Chapter 8: Ornithology

Figures

Appendices

8 Ornithology

8.1 Executive Summary

1. Baseline bird surveys undertaken in 2013 and 2015 showed that the proposed development, buffered to 500m, provides breeding habitat for several species of high nature conservation value including: whimbrel and dunlin (up to three pairs each), golden plover (up to two pairs) and Arctic skua (one pair). There are also several species of moderate nature conservation value including: curlew (up to 21 pairs), lapwing (up to 13 pairs) and common sandpiper (up to 1 pair). Outside the bird breeding season the site has relatively low ornithological value.

2. The proposed development is predicted to lead to two potential effects that could adversely affect birds: disturbance during the construction stage and long term habitat loss/change.

3. The site substantially overlaps the Central Shetland Moorland Areas Important Bird Area (IBA), an area of national importance for breeding whimbrel. This IBA comfortably meets the criteria for designation as a Special Protection Area under the EU Natura legislation (it currently holds approximately 8% of the UK whimbrel population).

4. Before mitigation, construction disturbance is predicted to cause disturbance of up to three pairs of breeding whimbrel, and this is rated as a Moderate magnitude effect on the Central Shetland Moorland Areas IBA whimbrel population and a Low magnitude effect on the Shetland (regional) population. Whimbrel is listed on Schedule 1 of the Wildlife and Countryside Act (as amended) and therefore disturbance of this species when breeding is prohibited. Habitat loss/change is also predicted to have a Low magnitude effect on the IBA whimbrel population.

5. The predicted effects of the development on regional populations of all other bird species are predicted to be of negligible magnitude.

6. Mitigation measures in the form of restricting the timing of construction works in the most bird sensitive parts of the site to outside the breeding season, and minimising habitat loss and change are proposed.

7. After mitigation the residual effect on all bird receptors is determined to be of negligible or minor significance and therefore judged to be not significant for the purposes of the EIA regulations.

8.2 Introduction

8. This Chapter identifies the ornithological sensitivities in the area potentially affected by the realignment and upgrade of the B9075 Sandwater Road, the proposed development.

9. This Chapter was prepared by Natural Research Projects (NRP) Limited on behalf of Viking Energy Wind Farm LLP (VEWF). The bird surveys that inform this report were also undertaken by NRP.

10. This Chapter is supported by the following Technical Appendix of this Environmental Statement (ES):

- Appendix 8.1: Baseline Bird Surveys Technical Report.

8.3 Scope of Assessment

11. The construction of the proposed development is predicted to lead to two types of effect on birds; those arising from construction disturbance and those arising from habitat loss or change.

8.3.1 Study Area

12. The assessment considers all areas in which birds could plausibly be affected by the proposed development. For all except three bird species it is not considered plausible that effects on birds could extend beyond 500m from the proposed development, therefore a 500m buffer around the proposed development was used to define a generic Sandwater Bird Survey Area (Figure 1 in Appendix 8.1). In keeping with best practice (SNH, 2013), it was assumed that effects on three species (red-throated diver, merlin and whooper swan) that breed locally and that have greater spatial sensitivity to disturbance could extend beyond 500m, and therefore for these species baseline surveys extended to 2km of the proposed development.

8.3.2 Scoping and Consultation

8.4 Scoping and Consultation

13. The proposed development lies entirely within the Viking Wind Farm site boundary previously consulted on. Extensive consultation has previously being undertaken with SNH and RSPB over the ornithological interests of the Viking Wind Farm development and this is summarised in the Viking ES Addendum 2010.

14. An environmental scoping exercise was undertaken in July 2013. A scoping report was prepared by Jacobs on behalf of VEWF (SIC ref: 2013/274/SCO). The scoping report provisionally identified the likely ornithological sensitivities that could be affected by the proposed development and described how these might be affected and the baseline survey work that would be undertaken. VEWF submitted the report to Shetland Islands Council (SIC) who then issued it to statutory and non-statutory consultees. Further details are provided in Chapter 6 (Scoping and Consultation).

15. No specific comments relating to birds were received in the consultation responses but Scottish Natural Heritage (SNH) stated that they were content with the proposed scope of the EIA as set out in the scoping report.

16. The Shetland Bird Recorder was consulted over recent records in the vicinity of Sandwater held by the Shetland Bird Club, in particular records of hen harrier and whooper swan.

Table 8.1: Summary of consultation responses and actions taken

Consultee	Summary Response	Comment/Action Taken
SNH	No comments on birds	None required
Shetland Bird Club	Provision of information on key bird species	Information taken into consideration

8.5 Methodology

8.5.1 Baseline Conditions

8.5.1.1 Desk Study

17. The following guidance and information sources have been consulted while undertaking this assessment:

- SNH Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH 2012);
- SNH Guidance: Assessing Significance of Impacts from Onshore Windfarms on Birds outwith Designated Areas (SNH 2006);
- SNH Guidance Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms (SNH 2013);
- Scottish Government (SG) Planning Advice Note 1/2013: Environmental Impact Assessment (SG, 2013);
- IEEM (2006). Guidelines for Ecological Impact Assessment in the United Kingdom. Institute of Ecology and Environmental Management;
- SNH SiteLink web pages (http://gateway.snh.gov.uk/sitelink/index.jsp) (online information on designated sites);
- the Shetland Islands Council Local Development Plan 2012 Supplementary Guidance on Natural Heritage; and
- Viking Wind Farm Environmental Statement Addendum (Viking Energy Partnership Ltd, 2010) for information on previous bird surveys covering the development site.

18. The following legislation has been taken into account when undertaking the assessment:

- the Council Directive on the Conservation of Wild Birds 2009/147/EC (the Birds Directive);
- the Wildlife and Countryside Act 1981 (as amended) (WCA);
- the Conservation (Natural Habitats &c) Regulations 1994 (as amended); ('The Habitats Regulations');
- the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (the EIA Regulations); and
- the Nature Conservation (Scotland) Act 2004 (as amended).

19. Information on site designations, receptor population size and conservation status, and species vulnerability to potential effects was sought from the relevant websites and published literature. In particular:

- SNH SiteLink website for information on designated sites;
- BirdLife International website and Pritchard *et al.* (1992) for information on Important Bird Areas;
- Birds of Shetland (Pennington *et al.*, 2004) for information on population size; and

- Birds of Conservation Concern 4 (Eaton *et al.*, 2015) for information on conservation status.

8.5.1.2 Field Studies

20. The methods deployed in undertaking baseline bird surveys are fully described in in Appendix 8.1: Baseline Bird Surveys Technical Report and are summarised below.

21. Breeding bird surveys using the Moorland Bird Survey method (Brown and Shepherd, 1993) were conducted in 2013 and 2015 covering a previous iteration of the site boundary buffered to 500m, an area herein referred to as the Sandwater Bird Survey Area (Figure 1 in Appendix 8.1). These surveys aimed to identify the locations of breeding territories of all bird species of potential concern including wader, skua, gull, tern and wildfowl species (i.e. non-passerine species).

22. In addition, surveys to detect the breeding sites of three scarce breeding species, merlin, red-throated diver and whooper swan were conducted covering all suitable habitat for these species within at least 2km of the site.

23. Regular visits to the Sandwater Bird Survey Area were also made in the 2013/2014 winter period to check for wintering whooper swans.

24. Large parts of the Sandwater Bird Survey Area and adjacent ground have been covered by breeding bird surveys conducted by NRP in the previous ten years to inform the Viking Wind Farm and the associated Habitat Management Plan (Viking ES Addendum 2010: Technical Appendix 11.1). This previous survey work has covered all parts of the Sandwater Bird Survey Area in at least one year and therefore provides valuable additional information on the extent of year-to-year changes in the numbers of birds breeding in the vicinity of the proposed development.

8.5.1.3 Designations

25. No part of the proposed development lies within a site designated for its ornithological interest such as an SPA, a SSSI or Ramsar site. There is no evidence or expectation that any of the individual birds using the Sandwater Bird Survey Area has more than negligible linkage to sites designated for their ornithological interest.

8.5.2 Assessment of Effects

26. This section sets out the methods used to assess the significance of the potential effects of the proposed development on birds.

27. The assessment followed the process set out in the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 and government guidance on the implementation of the EU Birds and Habitats Directives (SERAD, 2000).

28. The assessment determines the potential effects of the proposed development and the likelihood of their occurrence. Effect is defined as change in the assemblage of bird species present as a result of the effects accrued by the proposed development. Change can occur either during or beyond the life of the proposed development. Where the response of a population has varying degrees of likelihood, the probability of these differing outcomes is

considered. Note effects can be adverse, neutral or beneficial. In judging whether a potential effect is significant or not, three factors are taken into account:

- the Nature Conservation Importance of the species involved;
- the magnitude of the likely effect; and
- the conservation status of the species.

29. The significance of potential effects is then determined by integrating the assessments of these factors in a reasoned way. The magnitude of likely effects involves consideration of their spatial and temporal magnitudes. In making judgements on significance by this integration, consideration is given to the national and regional trends of the potentially affected species, and how the integrated effects may impinge on the conservation status of the species involved at these geographical levels. If a potential effect is determined to be significant, measures to avoid, reduce or remedy the effect are suggested wherever possible. Further details of the process underlying the assessment and the determination of significance follow.

30. Where there is a potential effect on a bird population that forms part of the qualifying interest of an internationally or nationally designated site (or where such designation is proposed), i.e. Ramsar site, SPA or a site that would meet the criteria for international or national designation, so far as possible, effects are judged against whether the proposed development could significantly affect the site population and its distribution. Where bird populations are not protected by a SPA designation (i.e. where the population does not meet the criteria for international designation), then judgement is made against a more general expectation that the proposed 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.

8.5.2.1 Methods Used to Evaluate Nature Conservation Importance

31. The Nature Conservation Importance of the bird species potentially affected by the proposed development is defined according to Table 8.2.

32. With two exceptions, the numbers of pairs of each species breeding within 500m of the proposed development make up well below 1% of the Shetland population (Table 8.3). Only two species, common sandpiper and whimbrel, approach or exceed 1% of the Shetland population, in some years at least (Table 8.3).

33. The whimbrel breeding within 500m of the proposed development has additional nature conservation value as they form a substantial proportion (approximately 8%) of the birds breeding in the Central Shetland Moors IBA.

34. All species categorised as having Low Nature Conservation Importance were not considered further in the assessment. Low Nature Conservation Importance species that breed in the vicinity of the proposed development include snipe, redshank, oystercatcher and greylag goose.

Table 8.2: Determining Factors for Nature Conservation Importance

Importance	Definition
High	Species listed in Annex 1 of the EU Birds Directive. Breeding species listed on Schedule 1 of the WCA. Species present in nationally important numbers (>1% national population).
Moderate	Other species listed on the Birds of Conservation Concern (BoCC) 'Red' list (Eaton *et al.*, 2015). 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 important numbers (>1% regional population).
Low	All other species not covered above.

Table 8.3: Nature Conservation Importance of breeding bird species and the reason for categorisation

Species (season)	Schedule 1	Annex 1	BoCC Red List	Number and % of Shetland population breeding in buffer	Nature Conservation Importance
Red-throated diver	Yes	Yes	No	None within 2km, 0%	High
Merlin	Yes	Yes	Yes	None within 1km, 0%	High
Whooper swan	Yes	Yes	No	1 pair within 1km, *ca*. 10%,	High
Whimbrel	Yes	No	Yes	Up to 3 pairs within 0.5km, *ca*. 1%	High
Curlew	No	No	Yes	Up to 21 pairs within 0.5km, *ca*. 0.7%	Moderate
Dunlin	No	Yes	No	Up to 4 pairs within 0.5km, *ca*. 0.2%	High
Common sandpiper	No	No	No	Up to 1 pair within 0.5km, *ca*. 2%	Moderate
Golden plover	No	Yes	No	Up to 2 pairs within 0.5km, *ca*. 0.1%	High
Lapwing	No	No	Yes	Up to 13 pairs within 0.5km, *ca*. 0.7%	Moderate
Ringed plover	No	No	Yes	Up to 1 pair within 0.5km, *ca*. 0.1%	Moderate
Arctic skua	No	No	Yes	1 pair within 0.5km, *ca*. 0.2%	Moderate
Arctic tern	No	Yes	No	Up to 1 pair within 0.5km, *ca*.<0.1%	High
All other species present (including snipe, redshank, oystercatcher, greylag goose)	No	No	No	<0.5% within 0.5km	Low

8.5.2.2 Methods Used to Determine Conservation Status

35. Where the available data allow, the conservation status of each potentially affected species is evaluated within the NHZ or for the appropriate 'population'. For these purposes conservation status is taken to mean the sum of the influences acting on a population which may affect its long term distribution and abundance. Conservation status is considered to be favourable where:

- a species appears to be maintaining itself on a long term basis as a viable component of its habitats;
- the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and
- there is (and will probably continue to be) sufficient habitat to maintain the species population on a long term basis.

8.5.2.3 Methods Used to Evaluate the Magnitude of Effects

36. Effects are judged in terms of magnitude in space and time (Regini, 2000). Magnitude was determined by consideration of the spatial and temporal nature of each effect. There are five levels of spatial magnitude (Table 8.4) and four levels of temporal magnitude (Table 8.5). As this is a non-designated site, spatial magnitude was assessed in respect of populations within the appropriate ecological unit.

37. The appropriate geographical unit for all species receptor populations is taken to be the Natural Heritage Zone 1 (NHZ 1), this is defined by SNH as the Shetland Islands including Fair Isle.

Table 8.4. Scales of Spatial Magnitude

Magnitude category	Description
Very High	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80% of population affected.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80% of population affected.
Moderate	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20% of population affected.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5% of population affected.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: < 1% population affected.

Table 8.5. Scales of Temporal Magnitude

Magnitude category	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25 years).
Long term	Approximately 15 - 25 years or longer (refer to above).
Medium term	Approximately 5 - 15 years.
Short term	Up to approximately 5 years.

38. Sensitivity to a potential effect is considered in assessing its spatial magnitude. Sensitivity to effects can differ between similar species and, for a particular species, some populations and individuals may be more sensitive than others, and sensitivity may change over time, e.g. birds are often more sensitive to disturbance during the breeding season. Sensitivity can also vary according to form of an effect. Displacement, for example, refers directly to behavioural sensitivity to disturbance and the distances of birds to its source.

39. The magnitude of an effect can be influenced by when it occurs. For example, seasonality in a bird population's occupancy of a site may mean that effects are unlikely during certain periods of the year.

40. Importantly, in determining sensitivity and its contribution to an effect, where such information exists from monitoring sites, data on the responses of individual birds and bird populations to similar developments are taken into account, along with knowledge of how rapidly the population of a species is likely to recover following loss or disturbance (e.g. birds being recruited from other populations elsewhere).

8.5.2.4 Method Used to Categorise Disturbance

41. In categorising the potential for the development to cause disturbance to breeding birds, the existing disturbance environment experienced by birds using the vicinity of the proposed development is taken into consideration. Birds breeding in the vicinity of the existing B9075 at Sandwater currently experience low levels of disturbance from vehicles and pedestrians to which they are likely to be habituated to some extent. The finding of an active curlew nest just 4m from the existing B9075 in 2013 (see photo in Appendix 8.1) is a good example of such habituation.

42. To assess the likely effects of disturbance each species is categorised according to its susceptibility to disturbance based on experience of observing these species in Central Mainland Shetland and information in Ruddock and Whitfield (2007). Three categories, low, medium and high, are defined (Table 8.6). These categories are necessarily an approximation as individuals vary in their response to potential disturbance for the reasons stated earlier. The definitions distinguish between a species' 'typical' response and its 'maximum' response. The typical response distance is defined as the approximate threshold distance to which a human or vehicle can normally approach a breeding bird before it exhibits alarm behaviour or moves away from its nest or chicks. The maximum response distance is defined as the approximate upper distance at which a species is considered to respond to a potential source of disturbance. Individuals are only likely to show a response to a potential disturbance source that is at or approaching this upper

distance if it is particularly obvious or aggressive in its approach, or the individual bird is unusually sensitive.

43. For assessment purposes breeding territories were categorised as being at either high, medium or low/zero risk of being affected by disturbance, based on the closest distance between the proposed development and the nominal territory centre (Table 8.6). Territories where this distance is less than the 'typical response distance' are categorised as being at high risk of being affected by disturbance. Territories where this distance is greater than the typical but below the maximum response distance are categorised as being at medium risk of being affected by disturbance (Table 8.6). For assessment purposes it is judged that, due to their close proximity, construction activities could cause adverse disturbance for a single breeding season to all 'high risk' territories either preventing birds settling to breed, causing them to move elsewhere or causing breeding failure. Taking into consideration the greater distance from the potential source of disturbance, it is also judged that on average half of the 'medium risk' territories would be adversely affected in the same way.

44. Merlin and red-throated diver are judged to have a relatively low tolerance to disturbance arising from the proposed development (Table 8.6). However, baseline surveys show that neither of these species breeds within 1km of the proposed development, and therefore no breeding pairs of these species will be at risk from construction disturbance.

Table 8.6: Distance thresholds for each Disturbance Risk Category

Species Disturbance Susceptibility	High risk 'typical' safe distance threshold	Moderate risk 'maximum' safe distance threshold	Species
High	300m	500m	Merlin, red-throated diver (at breeding lochans)
Medium	200m	300m	Arctic skua, great skua, golden plover, lapwing, redshank, whimbrel, curlew, greylag goose
Low	100m	200m	Oystercatcher, snipe, common sandpiper

8.5.2.5 Method Used to Categorise Habitat Change

45. In a worst case scenario habitat changes could lead to the abandonment of some territories or lower their quality such that they can no longer support successful breeding. Nevertheless both of these outcomes are considered to be relatively unlikely as on average the proportion of a territory affected is likely to be small and the changed habitat will not necessarily be unsuitable for a species. Indeed some changes may be beneficial for some species, for example species than feed on bare or sparsely vegetated ground. The effects of habitat change on birds will also depend on how quickly disturbed ground recovers and the nature of the vegetation that establishes.

46. For assessment purposes, habitat loss and change is assumed to affect territories where the footprint of the proposed development overlaps the core area of a breeding territory area (defined as a circle of 300m diameter centred on the 2015 nominal territory centre).

The estimated number of breeding bird territories considered at risk of adverse effects from habitat loss or change is presented in Tables 8.11.

8.5.3 Determining Significance of Potential Effects

47. SNH guidance for assessing the significance of effects on birds outside designated areas (SNH 2006) states that *"An impact should be judged as of concern where it would adversely affect the favourable conservation status of a species, or stop a recovering species from reaching favourable conservation status, at international or national level or regionally".*

48. Following the classification of each species' Nature Conservation Importance (Table 8.2), for each species to be assessed the temporal and spatial magnitudes of each potential effect is considered according to each phase of a development. The temporal magnitude is typically largely dependent on the duration of the phase of a development (Table 8.5). The spatial magnitude of likely effects involves consideration of the number of birds or breeding attempts that may be affected, which is derived from the results of baseline surveys after application of knowledge on sensitivity to the particular effect. This is then translated to a classification of spatial magnitude (Table 8.4) by reference to available information on the size of the receptor population (Tables 8.8). A species' Nature Conservation Importance, the duration of the effect (temporal magnitude) and the effect's level of spatial magnitude are integrated to reach a judgement on effect significance. In this integration the form of the effect's spatial magnitude is considered (e.g. mortality, displacement or failed breeding) as regards its influence on the population's demography. Hence the integration results from the species' Nature Conservation Importance (high or moderate), and the demographic sensitivity of its population to the form, scale and duration of the effect. In making judgements on significance by this integration, consideration is given to the national and regional trends of the potentially affected species, and how the integrated effects may impinge on the conservation status of the species involved at these geographical levels.

49. In accordance with the EIA Regulations, likely effects on species population are evaluated and classified as either significant or not significant. The significance levels of effects on bird populations are described in Table 8.7 for regional populations and populations recognised as having conservation importance (i.e., qualifying species of designated sites and IBAs). Effects resulting in detectable changes in the conservation status of regional populations of Nature Conservation Importance are automatically considered to be significant effects for the purposes of the EIA Regulations (i.e. no distinction is made between effects of "major" or "moderate" significance). Non-significant effects include all those which are likely to result in barely detectable (minor) or non-detectable (negligible) changes in conservation status of regional (and therefore national) populations.

Table 8.7: Significance Criteria

Significance of Effect	Description
Major	Detectable changes that will likely have a severe effect on the conservation status of a regional population of Nature Conservation Importance or a population recognised for its conservation importance.
Moderate	Detectable changes that will likely have an effect on the conservation status of a regional population of Nature Conservation Importance or a population recognised for its conservation importance.
Minor	Small or barely detectable changes that will unlikely to have an effect on the conservation status of a regional population of Nature Conservation Importance or a population recognised for its conservation importance.
Negligible	No or non-detectable changes in the conservation status of regional populations of Nature Conservation Importance or a population recognised for its conservation importance.

8.5.4 Limitations to the Assessment

50. The assessment assumes that following construction the levels of disturbance caused by road traffic and pedestrians using the proposed development will revert to the levels that are the same as baseline conditions. The assessment also assumes that the old sections of the existing B9075 that are to be left in situ will not be used by people in ways that could cause disturbance to breeding birds.

8.6 Baseline Conditions

8.6.1 Field Studies

51. The results of the baseline bird surveys undertaken to inform the assessment of effects are presented in detail in Appendix 8.1, including maps showing the distribution of breeding bird territories (Figures 2 to 9 in Appendix 8.1). Summary information from previous survey work undertaken to inform the assessment of the Viking Wind Farm and the development of the wind farm's Habitat Management Plan are also presented in Appendix 8.1.

52. The numbers of birds found breeding in the Sandwater Bird Survey Area is summarised below and in Table 8.8. In the most recent years surveyed (2013 and 2015) the survey area provided breeding habitat for several bird species of high nature conservation value including up to three pairs each of whimbrel and dunlin, up to two pairs of golden plover and one pair Arctic skua. There were also several species of moderate nature conservation value including curlew (up to 21 pairs) and lapwing (up to 13 pairs) and common sandpiper (up to 1 pair).

53. Baseline surveys identified that the closest breeding red-throated divers and merlin nesting sites are both over 1km from the proposed development, well beyond the distance that could plausibly lead to disturbance effects. A pair of whooper swan regularly breeds within 1km of the proposed development, however the nest site is more than 500m from the closest part of the proposed development.

54. Outside the bird breeding season the site and its immediate vicinity has relatively low ornithological value, the most important features being the occasional use by over

wintering whooper swans and the historical use by wintering hen harrier. Whooper swan surveys of conducted between October 2013 and February 2014 recorded no whooper swans using the Sandwater Bird Survey Area. The only whooper swans seen were eight birds at the south end of Sand Water Loch in mid-January; these birds were approximately 750m from the closest part of the proposed development.

Table 8.8: Summary of the numbers of breeding territories estimated within the Sandwater Bird Survey Area.

Species	Whole survey area (min-max, all years with survey data, 2010 - 2015)	2013/15 mean count	2013/15 maximum count
Great skua	1	1	1
Arctic skua	1	1	1
Common gull	5-35	5.5	6
Black-headed gull	0-1	0	0
Arctic tern	0-1	0.5	1 (possibly bred)
Oystercatcher	12-23	16.5	23
Snipe	5-13	10.5	13
Redshank	5-8	7	8
Ringed plover	0-1	0.5	1
Lapwing	11-14	9	13
Dunlin	0-3	2	3
Golden plover	0-2	1	2
Curlew	13-18	19.5	21
Whimbrel	2-4	2.5	3
Common sandpiper	0-1	0.5	1
Whooper swan	0-(1)	(0.5)	(1)
Greylag goose	0-3	3	3
Teal	0-1	1	1

The values shown are the lowest and highest annual totals for each year with survey data (2010 to 2015) and the mean and maximum number of territories for 2013/2015 surveys. Values in parentheses indicate territories where core area was outside the survey area.

8.6.2 Desk Studies

55. The Shetland (NHZ 1) population size and conservation status of species relevant to the assessment is presented in Table 8.9. The Shetland populations of Arctic skua and whimbrel are known to have an unfavourable conservation status, having both declined by approximately 50% in the past two decades. The UK populations of lapwing, ringed plover and curlew all have an unfavourable conservation status (all are on the BoCC Red List) but there has been no recent evaluation of the status of the Shetland populations of these species.

Table 8.9: The size and conservation status of Shetland breeding bird populations (number of pairs) for species breeding within the Sandwater Bird Survey Area.

Species	Receptor population	Population estimate (pairs)	Conservation status	Sources
Red-throated diver	Shetland (NHZ1)	407	Favourable	Dillon *et al.*, 2009; Eaton *et al.*, 2015
Merlin	Shetland (NHZ1)	20-25	Unfavourable UK, Shetland Unfavourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Teal	Shetland (NHZ1)	75 - 150	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Whooper Swan	Shetland (NHZ1)	*ca.* 9	Favourable	Shetland Bird Report, 2009; Eaton *et al.*, 2015
Greylag goose	Shetland (NHZ1)	at least 500 (increasing)	Favourable	Pennington *et al.*, 2004; Shetland Bird Reports, Eaton *et al.*, 2015
Oystercatcher	Shetland (NHZ1)	3,350	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Ringed plover	Shetland (NHZ1)	800 - 1,000	Unfavourable UK, Shetland probably Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Golden plover	Shetland (NHZ1)	1,450	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Lapwing	Shetland (NHZ1)	1,740	Unfavourable UK, Shetland probably Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Dunlin	Shetland (NHZ1)	1,700	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Snipe	Shetland (NHZ1)	3,450	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Whimbrel	Shetland (NHZ1)	ca. 290	Unfavourable	Jackson, 2009; Eaton *et al.*, 2015
	Central Shetland Moors IBA	ca. 24	Unfavourable (?)	
Curlew	Shetland (NHZ1)	2,300 - 3,975	Unfavourable UK, Shetland probably Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Redshank	Shetland (NHZ1)	1,170	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015

Species	Receptor population	Population estimate (pairs)	Conservation status	Sources
Common sandpiper	Shetland (NHZ1)	44	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Arctic skua	Shetland (NHZ1)	Was ca. 500 in 2000 Probably now <250 pairs	Unfavourable (JNCC report 71% decline for UK for 2000-2014)	Pennington *et al.*, 2004; Eaton *et al.*, 2015; JNCC (2015)
Great skua	Shetland (NHZ1)	6,874	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Black-headed gull	Shetland (NHZ1)	850	Favourable	Pennington *et al.*, 2004; Eaton *et al.*, 2015
Common gull	Shetland (NHZ1)	3,000	Favourable	Pennington *et al.*, 2004 Eaton *et al.*, 2015
Arctic tern	Shetland (NHZ1)	24,716	Favourable	Pennington *et al.*, 2004 Eaton *et al.*, 2015

8.6.3 Designations

56. No part of the proposed development lies within a site designated for its ornithological interest as a SPA, a SSSI or Ramsar site. There is no evidence or expectation that any of the individual birds using the proposed development area has more than negligible linkage to sites designated for their ornithological interest.

57. Where it passes through the Petta Dale valley, the development site substantially overlaps a nationally important area for breeding whimbrel. Although not designated under domestic or international legislation, the importance of this area is recognised through its classification as an Important Bird Area (IBA) and is listed in the IBA register as the Central Shetland Moorland Areas (IBA) (BirdLife International, 2016). This IBA comfortably meets the criteria for designation as a Special Protection Area under the EU Natura legislation (it currently holds approximately 8% of the UK whimbrel population).

8.6.4 Modifying Influences

58. The assessment assumes that the ornithological interests of the proposed development and its vicinity at the time of construction will remain unchanged from the baseline conditions identified through recent survey work. Monitoring of bird population in Central Mainland Shetland since 2005 shows that the bird species of interest generally show broadly stable year-to-year patterns of distribution and abundance and therefore this assumption is considered reasonable at least over a period of a few years. However, it is inevitable that there will be small year-to-year changes in the ornithological interest, in terms of the range of species using the area and their distribution and abundance. These changes are very unlikely to be so great as to undermine the assessment conclusions because these are based on cautious assumptions. Nevertheless it will be important that up-to-date information on the ornithological sensitivities of the site is obtained through field surveys in the period immediately before and during construction so that this can be taken into account. This will be achieved through the execution of the Bird Protection Plan described in Section 8.8 (Mitigation).

8.6.5 Do Nothing Scenario

59. In a 'do nothing' scenario the range and abundance of bird species using the site and its vicinity is likely to remain approximately the same over the next 20 years. However, as the results from survey undertaken show, there are likely to be modest year-to-year changes, reflecting natural changes in population sizes and the distribution of individuals (Appendix 1, Tables A1.8). The habitats within the site are all expected to show medium to long-term stability though can be expected to show minor changes in response to year-to-year changes in grazing pressure and weather conditions, which in turn could affect the numbers and distribution of birds.

60. Two species, whimbrel and arctic skua, have an unfavourable regional conservation status, having declined by approximately 50% over the past two decades (Eaton *et al.*, 2015). There is uncertainty if these regional level declines will continue in the future, but monitoring of whimbrel across Central Mainland Shetland and West Mainland Shetland by NRP since 2010 indicates that the population in these parts of Shetland at least has been stable in recent years.

8.7 Potential Effects

8.7.1 Effect 1: Construction Disturbance

General description

61. Birds may be disturbed by construction activity and noise, causing them to alter their behaviour. Birds can show a wide variety of behavioural responses to disturbance, ranging from avoidance of the area affected to temporary interruption of their normal activities such as feeding, nest attendance and chick rearing. Disturbance can also lead to indirect effects such as increasing the likelihood of nest predation. Disturbance can prevent prospective birds settling in an area to breed or cause settled pairs to leave an area; both these amount to displacement. Disturbance can also lead to reduced breeding success or breeding failure.

62. Disturbance effects on birds arising from the proposed development will occur both during the construction of the track and, at a reduced level, thereafter during its day to day use. The construction programme of the proposed development will be limited to a period of approximately nine months and therefore disturbance at this stage is considered to be an effect of short term duration. For the purposes of assessment it is assumed that construction takes place during the breeding bird season, i.e. the worst case scenario.

63. Once construction of the proposed development is completed the source of disturbance will be reduced greatly and will be limited to the vehicle traffic and occasional pedestrians using the track. Initially (approximately 2018 to 2021) vehicle traffic (but not pedestrian or bicycle traffic) will be slightly elevated over baseline levels due to wind farm construction activities. Thereafter, through the wind farm operation stage (approximately 2021 to 2041), vehicle traffic is expected to reduce to similar levels to baseline traffic conditions using the existing B9075.

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64. Disturbance during the construction stage would last less than one year and thus the temporal Magnitude is categorised as short term (Table 8.5).

65. It is predicted that no territories of red-throated diver, merlin, whooper swan, and Arctic tern will be affected by construction disturbance. It is also predicted that no overwintering whooper swans would be affected. It follows that disturbance effects on these species are judged to be not significant for the purposes of the EIA regulations.

66. Territories of three species categorised as having high Nature Conservation Importance are predicted to be affected by construction disturbance; up to three territories of whimbrel, up to two of golden plover and one of dunlin (Table 8.11; Figures 2 to 5 in Appendix 8.1). Territories of four species categorised as having moderate Nature Conservation Importance are predicted to be affected; three of lapwing, six of curlew, one of Arctic skua and one of common sandpiper (Table 8.11; Figures 6 to 9 in Appendix 8.1).

67. For all species except whimbrel and common sandpiper, the number of territories potentially affected by construction disturbance is well below 1% of the regional (NHZ1) total, and therefore this effect is categorised as short term and negligible magnitude (Table 8.11). Without mitigation, the effect of construction disturbance on these species is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations.

68. For whimbrel, a species of high Nature Conservation Importance, three territories represent approximately 1% of the regional (NHZ1) population. Therefore the potential disturbance effect is categorised as short term and low magnitude with respect to the NHZ1 population (Table 8.11). Without mitigation the effect of construction disturbance on the regional whimbrel population is determined to be of minor significance and is therefore judged to be not significant for the purposes of the EIA regulations. Nevertheless disturbance of breeding whimbrel would potentially be in contravention of the Wildlife and Countryside Act (as amended) and therefore mitigation is proposed to address this matter.

69. The three whimbrel territories also represent approximately 12% of the Central Shetland Moors IBA population. Therefore the potential disturbance effects is categorised as short term and moderate magnitude with respect to the IBA population (Table 8.11). Without mitigation, the effect of construction disturbance on the Central Shetland Moors IBA whimbrel population is determined to be of moderate significance and is therefore judged to be significant under the EIA regulations.

70. For common sandpiper, the single territory potentially affected by disturbance represents approximately 2% of the assumed regional (NHZ1) population, estimated to be just 44 pairs (Pennington *et al.*, 2004). The baseline survey results indicate that the single territory at risk of disturbance is not occupied annually (Appendix 8.1), so in some years there would be no potential for disturbance. Furthermore common sandpiper has a relatively high tolerance of human activity and has been found successful nesting within less than 10m of busy public highway in Central Mainland Shetland (D Jackson personal observation, June 2013). Taking all these factors into consideration, the potential disturbance effect on common sandpiper is categorised as short term and negligible magnitude. Without mitigation, the effect on this species is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations.

Table 8.10: Predicted potential for disturbance of breeding birds by development construction activities.

Species	Disturbance Risk Category (Table 8.6)	Territories at High risk[1]	Territories at Moderate risk[2]	Territories at Negligible risk[3]
Arctic skua	Moderate	1	0	0
Great skua	Moderate	0	1	0
Oystercatcher	Low	6	3	14
Snipe	Low	5	5	3
Dunlin	Low	1	0	2
Redshank	Moderate	4	2	2
Lapwing	Moderate	5	3	5
Golden plover	Moderate	2	0	0
Ringed plover	Moderate	0	0	1
Curlew	Moderate	8	5	11
Whimbrel	Moderate	2	1	0
Common sandpiper	Low	1 (not present every year)	0	0
Greylag goose	Moderate	1	1	1
Common gull	Moderate	6	0	0
Arctic tern	Moderate	0	1	0

Numbers are based on results from either 2013 or 2015, whichever year recorded the highest number of breeding territories.

[1] Territories considered to be at high risk are those for which the distance between the site boundary and the nominal territory centre is less than 100m (oystercatcher, dunlin, common sandpiper and snipe) or less than 200m (all other species).

[2] Territories considered to be moderate risk are those for which the distance between the site boundary and the nominal territory centre is between 100 and 200m (oystercatcher, dunlin, common sandpiper and snipe) or between 200 and 300m (all other species).

[3] Territories considered to be at negligible risk are all other territories with a nominal centre lying within 500m of the site boundary

Table 8.11: The potential effect of construction disturbance on breeding birds.

Species	Territories at High risk (Table 8.10)	Territories at Moderate risk (Table 8.10)	Estimated no. of pairs potentially displaced or experiencing reduced breeding success	Receptor population	% of regional population affected	Spatial Magnitude category
Arctic skua	1	0	1	Shetland (NHZ1)	*ca*. 0.4%	Negligible
Great skua	0	1	1	Shetland (NHZ1)	<0.1%	Negligible
Oystercatcher	6	3	9	Shetland (NHZ1)	0.3%	Negligible
Snipe	5	5	10	Shetland (NHZ1)	0.3%	Negligible
Dunlin	1	0	1	Shetland (NHZ1)	<0.1%	Negligible
Redshank	4	2	5	Shetland (NHZ1)	0.4%	Negligible
Lapwing	5	3	7	Shetland (NHZ1)	0.4%	Negligible
Golden plover	2	0	2	Shetland (NHZ1)	0.1%	Negligible
Ringed plover	0	0	0	Shetland (NHZ1)	0%	Nil
Curlew	8	5	12	Shetland (NHZ1)	0.4%	Negligible
Whimbrel	1	2	2	Shetland (NHZ1)	0.7%	Low
				Central Shetland Moors IBA	8.3%	Medium
Common sandpiper	1 (not present every year)	0	1 (none in some years)	Shetland (NHZ1)	2.2%	Low/ Negligible
Greylag goose	1	1	2	Shetland (NHZ1)	0.3%	Negligible
Common gull	6	0	6	Shetland (NHZ1)	0.2%	Negligible
Arctic tern	0 (not present every year)	1	1 (none in some years)	Shetland (NHZ1)	<0.1%	Negligible
It is assumed that all pairs breeding in high risk territories and half the pairs breeding in moderate risk territories would be adversely affected, either by displacement or by reduced breeding success.						

8.7.2 Effect 2: Habitat loss and change

General description

71. The route of the proposed development passes through a mix of natural and semi-natural habitat types (Chapter 9: Ecology and Nature Conservation). These habitats mainly comprise blanket bog, acid grassland and semi-improved grassland. All these habitats are of value to the local bird community, especially the valley floor blanket bog. Construction work will inevitably mean that some habitat is disturbed and will change in character, either temporarily or permanently.

72. Habitat loss and change is predicted to affect 3.09ha of ground, comprising approximately 1.37ha that will become the sealed road, 1.72ha of adjacent earthworks. Following construction the areas affected by earthworks will be revegetated as closely as possible to baseline conditions. However, for the purpose of this assessment, there areas are considered to be a permanent loss of habitat.

73. At a highly localised scale, construction activities, such as moving vehicles and excavation work, will result in the removal, burying of or severe damage to (e.g. trampling and squashing) the existing vegetation. Breeding bird territories and foraging areas that overlap the construction area will be at potential risk from habitat loss or change. As the construction works affect only a relatively narrow strip of ground and because individual bird territories are relatively large (typically at least several hectares) only a relatively small proportion of the territories that overlap the construction area would be affected by habitat loss or change.

74. Any nests or young chicks present in the parts affected by habitat loss and change during the construction phase are likely to be destroyed or killed. Adult birds and older chicks are likely to move away and thus unlikely to be killed, but these individuals could be disadvantaged by the reduced availability or quality of favoured feeding areas. Thus birds attempting to nest or rear chicks within the area directly affected by habitat loss and change are less likely to breed successfully.

75. In the short term (during construction) the habitat destroyed or changed by the proposed development will in most parts amount to a strip averaging approx. 12 metres in width, and, should this go through the centre of territory core circle would amount to the loss/change of 3600m^2 of habitat (12 x 300m) in that territory. In many cases the track would pass off centre through a territory in which case the overlap with the territory circle would be somewhat less. A potential loss/change of 3600m^2 of habitat would correspond to approx. 5% of the area of the assumed territory core (a circle of 300m diameter, an area of 70,686m^2). Thus, proportion of the core area of each of the territories predicted to be affected by habitat loss/change is calculated to be up to 5%.

76. Given that the proportion of the core area of affected territories is small, even before vegetation recovery has taken place, it is likely that that many and possibly all the territories potentially affected by habitat loss and change will continue to be viable for breeding.

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77. For the purposes of assessment, all habitat change and loss is considered to be permanent. This is highly precautionary because in the medium term (after five years), all disturbed ground except the 1.37ha comprising the sealed road is likely to have revegetated to conditions closely matching baseline vegetation and would therefore be expected to provide birds with potentially suitable breeding and foraging habitat.

78. No breeding territories of the following species categorised as being of high or moderate Nature Conservation Importance are predicted to be adversely effected by habitat loss or change: red-throated diver, merlin, whooper swan, Arctic tern and ringed plover. Furthermore, no wintering whooper swans are predicted to be affected by habitat loss or change. It follows that habitat loss or change effects on these species are judged to be not significant for the purposes of the EIA regulations.

79. The breeding territories of three species rated as having high Nature Conservation Importance are predicted to be effected by habitat loss and change: one territory of whimbrel, two of golden plover, one of dunlin (Table 8.12).

80. The breeding territories of four species rated as having moderate Nature Conservation Importance are predicted to be adversely effected by habitat loss and change; five of lapwing, 11 of curlew and 1 of Arctic skua, and, in years when present, one of common sandpiper (Table 8.12).

81. For whimbrel, one territory represents approximately 0.3% of the regional (NHZ1) population. Therefore the predicted habitat loss and change effect is categorised negligible magnitude with respect to the regional population. Without mitigation, the effect of habitat loss or change on the regional whimbrel population is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations.

82. For whimbrel, one territory also represent up approximately 4% of the Central Shetland Moors IBA population. Therefore the predicted habitat loss and change effect is categorised as low magnitude with respect to the IBA population. Without mitigation, the effect of habitat loss or change on the Central Shetland Moors IBA whimbrel population is determined to be of minor significance and therefore is judged to be not significant for the purposes of the EIA regulations.

83. For common sandpiper, the single territory potentially affected represents approximately 2% of the assumed regional population. However, the baseline survey results indicate that this territory is not occupied annually, so in some years there would be no potential for an adverse effect. Furthermore, this species commonly selects disturbed or partly vegetated ground as a foraging habitat and therefore it is considered likely that this territory would remain viable for breeding both in the short term and beyond. Taking all these factors into consideration, the habitat loss and change effect on common sandpiper is categorised as negligible magnitude. Without mitigation, the effect of habitat loss or change on common sandpiper is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations.

84. For all other species the number of breeding territories potentially affected by habitat loss and change is well below 1% of the regional (NHZ1) total (Table 8.12). Therefore, on this basis alone the magnitude of this effect for these species is categorised as negligible. Without mitigation, the effect of habitat loss or change on these species is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations.

85. It is concluded that, before mitigation, habitat loss and change effects are not significant for the purposes of the EIA regulations for all species.

Table 8.12: The estimated number of breeding territories that would be subject to potentially adverse levels of habitat loss or change.

Species	No. of territories predicted to be affected by habitat change	Receptor population	% of regional population affected	Magnitude category
Arctic skua	1	Shetland (NHZ1)	*ca*. 0.4%	Negligible
Great skua	0	Shetland (NHZ1)	0%	Negligible
Oystercatcher	6	Shetland (NHZ1)	0.2%	Negligible
Snipe	9	Shetland (NHZ1)	0.3%	Negligible
Dunlin	1	Shetland (NHZ1)	<0.1%	Negligible
Redshank	5	Shetland (NHZ1)	0.4%	Negligible
Lapwing	5	Shetland (NHZ1)	0.3%	Negligible
Golden plover	2	Shetland (NHZ1)	0.1%	Negligible
Curlew	11	Shetland (NHZ1)	0.4%	Negligible
Ringed plover	0	Shetland (NHZ1)	0%	Nil
Whimbrel	1	Shetland (NHZ1)	0.3%	Negligible
	1	Central Shetland Moors IBA	4%	Low
Common sandpiper	0-1 (not present annually)	Shetland (NHZ1)	2.2% (0% in some years)	Negligible
Greylag goose	2	Shetland (NHZ1)	0.3%	Negligible
Common gull	6	Shetland (NHZ1)	0.2%	Negligible
Arctic tern	0	Shetland (NHZ1)	0%	Negligible

8.8 Mitigation

8.8.1 Mitigating Effect 1: Construction Disturbance

86. Mitigation to address the predicted disturbance to breeding birds from construction activities are focussed on whimbrel, the only species for which Moderate or Minor significance disturbance effects is predicted. Whimbrel is also the only species predicted to be affected by disturbance that is listed on Schedule 1 of the Wildlife and Countryside Act (as amended). Thus, disturbance of this species (including nests and dependent young) when breeding would be in contravention of the WCA and therefore must be avoided. The primary objective of mitigation measures to address construction disturbance is to deploy measures that avoid all disturbance to breeding whimbrel.

87. The breeding whimbrel territories predicted to be affected have been shown by surveys over multiple years [redacted]

88. Several other breeding bird species of high or moderate Nature Conservation Importance are also predicted to potentially be adversely affected by disturbance during construction, namely: golden plover, dunlin, curlew, lapwing and Arctic skua (Table 8.11). Disturbance of any species of high or moderate Nature Conservation Importance whilst breeding is highly undesirable as it could lead to abandonment of territories or breeding failure. Although mitigation to control disturbance to these species is not required to prevent this effect being judged as significant under the EIA regulations nor for compliance with the WCA Schedule 1 disturbance clauses, best practice is to avoid or reduce disturbance to breeding birds in general in so far as measures are reasonable and practical to deploy. Thus the secondary objective of mitigation measures to address construction disturbance is to reduce disturbance to species other than whimbrel of high or moderate Nature Conservation Importance.

89. All the territories of golden plover, dunlin and Arctic skua, and approximately half the territories of curlew and lapwing, predicted to be affected by disturbance are located in close proximity to the three whimbrel territories. Therefore the measures described below aimed at avoiding disturbance of breeding whimbrel would incidentally also result in the avoidance of disturbance to the territories of these other species breeding in close proximity.

Bird Protection Plan

90. A Bird Protection Plan (BPP) will be drawn up before construction commences that describes the measures that will be deployed to manage disturbance of breeding birds, especially WCA Schedule 1 species such as whimbrel.

The BPP would provide a mechanism that allows construction activities to comply with WCA legislation by preventing, as far as is practically possible, disturbance to breeding Schedule 1 species, and keeping any low level incidental disturbance within levels deemed acceptable by SNH. In consultation with SNH, the BPP will identify the type, timing and location of activities that are likely to disturb breeding Schedule 1 and other priority bird species and their nests and young, and identify appropriate temporary protection zones and other mitigation procedures to prevent disturbance. The BPP will be informed by survey work conducted by an experienced ornithologist in the period leading up to and throughout construction work.

As part of the BPP, to avoid disturbance to breeding whimbrel it is proposed there will be a defined Breeding Whimbrel Protection Zone (BWPZ) with no access to Project workers and construction equipment during the period when whimbrel are breeding and sensitive to disturbance. Whimbrel is a summer visitor to Shetland arriving as early as 25 April and staying until up to mid-August. These dates are based on the period when breeding whimbrel have been encountered during baseline bird surveys for the Viking Wind Farm. Whimbrels are potentially most sensitive to disturbance when they have eggs or small chicks. Studies of nesting whimbrel undertaken in Shetland in 2010 and 2011 by NRP showed that egg-laying occurs from approximately 15 May up to approximately 20 June, and that incubation takes around four weeks (NRP/VEWF unpublished data). Therefore, the critical period when active nests and young chicks are potentially present is from around 15 May up to around 25 July. Although older chicks may be present until well into August, at this stage the birds have a much lower sensitivity to disturbance and are highly mobile; typically at this stage adults will quickly lead chicks away from disturbance sources.

The indicative extent of the BWPZ based on data collected during the baseline surveys is illustrated in Figure 8.1. The actual boundary of the BWPZ and the time period over which it would be enforced will be agreed, in consultation with SNH, prior to construction. Any new spatial and temporal information on the breeding attempts by whimbrel collected by field studies during the construction phase would be used to iteratively revise the BWPZ boundary and time period as appropriate.

The proposed southern boundary of the BWPZ shown in Figure 8.1 is based on a 15m-buffer along the proposed development (the maximum required for road construction and verges, and safe movement of construction personnel and equipment). There is more scope for where the eastern and western boundaries of the BWPZ are drawn (these boundaries will not materially impinge on construction activities), those shown in Figure 8.1 are based on buffering the areas used by whimbrel (the valley blank-bog habitat) to 150m, modified in parts to follow obvious features on the ground (existing stream courses and tracks).

The indicative BWPZ boundary illustrated in Figure 8.1 provides for a separation distances of at least 150m between the BWPZ boundary and the nominal centres of the recent (2013 – 2015) whimbrel territories potentially affected, and most of the recent nominal centres are more than 250m from the indicative BWPZ boundary. Whimbrel nest-flush-distances (the distance at which an incubating bird leaves its nest in response to a person approaching on foot) were recorded during the breeding studies undertaken in Shetland by NRP in 2010 and 2011 (Jackson and Chapman, 2010; NRP/VEWF unpublished data). This study found that flush distances are highly variable but that 92% of incubating birds (out of a sample of 77) had flush distances of below 150m, and 81% had flush distances of 100m or less; the median flush distance was 75m. Thus there is a high likelihood that the proposed southern boundary of the BWPZ shown in Figure 8.1 would effectively prevent disturbance in the core part the territories, including the nest sites, of the two to three pairs of whimbrel that breed in the BWPZ.

Should construction work commence in early 2017, works would be underway well before whimbrel (and most other species) would have returned and selected their breeding territories. The desirability and merits of taking measures that discourage whimbrel (and other species) from settling to breed close to the project site will be discussed with SNH. The aim of any such measures would be to encourage prospective breeding birds to settle at a safe distance away (say at least 200m) from the Project site rather than displace them to a different site altogether. For example, before birds return, a strip of 50 – 100 metres width along the southern edge of the proposed BWPZ (Figure 8.1) could be made visually less attractive to returning prospecting birds using light weight hazard tape strung between bamboo canes. The same measure could also be used elsewhere to discourage other bird species (i.e., those not on Schedule 1) from nesting close to the Project site. The desirability of this approach will also be discussed with SNH.

The mitigation measures described above are considered likely to prevent disturbance to breeding whimbrel, and therefore avoid potential violation of the WCA. Nevertheless, it is recognised that these measures cannot guarantee this because it remains possible that, despite the measures, whimbrel (or other Schedule 1 species) could attempt to breed so close to the proposed development that they would be disturbed by construction activity. Therefore, throughout the breeding season in the year of construction an ornithologist with a Schedule 1 license and experienced in surveying whimbrel would regularly (at least weekly) check for the presence of whimbrel in the vicinity of the proposed development,

locate nests and collect all other necessary information to inform how mitigation measures may need to be revised to take account of changing circumstances. In a worst case scenario it is accepted that a nest could be so close to the proposed development that it would necessitate the temporary cessation of construction work in that part of the site.

8.8.2 Mitigating Effect 2: Habitat loss and change

91. Although no mitigation is required, in keeping with good practice, measures will be undertaken to avoid and reduce the negative effects on birds arising from habitat loss and change, in particular by minimising the footprint of the proposed development in sensitive blanket bog habitat (all the whimbrel, dunlin, golden plover and Arctic skua territories potentially affected are on blanket bog) and restoring damaged habitat to good condition for birds. The detail of mitigation measures aimed at reducing adverse effects of habitat change on bird species will be devised in conjunction with the measures aimed at restoring the conditions of habitats of high ecological or conservation value (Chapter 9: Ecology and Nature Conservation). SNH will be consulted over habitat restoration methods.

8.9 Monitoring

92. In addition to the bird survey work undertaken as part of the BPP at the time of construction work described in Section 8.8 (Mitigation), monitoring will be undertaken following completion of the proposed development. This will be aim to measure the extent of changes in the abundance and distribution of priority breeding bird species. The details of the monitoring programme will be discussed and agreed with SNH. At this stage it is suggested that monitoring is undertaken annually in the first four years following construction using the MBS method and cover the defined Sandwater Bird Survey Area.

93. The monitoring of bird population in the vicinity of the proposed development will be coordinated with other bird monitoring proposed for the Viking Wind Farm and associated Habitat Management Plan.

8.10 Residual Effects

8.10.1 Effect 1: Construction Disturbance

94. Mitigation measures are designed to avoid all disturbance of breeding whimbrel. Therefore, following mitigation the predicted construction disturbance effect on whimbrel is categorised as a short term, adverse and of negligible magnitude for both the regional (NHZ1) population and the Central Shetland Moors IBA population. After taking mitigation into consideration, the residual effect of construction disturbance on whimbrel is determined to be of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations (Table 8.13).

95. After mitigation, the predicted residual disturbance on all other bird species will continue to be categorised as short term, adverse and negligible magnitude effects with respect to their regional (NHZ1) populations. They are determined to be effects of negligible significance and therefore are judged to be not significant for the purposes of the EIA regulations (Table 8.13).

8.10.2 Effect 2: Habitat loss and change

96. Mitigation aimed at avoiding or reducing habitat loss and change effects on birds are not strictly required as effects without mitigation are judged not significant for the purposes of the EIA regulations for all species. However, in keeping with best practice it is desirable to minimise habitat loss and change effects on species of high or moderate Nature Conservation Importance.

97. The proposed development's embedded habitat mitigation measures aimed at minimising damage to natural habitats (in particular blanket bog) and reinstatement of native vegetation along the road verges will reduce the potential habitat loss and change effect on birds. However some habitat loss will be permanent (i.e. the area occupied by the sealed road) and so after mitigation is taken into consideration some residual habitat loss and change effect will remain including to one whimbrel and one common sandpiper territory.

98. After taking mitigation into consideration, the residual effect of habitat loss and change on whimbrel with respect to regional (NHZ1) population will continue to be categorised as permanent, adverse and negligible magnitude. This is determined to be an effect of negligible significance and therefore is judged to be not significant for the purposes of the EIA regulations (Table 8.13).

99. After taking mitigation into consideration, the residual effect of habitat loss and change on whimbrel with respect to Central Shetland Moors IBA population will continue to be categorised as permanent, adverse and low magnitude. This categorisation is precautionary as it is likely that, as a result of the habitat mitigation measures the single territory affected would, at least in the medium and long term, be a viable breeding territory. This effect determined to be an effect of Minor significance and therefore is judged to be not significant for the purposes of the EIA regulations (Table 8.13).

100. After mitigation, the predicted habitat loss/change effects on all other bird species will continue to be categorised as permanent, adverse and of negligible magnitude. These effects are determined to be of negligible significance and therefore are judged to be not significant for the purposes of the EIA regulations (Table 8.13).

Table 8.13: Summary of residual effects on birds

Species	Receptor population	Disturbance effect		Habitat loss/change effect	
		Magnitude	Significance	Magnitude	Significance
Red-throated diver	Shetland (NHZ1)	None	Negligible	None	Negligible
Merlin	Shetland (NHZ1)	None	Negligible	None	Negligible
Whooper swan	Shetland (NHZ1)	None	Negligible	None	Negligible
Arctic skua	Shetland (NHZ1)	Negligible	Negligible	None	Negligible
Dunlin	Shetland (NHZ1)	None	Negligible	None	Negligible
Oystercatcher	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Snipe	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Redshank	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Common sandpiper	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Lapwing	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Golden plover	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Ringed plover	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Curlew	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
Whimbrel	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible
	Central Shetland Moors IBA	Negligible	Negligible	Low	Minor
Greylag goose	Shetland (NHZ1)	Negligible	Negligible	Negligible	Negligible

8.11 Cumulative Effects

101. The EIA Regulations require that the Project be assessed cumulatively along with other projects or plans. In doing so, SNH guidance (SNH, 2012) on assessing cumulative impacts has been followed. In considering cumulative impacts it is necessary to identify any impacts that are minor in isolation but that may be major additively.

102. 'Target' species were taken to be those species of high conservation importance and for which there was some indication of a potential impact as a result of the proposed development that may be exacerbated cumulatively (Section 8.7). Target species were therefore limited to whimbrel, golden plover and dunlin.

103. The only other project currently within or having gone through the planning system that is considered potentially to impact on these species is the Viking Wind Farm. The proposed development is closely connected with and in close proximity to the Viking Wind Farm. However, examination of the spatial distribution of the territories of 'Target' species potentially affected shows that the territories affected by these projects are different.

104. The Viking ES Addendum states that wind farm construction activities would cause no disturbance to whimbrel due to the implementation of the Viking Bird Protection Plan (VBPP), mitigation designed to prevent disturbance to Schedule 1 species. Without the beneficial effects of the VBPP, Viking construction activities are predicted to cause short-

term adverse disturbance effects to up to four whimbrel pairs each construction year (this figure takes account of the reduction to a 103 turbine layout). It is predicted that, prior to mitigation, construction of the proposed development would cause short-term adverse disturbance effects on up three whimbrel pairs. Therefore, without mitigation, the cumulative impact of the two projects would be short-term disturbance to up to seven whimbrel pairs. Seven pairs would represent approximately 2.5% of the NHZ1 (Shetland) whimbrel population and thus the pre-mitigation cumulative impact would be an adverse effect of low magnitude.

105. The Viking ES Addendum predicts that wind farm construction activities would have short-term adverse effects on golden plover caused by the disturbance of up to 12 pairs during each year of construction (this figure takes account of the reduction to a 103 turbine layout). The proposed development's construction activities are predicted to have short-term adverse effects on up to two golden plover pairs. Therefore, without mitigation, the cumulative impact of the two projects would be short-term disturbance to up to 14 golden plover pairs. 14 pairs represents approximately 1.0% of the NHZ1 (Shetland) golden plover population, and thus the pre-mitigation cumulative impact would be an adverse effect of low magnitude.

106. The Viking ES Addendum predicts that wind farm construction activities would have short-term adverse effects on dunlin caused by the disturbance of up to nine pairs during each year of construction (this figure takes account of the reduction to a 103 turbine layout). The proposed development's construction activities are predicted to have short-term adverse effects on up to one dunlin territory. Therefore, without mitigation, the cumulative impact of the two projects would be short-term disturbance to up to 10 pairs of dunlin. 10 pairs represents approximately 0.6% of the NHZ1 (Shetland) dunlin population, and thus the pre-mitigation cumulative impact would be an adverse effect of negligible magnitude.

107. Mitigation designed to prevent and reduce disturbance to breeding birds of high conservation importance delivered through the Bird Protection Plans for the Viking Wind Farm and Sandwater project respectively, would reduce the cumulative disturbance impact to all species to short term adverse effect of negligible magnitude.

108. In conclusion, for all bird species, the cumulative combined impacts of the proposed Project and other projects in the vicinity are likely to be negligible, and so not deemed to be significant for the purposes of the EIA Regulations.

8.12 Statement of Significance

109. Following the application of proposed mitigation measures the residual effects on all bird species would be negligible magnitude, and are therefore considered to be Not Significant in accordance with the EIA Regulations.

8.13 References

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