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Dear Ms Deeney

Application under Section 36 of the Electricity Act 1989 to construct and operate a wind farm at the mainland of Shetland (Central Grid Reference HU410610) by the Viking Energy Partnership

Thank you for consulting RSPB Scotland on this application.

RSPB Scotland supports the development of renewable energy, including wind energy, as a vital part of dealing with the challenge of climate change – the greatest long-term threat to birds, other wildlife and people. However, developments must be located and designed to avoid harming our most important places for wildlife.

RSPB Scotland **objects** to this application as currently proposed for the following reasons:

- **The development would cause unacceptable damage to regional and, in some cases, UK populations of a number of bird species.**
- **The development would cause unacceptable damage to active blanket bog.**
- **The predicted carbon balance of the proposal is uncertain, may be significantly negative and if positive, would be insufficient to outweigh the other significant adverse environmental effects of the development.**
- **The development would be contrary to the development plan and national planning policy.**

We would be prepared to review our position should these matters be adequately addressed. In Annex 1, we outline a number of measures, which may contribute towards reducing the impact of the proposed development.

We outline our reasons for objection below with fuller details in Annex 1 and further detailed comments on the text of the ES in Annex 2 (both attached).

Early consultation
We very much appreciate the consultation during the early stages of the design of the Viking wind farm by Viking Energy.

This pre-application consultation has led to a turbine layout, which avoids, to an extent, conflict with designated sites, and with red-throated divers and merlins, key species at this site. However, the use of landscape sensitivity as the initial constraint has moved turbines away from the edges of the site towards the centre, where much of the ornithological interest occurs. As we indicated to the Applicant, this limited opportunities for further changes to the layout in order to avoid ornithological sensitivities and our later suggestions were apparently not implemented, resulting in a number of turbine sites still posing a substantial threat to divers and merlins.

Information on collision risk and other impacts upon more widespread species (such as whimbrel and golden plover) was not made available prior to the publication of the Environmental Statement (ES) and no further design iterations to account for their needs have been carried out. Consequently, residual impacts on several important species still cause serious concern.

Importance of the site for birds

Breeding populations of several important birds are found on this site. Whooper swan, red-throated diver, merlin, golden plover, dunlin and Arctic tern are listed in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds. Whooper swan, red-throated diver, merlin and whimbrel are included in Schedule 1 of the Wildlife and Countryside Act 1981, which affords them special protection whilst breeding. Lapwing, dunlin, whimbrel, Arctic skua and skylark are of high conservation concern as their populations have undergone declines of at least 50% over the past 25 years and accordingly are on the Red List of Birds of Conservation Concern (BOCC) Shetland holds over 40% of the world population of great skuas and this species is also on the Amber list of the BOCC. In addition, curlew, Arctic skua and skylark are UK Biodiversity Action Plan (BAP) species, recognised as requiring conservation action to ensure the survival of healthy populations. The site is particularly important in a regional context as the surveyed area holds disproportionately high numbers (more than 10%) of the Shetland population of red-throated diver, greylag goose, wigeon, merlin, red grouse, golden plover, lapwing, snipe, whimbrel, curlew and common sandpiper.

For those species on Annex 1 and the regularly occurring migratory species, Article 4 of the 'Birds' Directive requires "special conservation measures" to be taken "to ensure their survival and reproduction in their area of distribution." Such measures include, *inter alia,* due regard to their conservation in the taking of development control decisions. For all species, especially those of conservation concern, such decisions also contribute to the "requisite measures" taken by Member States to secure the objectives of Articles 2 and 3.

Impacts of the proposed development on birds

The potential adverse impacts on red-throated diver, merlin, golden plover, lapwing, dunlin, whimbrel, curlew, Arctic skua and great skua are unacceptably high. For many of these species, operational disturbance and risk of collision with turbine blades are likely to have significant adverse effects on their Shetland populations. The development is likely to adversely affect the UK populations of whimbrel and Arctic skua. We make a number of suggestions concerning mitigation, including the removal of turbines from particularly sensitive locations, in an attempt to reduce the potential damage to key species from the proposal.

Impacts on blanket bog habitat
Much of the application area is active blanket bog (i.e. still peat-forming), which is a Priority habitat on Annex 1 of the EU Habitats Directive and therefore of international importance. Blanket bog is also a Priority habitat in the UK BAP. Aspects of the proposed development, in particular the construction of turbine bases, hardstandings and tracks and the disposal of excavated peat, would seriously damage blanket bog. Such damage would adversely impact upon important bird species, listed above. RSPB Scotland is seriously concerned about the excavation of large quantities of peat and the lack of clarity about plans for re-use or disposal. Some of the proposed methods of re-use, such as spreading along track sides and to restore blanket bog habitats, are unacceptable as they could further damage blanket bog habitat.

Carbon budget
There are serious shortcomings in the ES, which underestimates the extent to which peat may be indirectly affected by the development. No attempt has been made to assess the carbon budget of the interconnector link to the Scottish Mainland. Although subject to separate consent applications, the development of the Viking wind farm and interconnector are inextricably linked and no assessment of the carbon budget of one can be complete without inclusion of the other.

Predictions in the ES on the carbon payback time range from a best-case scenario of 2.3 years to a worst-case scenario of 48.5 years. The worst-case scenario is of particular concern, as the wind farm would release more carbon than it would save over its 25-year lifetime.

Unless the carbon budget can be guaranteed to result in carbon reduction benefits, this proposed development risks contributing negatively to climate change and the Scottish Government's 2020 target for reducing emissions.

Planning policy context
RSPB Scotland considers that to consent this application would be contrary to Government advice as set out in SPP6 (Renewable Energy) and NPPG 14 (Natural Heritage). Development Plan policies, in the adopted Shetland Structure Plan and approved Shetland Local Plan also indicate grounds for refusal. We provide further comment in Annex 1.

Conclusion
RSPB Scotland **objects** to this application, which we consider would seriously harm important bird populations and blanket bog habitat. We do not accept that it has been shown that a significant CO_2 reduction would result from this proposal. Moreover, the method of disposal of a huge volume of excavated peat is unspecified. We do not consider that the application conforms to important Government and Development Plan policies and consequently the proposal should not be approved in its current form.

We would be happy to discuss any matters raised in more detail.

Yours sincerely

Peter M. Ellis
Shetland Area Manager

Annex 1

RSPB Scotland comments on the Viking Energy Partnership wind farm application.

Introduction

1. The RSPB is a registered charity incorporated by Royal Charter and is Europe's largest voluntary conservation organisation, with a membership of more than 78,000 in Scotland. The principal objective of the RSPB is the conservation of wild birds and their habitats. RSPB Scotland is part of the RSPB and manages over 64,000 hectares of land in Scotland. We strongly support the provisions of international and domestic agreements and legislation for the conservation of the natural environment.

2. RSPB Scotland has been present in Shetland since 1904. We manage seven nature reserves totalling 2,379 ha. We have over 400 members and employ six staff. Shetland is internationally important for seabirds and blanket bog habitat and nationally important for its upland birds and habitats.

3. The Society has significant experience of wind farm proposals. For example, we have been involved in some 1,500 wind farm cases over the period 2004-2008 and of these, we initially objected to just 10%. Where possible, we seek changes through design, construction methods or operation to reduce harmful impacts. This allowed us subsequently to withdraw many of these objections, resulting in an overall final objection rate of only 7%.

Interpreting the predicted impacts on birds

4. Adverse impacts on Shetland bird populations due to land take, habitat modification and operational disturbance resulting from the proposed development can be considered cumulative. The relationship between collision risk and other adverse impacts is complex: clearly, birds excluded from a site due to operational disturbance cannot collide with wind turbines and yet the calculation of collision risk assumes that no birds are displaced from the site by operational disturbance.

5. Another potential adverse effect of collisions may be a "sink effect", whereby territories near turbines remain occupied, but birds are continually removed by collision. The resulting territorial vacancies are then reoccupied by immigration, only for these birds to be in turn removed by collision. It is likely that the reality lies somewhere between the two scenarios, with some pairs excluded by operational disturbance, whilst a proportion of other territories would be subject to the sink effect. This compound effect of collision and displacement is additive, and its effects may be seen beyond the development site. Consequently, we believe that the

Environmental Statement (ES) may have underestimated at least some of the bird impacts.

6. Collision risk modelling has been carried out for a number of species. The standard "Band" model can be a useful tool in comparing the predicted impacts arising from different sites, or from different parts of a large site. However, it is based on a number of largely untested assumptions and its predictions can only be as good as the quality of the input data. It is sensitive to small changes in some input figures and a particular concern is that the sample of bird flight observations must be representative. Even with the most skilled and well-trained observers, some flights will be missed, so we commend the use of a distance detection factor that will add to the accuracy of predictions. However, it is not clear from the ES text how corrections for distance detection have been made and a fuller explanation is required. Though welcome, the use of a distance detection adjustment makes it difficult to compare Viking figures with those obtained at other sites where no adjustment has been made. We are content that adequate watches have been carried out. However, 95% is the accepted avoidance figure in SNH guidance and we have made the necessary adjustment to the annual collision rates as given in the ES by multiplying the results by 2.5. We would wish to see the results presented in a way that enables comparison with other developments.

7. Throughout the ES, a variety of displacement distances from different aspects of infrastructure have been used, together with the differing assessments of the sensitivity of species to disturbance. It is not clear how these have been derived. This requires a fuller explanation.

8. A serious omission from chapter 11 is that no attempt has been made to model the effects of the development on the important bird populations that would be potentially affected. Although the absence of information on some of the necessary parameters would certainly make this exercise difficult, in our opinion an attempt should have been made. Provided sources of information were referenced, assumptions made explicit and uncertainties clearly stated, we consider that this would have been useful in helping determine the likely long-term population impacts of the proposal.

9. Our initial attempts at population modelling for a small number of species have indicated that adverse impacts of the proposal may cause Shetland populations to decline substantially over the proposed 25-year life of the development.

- **A fuller explanation of how adjustments have been made to collision risk estimates to account for distance detection is required.**

- **Collision risk estimates should be presented in a way that facilitates comparison with other developments.**

- **Displacement distances and sensitivity of different species requires explanation.**

- **Population modelling to show the effects of the development on Shetland key species should be carried out to enable the impacts of the proposal to be properly assessed.**

Potential damage to Shetland's bird populations

Effects of land take

10. The ES states that bird losses due to land take would not be significant. However, in respect of whimbrel and Arctic skua we disagree, for reasons detailed later.

Construction disturbance

11. Adverse impacts due to construction disturbance, although short term (lasting for five years or less), may still be serious for some species, particularly those already declining for other reasons. For species such as red-throated diver, whooper swan, merlin and whimbrel, the ES assumes that construction disturbance would have no direct effects on breeding pairs, as "appropriate measures" would be implemented. However, as Chapter 4 states that much of the work would be carried out during March to September, which includes the breeding season, it remains unclear what these appropriate measures would be and how such a complete absence of disturbance would be achieved in practice. Unless very careful mitigation is undertaken, some level of disturbance to these species is inevitable.

- **"Appropriate measures" need to be clearly defined in a detailed construction method statement that should be agreed with SNH and RSPB Scotland prior to any consent being issued.**

12. For several other key species, such as golden plover, the ES states that it is unlikely that individual pairs would be disturbed in more than one year. However, this would be a large and complex construction project, much of which would be undertaken during the breeding season and unless phasing is very efficient, disturbance will occur over several years.

- **The phasing of construction work should be detailed in a construction method statement in order to avoid unnecessarily disturbing individual pairs of key breeding birds in more than one year during the construction period. This method statement should be agreed with SNH and RSPB Scotland prior to the commencement of any works on site.**

The Habitat Management Plan (Appendix 10.9) and birds

13. Whilst we welcome a number of the proposals in the Habitat Management Plan (HMP), we also have some serious concerns.

14. The plan is theoretical and none of the necessary agreements with land owners/occupiers are in place. Therefore, regardless of the theoretical ability of the HMP to enhance habitat in the future, its implementation cannot be guaranteed, and so cannot be considered as mitigation for any potentially damaging effects of the development.

- **Prior to consenting this proposed development, firm guarantees must be in place to ensure that the HMP can be delivered.**

15. We are disappointed in the area covered by the HMP, which is small relative to the scale of the development and its likely environmental impacts. A larger area would be more likely to offset the many adverse impacts of the proposed development.

16. Although some species of birds such as red-throated diver, merlin, dunlin, snipe and curlew, may benefit from aspects of the HMP, species preferring short vegetation such as golden plover and whimbrel are unlikely to do so and may be disadvantaged. Arctic skua and great skua are also unlikely to benefit from the HMP as currently proposed.

17. Some aspects of the intended management, such as blocking erosion features with plastic "dams", may well be effective in allowing eroded material to accumulate and eventually revegetate behind them. However, unless carefully controlled, this work could cause considerable disturbance to birds breeding in the area and vehicle transit could damage intact blanket bog. The use of excavated peat is not acceptable, as it cannot be guaranteed that it would not be washed away, causing further damage. The suggestion in Appendix 4.5, that 15,000 m^3 of peat can be re-used in the restoration of habitat, is unacceptable and amounts to the disposal of waste peat in a way likely to cause additional habitat damage.

- **The HMP area must be significantly increased.**

- **The HMP must seek to offset adverse impacts on all key species and habitats.**

- **In order to reduce disturbance to key species during implementation of the HMP, no works should be carried out during April to August inclusive.**

- **In order to prevent further damage to habitats, no excavated peat should be used in the implementation of the HMP.**

Key bird species likely to be affected

Red-throated diver

18. The red-throated diver is in the Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also on Schedule 1 of the Wildlife and Countryside Act 1981 and the Amber List of Birds of Conservation Concern. The Shetland population is estimated to be 407 breeding pairs (33% of the British breeding population), and 536 non-breeding adults. There was a 3.8% decline between the censuses in 1994 and 2006 and an earlier decline of 36% between 1983 and 1994 censuses. (Dillon et al. 2009).

19. The ES estimates that 30 pairs breed within 1km of the proposed turbines, tracks and other infrastructure, representing 2.4% of the UK breeding population and 7.4% of the Shetland breeding population. Despite earlier design iteration to reduce the effects of the development, which included input from RSPB Scotland, the ES indicates that six breeding lochs are still located within 350m of turbines and an additional 12 within 450m. Seven lochs within 1km of infrastructure were assessed in the ES as important gathering sites for non-breeding divers.

20. **Habitat modification** effects are stated to have a negligible effect on red-throated divers but we consider this unproven. The use of floating roads and construction of other infrastructure within 350m of breeding lochs could have damaging effects on the water table and hydrology. The ES also indicates that implementation of the HMP (Appendix 10.9) would have a positive effect on breeding red-throated divers. See our earlier comments on the HMP.

21. **Construction disturbance** is assumed to have no direct effects on breeding divers, as appropriate measures would be undertaken. The ES states that up to four non-breeding lochs would be affected in any one year. See our earlier comments.

22. **Operational disturbance** is assumed in the ES to displace divers within 500m of turbines and from areas within 250m of tracks. The ES indicates that 15 breeding lochs are located within the assumed operational disturbance zone, of which 10 are typically occupied in any one year. This would result in the loss of 10 pairs of breeding divers (2.5% of the Shetland population) and in a loss of 6.5 young per year, a reduction of 2% in the productivity of the Shetland population. The ES assesses this effect as not significant. We disagree.

23. **Collision risk assessment** in the ES estimates that, at an avoidance rate of 98%, 2.6 breeding birds (0.3% of the Shetland breeding population) and 3.5 non-breeding birds (a total of 6.1) would be killed by collision with the turbines each year. This represents 65 breeding birds and 87.5 non-breeding birds (total of 152.5) over the 25 year life of the development. The ES concludes that the effects of this would not be significant but this assessment takes no account of any loss of production or

effect on population stability arising from collision mortality. At the standard 95% avoidance rate adopted in SNH guidance, corresponding figures for annual mortality would be 6.5 breeding birds (0.75% of the Shetland breeding population) and 8.7 non-breeding birds, giving a total of 15.2 birds killed annually. Figures for the 25-year lifetime of the wind farm would be 162.5 breeding birds (1.88%) and 218.8 non-breeders, providing a total mortality of 381 birds.

24. In its current form, the proposed development would have an unacceptably serious, adverse effect on the Shetland population of this Annex I species.

- **All proposed turbines should be moved more than 500m from any breeding and non-breeding lochs and tracks re-routed more than 250m from these lochs.**

- **No anemometer masts should be sited within 500m of lochs used by breeding and non-breeding red-throated divers, nor in diver flightlines.**

Merlin

25. The merlin is in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also on Schedule 1 of the Wildlife and Countryside Act 1981 and the Amber List of Birds of Conservation Concern. The Shetland population of about 20 pairs is approximately 1% of the GB population. Population trends within Shetland are currently unclear (Pennington et al. 2004).

26. The ES estimates that up to nine pairs of merlin (45% Shetland and 0.7% UK breeding populations) breed within two km of the proposed turbines, tracks and other infrastructure. The ES indicates that, despite earlier design iteration to reduce the effects of the development, which included input from RSPB Scotland, turbines are still proposed within 500m of sites where two pairs of merlin routinely breed.

27. **Habitat modification** effects are stated in the ES to be negligible. The ES also indicates that implementation of the HMP (Appendix 10.9) would have a positive effect on breeding merlin. We agree but suggest that the creation of nesting habitat should focus primarily on areas where merlin have previously nested, avoiding sites too close to infrastructure. See our earlier comments on the HMP.

28. **Construction disturbance** effects are assumed to have no direct effects on any breeding merlin, as appropriate measures would be undertaken. The ES goes on to suggest that disturbance of foraging birds may adversely affect breeding in two of the nine pairs, representing a loss of 10% of the Shetland population for a period of five years. The ES assesses the effects of this to be significant. We agree with this assessment and consider this an unacceptable level of damage to the Shetland merlin population.

29. **Operational disturbance** is assumed in the ES to displace breeding merlin within 500m of operational turbines and foraging birds from areas within 100m. Two pairs of merlin, with a high annual productivity of 3.9 young per pair, typically nest within the assumed operational displacement zone. This would result in a reduction of approximately 10% of the Shetland breeding population and a consequent reduction in productivity. The effect of this is assessed as significant in the ES and we agree with this assessment.

30. **Collision risk assessment** in the ES estimated that one merlin would be killed every 2.8 years (0.36 birds per year or approximately 0.9% of the breeding population). This equates to nine merlin over the 25-year life of the development. However, this is based on 98% avoidance and, using the standard 95% rate, these figures should be 1.1 years, 0.9 birds per year and 2.2% respectively.

31. The ES indicates that merlin is currently in favourable conservation status but population trends in Shetland are unclear: there appear to have been local increases in places such as the Viking area, but declines in the north and west Mainland. The ES indicates that the effects of potential collisions would not be significant. However it goes on to indicate that the loss of almost nine merlins over the lifetime of the wind farm is considered highly undesirable. The ES states that precautionary measures would be implemented to reduce the likelihood of collisions by merlin, but does not indicate what these would be.

32. In its current form, the development is likely to have an adverse, population-level effect on breeding merlin and is consequently unacceptable.

- **All proposed turbines should be moved more than 500m from any breeding territories and tracks re-routed more than 250m from such areas. This would reduce the adverse effects of construction and operational disturbance and the risk of collision with turbine blades.**

Golden plover

33. The golden plover is in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also on the Amber List of Birds of Conservation Concern. The Shetland population is estimated at 1,450 pairs, approximately 6% of the GB population. Population trends within Shetland are unclear (Pennington et al. 2004).

34. The ES estimates that approximately 90 pairs of golden plover breed within 500m of the proposed turbines, tracks and other infrastructure (0.4% of the UK population, 6.2% of the Shetland population).

35. **Habitat modification** effects are stated in the ES to be negligible. The ES also indicates that implementation of the HMP (Appendix 10.9) would have a positive effect on breeding golden plover. We consider that HMP measures are currently unlikely to benefit breeding golden plover. Therefore, this cannot be considered as mitigation for any potentially damaging effects of the development.

36. **Construction disturbance** effects are assumed in the ES to affect 90 pairs of golden plover within 500 metres of infrastructure and that c.30 pairs would be affected in any one year. The ES estimates a reduction of c.30 pairs of golden plover (2% of the Shetland population) for five years and assesses the effects of construction disturbance as not significant.

37. Displacement and the reduction in productivity of approximately 2% of the Shetland golden plover population during five breeding seasons would be likely to have an adverse population level effect. We therefore disagree with the conclusions of the ES.

38. **Operational disturbance** is assessed in the ES as affecting golden plover within 250m of operating turbines and within 100m of tracks, involving 35 pairs of golden plover (2.4% of the Shetland population). This effect is assessed in the ES as being not significant.

39. Displacement and the reduction in productivity of approximately 2.5% of the Shetland golden plover population would be likely to have a significant adverse effect.

40. **Collision risk assessment** in the ES estimates that 62.5 golden plover would be killed each year (over 2% of the Shetland population). This represents 1,562 birds killed over the 25-year operational life of this development. However, this is based on 98% avoidance and, using the standard 95% rate, these figures should be 156 birds, 5% and 3900 birds. The ES assesses the effect of collisions as not significant. It also states that "*the conservation status of this species is judged favourable*", despite the fact that there are no clear indications of population trends for this species within Shetland. The assessment has not taken account of any reduction in productivity of breeding golden plover resulting from the predicted deaths due to collision.

41. The consequences of this development are likely to have a significant adverse population level effect on golden plovers, which is unacceptable.

- **The removal of further turbines should be implemented in order that less than one percent of the Shetland population would be adversely affected.**

Lapwing

42. The lapwing is in the Red List of Birds of Conservation Concern and is a UK Biodiversity Action Plan (BAP) species. The Shetland population of approximately 1,740 pairs (*ca* 1% of the UK population) is considered to be declining (Pennington et al. 2004).

43. The ES states that approximately 65 pairs of lapwing breed within 500m of the proposed turbines, track and other infrastructure, representing less than 1% of the UK breeding population and 3.7% of the Shetland breeding population. Five territory centres are noted to be within 250m of the proposed turbines.

44. **Habitat modification** effects on lapwings are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species. See our earlier comments on the HMP.

45. **Construction disturbance** effects are assumed in the ES to displace lapwings within 500m of construction work sites, with 64 pairs estimated to be in the assumed displacement zone. The ES estimates that c.20 pairs would be affected in any one year, representing a reduction of approximately 1% of the Shetland population for a period of five years. See our earlier comments. The ES concludes that this effect would not be significant. We disagree with this conclusion.

46. **Operational disturbance** is assumed in the ES to displace nesting and foraging lapwings from areas within 250m of operating turbines and 100m of tracks. The ES estimates that 13 pairs of lapwings typically breed within the assumed displacement zone. The ES goes on to estimate that this would result in a reduction of 0.7% in the Shetland breeding population and considers this effect to be not significant.

47. As the Shetland population may be declining, this adverse effect may be significant in population terms.

48. **Collision risk assessment** data for lapwing are not presented in the ES but are assumed to be included in the assessment of negligible impacts stated for all other species.

49. The consequences of this development are likely to have a significant adverse population level effect on lapwing.

- **The removal of further turbines should be considered in order to reduce the proportion of the Shetland population that would be adversely affected.**

Dunlin

50. Dunlin of the race *schinzii* is included in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. Dunlin is also on the Red List of Birds of Conservation Concern. The Shetland population of *ca* 1,700 pairs is approximately 18% of the GB population. Population trends within Shetland are currently unclear (Pennington et al. 2004).

51. The ES estimates that approximately 57 pairs of dunlin (0.6% of the UK breeding population and 3.4% of the Shetland breeding population) breed within 500m of proposed turbines, tracks and other infrastructure, with 25 territories within 250m.

52. **Habitat modification** effects are stated in the ES as likely to result in the loss of two pairs of dunlin, based on the mean density of breeding birds within 250m of proposed infrastructure. However, it is not clear how this has been determined, when it is earlier stated in the ES that 25 territories are located in the same area. See our earlier comments on the HMP.

53. **Construction disturbance** effects are assumed in the ES to apply to pairs breeding within 250m of construction worksites, amounting to 42 pairs. The ES then suggests that c.14 pairs would be affected in any one year. The ES assesses the effects of construction disturbance on dunlin as likely to affect less than 1% of the Shetland population of dunlin for five years and not significant.

54. Displacement and the reduction in productivity of 0.8% of the Shetland dunlin population (whose trends are unclear) during more than one breeding season would be likely to have an adverse population level effect.

55. **Operational disturbance** is assumed in the ES to apply to 32 pairs of dunlin nesting within 250m of operating turbines and within 100m of tracks. The ES suggests that this would result in a reduction of 2% in the Shetland population of breeding dunlin, but assesses this effect as not significant. We disagree.

56. **Collision risk assessment** in the ES estimates that 13.4 dunlin per year (0.4% of the Shetland population) would be killed by collision with the turbines. This would amount to 335 dunlin over the 25-year life of the development. These figures are based on 98% avoidance. At the standard 95% avoidance, the corresponding figures would be 33.5 birds per year (1% of Shetland population) and 838 birds over the 25-year life of the development.

57. This may have a significant adverse population level effect.

- **The removal of further turbines should be considered in order to reduce the proportion of the Shetland population that would be adversely affected.**

Curlew

58. The curlew is listed by the International Union for Conservation of Nature as near threatened due to its decline as a breeding species in Europe. It is included in the Amber List of Birds of Conservation Concern and is a UK BAP species. The Shetland breeding population is estimated at 2,300 pairs (approximately 2% of the GB population) and is considered to be declining (Pennington et al. 2004). The UK population has also declined, by 38% between 1994 and 2007. (British Trust for Ornithology, 2008)

59. The ES estimates that approximately 227 pairs of curlew breed within 500m of proposed turbines, tracks and other infrastructure, representing 0.2% of the UK breeding population and 6.6% of the Shetland breeding population.

60. **Habitat modification** effects are stated in the ES to potentially affect six breeding pairs of curlew (approximately 0.3% of the Shetland population) and the likely adverse effects would be low. The ES also states that these effects would be limited by habitat management. See our earlier comments on the HMP.

61. **Construction disturbance** effects are assumed in the ES to displace curlews from areas within 500m of construction work sites. The assumed displacement zone typically contains 225 pairs of breeding curlew and ca. 75 pairs (just over 2%) would be likely to be affected in any one year and a reduction of just over 2% of the Shetland population would occur for five years. See our earlier comments. The ES regards this effect as not significant. Our estimates suggest that these figures equate to 9.8% of the Shetland population being present in the assumed displacement zone, with 3.3% of the Shetland population being affected in any one year and displaced for five years.

62. This may have a significant adverse population level effect.

63. **Operational disturbance** is assumed in the ES to displace nesting and foraging curlews from areas within 250m of operating turbines and 100m from tracks. The ES estimates that 93 pairs of curlew typically breed within the assumed displacement zone and so operational disturbance would result in a reduction of less than 3% in the Shetland breeding population. The ES considers that this effect would not be significant. Our estimates suggest that this reduction of the Shetland breeding population would be 4%.

64. This may have a significant adverse population level effect.

65. **Collision risk assessment** in the ES estimates that 58.4 curlew would be killed each year, representing approximately 0.9% of the Shetland population and considers this to be a not significant effect. However, our calculations equate 58.4 curlew with 1.3% of the Shetland population of breeding curlew, and this would amount to 1,460 curlews being killed over the 25-year life of the development. These figures are based on 98% avoidance: at 95% avoidance, figures are 146 birds, 3.2% and 3,650 birds respectively.

66. The consequences of this development are likely to have a significant adverse population level effect, which would be unacceptable.

- **The removal of further turbines should be implemented in order that less than one percent of the Shetland population would be adversely affected.**

Whimbrel

67. The whimbrel is on Schedule 1 of the Wildlife and Countryside Act 1981 and in the Red List of Birds of Conservation Concern. The Shetland population was estimated to be 479 pairs in 1989-1994, approximately 90% of the UK population at that time. However, provisional figures from 2009 suggest that the population may have declined by c.39% since then and may now be closer to 290 pairs, with the UK breeding population believed to have declined to approximately 300 pairs, so that Shetland is now considered to hold approximately 97% of the UK population. (Natural Research unpublished 2009).

68. The ES estimates that approximately 40 pairs of whimbrel breed within 500m of the proposed turbines, tracks and other infrastructure, representing approximately 7.5% of the UK breeding population. However, this may now represent closer to 13.3% of the reduced UK population.

69. **Land take** effects are estimated in the ES to be likely to lead to the loss of one pair (0.3%) of the Shetland population of whimbrel.

70. **Habitat modification** effects are estimated in the ES to be likely to lead to the potential loss of one pair (0.3%) of the Shetland population of whimbrel.

71. As the Shetland population of this species has declined considerably in recent years, and constitutes almost the whole of the UK population, the loss of even one pair would be significant.

72. **Construction disturbance** effects are assumed in the ES to have no direct effects on any breeding whimbrel, as appropriate measures would be undertaken. The ES goes on to say that it is assumed that whimbrel would be displaced from areas within 500m of construction work sites, an area that 40 pairs of whimbrel typically occupy. The ES goes on to assume that c. 15 pairs would be affected in any one year. This represents a reduction of just over 3% of the Shetland population for five years. However, more recent estimates suggest that this reduction may be closer to 5%. The ES goes on to consider that this effect would be significant. We agree.

73. **Operational disturbance** is assessed in the ES as likely to displace whimbrel from areas within 250m of operating turbines and from areas within 100m of tracks. Sixteen pairs of whimbrel typically breed within the displacement zone. This represents just over 3% of the Shetland population. However, this may be closer to 5.5% of the reduced Shetland population.

74. This would be likely to have a significant adverse population level effect.

75. **Collision risk assessment** in the ES estimates that 10.5 whimbrel would be killed per year, which, after further analysis, was refined to 9.6 per year. Whilst it is clear that this second figure takes account of the finding that aerial activity of this species was non-random with respect to topography, no details of the correction procedure, which has been applied, are given. The figure of 9.6 whimbrel is approximately 1% of the Shetland and UK populations as they were estimated during 1989-1994. However, this may now represent 1.6% of the reduced UK population. This would amount to 240 over the 25-year life of the development. The ES concludes that this would be a significant effect. These figures were based on an avoidance rate of 98%. At 95% avoidance, 24.0 whimbrel would be killed annually, 4% of the reduced Shetland and UK populations. We agree with the ES conclusion that this level of mortality would be significant.

76. This development would have a significant adverse population level effect on whimbrel, which is unacceptable.

- **Further turbines should be removed in order to ensure that the Shetland population is not adversely affected.**

- **Data should be presented indicating the collision risk for each turbine.**

- **Details should be provided of the procedure adopted to correct for non-random flight activity with respect to topography.**

Arctic skua

77. The Arctic skua is in the Red List of Birds of Conservation Concern and is a UK BAP species. The Shetland population of 1,128 apparently occupied territories (AOTs) in 2001/02 was approximately 52% of the GB population at that time. With substantial declines since then, the Shetland population may now be closer to 823 AOTs, with the UK population approximately 1,465 AOTs, so that Shetland is now considered to hold approximately 56% of the UK population (RSPB unpublished data).

78. The ES estimates that approximately 30 pairs of Arctic skuas breed within 500m of the proposed turbines, tracks and other infrastructure. This was 1.4% of the UK and 2.7% of the 2001/02 Shetland breeding population. However, this may now represent closer to 2% of the UK and 3.6% of the Shetland populations. Twelve territory centres are also within 250m of the proposed turbines.

79. **Land take** effects are stated in the ES to be likely to result in the loss of one pair of Arctic skuas.

80. **Habitat modification** effects are stated in the ES to be likely to result in the loss of one pair of Arctic skuas. This is assessed as a negligible effect in the ES.

81. As the Shetland (and UK) population of this species has declined considerably in recent years, the loss of one pair is significant.

82. **Construction disturbance** effects are assumed in the ES to be likely to displace breeding Arctic skuas from an area within 500m of the construction work sites, which hold c.30 pairs of skuas. The ES estimates that 10 pairs of Arctic skuas would be displaced in any one year. See our earlier comments. The ES assesses the effects of construction disturbance on Arctic skuas as likely to affect 0.1% (although this may be a typographical error) of the Shetland population of Arctic skuas for five years and not significant. We estimate that this may be closer to 1.2% for five years and would be likely to have a significant adverse population level effect.

83. **Operational disturbance** is assumed in the ES to displace breeding and foraging Arctic skuas from areas within 250m of operating turbines and from within 100m of tracks. Thirteen pairs of Arctic skuas typically breed within the assumed displacement zone. The ES asserts that a reduction of just over 1% of the Shetland breeding Arctic skua population would occur and that this is assessed as not significant. We estimate that this may be closer to 1.6% and would likely to have a significant adverse population level effect.

84. **Collision risk assessment** in the ES estimates that, at 98% avoidance, 10.1 Arctic skuas (0.4% of the Shetland population) would be killed each year. We estimate that this may be closer to 0.6%. This represents 252.5 birds killed over the 25-year life of the development. This is assessed in the ES as not significant. At 95% avoidance, 25.2 skuas (1.5% of the Shetland population) would be killed each year, representing 630 birds over the development lifetime.

85. This would have a significant adverse population level effect.

- **Further turbines should be removed in order to ensure that the Shetland population is not adversely affected.**

Great skua (bonxie)

86. The great skua is included in the Amber list of Birds of Conservation Concern. The Shetland population was estimated at 6,846 AOTs during 1998-2002, representing 71% of the UK breeding population and 43% of the world population (Mitchell et al. 2004). The current status of the Shetland population is uncertain but some colonies, including the largest, on Foula, have declined in recent years.

87. The ES states that approximately 53 pairs of bonxies breed within 500m of the proposed turbines, tracks and other infrastructure, and that this represents 0.8% of the Shetland, 0.6% of the UK and 0.3% of the global breeding populations.

88. **Habitat modification** effects in the ES are predicted to be negligible, as bonxies are not expected to be sensitive to the effects of localised habitat drying. We agree.

89. **Construction disturbance** effects are assumed in the ES to apply to bonxies within 500m of construction work sites, with 53 pairs typically breeding within the assumed displacement zone (0.8% of the Shetland population). The ES goes on to state that c.18 pairs would be affected in any one year, resulting in a reduction of less than 0.3% in the Shetland population for five years. The ES considers this effect not significant.

90. **Operational disturbance** is assumed in the ES to apply to bonxies nesting and foraging within 250m of operating turbines and 100m of tracks. The assumed displacement zone is estimated to typically hold 27 pairs of bonxies, leading to a reduction of just over 0.4% in the Shetland breeding population. The ES considers this effect not significant.

91. **Collision risk assessment** in the ES estimates that, at 98% avoidance, 60.2 bonxies (0.4% of the Shetland breeding population) would be killed by collision with turbines each year. The ES considers this effect not significant. However, this represents 1,505 bonxies killed over the 25-year life of the development, which is an unacceptable level of mortality. Corresponding figures at 95% avoidance are 150.5 birds (1.0% of the Shetland population) would be killed annually and 3,762 birds over the development lifetime.

92. As 43% of the world population of this species is present in Shetland, significant impacts on the Shetland population are therefore of international significance. Therefore, the effects of this development would be potentially significant.

- **Further turbines should be removed in order to reduce adverse effects on the internationally important Shetland population.**

Whooper swan

93. The whooper swan is in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also on Schedule 1 of the Wildlife and Countryside Act 1981 and the Amber List of Birds of Conservation Concern. Since breeding was first confirmed in 1994, the Shetland population has increased to eight pairs in 2008. This is estimated to be 61-89% of the UK breeding population (Pennington et al. 2004).

94. The ES states that a pair of whooper swans breeds annually less than 750m from the proposed turbines. It goes on to state that this is approximately 20% of the UK population and one third of the Shetland population. However, based on the 2008 figures, this is closer to 7-11% of the UK population and 12.5% of the Shetland

population. The ES indicates that small numbers of whooper swans were recorded in the Viking area outside the breeding season.

95. In addition, a pair of whooper swans nested in 2009 at Sand Water, near the southern boundary of the Viking area and close to one of the provisional construction compounds.

96. **Habitat modification** effects are indicated in the ES to have no effect on whooper swans.

97. **Construction disturbance** effects are assumed in the ES to have no direct effects on any breeding whooper swans, as appropriate measures would be undertaken. However, some level of disturbance to breeding swans is likely, particularly to the new pair that bred in 2009 close to the proposed site of a construction compound.

98. The ES concludes that it is unlikely that construction disturbance would have a material effect on the Shetland population of wintering or migratory whooper swans.

99. **Operational disturbance** is assessed in the ES as potentially displacing breeding/feeding whooper swans from within 500m of turbines and 250m from tracks. The ES suggests that whooper swans are unlikely to breed within the assumed displacement zones. However, the loch used by breeding whooper swans in 2009 is within 250m of a proposed track, and also within 150m of a provisional construction compound site. Consequently, following the application of criteria used elsewhere in the ES, we suggest that one pair of whooper swans (12.5% of the Shetland population) may be displaced.

100. The ES identifies that one loch (Sand Water) is used by migratory and wintering whooper swans is within 250m of a proposed track. The ES concludes that the development is unlikely to contribute to overall disturbance. However, the proposed siting of a construction compound within 150m of Sand Water may increase the level of disturbance to swans using this loch.

101. **Collision risk assessment** was not carried out, but an estimate that less than one whooper swan would collide with a turbine during the 25-year lifetime of the development was suggested in the ES. As a second pair of whooper swans bred close to the boundary of the Viking area in 2009, the collision risk should be re-evaluated.

- **The conclusion in the ES that collision risk would not have a significant effect on whooper swans should be reassessed in light of more recent information.**

- **The proposed construction compound adjacent to Sand Water should be relocated at least 500m from the loch. This would reduce the possibility of any serious adverse effects on the breeding population of whooper swans in Shetland.**

Hen harrier

102. The hen harrier is in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also on Schedule 1 of the Wildlife and Countryside Act 1981 and in the Red List of Birds of Conservation Concern. Hen harriers do not breed in Shetland, but two to 20 individuals are recorded annually (Pennington et al. 2004).

103. The ES states that in the winter of 2005-06 at least three hen harriers roosted communally adjacent to the development, with a maximum of two present on any one date. The roost site is stated to be 375m from the nearest proposed track and over 1km from the nearest proposed turbine. However, the ES fails to note that it lies close to one of the provisional construction compound sites.

104. **Habitat modification** effects on hen harriers are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species.

105. **Construction disturbance** effects are assumed in the ES to have no direct effects on hen harrier roosts, as appropriate measures would be undertaken. The ES concludes that the effects of construction disturbance would be not significant. However, no mention is made in the ES of the proximity of the provisional construction compound site, which may cause disturbance to roosting hen harriers, which could be damaging.

106. **Operational disturbance** effects in the ES are assumed to occur on hen harrier roosts within 500m of turbines and 250m of tracks, but goes on to state that there are no known roosts within the assumed displacement zone. The ES concludes that any displacement of hen harriers when roosting or foraging would be not significant.

107. **Collision risk assessment** has not been calculated for hen harriers in the ES, and is judged to be not significant.

- **The development of the wind farm would be unlikely to have any significant adverse population effects. However, in order to ensure this, the provisional construction compound site should be relocated at least 500m from the roost site.**

Snipe

108. The snipe is included in the Green List of Birds of Conservation Concern. The Shetland population has been estimated at 3,450 pairs, approximately 3% of the GB population. Trends in the Shetland population are unclear, but it has been suggested that it may be declining (Pennington et al. 2004).

109. Surveys of the Viking area recorded 395 pairs, which is over 10% of the Shetland population so it is surprising that no detailed analysis of effects of the proposal has been undertaken.

- **More information should be provided on potential impacts upon this species, as the development may have a significant adverse population effect.**

- **The removal of further turbines should be considered in order to reduce the proportion of the Shetland population that could be adversely affected.**

Species subject to lower levels of risk

Greylag goose

110. The greylag goose is on the Green List of Birds of Conservation Concern. The Shetland population has expanded since the first confirmed breeding record in 1985, and is now believed to be in excess of 500 pairs (M. Pennington pers. comm.). The wintering/migrant population in Shetland has also increased in recent years.

111. The ES suggests that approximately 49 pairs of greylags breed within 500m of proposed turbines, tracks and other infrastructure and that this represents 0.1% of the UK breeding population and 39% of the Shetland population. However, this may be closer to 8% of the increasing Shetland population. The ES notes that the Central Mainland is thought to hold 11% of the Shetland population. As noted above, the wintering/migrant population in Shetland has also increased in recent years.

112. **Habitat modification** effects on greylag geese are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species.

113. **Construction and Operational disturbance** effects on greylag geese are not presented in the ES.

114. **Collision risk assessment** in the ES estimates that, at 99% avoidance, 6.4 greylag geese would be killed annually representing, at most, 2.6% of the Shetland population. However, it is likely that the Shetland population is now considerably higher, so this is probably an overestimate and we consider that this may be closer to 0.64% of the increasing Shetland population. This would be likely to equate to 160

collisions during the 25-year life of the development. The ES concludes that this would have a not significant effect.

115. This level of mortality, though regrettable, would be unlikely to have any significant adverse population effects.

Red grouse

116. The red grouse is included in the Amber list of Birds of Conservation Concern and is a UK BAP species. The red grouse was introduced to Shetland, and its current status is poorly known, but the breeding population has been estimated to be between 100 and 200 pairs (Pennington et al. 2004).

117. The ES states that approximately 18 pairs of red grouse breed within 250m of proposed turbines, tracks and other infrastructure. The ES estimates this to be approximately 20% of the Shetland breeding population, but we estimate that this may be as low as 9%.

118. **Habitat modification** effects on red grouse are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species.

119. **Construction disturbance** effects are assumed in the ES to displace red grouse from areas within 250m of construction work sites. The ES states that 19 pairs typically breed within this assumed displacement zone, and it is assumed that six pairs would be affected in any one year. The ES states that this would represent a reduction of approximately 4% of the Shetland population for five years. This effect is considered not significant in the ES.

120. As the proportion of the current Shetland population will now be lower, this effect may have been overestimated: it is not likely to have a population level affect.

121. **Operational disturbance** is assumed in the ES to displace nesting and foraging red grouse from areas within 100m of operating turbines. The ES states that one pair of red grouse typically breeds within the assumed displacement zone and suggests that this would represent a reduction of 0.7% in the Shetland population. The ES assesses this effect as not significant.

122. This effect may have been overestimated and is not likely to have a population level effect.

123. **Collision risk assessment** data for red grouse are not presented in the ES. It is assumed that the conclusion that collision risk is not significant for other species includes red grouse.

124. This development is not likely to have a population level affect on this species.

Black-tailed godwit

125. The black-tailed godwit is on Schedule 1 of the Wildlife and Countryside Act 1981 and is included in the Red List of Birds of Conservation Concern. The black-tailed godwit is a very rare breeding species in Shetland although the population has been increasing (Pennington et al. 2004). In recent years, four pairs have nested in Shetland, but in 2009 five or six pairs may have attempted to breed.

126. The ES states that a pair probably bred in the Nesting quadrant in 2007 and 2008 at locations approximately 590m and 1.3km respectively from the nearest proposed turbine, track or other infrastructure. The ES goes on to say that one pair represents 2% of the UK breeding population and one third of the Shetland breeding population. Our calculations suggest that one pair represents 17-25% of the Shetland population.

127. **Habitat modification** effects on black-tailed godwits are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species.

128. **Construction disturbance** effects on black-tailed godwits are not presented in the ES.

129. **Operational disturbance** effects are not presented in the ES.

130. **Collision risk assessment** data for black-tailed godwits are not presented in the ES, but the effects are assumed to be included in the assessment of negligible impact stated for all other species.

131. We are not aware of any regularly occupied black-tailed godwit breeding site that would be adversely impacted by the development.

Arctic tern

132. The Arctic tern is in Annex 1 of EU Directive 79/409/EEC on the Conservation of Wild Birds, which requires the UK Government to take special conservation measures to protect its habitats. It is also included in the Amber List of Birds of Conservation Concern. The Shetland population was estimated at 24,716 breeding pairs during 1998-2002, representing 47% of the GB population. Population trends in Shetland in recent years are not clear, but a decline has certainly occurred in the last 20 years (Pennington et al. 2004).

133. The ES states that 12 pairs of Arctic terns (0.1% of the UK and Shetland breeding populations) bred in three colonies within 500m of the proposed turbines, tracks and other infrastructure.

134. **Habitat modification** effects on Arctic terns are not presented in the ES, but are assumed to be included in the assessment of negligible impact stated for all other species.

135. **Construction disturbance** effects are assumed in the ES to result in Arctic terns being displaced from within 500m of construction work sites. Typically, 14 pairs of Arctic terns nest in the assumed displacement zone. The ES estimates that approximately five pairs of Arctic terns would be affected, resulting in a reduction of less than 1% in the Shetland breeding population for five years. The ES judged this effect to be not significant. So long as construction work in the vicinity of colonies is avoided, we agree that effects will be negligible.

136. **Operational disturbance** effects are assumed to displace nesting Arctic terns from areas within 250m of operating turbines and from 100m of tracks. The ES states that typically no Arctic terns nest in the assumed displacement area and so the effects are not significant.

137. **Collision risk assessment** data for Arctic terns are not presented in the ES, but the effects are assumed to be included in the assessment of negligible impact stated for all other species.

138. This development is unlikely to have a detectable adverse population level effect on Arctic tern.

Potential mitigation

139. In order to reduce the level of the effects on the Shetland, UK and global populations of key species, further mitigation would have to be carried out. Because the most serious effects outlined above include both operational disturbance and collision with wind turbine blades, removal of proposed turbines from particularly sensitive locations is most likely to be effective. This would also have the consequences of both reducing the area of blanket bog being damaged and reducing the volume of excavated peat that would need to be dealt with.

Concerns over damage to blanket bog habitat

140. Much of the application area is blanket bog, a considerable proportion of which is regarded as active, i.e. with a significant area of peat-forming vegetation present. This is a Priority Habitat on Annex 1 of the EU Habitats Directive. Blanket bog is also a Priority Habitat in the UK BAP.

141. Aspects of the proposed development, in particular the construction of turbine bases, hard standings and tracks, and disposal of excavated peat would cause serious damage to the blanket bog of the site.

142. We consider that the area of the development that could be potentially damaged by drainage effects has been considerably underestimated, for two reasons.

143. Firstly, the ES uses a catchment-based system to describe the hydrology of the Viking area. The alternative, hydromorphological system provides a functional framework of classification for peatland systems appropriate to blanket bog. This system, employed since the early 1980s in many parts of the world, now forms the basis of official guidance from JNCC to the UK conservation agencies and features in Ramsar Convention guidance for peatlands (Lindsay and Freeman 2008). The use of a catchment-based system is likely to have underestimated the extent of habitat potentially affected by the development.

144. Secondly, the zone of influence on either side of tracks constructed by the cut method has been assumed, in the ES, to be 20m wide. The extent of this zone is likely to be highly variable as the nature of the peat varies. In the ES, it is acknowledged that *"Studies have shown that drainage can be affected by as much as 200m from the ditch."* We consider that damage to the living acrotelm of the blanket bog habitat has been underestimated and that such damage would adversely impact upon several key bird species.

- **The hydromorphological approach as endorsed by JNCC would allow a more accurate assessment of the impacts on blanket bog habitat. We believe this methodology should be used.**

Floating roads

145. So-called "floating roads" compress the catotelm and often result in slumping of the peat. They cut across the natural surface flow of the bog, causing problems for both the bog and the road. Experience has shown that floating roads do not continue to float, but both short and long-term subsidence is almost inevitable, and this occurs to different degrees and at different rates along a road (Lindsay and Freeman 2008). This variable subsidence tends to have significant operational and environmental consequences as parts of the road become saturated. In some cases, this can lead to ponding of surface water on the upslope side of a track. Ponding of surface water can make the upslope side of the track unstable, and so may require remedial cross drainage, which would in turn damage the blanket bog, by drying out the upslope peat and causing erosion on the downslope side of the track. Consequently, the damage to the blanket bog from "floating roads" can be considerable. The assumption that 'floating' roads require no side-drainage means that the ES has not properly considered the potential environmental effects of such drainage.

Concerns over the proposed re-use/disposal of excavated peat

146. The excavation of extremely large quantities of peat and lack of clarity about how it would be re-used or disposed of is of serious concern to RSPB Scotland. One of the methods suggested for re-use/disposal of the large volume of excavated peat is

to spread 70,500 m^3 alongside tracks. This would cause additional damage to the habitat and hydrology of the area.

- **In order to prevent damage to the blanket bog vegetation and hydrology of the area, no excavated peat should be spread along the sides of tracks.**

147. Some aspects of the Habitat Management Plan such as the use of peat to fill erosion features is not acceptable, as it cannot be guaranteed that this peat would not be washed away. The suggestion in Appendix 4.5, that 15,000 m^3 of peat can be re-used in the restoration of habitat (as part of the Habitat Management Plan) is unacceptable as it would further damage blanket bog vegetation and disrupt the hydrology of the site. In our opinion, this development would cause unacceptable levels of damage to active blanket bog.

- **In order to prevent excavated peat causing further damage to habitats, no excavated peat should be used in the HMP.**

- **We do not consider that <u>any</u> viable options have been presented for the re-use/disposal of in excess of 550,000 m^3 of peat. Viable options should be produced.**

Concerns over the calculation of the carbon budget

148. As the site of this proposed development lies substantially on peat, a thorough examination of the net CO_2 savings to be made by the development, is necessary. In our opinion, a number of concerns have not been adequately addressed in the carbon budget model:

149. As mentioned above, the ES states, *"Studies have shown that drainage can be affected by as much as 200m from the ditch …"* However, the ES goes on to say that *"three drainage scenarios were considered, namely 10m, 50m, and 100m to account for best, intermediate and worst case drainage impact"*, when it could be argued that 200m should have been used for the worst-case scenario.

150. Floating roads are again assumed to cause less damage to the blanket bog than has been found to occur in other developments.

151. One critical assumption of the carbon budgeting model is that site hydrology would be restored at the end of the 25-year life of the development. As it is intended that all tracks and buried infrastructure remain in place, this condition would not be met.

152. In Chapter 16 of the ES, the payback period for the best case, intermediate and worst-case scenarios are given respectively as**:**

Best	Intermediate	Worst
2.3 years	3.7 years	14.9 years

153. In 20.9 the payback periods are given as:

Best	Intermediate	Worst
2.8 years	6.8 years	48.5 years

154. No explanation for this discrepancy is given in the ES and the widely differing figures for worst-case scenario are a cause for concern, particularly as the worst case scenario given in Section 20.9 of the ES shows the wind farm releasing more carbon than it would save.

155. This means that, as currently proposed, the development could result in significant additional carbon emissions contributing to climate change and damaging efforts to meet the Scottish Government's 2020 emissions reduction target.

156. Although subject to separate consent applications, no assessment of the carbon budget of the wind farm can be complete without inclusion of the Interconnector as both are inextricably linked.

157. Consequently, we do not accept that it has been adequately shown that this development would achieve a significant reduction of CO_2, within its predicted 25-year lifetime.

- **The carbon budget must include the essential interconnector and all other associated infrastructure to ensure fully informed decision-making on the overall acceptability of these proposals.**

Planning context

158. Scottish Government planning policy on renewable energy developments is outlined in SPP 6, which states that policies will also "*be applied to the authorisation of on-shore electricity generation schemes under Section 36 of the Electricity Act 1989*".

159. SPP6 principles include:

160. *"The Scottish Ministers expect planning authorities to make positive provision for renewable energy developments by:*

- *Guiding development to appropriate locations…and*
- *Maximising environmental, economic and social benefits:*

while at the same time:

- *Meeting international and national statutory obligations to protect designated areas, species and habitats…"*

161. As we have stated earlier, to consent this application in its current form would not maximise environmental benefits and would not fulfil statutory obligations to protect species and habitats.

162. Government policy, as outlined in NPPG14 (Natural Heritage) is that:

- *"The presence of a protected species or habitat is a material consideration in the assessment of development proposals. Planning authorities should take particular care to avoid harm to species or habitats protected under the 1981 Act or European Directives, or identified as priorities in the UK Biodiversity Action Plan."*

163. As we have stated earlier, the proposed development would adversely affect species and habitats, including those protected under the Birds and Habitats Directives, the Wildlife and Countryside Act (1981) and identified as priorities in the UK Biodiversity Action Plan.

164. The relevant development plan consists of the Shetland Structure Plan 2000 (approved 2001) and the Shetland Local Plan (adopted 2004).
Development proposals conflict with Structure Plan policy GDS4:

165. "*New development will conserve and, where possible, improve the quality of life and the environment by:*

a) controlling the location, scale and design of new development to respect, protect and conserve the natural and built environment;

b) *minimising water, air and land pollution and waste generation……"*

166. In addition, damage would occur to important habitats and species listed under all five categories of Policy NE7:

167. "In considering development proposals, the Council will give full consideration to the legislation, policies and conservation objectives, that may apply to the following:

- *Habitats & Species listed under Annex I, II & IV of the Habitats Directive;*
- *Species listed under Annex l of the Birds Directive;*
- *Species listed on Schedules 1,5 and 8 of the Wildlife and Countryside Act 1981; and*
- *Habitats and Species listed in the UK Biodiversity Action Plan.*
- *Habitats & Species which are widely regarded as locally important"*

168. Current proposals conflict with Local Plan Policy NE10, which requires that applications should *"not have an unacceptably significant adverse effect on the natural or built environment"* and considerations to be taken into account include *"likely impacts, including cumulative impacts, on amenity and the environment as a whole"*.

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Peter M Ellis
Shetland Area Manager
24 July 2009

Annex 2

Detailed comments on specific aspects of the ES

Chapter 4 Development Description

4.2.3 (a) Track construction

169. It is unclear which depth of peat would trigger Type B (floating road) construction. This paragraph refers to 1-1.5m and 1.5m peat depth triggering the use of floated roads, but in later chapters, it is repeatedly stated that these will be used on peat depths over 1m (e.g. Chapter 14 page 52, Chapter 16 page 16-10).

- **This needs to be clarified**

Table 4.1 Cut and float track lengths

170. No justification for the operational track that runs north from proposed turbine K42 at Marro field has been given.

- **We consider it unnecessary and, as it would damage semi-natural habitat in the area, it should not be constructed.**

4.2.4 Control buildings and sub-stations

171. Paragraph 4 on page 4-6 indicates that the Delting substation at Wester Scord will be connected to the converter station by means of a wooden pole mounted 132 kV trident line. All previous indications by Viking Energy and SHETL have been that all cabling will be underground.

- **This section of transmission line should be underground in order to reduce the risk of bird collisions.**

4.2.5 On-site cabling

172. This paragraph indicates that cable trenches will be backfilled possibly with sand. Later chapters such as 10.7.6 suggest that excavated material (peat) will be used for back filling cable trenches.

- **The use of sand is likely to increase the probability of cable trenches acting as drains and damaging blanket bog habitat.**

- **Backfilling of cable trenches should only use peat except in exceptional circumstances to be agreed with SNH.**

4.2.6 Anemometers

(a) Permanent masts

- **No anemometer masts should be constructed within 500m of diver breeding lochs or merlin nest sites in order to minimise the possibility of these species colliding with the masts.**

(b) Temporary masts

- **No anemometer masts should be constructed within 500m of diver breeding lochs or merlin nest sites in order to minimise the possibility of these species colliding with the masts.**

- **All guy wires must be marked with suitable bird deflectors in order to reduce potential bird collisions.**

4.3.2 Borrow pits

- **No borrow pits should be constructed within 500m of diver breeding lochs or merlin nest sites in order to minimise disturbance to these species.**

4.4.3 Working hours

173. We note that it is anticipated that works will be concentrated in the months March to September. This period includes the breeding seasons for all the important species breeding in the area.

- **Detailed plans will need to be agreed with SNH and the RSPB Scotland in order to avoid disturbance to whooper swan, red-throated diver, merlin and whimbrel, which are specially protected in the UK by reason of being included in Schedule I of the Wildlife and Countryside Act 1981.**

4.4.4 Concrete batching plant

174. Locations of concrete batching plants have not been indicated on the maps in the ES.

- **Details of the locations and water sources for all batching plants must be agreed with SNH and SEPA.**

175. However, it is later indicated that one such plant may be located at Sae Water, which holds breeding wigeon.

- **No concrete batching plant should be located near this loch, in order to avoid draw down or pollution of the loch and disturbance to the breeding wigeon.**

4.6 Decommissioning

176. We note that it is intended to leave buried structures in place. This is not compatible with the statement in chapter 16 that the hydrology of the site will be restored after the 25-year lifetime of the development. We also note that restoration of the hydrology of the site after 25 years is a crucial element of the carbon budget of the development: without such action it is highly doubtful that the wind farm will contribute positively to reducing CO_2 emissions in Scotland.

- **The hydrology of the site must be restored at the end of the 25-year life of the development.**

4.11.3 Layout

177. Paragraph 1. Whilst we welcome the reassurance that an on-site Environmental Clerk of Works (ECW) will be employed, given the huge scale of operations, more than one will be necessary.

- **An ECW must be present whenever work is carried out in each sector of the development and, for such a large development, it will be necessary to engage an ECW for each sector in which work is taking place.**

Access track initial layout

178. The suggestion is made that access tracks can be beneficial in terms of blanket bog conservation since they can act as barriers to drainage. However, blanket bog on the down slope side of any road will likely be adversely affected as it will receive less water and may dry out, whilst ponding of the upslope side of the road may make the road unstable and drainage may be required. Therefore, we cannot agree with this assertion.

Turbine locations adjusted layout

179. As noted earlier, RSPB Scotland has been in contact with Viking Energy about this project from early in the development process, particularly concerning the ornithological fieldwork and turbine layout and we have welcomed this consultation.

180. The fieldwork carried out by Natural Research identified areas that were considered to be particularly sensitive, especially for breeding and non-breeding red-throated divers. An iterative process was undergone when RSPB Scotland, SNH, Natural Research and Viking Energy staff met to discuss ways in which the turbine layout could be altered to reduce the risk to divers, merlins and, to a lesser extent, other species. This resulted in the re-siting or removal of a substantial number of turbines.

181. However, the iterative process used landscape sensitivity as an initial constraint in guiding some of the earliest turbine layouts. This process tended to move turbines away from the edges of the site and towards the centre, where much

of the ornithological interest occurs. Consequently, as we pointed out in discussions with the Applicant, this substantially limited the opportunities for further changes to the turbine layout in order to avoid ornithological sensitivities.

182. However, after the initial stages of iteration, intended to reduce the potential impact on red-throated divers and merlins, further suggested changes were not implemented. This has resulted in a number of turbine sites that still pose a substantial threat to divers and merlins.

183. Unfortunately, information on collision risk and other impacts upon other more widespread species (such as whimbrel and golden plover) was not made available prior to the publication of the Environmental Statement (ES) and so could not be included in further design iterations.

184. Consequently, whilst consultation by Viking Energy and Natural Research has been very good (especially in the early stages of the process) it has not resulted in design changes of sufficient magnitude to reduce the impact on several important species to acceptable levels. RSPB Scotland was not consulted on the track layout and design, borrow pits and several other aspects of the design.

Chapter 5. Environmental Impact Assessment

5.3.7 Mitigation

185. The last line in this paragraph states that "*only committed measures are taken into account in making the assessments*". However, the HMP is frequently referred to throughout the ES and, as stated earlier, this plan is theoretical and none of the necessary agreements with land owner/occupiers are in place. Therefore, whilst the HMP may serve to enhance lochs and other habitats in the future, it cannot be guaranteed, and cannot be regarded as committed, and so cannot be considered as mitigation for any potentially damaging effects of the development.

Chapter 6. Site Context

6.10 Other Designations

186. It should be noted that the south-east part of Petta Dale is part of an Important Bird Area (IBA) for its breeding whimbrel.

Chapter 10. Ecology

10.5.4 Evaluation of nature conservation interest

Blanket bog/mire

187. Paragraph 2, page 10.30 states:

"In such a well studied area as Shetland if the value of the blanket bog was recognised to be of national or international significance, the Viking area would be expected to be designated a SSSI or SAC and it clearly is not. Therefore, the over-all blanket bog resource within the Viking study area is certainly of Regional value."

188. We disagree with this statement, which overlooks the fact that for many species and habitats throughout Shetland and Scotland, sites that appear to qualify for designation have not been designated. Consequently, the lack of designation of the Viking area does not preclude its being of national or even international significance.

189. SNH have suggested to us that Shetland blanket bogs have not been fully assessed.

Wet and dry dwarf shrub heath

190. The same erroneous argument is used as for blanket bog above.

(c) Evaluation of otter interest

191. The same erroneous argument is used as for blanket bog above.

10.7.6 Potential hydrological changes due to cabling, tracks and trackside drains

192. Paragraph 1 states that:

"The potential for cable trenches to act as drains is recognised and will be avoided by back-filling with compacted excavated material, rather than more porous bedding."

193. This is not consistent with 4.2.5 **On-site cabling,** which indicates that cable trenches will be backfilled possibly with sand. The use of sand increases the probability of cable trenches acting as drains and damaging blanket bog habitat.

- **Backfilling of cable trenches should only use peat, except in exceptional circumstances to be agreed with SNH**

194. Paragraph 3 states that:

"There will be no mounding or spreading of waste peat in the track side areas where surface flows would be impeded."

195. This is contrary to later chapters and Appendix 14.4, which suggest that 70,500 m^3 of excavated peat will be spread along the side of tracks.

10.9 Monitoring

196. The suggested formation of the Shetland Wind farm Environmental Advisory Group (SWEAG) is welcomed and RSPB Scotland would wish to be part of the group although we note that a proposed exploratory meeting has not yet taken place.

Chapter 11. Ornithology

11.7.17 Information gaps

197. Population trend data for additional species, including several waders should have been presented.

198. Density data for the Viking area should have been presented to allow comparison with other areas.

Table 11.5: Nature conservation importance of potentially affected species

199. The status of several species in Birds of Conservation Concern (BOCC) has changed recently. In particular, whimbrel and Arctic skua are now on the Red List.

- **BOCC Red List species, UK Biodiversity Action Plan (BAP) species and IUCN near-threatened species should all have been given high importance in this table.**

- **All species for which the Viking area holds regionally important populations should have been included in the table, including snipe and skylark.**

11.10.05 Habitat modification

200. Paragraph two. As noted earlier, the zone of influence is likely to be highly variable throughout the area as the nature of the peat varies. However, it has been suggested that the effects of drainage on the living components of the upper acrotelm can extend for up to 200m.

201. So-called "floating roads" compress the catotelm and often result in slumping of the peat. In some cases, this can lead to ponding of surface water on the upslope side of a track and consequent drying out of the peat on the downslope side. Ponding of surface water can make the upslope side of the track unstable, and so may require remedial cross drainage, which will in turn damage the blanket bog, by drying out the upslope peat and causing erosion on the downslope side of the track. Consequently, the damage to the blanket bog from "floating roads" can be considerable.

11.10.9 Decommissioning

202. We agree that the effects could be significant for merlin and whimbrel and probably also for several other species including red-throated diver and Arctic skua.

Chapter 14. Soil and Water

14.5.8 Hydrology (Surface Water)

203. The ES uses a catchment-based system to describe the hydrology of the Viking area. The alternative hydromorphological system is long established and provides a functional framework of classification for peatland systems appropriate to blanket bog. This system has been employed since the early 1980s in many parts of the world and now forms the basis of official guidance from JNCC to the UK conservation agencies, and features in Ramsar Convention guidance for peatlands. The use of a catchment-based system is likely to have underestimated the extent of habitat potentially affected by the development.

Chapter 15. Roads and Traffic

15.6 Impact Assessment

Traffic management measures

204. We welcome the statement that drivers' induction would include:

- Identification of specific sensitive areas.
- The requirement not to deviate from the specified route

205. These measures would help to reduce disturbance and damage to habitats.

Chapter 16. Air and climate

16.44 Discussion of calculation method and data assumptions

(b) Characteristics of the peat land

206. In paragraph 2, it is acknowledged that *"Studies have shown that drainage can be affected by as much as 200m from the ditch".* It does not seem logical therefore to go on to say in paragraph 3 that *"three drainage scenarios were considered, namely 10 m, 50 m, and 100 m to account for best, intermediate and worst case drainage impacts."*

10.19. Area of terrestrial habitat affected directly by predicted operational impacts

(i) Peat landslide hazard

207. In this paragraph it is stated that *"The loss of peat due to landslides is excluded from the calculation because it is assumed that the Scottish Executive good practice guidance on `Peat landslide hazard and risk assessments, best practice guide for proposed electricity generation developments' (Scottish Executive, 2006) will have been followed."*

208. Surely, given that peat landslides are not uncommon in Shetland, a true worst-case scenario would assume that despite this some peat landslides may occur? This should have been included in the calculation.

- **The effects of grazing on peat stability should be assessed.**

(j) Improvements to carbon sequestration at site by blocking drains, restoration of habitat

209. Paragraph three states *"In addition, the section also requires data on the length of time until the hydrology and habitat on site are restored. This information is highly site specific and cannot be predicted. A time scale of 10 years is used in the assessment as a default parameter."*

210. In Shetland at 60^0 north, where the growth rates of blanket bog plants are slow, this seems to be a highly optimistic time scale and the true figure could easily by twice as long or more.

(k) Restoration of site after decommissioning

211. In paragraph two the description of the blanket bog fails to point out that large areas are also intact and active. It also again refers to the HMP, which as stated earlier is, in our opinion, uncertain and flawed.

212. Paragraph three states that *"The critical component of restoration is to restore the hydrology on site since this is fundamental to peat functioning. Certain elements of the infrastructure such as turbine bases and access roads will likely be left in situ, however, since it is expected that the site will re-establish equilibrium provided that all drains are blocked on decommissioning."*

213. Paragraph four goes on to state *"The calculation has been undertaken assuming that the hydrology and habitats on site will be restored upon decommissioning. Therefore, the results presented in the assessment assume that carbon losses are for the duration of the wind farm lifetime only."*

214. In our view it is not safe to assume that hydrology on the site can be restored on decommissioning. Therefore, a more realistic worst-case scenario would take account of damage to the hydrology and blanket bog continuing after 25 years.

215. There is no mention in this chapter of the effects on the calculation of a failure to deal with the huge volume of excavated peat, in a way which prevents it losing substantial quantities of carbon. We consider that this is a crucial aspect of the calculation, and without this being assessed, the calculation is flawed and may seriously underestimate the payback period.

(c) CO_2 emissions

216. As stated earlier, we consider that the worst-case scenario has been considerably underestimated and this could seriously reduce this estimate.

16.8 Mitigation

16.8.1 Air quality mitigation

217. Bullet point 11 states:

"Consideration of additives in sprays/wash water, e.g. use of calcium chloride."

- **This may cause significant pollution and damage to the watercourses and blanket bog habitat and should not be used.**

218. Bullet point one on page 16-21 states

"Vegetate exposed surfaces, with quick growing plants."

219. Any exposed surfaces of peat should be restored using previously removed acrotelm turfs or native plant species.

16.8.2 CO_2 emissions mitigation

220. In paragraph two, the last sentence states that *"Any displaced peat will not be allowed to dry out."*

221. It is not clear from the ES how this will be achieved when such large amounts of excavated peat are involved. Storage of large volumes of excavated peat on site could cause further damage to the blanket bog habitat.

222. Bullet point 6 refers to roads being floated on peat greater than 1m deep, but as noted earlier, this is not consistent with statements in chapter 4.

223. Bullet point 9 states:

- *"Tracks will be designed to avoid acting as drainage channels or barriers to water flow"*

224. Bullet point 10 states:

"Tracks will incorporate cross drains where appropriate to minimise water collection."

- **This conflicts with earlier statements concerning floating roads and requires clarification.**

16.9 Summary of effects

225. We consider that the payback time may have been seriously underestimated for the reasons noted earlier.

Chapter 17. Socio-economic Assessment

17.7 Mitigation

226. Bullet point seven suggests promotion of access into the Viking area. It is likely that increased access into the area would cause additional disturbance to birds breeding there and could reduce their productivity.

227. Access would have to be very strictly controlled. Locked gates must be installed to prevent access by unauthorised vehicles during the breeding season.

Chapter 19. Recreation and Tourism

19.6.4 Operational impacts

(c) Access provision

228. We welcome the statement in paragraph three that *"Increased access would therefore require to be appropriately managed"*.

19.7 Mitigation

229. We welcome the commitment in bullet point 4 to an access management plan. However, this must be aimed primarily at preventing disturbance to important bird species during the breeding season and preventing damage to the blanket bog habitat.

Appendices

Appendix 4.1 Track Layout and Design Strategy

Page 4.1-3

230. It is not clear why re-vegetated mineral watersheds should be avoided, as these areas are likely to be of lesser conservation value than watersheds with blanket bog, and are more easily restored.

Appendix 4.4 Best Practice Guidelines

231. We note that the section numbering in this appendix uses 4.1 in error rather than 4.4.

Page 4.4-3 Employment of a construction ecologist

- **The authority of this post must be clearly defined and agreed with SNH.**

Page 4.4-4 Measures to discourage birds from breeding on site

- **Any such measures must be agreed with SNH and RSPB Scotland.**

Page 4.4-5 Facilitate site visits for educational and interest groups

- **Any such visits should avoid sensitive areas.**

Page 4.4-5 Monitoring of habitat management effectiveness

- **This must include ornithological monitoring.**

Appendix 10.9 Habitat Management Plan

Detailed Comments/recommendations

- **Because habitat management activity could result in widespread disturbance to important breeding bird species over a large area and result in exclusion of species and reduction in breeding success, we recommend that no management work should be carried out from April to August inclusive, except with the written consent of SNH.**

- **In order to prevent damage to existing peatland vegetation, the use of tracked vehicles should be restricted to within 200m of the wind farm tracks unless previously agreed with SNH. Great care should be taken to prevent repeated use of tracked vehicles from damaging vegetation.**

- **In order to prevent further damage to habitats, no excavated peat should be used in the implementation of the HMP.**

- **No excavations of completely new `diver pools' should occur, as disposal of the spoil would damage existing areas of peatland vegetation.**

- **Excavation should only be used to slightly enlarge small pools or clear vegetation mats from succeeding pools.**

- **Some burn sides could be fenced to promote heather growth to attract merlins to breed in areas with former breeding records, or in current sites where most of the heather has been lost.**

- **Fencing should be kept well clear of diver breeding lochs and areas with breeding Arctic skuas.**

1.3 Scope of management plan

232. Paragraph three indicates that the plan covers the 25 year minimum lifespan of the Viking Wind Farm.

- **Habitat management would begin as soon as possible and certainly before the end of the five-year construction period**

4.3.1.1 Peat

- **No intact peat should be damaged to carry out this management.**

4.3.2 page 16 bullet point three

- **Turfs should not be cut from nearby undisturbed vegetation.**

4.4.2 Lochan enhancement techniques

- **No completely new lochans should be created as this would damage the existing habitat and sufficient scope should exist for enhancement.**

Appendix 11.1 Viking Bird Report

233. Information Gathering

70 Some explanation for the wide range given for the numbers of breeding dunlin should be provided.

84 Those species with regionally important populations should have been given more consideration in chapter 11 of the written statement.

- **The numbers and percentages of the populations of each of these species should be provided for each of the predicted effects of the development.**

Appendix 14.4 Estimated Peat Extraction Volume and Potential Re-use options

7.5 Peat Spreading

234. We agree that this is not a viable option.

7.6 Domestic Fuel Use

235. If peat was used for domestic fuel, this would adversely affect the payback period for CO_2 reduction for the project.

236. If peat were spread on blanket bog to dry, this would further damage the habitat.

237. We also consider that this would be of such small scale as not to be a viable option.

238. We do not agree that this is a viable option.

7.7 Commercial Fuel Use

239. If peat were to be used for commercial fuel, this would adversely affect the payback period for CO_2 reduction for the project, as would any dewatering of the peat that required the input of additional energy.

240. We consider that this is not a viable option.

7.8 Dry Soil Mixing and Stabilisation of Peat

241. We agree that this is not a viable option.

7.9 Commercial Horticulture

242. We agree that this is not a viable option.

7.10 Off-site infill

243. We agree that this is not a viable option.

8 Peat Treatment & Disposal Options

8.1 Dewatering

244. We consider that this is not a viable option.

8.2 Off-site Landfill to an Existing Facility

245. We consider that this is not a viable option.

9 Conclusion

246. We do not consider that any viable options have been presented for the re-use/disposal of over 550,000 m^3 of peat.

Peter M Ellis
Shetland Area Manager
24 July 2009