitat (Chapter7)	Negligible	Adverse
	Habitat Loss	Medium Likely	Minor	Adverse		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Moorland Birds	Direct Mortality	Negligible Unlikely	Negligible	Neutral	Generic Mitigation	Negligible	Adverse
	Habitat Loss	Medium Likely	Minor	Adverse		Negligible	Adverse
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Disturbance	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse
Black Grouse	Direct Mortality	Negligible unlikely	Negligible	Neutral	Implementation of HMP (Chapter 7 and Chapter 17)	Negligible	Adverse
	Habitat Loss	Negligible Unlikely	Negligible	Neutral		Positive Minor	Beneficial
	Fragmentation	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse

VER	Description of Effect	Potential Effect			Mitigation	Residual Effect	
		Magnitude - Probability	Significance	Adverse / Beneficial		Significance	Adverse / Beneficial
	Disturbance	low Likely	moderate	Adverse		Negligible	Adverse
	Pollution	Negligible Unlikely	Negligible	Neutral		Negligible	Adverse

**Table 8.11 – Summary of Cumulative Effects**

Construction, Operation or Decommissioning of the Proposed Development	Description of Effect	Proposed, Consented and Operational Developments	Significance	Beneficial/ Adverse
Construction, Operation and Decommissioning	Effects on ornithology	Proposed, consented and operation wind farm developments.	Negligible	Adverse
	Effects on ornithology	Glenmuckloch Surface Coal Mine, Rigg North Surface Coal Mine and Rigg South OCCS.	Moderate (short-term)  Negligible (long-term)	Adverse

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