# NON-TECHNICAL SUMMARY

## INTRODUCTION

In May 2009 Viking Energy Partnership (VEP) applied for permission to build a wind farm in central Mainland, Shetland. Extensive environmental studies were carried out over several years to determine the likely significant effects of building and operating the wind farm, and an "Environmental Statement" (ES) accompanied the application, as required by law. The ES was a large document published in five volumes, and is available for download in sections from the Viking Energy website.

The design of the proposed Viking Wind Farm has changed since the application, and its associated ES, were submitted. The ES has therefore been reviewed in the light of the changes, and an "ES Addendum" has been submitted to the Scottish Government in support of the revised application. The ES Addendum describes how the changes to the proposed wind farm change the likely environmental effects of building and operating the Viking Wind Farm.

This document is a "non-technical summary" (NTS) of the ES Addendum. The NTS summarises the findings of the ES Addendum topic chapters, which in turn describe changes since the 2009 application. It is important, therefore, that before reading this document, you should first read at least the NTS of the 2009 ES. If you do not, you may misunderstand important aspects of the changes and the likely environmental effects.

For more detail on any aspect of the revised environmental assessment, please see the relevant chapters of the ES Addendum. A map of the revised proposals is provided at the end of this NTS as Figure NTS A1.

## WHY THE PROPOSED WIND FARM DESIGN WAS CHANGED

The Viking Wind Farm as envisaged in 2009 would have consisted of 150 wind turbines in five groups: in the Delting area, in the Collafirth area, in the Kergord area and in North Nesting and South Nesting. Naturally, the project has prompted a great deal of debate within the statutory agencies, such as Scottish Natural Heritage (SNH), the Scottish

Environment Protection Agency (SEPA) and the Shetland Islands Council, and in the general public and special interest groups including the Royal Society for the Protection of Birds (RSPB). VEP had been communicating very frequently with all these stakeholders up to and beyond the 2009 application. Much work remained to be done after the application was submitted, for example in continuing with monitoring bird species on the islands, and this work has continued without a break.

It became apparent, through the continuing dialogue with stakeholders after the application was submitted, that a number of changes would need to be made to the application to satisfy their concerns. Formal comments, when they arrived, confirmed that the effects of the proposed wind farm on bird species, on peatlands and on archaeology were of most concern.

Concerns were raised about the effects of the wind farm itself. But there was also some uncertainty regarding the way the assessments had been carried out, and the commitment of VEP to carrying out the various proposed mitigation measures. For example, the ornithology assessment was necessarily complex and employed some innovative methods, and SNH and RSPB both expressed some concerns.

Another example of uncertainty related to the extent to which VEP had the capability to implement the Habitat Management Plan (HMP), a crucial part of the environmental compensation and mitigation measures. In particular, the HMP depends upon landowner agreements, because its proposals include land management for nature conservation purposes over extensive areas, particularly in the uplands. When the 2009 ES was published these agreements were largely provisional; naturally it is hard to enter into firm financial agreements regarding a project which does not yet have consent and where the HMP requirements are likely to change as time goes on. Nevertheless, consultees felt that more assurance was required regarding VEP's capability and commitment in this regard.

A final example of consultee concern relates to peat. The proposed Viking Wind Farm would be built largely on peatland and blanket bog, much of which is currently in poor (and declining) condition. VEP is confident that the wind farm as proposed in 2009 would have had a significantly beneficial effect on the peatland environment, because the proposals included stopping up drainage ditches, reducing sheep grazing intensity, restoring upland lochans and managing large HMP areas for nature conservation purposes,

and other measures. However, two factors led to particular concern within SEPA. First, their own policy regarding the excavation and re-use of peat in construction projects was, in 2009, in a state of development, because of some uncertainty about the status of excess peat arising from excavations, in the context of the waste regulations. Second, debate arose as to the physical nature of the peat on the site, its depth, hydrological qualities and engineering properties. These debates affected the ecology and ornithology assessments (because drying peat leads to vegetation changes at the surface which alter the habitat qualities) and the climate change assessment (because peat is a very important carbon store, and when it dries and decomposes it releases some of its stored carbon into the atmosphere). SEPA, therefore, requested more work in this regard. The result, following further input from expert academic consultants, is that VEP's initial assessment was substantially valid, but based on unnecessarily pessimistic parameters. For example their opinion is that peat is unlikely to dry out as much as was assumed in the 2009 assessment; and the 2009 assessment failed to take sufficiently into account the fact that the peat is currently in very poor condition, and getting steadily worse.

Accordingly, in the summer of 2009 VEP commenced the process of reviewing both the design of the wind farm itself, and the methods and results of the environmental assessment.

For further details of why the wind farm design was changed, and the way the design process was addressed, please see ES Addendum Chapter A1, Introduction.

*Climate Change*

The 2009 Viking Wind Farm NTS included references to UK and Scottish Government carbon emission reduction and renewable energy targets. Following the enactment of new legislation these targets have been amended. The UK target is now to achieve a 34% reduction in carbon emissions by 2020 (from 1990 levels) and 80% by 2050, whilst the Scottish Government has specified reductions of 42% and 80% over the same periods. The Scottish target for increasing the amount of electricity generated by renewable sources has increased to 50% by 2020 and an interim target for 2011 has been set at 31%.

For further details of the background to the project, please see ES Addendum chapters A2 (Background) and A7 (Renewable Energy and Planning Policy Context).

# THE PROPOSALS

Chapter 4 of the 2009 ES described the proposed Viking Wind Farm in detail. In the 2010 revision, the size of the proposed wind farm has been substantially reduced. The remaining elements of the design are illustrated on Addendum Figures A4.1.1 and A4.1.2; and the elements of the design which have been removed are illustrated on Addendum Figures A4.1.1b and A4.1.2b.

**Key Elements of the Wind Farm**

*Turbines*

The number of proposed turbines has been reduced from 150 to 127. All the turbines and associated infrastructure which were proposed for the Collafirth "quadrant" (north of the B9071 and east of the A968) have been deleted from the design. One turbine, formerly located about 150m north-east of Flamister, has been moved about 200m further to the north-east; all other amendments to the turbine layout design consist of simple deletions of turbines.

Turbines have been deleted or moved for a variety of reasons, including possible impacts on birds, cultural heritage (archaeology), aviation activities at Scatsta airfield, deep peat, landscape character and visual amenity. Further details are given in Addendum Chapter A4, Development Description.

*Access tracks*

The access track network has been reduced by about 14 km compared with the 2009 proposals. Generally this has been made possible by the removal of turbines. The proposed width of the double-width tracks has been reduced from 12m to 10m, and VEP now commits to restoring the double-width tracks to single width after construction is complete. The combined effects of these changes include:

- Reduced effect on the natural heritage
- Reduced excavation of peat
- Reduced requirement for aggregate from borrow pits for road construction
- Reduced construction activity and lorry movements

- Reduced carbon footprint for the project
- Reduced landscape character and visual impact.

Because the length of on-site track has declined, eighteen fewer stream crossings would be required. This results in less risk of pollution of watercourses, either by grit and soil being washed into the water from construction sites, or from petrol and oil seeping from trackside drains.

The reduction in track length and turbine numbers also reduces the amount of on-site buried cabling required, from about 118 km to about 104 km. This has the effect of reducing the risk of introducing new routes by which water may drain from the blanket bog. Enhancement of the blanket bog on site, much of which is currently in poor condition, is a major focus of the environmental works associated with the proposed wind farm construction.

*Monitoring masts*

Two wind monitoring masts have been deleted from the proposed wind farm: one at Hill of Trondavoe, and one south-east of the Hill of Susetter. Nine masts remain in the 2010 design.

*Borrow pits*

23 borrow pits (small quarries) were proposed in the 2009 application, although not all of these would have been used. Less aggregate would be required for the 2010 design, and VEP now has a greater knowledge of site conditions and likely sources of stone. The number of potential borrow pits has therefore been reduced to 13, of which 12 are likely to be actually opened. Borrow pits would be restored after use with peat sourced from excavations for track construction and turbine foundations.

*Construction compounds*

In the 2010 design, no turbines or other infrastructure would be constructed in the Collafirth quadrant. Therefore the construction compound originally proposed for Easter Scord has been deleted from the construction plan, leaving seven temporary construction compounds.

**Construction**

*Construction programme*

Although the proposed wind farm has been substantially reduced in size, it is still likely to take up to five years to construct. No change has therefore been made to the outline construction programme.

*Construction traffic*

The reduction in the wind farm size would cause a proportional reduction in the amount of construction traffic, including traffic to deliver turbine components and sand, cement and aggregate for concrete. About 10,000 vehicle movements would be required for the 2010 proposals, including about 6,600 for concrete.

**Layout Design Evolution**

The aim of the design changes between 2009 and 2010 was to reduce the actual or potential environmental impacts of building a wind farm in Shetland, while maintaining the significant social, economic and environmental benefits which such a project would bring. The changes have therefore concentrated on removing, where possible, direct impacts on the natural environment such as possible collision risk for birds, and damage to deep peat deposits. The changes have in all cases been informed by extensive consultation with the relevant conservation bodies, by continuing survey and research, by the development of new methods, by refinement of project planning (in particular a great deal of further work on the Site Environmental Management Plan and the Habitat Management Plan) and consultation with independent experts in certain fields.

**Disturbance Footprint**

All the changes described above lead to a greatly reduced footprint for the proposed wind farm. Compared with the 2009 proposals, the area which may be disturbed during construction activities is reduced from about 314 hectares to about 232 hectares (1.24 per cent of the planning application area). This is the worst case, including the whole of the possible borrow pit "areas of search", and the actual final disturbance figure would be

less. This figure includes an allowance for construction activities to over-run the actual working area, when for example lorries turn outside the construction zone.

After construction is complete, the area which would be permanently affected amounts to about 104 hectares (0.56 per cent of the planning application area).

The wind farm has therefore reduced in size by about 15% in terms of the number of turbines, but by about 26% in terms of the area of land affected during the construction process.

## RENEWABLE ENERGY AND PLANNING POLICY CONTEXT

Chapter A7 of the ES Addendum describes the significant changes in the planning policy context since publication of the 2009 ES. In general, few substantive changes to policy have occurred although the planning regime has been extensively revised. For example, there has been a significant consolidation of Scottish Government planning policy into a single "Scottish Planning Policy" (SPP). There has also been a fundamental change to the Planning system as a result of the implementation of the changes brought about under The Planning Etc. (Scotland) Act 2006.

The effect of Scottish planning policy remains largely unchanged as a result of the consolidation; nevertheless the impacts of the changes are assessed further within the revised Planning Policy Statement submitted in support of the amended application.

Changes to planning legislation will, over time, require the replacement of Shetland's existing Development Plan Framework, which currently consists of the "The Shetland Structure Plan (2000)" and "The Shetland Local Plan 2004." Shetland Islands Council (SIC) has commenced the process with the publication of a Main Issues Report (MIR) for consultation. The MIR identified the matters which will be a priority within a forthcoming Local Development Plan (LDP).

SIC has also introduced Interim Planning Policy (IPP) and has started to prepare Supplementary Planning Guidance (SPG) which will be of relevance in its assessment of the consultation on the application addendum from The Scottish Government.

The effects of these additions and changes to the policy context, most of which are relatively minor, are assessed in Chapter A7 of the ES Addendum.

Apart from changes in national, regional and local government policy, Scottish Natural Heritage (SNH) has also updated its policy for the management of the natural heritage of the Shetland Islands, and its vision for how the natural heritage of the Shetland Islands will look in 2025. The proposed Viking Wind Farm is largely in accordance with the aspirations and vision of the SNH Futures document. In particular, the Viking Wind Farm would allow the Shetland Islands to make a much greater contribution to Scotland's fight against climate change, while also benefiting the islands financially. The Viking Wind Farm Habitat Management Plan, which would be put into effect if the project achieves consent, would make significant contributions to SNH's vision for Shetland's natural heritage, for example by reducing grazing on uplands and providing enhanced habitat for locally endangered habitats and species

# ENVIRONMENTAL EFFECTS

## Landscape Character

*Consultation Responses*

Following submission of the 2009 ES, Scottish Natural Heritage (SNH) submitted a formal response combining landscape and visual issues. Their objection to the scheme was based on their view that "…it exceeds [the] landscape capacity of mainland Shetland and will have significant adverse effects on visual amenity." SNH disagreed with a number of detailed findings of the ES. The SNH response drew heavily upon a report commissioned by Shetland Islands Council from Land Use Consultants (LUC), entitled "Landscape Sensitivity and Capacity Study for Wind Farm Development" which had (and still has) no official status as a planning guidance document.

Having reviewed these points, Viking Energy Partnership (VEP) is content to stand by the original ES conclusions which have been arrived at by professional judgement based on recognised and sound methodologies.

SNH requested that turbines should be removed to alleviate the main landscape and visual impacts and bring the proposal within, or close to, the level of wind farm development identified in the LUC Report as the "landscape capacity" of mainland Shetland. In the event, VEP has taken account of this request and has gone towards this end by reducing turbine numbers by twenty-three in total, including the complete deletion of all turbines in the Collafirth "quadrant" with consequent localised reduction of adverse impacts upon landscape character and, to a lesser extent, visual amenity. These changes are briefly summarised below.

*Changes in the Policy Context*

In 2009 Shetland Islands Council published a Landscape Sensitivity and Capacity Study for Wind Farm Development on the Shetland Islands, as mentioned above. This LUC report had been intended to form part of the technical appendices of the *Shetland Islands Supplementary Planning Guidance (SPG) 2009*, but this SPG was not, in the event, implemented. It has, however, strongly informed SNH's response to the landscape and visual issues raised by the proposed wind farm.

A review of this document shows that the proposed Viking Wind Farm is generally in accordance with the report recommendations in locational terms, being situated within areas identified as being of lower landscape sensitivity to wind farm development. However, the numbers of turbines identified by the report as being the notional maximum "capacity" of the landscape in two of the remaining three quadrants and also the Mid-Kame Ridge are exceeded. This is despite the reduction in turbine numbers with a view to alleviating potential impacts. However, the exceptions are the "Sullom Voe" and "Central Mainland - East" visual compartment areas, where turbine numbers are now below the notional "suitable typologies" - or landscape "capacity" - for these areas as identified by the LUC report.

*Changes in the Proposed Wind Farm*

The removal of twenty-three turbines, approximately 14 km of tracks, four borrow pit areas of search and a construction compound would reduce the number of elements of the proposals impacting upon the landscape character of the study area. This in turn would reduce the magnitude of change received by a landscape character area and/or designated

landscape site. The level of reduction would be dependent on a number of other factors such as distance, the extent or nature of the impact, and whether the impact was direct or indirect.

*Changes in Agreed Mitigation*

The assessment presented in the 2009 ES took into account primary mitigation measures related to site selection and the design of the layout. The broad landscape constraints which were applied to the siting and design of the layout as presented in the ES have been carried through into the revised layout, as presented within the Addendum.

Proposed secondary mitigation principles, such as woodland screen planting etc. were outlined within Chapter 9 of the 2009 ES. SNH have advised against these principles and therefore they will not be pursued further. However, since they were not taken into account in the assessment process of the ES, their removal does not affect the outcome.

*Changes in the Impact Assessment*

In landscape character terms, the removal of turbines and other infrastructure would reduce adverse impacts. This would apply in particular in the Collafirth quadrant and, to a lesser extent, in the Delting quadrant. In the 2009 ES landscape character impacts were described in terms of impacts upon whole "Landscape Character Areas". Collafirth is a small part of a landscape character area called "East and West Kame", and so despite the local reduction in impacts in Collafirth the overall effect on this landscape character area would remain "significant".

In the adjacent Landscape Character Area "Dales Voe and Colla Firth" the change caused by deleting turbines from the proposed design would be negligible, and the assessment would remain as in 2009: "not significant".

Elsewhere the changes to the layout are, similarly, not considered to be of sufficient magnitude to alter the landscape assessment conclusions of the 2009 ES.

**Visual Impact**

*Consultation Responses*

Consultation responses are as for the Landscape Character chapter, as described above.

*Changes in the Proposed Wind Farm*

The removal of twenty-three turbines, approximately 14 km of tracks, four borrow pit areas of search and a construction compound would reduce the number of elements of the proposals affecting the visual amenity of people in the study area. The level of reduction would be dependant on a number of other factors such as distance, the extent or nature of the impact, and any screening features intervening between the wind farm and the viewer.

*Changes in the Impact Assessment*

The revised (2010) design would lead to changes to a large number of views compared with the 2009 proposals. However, due largely to the context within which they would occur, these changes, although beneficial when compared to the 2009 proposals, would be relatively minor for the majority of receptors. Therefore the assessed level of visual impact due to the proposed wind farm has changed in only a small number of cases.

The assessed level of visual impact caused by the proposed wind farm has been reduced, due to the changes put in place in the 2010 design, for seven residential properties, four viewpoints and one route. For two of these, at Hillswick and Newing, the level of visual impact would no longer be significant. In the case of Newing, the change is due to the deletion of a proposed nearby access track and borrow pit, which would have been significant only during the construction period. (Visual impacts at this location during operation of the wind farm were assessed in 2009, and remain, not significant.)

**Cumulative Landscape and Visual Impact**

There are no changes to the cumulative assessment.

**Non-avian Ecology**

The changes associated with the revised design affect the extent rather than the magnitude or duration of any given impact on non-avian ecology. This reduction in extent would reduce impacts to some of the most sensitive and intact habitat found within the study area, particularly blanket bog.

The reduction of the proposed wind farm from 150 to 127 turbines, the removal of about 14km of track and the reduction in width of much of the remainder, and the removal of

other associated infrastructure and borrow pits, all result in a very large reduction in the amount of land occupied by the proposed wind farm both during construction and over the operational lifetime of the wind farm. Most significantly, the complete removal of infrastructure associated with the Collafirth quadrant which contains the most intact bog habitat throughout the study area would significantly reduce impacts on this habitat type.

In summary, almost 70 hectares of blanket bog is to be retained, which would have been lost in the original layout. Eighteen proposed new water course crossings would also no longer be required.

In response to concerns regarding the extent of measures detailed within the original Habitat Management Plan (HMP), and a lack of any demonstrated commitments to such measures, Viking Energy Partnership (VEP) have received commitments in principle to land management agreements from a large number of landowners and crofters over wide areas. These land management agreements and the commitments therein would be formalised upon planning approval, and would cover the lifetime of the wind farm. It is expected that the measures outlined in the HMP would result in improvements to the nature conservation status of the area, in particular blanket bog, much of which is currently in poor condition, and getting worse.

**Ornithology**

Chapter A11 of the ES evaluates the effects of the proposed 127 turbine Viking Wind Farm on birds. The proposed development site is not designated internationally or nationally for birds, although it supports strong populations of several species of high and moderate conservation importance.

The proposed wind farm design has been amended from the 2009 ES design including the removal of 23 turbines. The majority of these deletions were made to reduce potential risks to priority bird species, in particular, whimbrel, red-throated diver and merlin. As a result the predicted effects on birds in general and priority species in particular are substantially reduced.

*Background*

The methods used to establish the bird interest within and around the proposed wind farm are described, together with the process used to determine the nature conservation importance of the bird populations present. The ways in which birds might be affected by the development are explained and the magnitudes of the likely effects are predicted. The significance of the effects on species' populations is evaluated, taking into consideration mitigation measures and Favourable Conservation Status.

The approach to assessing the effects on birds follows the SNH assessment guidelines (SNH 2006) and considers what is 'likely' and biologically realistic whilst erring on the side of caution where there is uncertainty. This approach is a change to the approach used in the 2009 ES, which adopted a stance that was based on scenarios that were closer to 'worst' case.

*Results*

Approximately 21 breeding pairs of red-throated diver are present within 1km of the proposed wind farm infrastructure in spring and summer, representing approximately 1.6% of the UK breeding population and 4.9% of the Shetland population. Particular attention was paid to keeping wind farm infrastructure away from important diver breeding lochs and not positioning turbines within regularly-used diver flight corridors.

Up to nine pairs of merlins breed within, or adjacent to, the site, representing approximately 45% of the Shetland breeding population. As far as it was practicable, the development was designed in a way that minimised the potential for disturbance and collision effects on merlins.

Approximately 23 pairs of whimbrel breed within 500m of the proposed wind farm infrastructure representing approximately 7.9% of the new UK population estimate derived from survey work undertaken in 2009. Shetland supports most of the UK's breeding population of this declining species. Particular attention was paid to keeping wind farm infrastructure out of the core parts of areas identified as regular hot spots for breeding whimbrel.

Approximately 25 pairs of Arctic skua breed within 500m of the proposed wind farm infrastructure. These represent approximately 4% of the Shetland population, assuming

that this has now declined to around 600 pairs as recent sample counts by RSPB suggest. Where possible wind farm infrastructure was kept out of core parts of areas identified as regular hot spots for breeding Arctic skua.

Approximately 81 pairs of golden plover and 48 pairs of dunlin breed within 500m of the proposed wind farm infrastructure, representing approximately 5.6% and 2.8%, respectively, of the Shetland breeding populations.

Other species of conservation interest that breed within 500m of the proposed wind farm infrastructure include greylag goose (~43 prs), lapwing (~54 prs), curlew (~193 prs), great skua (~49 prs) and Arctic tern (~12 prs).

The site does not appear to lie on a route used regularly by migratory swans and geese. Wintering hen harriers occasionally roost adjacent to the site; this species does not breed in Shetland. Small numbers (up to 12) of whooper swan occur in autumn and winter on lochs and lowland pastures peripheral to the proposed development site.

*Effects assessment*

1. Land take and habitat modification due to the proposed wind farm infrastructure would be small in the context of the area available to birds and any adverse effects would be of negligible magnitude and not be significant.
2. Displacement due to noise and visual disturbance during construction for all species is predicted to have short-term adverse effects of negligible or low magnitude and be not significant.
3. Displacement due to the presence and operation of wind turbines is predicted to have non-significant long-term adverse effects of negligible or low magnitude on all species except merlin, whimbrel and curlew. The magnitude of operational disturbance effects on curlew, although not significant is evaluated as low-moderate.
4. A potentially significant effect was identified for merlin as a result of the possible displacement of one breeding pair from a traditional nest site. This potential effect would be offset by the specific measures to enhance the quality of merlin nesting

habitat (heather) at multiple former breeding territories, as described in the Habitat Management Plan (HMP) (Appendix A10.9).

5. Operational disturbance is predicted to cause the displacement of up to 1.8 breeding pairs of whimbrels. This effect would have a long-term adverse effect of low magnitude on the UK population and if realised would be significant.

6. Collision mortality with turbine rotors is predicted to have not significant long-term adverse effects of negligible or low magnitude on all species.

7. The overall combined effects of wind farm construction and operation, before mitigation, are predicted to have not significant long-term adverse effects of negligible-low magnitude on all species, except for merlin and whimbrel.

8. It is predicted that the overall likely combined effects of wind farm construction and operation, before mitigation, on merlin will be of low-moderate magnitude. The extent and severity of these predicted combined effects are largely down to how a single pair of merlins respond to the wind farm. If this pair is not displaced the combined effects, before mitigation, on the Shetland merlin population would be judged not significant. However, if it was displaced and did not resettle elsewhere there would be a measurable decline of approximately 5% in the Shetland merlin population and combined effects, before mitigation, would be judged significant.

9. It is predicted that the overall likely combined effects of wind farm construction and operation, before mitigation, on whimbrel will be of low magnitude. The likely extent and severity of these predicted combined effects are not well understood because wind farms have not been built previously in areas with breeding whimbrel. The likely response of whimbrel has therefore had to be inferred from knowledge of how other similar wader species respond. The Unfavourable Conservation Status of whimbrel together with the fact that a relatively large proportion of the UK population breeds within or close to the proposed wind farm are reasons why a cautious approach to judging the significance of effects on this species is justified. Therefore, the potential adverse effects identified, which are based on highly cautious assumptions, before mitigation, are judged significant. For this reason, and to create conditions that

promote population recovery, an extensive programme of management measures to benefit whimbrel is described in the HMP. This programme would cover much of Central and Western Mainland and would bring between a quarter and a third of the entire UK whimbrel population under conservation management agreements for the life-time of the wind farm.

10. The overall combined effects of wind farm construction and operation, after mitigation, are predicted to have to have not significant long-term adverse effects of negligible-low magnitude on all species.

*Monitoring*

The effects of the proposals on birds would be monitored during wind farm construction and in years 1-3 following final commissioning. Thereafter, dependent on the results of monitoring, it is proposed to undertake bird surveys at 4-yearly intervals. Monitoring would seek to determine the extent of disturbance and collision effects on the key species, in particular red-throated diver, merlin and whimbrel.

*Conclusion*

The assessment has determined that the predicted residual effects of the proposed Viking Wind Farm on the main ornithological receptors after mitigation are all likely to be *not significant*. Furthermore, there is strong reason to believe that conservation management actions outlined in the HMP may have significant beneficial effects on a range of important species e.g. red-throated diver, merlin and whimbrel.

**Noise**

The assessments of noise impacts of the proposed development considered both the construction and operational phases of the development. The assessments considered the impact of noise from the amended layout and the operational noise assessment was also amended to take account of changes in assessment best practice.

The assessment of the turbine operational noise levels was undertaken in accordance with the appropriate guidance, ETSU-R-97. In accordance with ETSU-R-97 separate noise limits for night-time, designed to prevent sleep disturbance, and the recreational period of daytime, referred to as quiet daytime and designed to protect residential amenity, were

developed in relation to prevailing background noise levels for noise sensitive receptors. Due to changes in the method of determining background noise, developed since the 2009 assessment was undertaken, it was necessary to undertake new background noise measurements at representative locations. Measurements were undertaken at nine locations, over a three week period in March to April 2010.

Predictions of turbine noise levels at noise sensitive receptors were undertaken using a noise model based on data provided by the turbine manufacturers. As expected, the reduction in the total number of turbines resulted in a reduction in the overall operational noise levels. The predicted turbine noise levels at all receptors were below the derived night-time and quiet daytime noise limits at all wind speeds. No significant impacts were therefore predicted in relation to operational noise levels.

The assessment of construction noise predicted noise levels at the closest receptors to construction operations based on published noise data for construction plant. The reduction in the number of turbines and borrow pits proposed has, as expected, led to an overall reduction in construction noise levels. Furthermore, the reduction in proposed borrow pits has meant that no receptors would be exposed to concurrent or consecutive noise from multiple borrow pits.

No specific noise limits exist for construction noise, therefore appropriate noise limits were derived with reference to noise limits set out in planning guidance for the quarrying industry. The predicted construction noise levels at three receptor locations were above the derived construction noise limits as a result of operations at potential borrow pits located close to these receptors. The borrow pits in question are small borrow pits which would provide the aggregate material for the initial track laying to allow access to the site. The duration of activities at these borrow pits would, therefore, be short and activities would be restricted to appropriate daytime hours to minimise disturbance. Appropriate mitigation measures would be adopted to further reduce noise impacts at the identified receptors where construction noise would be otherwise above limits. The predicted noise levels for construction activities at other receptors were below the derived noise limits and, accordingly, no significant impacts are predicted.

**Cultural Heritage**

The cultural heritage addendum chapter describes changes in impacts and mitigation resulting from changes to the design of the proposed Wind Farm. The chapter addresses changes in standard good practice in the assessment of the setting of cultural heritage features and responds to the concerns and recommendations of the responses of the statutory consultees, Historic Scotland and Shetland Amenity Trust

The area proposed for the Viking Wind Farm contains a total of 99 known heritage assets within the application area boundary. These comprise diverse remains including prehistoric cairns, settlements and field systems, medieval and post-medieval settlement and associated agricultural structures, as well as WWII structures. A total of eight sites lie within the vicinity (100 m) of the footprint of the proposed development. These are the remains of an agricultural and industrial landscape associated with the Catfirth Linen Industry (Site 448); World War II remains (Sites 9 and 10); two marker stones/cairns (Site 341 and 349); a possible prehistoric mound (Site 445), a possible prehistoric settlement (Site 447) and a cist (Site 450). As a result of the soil studies that were carried out for the EIA, the ES demonstrated that a significant proportion of the proposed development area is covered by peat and there is therefore the potential for discovering hitherto unknown archaeological remains.

Potential visual impacts on the setting of Scheduled Ancient Monuments within 10 km of the proposed windfarm boundary have been reassessed as part of this report. Revisions to the turbine layout have reduced the overall impact on the settings of Scheduled Ancient Monuments in the vicinity of the wind farm. The majority of visually affected sites would sustain an impact of Negligible or Minor significance.

In compliance with national and local planning policies a programme of archaeological works designed to investigate the potential for archaeological sites within the development area and allow for the preservation or recording of any significant archaeological remains has been proposed.

The necessary archaeological works would consist of seven components:

- Archaeological Clerk of Works
- Walkover Survey to inform micro-siting in sensitive areas

- Demarcation of Archaeologically Sensitive Areas
- Geophysical Survey
- Archaeological Trial Trenching
- Archaeological Watching Brief
- Archive Deposition

There would be no direct impact on potential buried archaeological remains by the proposed floating roads. However, it is recognised that the effectiveness of methods of prospecting for buried archaeological remains within deep peat are unclear. In recognition of this ambiguity, it is proposed that a programme of reconnaissance coring in areas of deep peat is undertaken to test the effectiveness of geoarchaeological coring as a prospection technique

It is acknowledged that the proposed wind farm, if approved, would alter the context in which the heritage of the Central Mainland is viewed. Viking Energy proposes to undertake a major heritage project that would allow people to experience, enjoy and connect with their heritage in harmony with policies expressed in SHEP (2009).

**Soil and Water**

Due to removal of infrastructure there have been a number of changes to the effects.

There are no longer any private water supplies within a hydrological catchment where development is planned. Formerly the supply at Grutin was within a proposed wind farm development catchment, although not likely to be influenced given relative positioning. The number of stream crossings required has been reduced from 97 to 79 (including 2 existing crossings) given removal of associated sections of tracks.

The above alterations do not materially change our previous assessment, with 3 items retained as being considered of significance.

**Roads and Traffic**

The newly-proposed 127-turbine layout would reduce the construction requirements of the project compared with the 150-turbine 2009 layout, resulting in fewer construction vehicles using the Shetland road network. The deletion of the access for abnormally long loads at

Hill of Susetter, and two normal load site access points (on the B9071 between Gonfirth and Setter and the B9075 at Newing) would also reduce transport impacts at these locations.

Recent planning approval for Total's Gas Processing Plant at Sullom Voe means additional construction traffic on the B9076 is likely. Implications for the Viking project would be identified with ZETRANS and Total, with issues and solutions incorporated into a Traffic Management Plan.

Additional measures have been identified that mitigate impacts on Sandwater SSSI and other water bodies that lie outside of the planning application boundary. Car pooling facilities would also be designed into any upgrade of the B9075/A970 junction.

Traffic congestion problems remain unlikely.

**Air and Climate**

No emissions would be generated during the operation of the wind farm, therefore the assessment of impacts to local air quality considered the construction phase of the development only. The most significant emission source from the construction phase of the development was determined to be emissions of dust and fine particulate material from borrow pit quarrying operations and excavation operations. It was determined that adverse impacts associated with these activities would be localised and are unlikely to occur at distances beyond 1km.

The reduction in the extent of the wind farm development, including a reduction in the number of turbines and borrow pits, has reduced the number of receptors potentially affected by construction phase emissions. No new receptors have been identified. The amendment to the wind farm layout is considered likely to mean a reduction in emissions overall, and for those receptors still within the study area no change to the overall impact is predicted.

Electricity produced by the wind farm would offset emissions from electricity produced by fossil fuel power stations, leading to a reduction in greenhouse gas emissions. However, the development would result in emissions of greenhouse gases associated with the manufacture of turbines, the requirement for backup power generation, and through the disturbance of peat. Peat contains a significant carbon store and any damage to peat would

result in a release of embedded carbon. Analysis of baseline conditions on the development site, however, indicated that the peat bog is not in pristine condition and that it is currently subject to extensive erosion. The eroded peat across the development site is a significant carbon emitter.

Calculations were undertaken to quantify both the greenhouse gas emissions associated with the development and the emissions resulting from the development itself. One of the most crucial factors in the release of greenhouse gases from peat is the disturbance to local hydrology around features, known as the drainage extent. As specific details of the local effect could not be determined three different drainage extents were considered and emissions calculated for each scenario. The calculations also accounted for the effects of the habitat management plan in reducing peat erosion across the site.

The $CO_2$ emissions associated with the development were determined to be in the order of 0.5-1.1 megatonnes of carbon dioxide over the lifetime of the wind farm. These emissions are small in comparison to the likely emissions due to peat erosion and are substantially offset by the proposed habitat management measures. Overall, it is estimated that any emissions associated with the development would be offset within the first year of the development. This carbon payback period is relatively low, and is a consequence of the high efficiency of the wind farm, the scale of the development and the potential of the habitat improvement measures to substantially improve existing habitats.

**Socio-economic Effects**

The revised design and changed financial circumstances means that although the overall physical scale of the development has been reduced, the benefits to Shetland have either remained at a similar level or in some cases increased, such as the land rental and community levy.

The social and economic effects of the proposed wind farm are unusually important in the case of the Viking Wind Farm compared with other wind energy developments, due to the partnership arrangement under which the project is being brought forward. This means that half of the profits of the wind farm would go to the local community, (the bulk of which would go to the Shetland Charitable Trust), which is in addition to the income from the land rental and community levy.

Operation of the wind farm would provide direct and indirect employment and training opportunities.

There would be few if any negative socio-economic effects during the operational period. In total this could amount to around £38m of direct income each year to Shetland and help to create and sustain around 430 gross jobs per annum over the23 year life of the project.

Construction of the wind farm would provide opportunities for direct and indirect employment and training associated with the development. This would amount to around 285 gross jobs per annum and £10.9m to local suppliers over the 5 year construction period. Negative impacts may be felt through displacement of employment and construction projects, through effects on grazing land occupied by the construction site, and through reduction in the availability of tourist accommodation caused by its occupation by construction workers (although there is a possibility that sharing of specialised accommodation might be negotiated e.g. with Total).

Shetland people currently enjoy relatively stable economic conditions with little unemployment and a high quality of life, but this needs to be set against the lower levels of income generated by current investments held by the Trust and significant government spending cuts which is likely to mean there will be insufficient public resources to maintain existing facilities or undertake new projects.

**Telecoms and Aviation**

As highlighted in the 2009 ES, wind turbines have the potential to interfere with broadcast signals and with aviation activities. Assessment of these effects is therefore a central part of wind farm EIA, and they have been carefully considered in the re-design of the Viking Wind Farm.

Since the 2009 ES an extensive TV impact assessment has been carried out across the wind farm area and beyond. This survey assessed the TV and broadcast signals and aimed to identify areas where the signal may be impacted by the proposed wind farm. The survey used the existing analogue signal which will give a good indication of signal conditions. As the digital switchover has now been implemented a further survey would be carried out before any construction takes place.

The only remaining aviation issue relates to Scatsta and a number of turbines have been removed from the 2009 ES design as a result of discussions with the airport operators in order to mitigate against certain issues. Discussions continue with the airport owners and operators regarding a number of additional turbines in the vicinity of the runway. Any adverse effects caused by these additional turbines can be mitigated in a number of ways, but this can only be agreed once the airport has completed its discussions with the Director of Airspace Policy and finalised its plans for redevelopment, both of which are beyond the timescales for the production of this Addendum. Viking Energy Partnership would continue to work with Scatsta airport owners and operators to reach an agreed position allowing the airport and the wind farm to co-exist to the benefit of Shetland.

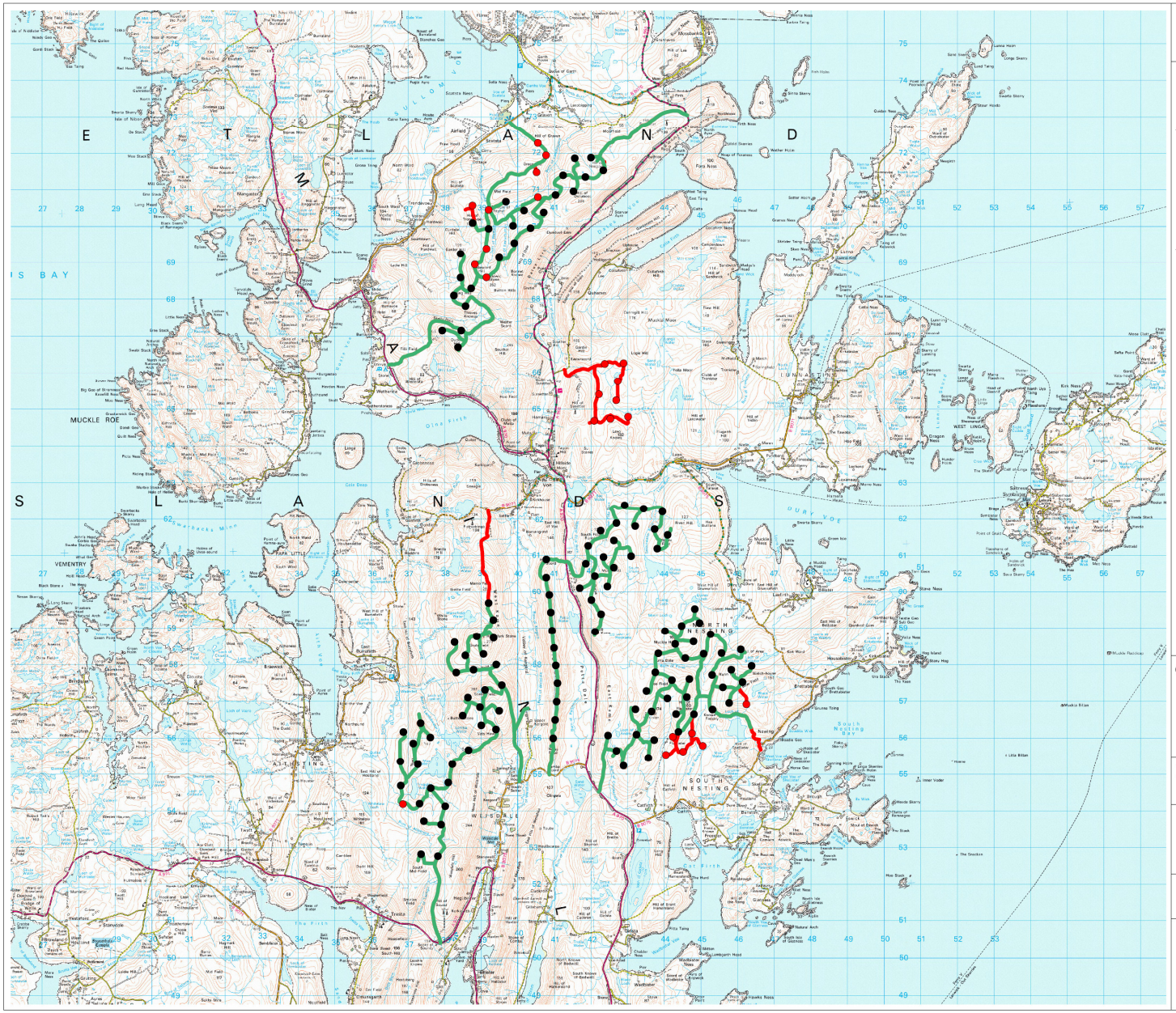
**Recreation and Tourism**

Recreation and tourism impacts are influenced by effects on landscape character, visual amenity, cultural heritage, traffic volumes, ecology and ornithology. The 127-turbine layout, in which 23 turbines and associated infrastructure have been deleted from the 2009 proposals, would result in reduced effects for each of these issues and for recreation and tourism.

Mitigation has been enhanced through revisions to the Habitat Management Plan. The latter has been altered to prevent disturbance to breeding birds and damage to blanket bog habitats, and updated to provide guidance on appropriate destinations for group visits and instruction on signage compliant with the Scottish Outdoor Access Code.

Shetland's tourism offering would further benefit through the provision of wind farm visitor facilities. Interpretation would be provided on the technical aspects of wind energy, and on ecological, heritage and archaeological interest at the site.

A re-assessment of recreation and tourism impacts has been carried out and it remains unlikely that the Viking Wind Farm would result in any impacts of high significance.




# Figure NTS A1

## Key

- 2010 Proposed Turbines
- 2009 Deleted/Moved Turbines
- Proposed Tracks
- Deleted Tracks

| | | | |
|---|---|---|---|
| Client: | viking energy<br>Harnessing Shetland's natural resources | | |
| Project | **Viking Wind Farm** | | |
| Title: | 2010 Viking Wind Farm proposed layout | | |
| Scale: | NTS | Date: | Sep 2010 |

BMT Cordah