CHAPTER 8: ORNITHOLOGY

INTRODUCTION

8.1 This chapter assesses the effects of the proposed Silton Wind Park on birds. It complements the assessment of ecological effects in Chapter 7. The chapter describes the methods used to evaluate the bird interest at Silton and determine its nature conservation importance. It explains the ways in which birds may be affected by the development and assesses the likely effects of the scheme and their significance.

8.2 The assessment was undertaken by Kevin Shepherd - Consultant Ornithologist Limited.

8.3 Birds may be affected by the following phases of the proposed development:

- Construction: construction of tracks, turbines, buildings and hard-standings (including borrow pit operations);
- Operation: turbine operation and associated maintenance activities;
- Decommissioning: the removal of installed structures and reinstatement of habitats if appropriate.

8.4 The potential effects of the proposed wind park on birds are:

- Direct habitat loss: due to land take by wind turbine bases, access tracks and ancillary structures;
- Indirect habitat loss: due to the displacement of birds as a result of construction and maintenance activities, or due to the presence of the operating wind turbines close to nesting or feeding sites or habitual flight routes;
- Collision: the killing or injury of birds following collision with rotating turbine blades and associated structures.

8.5 The assessment is based on information available at the time of writing (October 2007).

METHODS

Guidance

8.6 The following guidance and legislation was taken into account during this assessment:

- Review of relevant guidance documents and methods[1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12];
- Review of relevant legislation, including the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (EIA Regulations) and the Conservation (Natural Habitats, &c.) Regulations 1994[13] (Habitats Regulations);
- Review of relevant government policy, including Planning Policy Statement 22: Renewable Energy 2004, Planning for Renewable Energy: A Companion Guide to PPS22 2004 and Planning Policy Statement 9: Biodiversity and Geological Conservation 2005.

Consultations

8.7 Ornithological information was sought from the British Trust for Ornithology (BTO), Dorset Environmental Records Centre, Natural England (NE), the Royal Society for the Protection of Birds (RSPB) and local landowners[14] prior to the commencement of field survey work. Other than general/regional data and knowledge on bird distribution, no relevant information is known to exist for the proposed development site.

8.8 Richard Archer (RSPB, Exeter) commented that the proposed development was unlikely to be of high concern to RSPB. Nevertheless he recommended the undertaking of a thorough ornithological assessment; to include a full breeding bird survey (with particular emphasis on stone curlew and other farmland Birds of Conservation Concern 'red list' species) and regular flight activity surveys throughout the year.

Baseline studies

8.9 A review of potential bird issues associated with the proposed development was undertaken by Kevin Shepherd and identified the following field survey requirements:

- A breeding bird survey;
- Surveys to investigate use of the area during the non-breeding period;
- Vantage point surveys to assess bird flightlines and use of the area by foraging birds.

8.10 A twelve-month baseline ornithological survey was initiated in October 2006. The objectives were to survey:

- All bird species breeding within an area extending to at least 500m beyond the locations of the proposed turbines and site infrastructure (undertaken during April-July 2007);
- All bird species utilising the above area during the non-breeding period (undertaken during October 2006 – March 2007);
- Flight activity of selected bird species throughout the year; within an area extending to at least 200m beyond the locations of the proposed turbines (undertaken during October 2006 - September 2007).

[1] *Institute of Environmental Assessment (1995). Guidelines for Baseline Ecological Assessment. E & FN Spon, London.*

[2] *Office of the Deputy Prime Minister (2000). Environmental impact assessment: guide to procedures.* http://www.communities.gov.uk/index.asp?id=1143250.

[3] *Regini, K. (2000). Guidelines for ecological evaluation and impact assessment. Ecology and Environmental Management. In Practice 29 (September). Institute of Ecology and Environmental Management, Winchester.*

[4] *Oxford, M. (2001). Developing Naturally. A handbook for incorporating the natural environment into planning and development. Association of Local Government Ecologists.*

[5] *Scottish Natural Heritage (2002). A Handbook on Environmental Impact Assessment. SNH, Battleby.*

[6] *Institute of Ecology and Environmental Management (2002). Guidelines for Ecological Impact Assessment: Amended Pilot November 2002. IEEM, Winchester.*

[7] *Communities and Local Government (2004). Note on environmental impact assessment directive for local planning authorities.* http://www.communities.gov.uk/index.asp?id=1143273.

[8] *Institute of Environmental Management and Assessment (2004). Guidelines for Environmental Impact Assessment. IEMA, Lincoln.*

[9] *IEEM (2006). Guidelines for Ecological Impact Assessment in the United Kingdom (version 7 July 2006). http://www.ieem.org.uk/ecia/index.html.*

[10] *Gilbert, G., Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods; a manual of techniques for key UK species. RSPB, Sandy.*

[11] *SNH (2005). Survey Methods for use in Assessing the Impacts of Onshore Wind Farms on Bird Communities. SNH, Battleby.*

[12] *Band, W., Madders, M. & Whitfield, D.P. (2006). Developing field and analytical methods to assess avian collision risk at wind farms. In: de Lucas, M., Janss, G. & Ferrer, M. (eds). Birds and Wind Power. Lynx Edicions, Barcelona.*

[13] *With subsequent amendments in 1997 & 2000.*

[14] *Including enquiries made on whether local bird surveys/studies had been undertaken on landholdings in recent years.*

8.11 Full details of survey methods and results are given in **Appendix 11**. Findings relevant to birds of conservation importance are summarised in paragraphs 8.27 - 8.52 below.

Assessment of significance

Overview

8.12 During the rapid evolution of methods in recent years, ecological consultants and advisory bodies have employed a variety of techniques to assess the significance of potential effects of wind parks on birds. Assessment at Silton takes these, and all published guidance and legislation[15] into account. It ensures that local authorities have sufficient information to determine whether the proposal is likely to have a significant effect on bird interests.

8.13 Where there is a potential effect on a bird population that forms part of the qualifying interest of an internationally or nationally designated site[16], or a site that would meet the criteria for international or national designation, effects are judged against whether the development could significantly affect the site population and its distribution. Where bird populations are not protected by designated sites, judgement is made against a more general expectation that the development would not have a significant adverse effect on the overall population, range or distribution; and that it would not interfere significantly with the flight paths of migratory birds. In assessing the effects, consideration is given to the national, regional and local populations of the species. Trivial or inconsequential effects are excluded.

8.14 The assessment determines the potential effects of the development and the likelihood of their occurrence. Effects are assessed to determine whether or not they are significant with respect to the EIA Regulations. In judging whether a potential effect is significant or not, two principal factors are taken into account:

- The nature conservation importance of the species present;
- The magnitude of the likely effect.

8.15 The significance of potential effects is determined by integrating the assessments of nature conservation importance and magnitude of effects in a reasoned way. In making judgements on significance, consideration is given to the population status and trend of the potentially affected species[17]. If a potential effect is determined to be significant, measures to avoid, reduce or remedy the effect are suggested where possible.

Evaluating Nature Conservation Importance

8.16 The nature conservation importance of the bird species potentially affected by development is defined in accordance with Table 8.1.

Table 8.1 Determining factors for nature conservation importance.

Importance	Definition
Very high	Species that form the cited interest of SPAs and SSSIs.
High	Species listed on Annex I of EC Directive 79/409/EEC on the Conservation of Wild Birds 1979 (Annex I species). Breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (Schedule 1 species). Species present in nationally important numbers (>1% UK population).
Moderate	Other breeding species listed on the Birds of Conservation Concern 'Red' list (BOCC Red List species). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the proposed development. Species present in regionally[18] important numbers (>1% regional population).
Low	Other Local Biodiversity Action Plan breeding species (LBAP species).

Evaluating the magnitude of effects

8.17 Effect is defined as change in the population of a given bird species present during (or beyond) the life of the development. Where the response of a population has varying degrees of likelihood, the probability of these differing outcomes is considered. Note that effects can be adverse, neutral or favourable.

8.18 The overall magnitude of effects is determined by taking three factors into account:

- The behavioural sensitivity of the species;
- The spatial magnitude of the effect;
- The temporal magnitude of the effect.

8.19 Behavioural sensitivity is determined subjectively based on species' ecological function and behaviour, using the broad criteria set out in Table 8.2. The judgement takes account of information available on the responses of birds to various stimuli (e.g. predators, noise and disturbance by humans). Note that behavioural sensitivity can differ even between similar species[19] and that, within a particular species, some populations and individuals may be more sensitive than others. Thus the behavioural responses of birds are likely to vary with both the nature and context of the stimulus and the experience and personality of the bird. Sensitivity also depends on the activity of the bird. For example, a species is likely to be less tolerant of disturbance whilst breeding than at other times, and tolerance is likely to increase as breeding progresses[20].

Table 8.2 Determining factors for behavioural sensitivity.

Sensitivity	Definition
High	Species or populations occupying habitats remote from human activities, or that exhibit strong and long-lasting (guide: >20 mins) reactions to disturbance events.
Moderate	Species or populations that appear to be warily tolerant of human activities, or exhibit short-term reactions (guide: 5-20 minutes) to disturbance events.
Low	Species or populations occupying areas subject to frequent human activity

[15] *See paragraph 8.6.*

[16] *i.e. Ramsar sites, Biosphere Reserves, Special Areas of Conservation (SAC), Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI).*

[17] *Population status and trends are considered at an appropriate geographical scale.*

[18] *Region is defined as the relevant Natural England Regional Area (*http://www.naturalengland.org.uk*), in this case NE East of England Region.*

[19] *Schueck, L.S., Marzluff, J.M., & Steenhof, K. (2001). Influence of military activities on raptor abundance and behavior. Condor 103: 606-615.*

[20] *Holthuijzen , AMA (1985). Behavior and productivity of nesting prairie falcons in relation to construction at Swan Falls Dam and experimental blasting. Snake River Birds of Prey Research Project Annual Report 1985.*

	and exhibiting mild and brief reaction (including flushing behaviour) to disturbance events.

8.20 The magnitude of effects is also judged in terms of space (Table 8.3) and time (Table 8.4).

Table 8.3 Spatial magnitude criteria.

Magnitude	Definition
Very high	Total loss or very major alteration to key elements/features of the baseline (pre-development) conditions such that the post development attributes would be fundamentally changed and may be lost altogether. Guide: >80% of population lost (or gained).
High	Major loss or major alteration to key elements/features of the baseline conditions such that the post development attributes would be fundamentally changed. Guide: 21-80% of population lost (or gained).
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post development attributes would be partially changed. Guide: 6-20% of population lost (or gained).
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration would be discernible but the underlying attributes would be similar to pre-development circumstances/patterns. Guide: 1-5% of population lost (or gained).
Negligible	Very slight change from baseline conditions. Change barely distinguishable, approximating to the “no change” situation. Guide: < 1% population lost (or gained).

Table 8.4 Temporal magnitude criteria.

Magnitude	Definition
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period (e.g. the replacement of mature trees by young trees which need >25 years to reach maturity, or restoration of ground after removal of a development. Such exceptions can be termed very long term effects).
Temporary	Long term (15 - 25 years or longer - see above). Medium term (5 – 15 years). Short term (up to 5 years).

8.21 In the case of internationally or nationally designated sites (e.g. SPAs, SSSIs), magnitude is assessed in respect of the area within the designated site boundary. For non-designated sites, magnitude is assessed in respect of an appropriate ecological unit, e.g. Natural England Regional Area.

8.22 Knowledge of how rapidly the population or performance of a species is likely to recover following loss or disturbance (e.g. by birds being recruited from other populations elsewhere) is used to assess temporal effects, where such information is available.

8.23 The above factors are taken into account in order to come to an overall assessment of impact magnitude using simple categories (Table 8.5). These place an emphasis on the integrity of species/populations, in line with the approach set out in European law for the protection of populations of birds, particularly within SPAs. The integrity of a population is essentially the coherence of its ecological structure and function, across its range, that enables it to sustain itself. A population that achieves such coherence is considered to be in favourable condition.

Table 8.5 Overall impact magnitude.

Magnitude	Criteria
Major negative	The change is likely to cause an adverse effect on the integrity of a species/population of nature conservation importance.
Negative	The change adversely affects the species/population, but there will probably be no effect on its integrity.
Neutral	No or negligible effect.
Positive	The change is likely to benefit the species/population.
Major positive	The change is likely to cause a positive effect on the integrity of the species/population.

Evaluating the significance of effects

8.24 A matrix (Table 8.6) is then used to assign a level of significance (Table 8.7) to the potential impact.

Table 8.6 Impact significance matrix.

Magnitude of effects	Nature conservation importance			
	Very high	High	Moderate	Low
Major negative	Extreme	Extreme	Extreme-moderate	Major-minor
Negative	Major- minor	Major-minor	Major-minor	Moderate-minor
Neutral	No impact			
Positive	Major-minor	Major-minor	Major-minor	Moderate-minor
Major positive	Extreme	Extreme	Extreme-moderate	Major-minor

Table 8.7 Definitions of significance.

Significance	Definition
Extreme	These effects represent key factors in the decision making process. They are generally, but not exclusively, associated with sites and features of international or national importance (e.g. SPA/SSSIs) and resources/features which are unique and which, if lost, cannot be replaced or relocated.
Major	These effects are likely to be important considerations at a regional or district scale, but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision making process.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be

	key decision making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision making process. Nevertheless, they may be of relevance in the detailed design of the project.
Negligible	No effects (or those beneath levels of perception); within normal bounds of variation or within margins of forecasting error.

8.25 Where the boxes in Table 8.6 contain a range of values, professional judgement is used to assign a value within the range given. Impacts judged to be of moderate or greater significance should be considered 'significant' in terms of the EIA regulations, while impacts assessed as being of minor significance or no impact do not need to be treated as significant effects in terms of the EIA regulations.

BASELINE DESCRIPTION

Designated sites

8.26 No SSSIs lie within 5km of the proposed wind park.

Baseline survey results

8.27 Ten Annex I species (little egret, red kite, marsh harrier, osprey, merlin, peregrine, dotterel, golden plover, common tern and kingfisher) were recorded during the baseline surveys.

8.28 There were three sightings of little egret flying over the application site during October 2006 – September 2007: two at 1018hrs on 30 October, one (considered to be one of the same) at 1153hrs on 30 October and one on 19 April.

8.29 A red kite flew over the site on 1 May 2007.

8.30 A female marsh harrier foraged on the site on 19 April 2007.

8.31 An osprey flew over the site on 10 April 2007.

8.32 Merlins were occasionally recorded foraging on the site in October (a juvenile or female), November (a juvenile or female and an adult male) and January (a brief sighting of a bird that could not be aged or sexed). The sightings related to at least two, possibly four individuals. Flight activity over the site was very limited; only two flights were recorded during 432 hours of observations undertaken during the year.

8.33 Peregrines were occasionally recorded foraging on the site in September, October, November, December, January and March. The sightings were considered to relate to three individuals (an adult male, an adult female and a juvenile female) foraging in the wider area. Flight activity over the site was limited; only fifteen flights were recorded during 432 hours of observations undertaken during the year, only five of these within rotor-sweep height.

8.34 A party of eight dotterel flew over the site on 19 April 2007.

8.35 Roving parties of golden plover were recorded utilising agricultural fields in the Silton area during October-March. Up to 316 were recorded on the site in October, 34 in November, 59 in December, 39 in January, 38 in February and 320 in March. The site counts were indicative of good numbers of birds moving through the area on passage in autumn, smaller numbers then wintering, with the winter population then augmented by good numbers moving through again in spring. Though birds were regularly recorded on site, they were often absent, sometimes for prolonged periods, as they moved around utilising a variety of locations in the wider area. The birds generally avoided smaller, more enclosed, vegetated fields, much preferring to forage on larger, more open fields with little or no vegetation. A total of 125 flights were logged during 216 hours of observations between October-March. Some of these involved localised, low-level flights. A total of 99 flights were observed within rotor-sweep height; 29 in October, three in November, 22 in December, six in January, six in February and 33 in March. The flight activity recorded involved the localised movements, comings and goings of birds utilising the site. There was no evidence of the site lying on regular flight lines used by other birds.

8.36 The golden plover is a locally common winter visitor and passage migrant in Dorset[21]. A number of localities in the county are documented as being regular wintering areas supporting good numbers of birds, though it is clear that the birds are highly mobile and numbers fluctuate considerably in each[21]. The Silton area is not documented. This could be due to lack of observer coverage in the north of the county, for a flock of 500 reported 'near Wincanton', Somerset on 17 December 2002[21] is indicative of birds utilising the Silton area. Alternatively, the Silton area may not be a regular wintering area, utilised only when enough suitable habitat is provided by localised, constantly changing agricultural cropping regimes and rotations.

8.37 An adult common tern flew over the site on 17 July 2007.

8.38 Single kingfishers were recorded foraging on water bodies c.500m north-east of the application site in October and January. The sightings were considered to relate to 1-2 birds wintering in the general area.

8.39 One further Schedule 1 species[22] (hobby) was recorded during the baseline surveys.

8.40 Hobbies were recorded flying over the site on 1 May, 26 June, 18 July, 15 August (two birds) and 3 September 2007. The sightings are considered to have related to birds foraging in the wider area; migrants, non-breeders or breeding birds. There was no evidence that the species bred locally. Flight activity over the site was limited; only nine flights were recorded during 432 hours of observations undertaken during the year, only five of these within rotor-sweep height.

8.41 Seven BOCC Red List species were found breeding within 500m of the site; grey partridge, skylark, song thrush, starling, linnet, bullfinch and yellowhammer.

8.42 One pair of grey partridge was found breeding in an agricultural field c.370m from the site.

8.43 A total of 48 pairs of skylark were found breeding in agricultural fields within 500m of the site.

8.44 Sixteen pairs of song thrush were found breeding in woodland, hedgerows and scrub within 500m of the site.

8.45 Three pairs of starling were found breeding in tree cavities within 500m of the site.

8.46 Five pairs of linnet were found breeding in hedgerows and low scrub within 500m of the site.

8.47 One pair of bullfinch was found breeding in a dense hedgerow c.470m from the site.

8.48 Nineteen pairs of yellowhammer were found breeding in hedgerows and low scrub within 500m of the site.

8.49 The site does not support any bird populations of regional or national importance.

8.50 The site does not support any additional breeding LBAP species.

8.51 The site does not lie on any recognised bird migration routes and is therefore unlikely to be utilised by significant numbers of migratory birds. Numbers of migratory birds noted during the baseline surveys were small and clearly insignificant.

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[21] *Green, G. (2004). The Birds of Dorset. Christopher Helm, London.*

[22] *In addition to red kite, marsh harrier, osprey, merlin, peregrine, dotterel and kingfisher (see paras. 8.29 - 8.34 & 8.38), which are both Annex I and Schedule 1 species.*

8.52 There is no possibility that the site would be designated as internationally or nationally important for birds.

ASSESSMENT OF EFFECTS

Nature conservation importance

8.53 Eleven species of **high** nature conservation importance were identified using the criteria set out in Table 8.1: little egret, red kite, marsh harrier, osprey, merlin, hobby, peregrine, dotterel, golden plover, common tern and kingfisher. Red kite, marsh harrier, osprey, merlin, peregrine, dotterel and kingfisher are both Annex I and Schedule 1 species. Little egret, golden plover and common tern are Annex I species. Hobby is a Schedule 1 species.

8.54 Seven species of **moderate** nature conservation importance were identified using the criteria set out in Table 8.1: grey partridge, skylark, song thrush, starling, linnet, bullfinch and yellowhammer are all BOCC Red List species.

Nature and magnitude of potential effects

8.55 Potential effects are discussed in turn and assessed in relation to species of nature conservation importance.

8.56 Only odd sightings of little egret (see para 8.28), red kite (see para 8.29), marsh harrier (see para 8.30), osprey (see para 8.31), dotterel (see para 8.34) and common tern (see para 8.37) were made. A wintering kingfisher was seen twice a considerable distance from the application site (see para 8.38). Very small numbers of grey partridge (see para 8.42), starling (see para 8.45) and bullfinch (see para 8.47) were found breeding in enclosed habitats considerable distances from the application site. Potential effects of the development on all these species are considered to be negligible and not significant under the terms of the EIA regulations. They are not discussed further.

Behavioural sensitivity

8.57 Using the criteria set out in Table 8.2, merlin, hobby, peregrine and golden plover are judged to have **moderate** behavioural sensitivity, skylark, song thrush, linnet and yellowhammer **low** sensitivity in the context of this assessment. In broad terms, the former species are generally warily tolerant of human activities and exhibit short-term reactions to disturbance events. The latter exhibit mild and brief reactions (including flushing behaviour) to disturbance events.

Land-take effects

8.58 The total land-take by the development would result in the permanent loss of a very small area (c.0.05km^2) of available habitat. The potential effect on all birds is considered to be negligible and not a significant effect under the terms of the EIA regulations.

Construction disturbance

8.59 It is likely that noise and visual disturbance associated with construction activities would temporarily displace some breeding and foraging birds. The routines of some birds that are not displaced would also be temporarily disrupted. Potential effects would be greatest during the breeding season. Birds that are disturbed at breeding sites are vulnerable to a variety of potential effects, including the chilling or predation of exposed eggs/chicks, damage or loss of eggs/chicks caused by panicked adults and the premature fledgling of young. Disturbed birds may therefore breed less successfully and feed less efficiently, leading to a reduction in the productivity and survival of bird populations.

Merlin, hobby and peregrine

8.60 The merlins, hobbies and peregrines utilising the proposed development site are individuals foraging over a very wide area and spending very limited time on the site. It is highly unlikely that the site provides critical elements of habitat for such individuals. The spatial magnitude of effects of construction disturbance on merlin, hobby and peregrine is therefore considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of construction disturbance.

Golden plover

8.61 The golden plovers recorded at Silton during winter 2006/07 were wide-ranging, utilising not only the proposed development site but also locations in the wider area. Nevertheless they regularly utilised and spent time on the site, such that the site presumably provided valuable elements of habitat for the birds involved. Construction disturbance, at least on or in the vicinity of the birds' favoured agricultural fields, is likely to displace the birds. However (a) the displaced birds are likely to relocate to alternative locations (including those already being used when the birds are frequently absent from the site), (b) numbers of birds involved are small (representing <1% of the regional wintering population) and (c) such disturbance will be only temporary (construction activities are predicted to last only eighteen weeks and, depending upon the construction schedule, may not occur during the winter months). Taking these factors into account, the spatial magnitude of effects of construction disturbance on golden plover is considered to be **low**, the overall impact is considered to be **negative** and there is predicted to be an impact of **minor significance** (not significant in terms of the EIA regulations) on golden plover as a result of construction disturbance.

Skylark, song thrush, linnet and yellowhammer

8.62 Noise and visual disturbance associated with construction activities could have temporary effects on locally breeding skylark, song thrush, linnet and yellowhammer. Birds breeding close to construction activities could be displaced altogether (and fail to breed), or disturbance could lead to decreased breeding success. In turn, this could lead to a temporary reduction in the productivity and survival of local skylark, song thrush, linnet and yellowhammer populations. However (a) such disturbance will be only temporary as construction activities are predicted to last only eighteen weeks and, depending on the construction schedule, may not occur during the breeding season and (b) only birds breeding in less enclosed, more open habitats in proximity to construction activities are likely to be affected, hence numbers of birds affected will be small (if it is assumed that there could be effects up to 200m from construction activities, then there could be effects on 26 pairs of skylark, five pairs of song thrush, two pairs of linnet and nine pairs of yellowhammer). Taking these factors into account, though there could be effects on small numbers of skylark, song thrush, linnet and yellowhammer in the short term, the long term spatial magnitude of effects of construction disturbance on skylark, song thrush, linnet and yellowhammer is considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of construction disturbance.

Operational disturbance

8.63 The disturbance effects of operational turbines on nesting and foraging birds have not yet been adequately quantified. Published information[23] [24] [25] and reviews of impacts[26] [27] [28] suggest that

[23] *Vauk, G. (1990). Biological and ecological study of the effects of construction and operation of wind power sites. Jahrgang/Sonderheft, Endbericht. Norddeutsche Naturschutzakemie, Germany.*

[24] *Phillips, J.F. (1994). The effects of a wind farm on the upland breeding bird communities of Bryn Tytli, mid-Wales: 1993-4. Unpublished report to National Windpower.*

most birds are affected only slightly. Breeding birds have not been found to be displaced at distances greater than 300m from a turbine[29] [30]. However, wind turbines might displace birds from much larger areas if they act as a barrier to bird movements, or if the availability of suitable habitat is restricted.

8.64 Displacement effects are likely to be greatest in the initial period of turbine operation. In the medium and long terms, birds may habituate to the operation of the turbines. The limited evidence on breeding birds of open country to date suggests that effects vary between species. Thus, declines have been reported for some species (e.g. curlew) but not others (e.g. skylark)[31] [32] [33]. There is the potential for some disruption of feeding and nesting behaviours due to increased human activity for maintenance purposes and recreational access. However, this would be relatively infrequent, involve low levels of disturbance and would be restricted to areas of the site accessible by tracks. Therefore the overriding disturbance is considered to be turbine operation.

Merlin, hobby and peregrine

8.65 The merlins, hobbies and peregrines utilising the proposed development site are individuals foraging over a very wide area and spending very limited time on the site. It is highly unlikely that the site provides critical elements of habitat for such individuals. Furthermore, all three species have been recorded foraging, unperturbed, on operational wind farms[34]. The spatial magnitude of effects of operational disturbance on merlin, hobby and peregrine is therefore considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of operational disturbance.

Golden plover

8.66 Wintering flocks of golden plover are known to regularly forage, unperturbed, on operational wind farms e.g. a flock of up to 500 birds regularly commuted to a pasture completely encircled by wind turbines on the Penrhyddlan & Llidiartywaun Wind Farm, Powys throughout the winters of 1999/2000 – 2002/03[35]. Vehicular movements and most human activity on the operational wind farm also did not disturb the birds, though workers exiting vehicles close to flocks sometimes flushed them. Levels of human disturbance to golden plover of the operational Silton Wind Farm are likely to be slightly higher than current levels at the site. Also, the golden plovers in the Silton area typically utilise more open, less enclosed agricultural fields. They could be more reluctant to utilise fields that have become less open due to the presence of wind turbines and associated infrastructure. Taking these factors into account, the spatial magnitude of effects of operational disturbance on golden plover is considered to be **low**, the overall impact is considered to be **negative** and there is predicted to be an impact of **minor significance** (not significant in terms of the EIA regulations) on golden plover as a result of operational disturbance.

Skylark, song thrush, linnet and yellowhammer

8.67 Breeding skylarks and operational wind turbines have been shown to successfully co-exist. Following a four-year study, a breeding population of 61-67 pairs remained stable following construction of the 20-turbine Hare Hill Windfarm in Ayrshire[33]. Song thrushes, linnets and yellowhammers all nest in hidden locations in cover and forage on or close to ground level. Like skylarks, they are likely to generally be able to quickly habituate to the presence of an operational wind park. The spatial magnitude of effects of operational disturbance on skylark, song thrush, linnet and yellowhammer is therefore considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of operational disturbance.

Collision

8.68 The level of collision would depend on the amount of flight activity over the site, the extent to which birds are displaced by the turbines and the ability of birds to detect and manoeuvre around rotating turbine blades. Birds that collide with a turbine are likely to be killed or fatally injured.

8.69 The extent to which birds are able to avoid collision with wind turbines has not yet been adequately quantified. The indications from studies so far are that birds readily avoid wind turbines and that collisions are rare events and occur mainly at sites where there are unusual concentrations of birds and turbines, or where the behaviour of the birds concerned leads to high-risk situations[25] [26] [27] [36]. Examples include concentrated migration flyways, other situations where large numbers of birds may be flying at night or in poor visibility (e.g. tidal feeding movements), areas where the food resource is exceptional, 'wind wall' turbine layouts (a close array of turbines across a wind funnel), and the use of lattice towers by perching birds. There are no such unusual circumstances at Silton that are likely to result in a high level of collision to birds.

Merlin, hobby and peregrine

8.70 During 432 hours of flight activity observations undertaken during the year, only two merlin, nine hobby and fifteen peregrine flights were recorded. Of these, no merlin, only five hobby and five peregrine flights were observed within rotor-sweep height. Such a level of flight activity is of little concern. The magnitude of collision effects on merlin, hobby and peregrine is therefore considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of collision.

Golden plover

8.71 A total of 99 golden plover flights were recorded within rotor-sweep height during 216 hours of observations between October-March. Though flights were infrequent (averaging one flight

[25] *Leddy, K.L., Higgins, K.F and Naugle, D.E. (1999). Effects of wind turbines on upland nesting birds in conservation reserve program grasslands. Wilson Bull. 111(1): 100-104.*

[26] *Crockford, N.J. (1992). A review of the possible impacts of wind farms on birds and other wildlife. JNCC report no. 27. JNCC, Peterborough.*

[27] *Benner, J.H.B., Berkhuizen, J.C., de Graaf, R.J. and Postma, A.D. (1993). Impact of wind turbines on birdlife. Report no. 9247. Consultants on Energy and the Environment, Rotterdam, The Netherlands.*

[28] *Winkelmann, J.E. (1994). Bird/wind turbine investigations in Europe. Proc. of the National Avian Wind Power Planning Meeting, Denver, Colorado: pp 43-48.*

[29] *Gill, J.P., Townsley, M. and Mudge, G.P. (1996). Review of the impacts of wind farms and other aerial structures upon birds. SNH Review 21: 68pp.*

[30] *Percival, S.M. 1998. Birds and Turbines: managing potential planning issues. Proc. of the 20th BWEA Conference 1998: pp 345- 350.*

[31] *Williams, I. and Young, A.J. (1997). Trannon Moor ornithological studies. RSPB report to Powys County Council, Powys.*

[32] *Young, A.J. (1999). Trannon Moor Ornithological Survey. Unpublished report, RSPB Wales.*

[33] *Shepherd, K.B. (2000, 2001, 2002, 2003). Hare Hill Windfarm, New Cumnock, Ayrshire: Breeding bird monitoring 2000, 2001, 2002, 2003. Reports to Scottish Power plc, Glasgow.*

[34] *Shepherd, K.B. (2001). Penrhyddlan & Llidiartywaun Windfarm proposed extension: Research on foraging raptors and assessment. Report to Ingenco plc, Glasgow.*

[35] *Shepherd, K.B. (2001 & subsequent observations). Penrhyddlan & Llidiartywaun Windfarm proposed extension: Wintering bird survey and assessment. Report to: Ingenco, Glasgow.*

[36] *Dong Energy (2006). Danish Offshore Wind: key environmental issues. Dong Energy, Fredericia, Denmark.*

every 2.2 hours), large flocks were sometimes involved (21 flights involved flocks of 100-320 birds) and flocks sometimes wheeled around considerably before landing. Golden plovers are also known to forage and move around nocturnally[37], so birds may also be flying over the site at night.

8.72 The extent to which golden plovers are able to avoid collision with wind turbines has never been investigated or quantified. However, studies of onshore wind turbines in Schleswig-Holstein showed that waders reacted to turbines up to 200-500m away and showed either a change in flying height or direction in order to avoid them[38]. Studies of offshore wind farms in Denmark recorded similar responses in migrating waterfowl (primarily common eiders), both diurnally and nocturnally[36]. Studies of Aythya ducks wintering in the Netherlands showed that they were able to negotiate four turbines, both on moonlit and moonless nights[39]. The eyesight of golden plover is highly likely to be at least as good as all these species, so similar avoidance action is likely to be taken in the majority of instances. Frequent observations over a prolonged period of a flock of up to 500 golden plovers at Penrhyddlan & Llidiartywaun Wind Farm, Powys witnessed frequent avoidance behaviour to enable the birds to regularly commute to a small area of prime foraging habitat completely surrounded by wind turbines[35].

8.73 Though the possibility of golden plovers colliding with the rotating wind turbine blades cannot be ruled out, given the numbers of birds utilising the site and their recorded flight activity, the number of birds affected is likely to be small. The magnitude of collision effects on golden plover is therefore considered to be **low**, the overall impact is considered to be **negative** and there is predicted to be an impact of, at worst, moderate significance on golden plover as a result of collision. Following mitigation (see para 8.77 below), the impact is predicted to be of **minor significance** (not significant in terms of the EIA regulations) on golden plover as a result of collision.

Skylark

8.74 A fresh male skylark fatality recorded at the Hare Hill Windfarm in Ayrshire in spring 2003 had injuries clearly consistent with a recent collision with a rotating turbine blade[40]. Considerable singing activity had been recorded in the vicinity at the time and the bird was considered to have collided whilst song-flighting. Though skylarks therefore can collide with rotating turbine blades, collisions are likely to be unusual and restricted to birds song-flighting within breeding territories located close to operational wind turbines. The spatial magnitude of collision effects on skylark is therefore considered to be **low**, the overall impact is considered to be **negative** and there is predicted to be an impact of **minor significance** (not significant in terms of the EIA regulations) on skylark as a result of collision.

Song thrush, linnet and yellowhammer

8.75 Locally breeding song thrushes, linnets and yellowhammers fly mainly below rotor-sweep height and are unlikely to collide with rotating wind turbine blades. The spatial magnitude of effects of collision on song thrush, linnet and yellowhammer is therefore considered to be **negligible**. The overall impact is therefore **neutral** and there is predicted to be **no impact** on these species as a result of collision.

Decommissioning

8.76 Habitat reinstatement would be decided in consultation with the statutory authorities at the time of decommissioning. It is assumed that habitats lost to the wind park infrastructure would be reinstated. Disturbance effects due to decommissioning and reinstatement of habitats would be similar to those identified for construction. In summary, there is predicted to be an impact of **minor significance** (not significant in terms of the EIA regulations) on golden plover and **no impact** on all other species as a result decommissioning.

MITIGATION

8.77 Roving parties of passage and wintering golden plover in north Dorset were found to regularly utilise agricultural fields on and in the vicinity of the proposed application site, particularly during October and March when up to 320 birds were present. Their resulting flight activity could lead to fatalities due to collision with rotating wind turbine blades. In consultation with Natural England, golden plover flight activity will therefore be reduced on the proposed development site; by rendering fields in proximity to proposed wind turbine locations unfavourable for foraging during September-March. As mitigation, it is therefore proposed that some form of medium to tall crop cover will be maintained over the winter months to discourage golden plovers from utilising the site.

8.78 The agricultural landscape in north Dorset is subject to constantly changing cropping regimes and rotations. Larger, more open fields that happen to be bare or short-vegetated during September-March may be utilised by roving parties of passage and wintering golden plovers. These birds are likely to utilise a multitude of locations whilst away from their breeding grounds in northern Britain, Iceland, Scandinavia and Russia[37] [41]. They are highly mobile and numbers typically fluctuate considerably at wintering sites in the county[21]. Local manipulation of habitat at Silton is highly unlikely to affect the species significantly in the wider area, regionally or nationally.

SUMMARY OF EFFECTS

8.79 Effects are summarised in Table 8.8 - 8.11.

STATEMENT OF SIGNIFICANCE

8.80 This chapter assesses the effects of the proposed Silton Wind Park on birds. It is based on baseline data gathered on breeding birds, wintering birds and bird flight activity over the site during the months of October 2006 – September 2007 inclusive.

8.81 Though there may be minor impacts on locally wintering golden plover as a result of disturbance during construction, operation and decommissioning, and minor impacts on locally wintering golden plover and locally breeding skylark as a result of birds colliding with rotating turbine blades, no effects of the development on birds are considered to be significant under the terms of the EIA regulations.

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[37] *Cramp, S. (1983). Handbook of the Birds of Europe, the Middle East and North Africa: The birds of the Western Palearctic. Volume III (waders to gulls). Oxford University Press, Oxford.*

[38] *Koop, B. (1997); cited in Langston, R.H.W. & Pullan, J.D. (2002). Windfarms and birds: an analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues. Birdlife International report to the Bern Convention. Convention on the Conservation of European Wildlife and Natural Habitats, Strasbourg, France.*

[39] *Spaans et al (1998); cited in Langston, R.H.W. & Pullan, J.D. (2002). Windfarms and birds: an analysis of the effects of windfarms on birds, and guidance on environmental assessment criteria and site selection issues. Birdlife International report to the Bern Convention. Convention on the Conservation of European Wildlife and Natural Habitats, Strasbourg, France.*

[40] *S Votier pers. obs.*

[41] *Wernham, C.V., Toms, M.P., Marchant, J.H., Clark, J.A., Siriwardena, G.M. & Baillie, S.R. (2002). The Migration Atlas: movements of the birds of Britain and Ireland. Poyser, London.*

Table 8.8 Summary of construction disturbance effects

Species	Nature conservation importance	Behavioural sensitivity	Spatial magnitude	Temporal magnitude	Overall impact magnitude	Mitigation	Residual significance
Merlin	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Hobby	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Peregrine	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Golden plover	High	Moderate	Low	Short-term	Negative	Not required	Minor
Skylark	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Song thrush	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Linnet	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Yellowhammer	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact

Table 8.9 Summary of operational disturbance effects

Species	Nature conservation importance	Behavioural sensitivity	Spatial magnitude	Temporal magnitude	Overall impact magnitude	Mitigation	Residual significance
Merlin	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Hobby	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Peregrine	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Golden plover	High	Moderate	Low	Long-term	Negative	Not required	Minor
Skylark	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact
Song thrush	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact
Linnet	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact
Yellowhammer	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact

Table 8.10 Summary of collision effects

Species	Nature conservation importance	Behavioural sensitivity	Spatial magnitude	Temporal magnitude	Overall impact magnitude	Mitigation	Residual significance
Merlin	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Hobby	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Peregrine	High	Moderate	Negligible	Long-term	Neutral	Not required	No impact
Golden plover	High	Moderate	Low	Long-term	Negative	See para 8.77	Minor
Skylark	Moderate	Low	Low	Long-term	Negative	Not required	Minor
Song thrush	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact
Linnet	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact
Yellowhammer	Moderate	Low	Negligible	Long-term	Neutral	Not required	No impact

Table 8.11 Summary of decommissioning effects

Species	Nature conservation importance	Behavioural sensitivity	Spatial magnitude	Temporal magnitude	Overall impact magnitude	Mitigation	Residual significance
Merlin	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Hobby	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Peregrine	High	Moderate	Negligible	Short-term	Neutral	Not required	No impact
Golden plover	High	Moderate	Low	Short-term	Negative	Not required	Minor
Skylark	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Song thrush	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Linnet	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact
Yellowhammer	Moderate	Low	Negligible	Short-term	Neutral	Not required	No impact