

# Non-Technical Summary

## 1 Introduction

This Non-Technical Summary (NTS) forms part of an Environmental Statement (ES) for the development of Spittal Hill Wind Farm near Spittal, Caithness. The ES has been prepared on behalf of Spittal Hill Wind Farm Ltd to accompany an application to the Scottish Executive, under Section 36 of the Electricity Act 1989, for permission to construct and operate a wind farm with a maximum output of 77.5 MW at the location shown on Figure 1.1

The proposed wind farm encompasses thirty wind turbines of rated capacity 2.5 MW and associated infrastructure, as shown on Figure 1.2. The wind farm will operate for a period of 25 years after which the turbines will either be decommissioned or the life of the wind farm will be extended.

Under the terms of the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2000, an Environmental Impact Assessment (EIA) has been carried out to identify and assess the proposed development's likely environmental effects and propose mitigation measures. The ES contains the findings of this assessment, which are summarised in a non-technical manner within this document.

Spittal Hill Wind Farm Ltd, a special purpose vehicle comprising the developers, who own part of the site, and a number of largely Highland based investors has been set up in order to develop the proposed wind farm at Spittal Hill.

## 2 Project Description

Construction of the wind farm will follow a rolling programme over an 18 month period, with the following infrastructure being provided within the site:

- 30 Turbines and Transformers;
- Temporary Contractors Compound and Turbine Laydown Area;
- 2 Anemometer Masts;
- Site Tracks;
- Cabling; and
- Substation.

The following activities will take place on site during the construction period:

- **Enabling works;**
- **Sourcing of stone:** stone for site tracks will be sourced from the existing stone quarries within the site boundary;
- **Cement batching:** concrete will either be brought in from a local batching plant or a temporary batching plant will be established on site;
- **Turbine Delivery:** turbines will be delivered from Wick Harbour on semi-low extendable trailers and erected using a 350 tonne crane; and
- **Construction of infrastructure and turbines.**

On-going maintenance will be carried out throughout the 25 year operational life of the wind farm. Decommissioning of the wind farm will involve dismantling and removal of the turbines and on-site substation. Tracks and foundations will either be retained on site or dismantled where appropriate.

## 3 EIA Methodology

As required by the Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2000 an EIA has been carried out for the proposed wind farm development. One of the key aims of the EIA was to influence the layout of the site in order to minimise associated environmental impacts. The ES reports the findings of the EIA, which involved the following stages:

- **Site selection:** sites throughout the north east of Scotland were examined and sites selected based on technical and environmental criteria and constraints.
- **Scoping and consultation:** full consultation with a wide range of statutory and non-statutory groups was carried out in order to identify key issues to be addressed during the EIA.
- **Identification of issues:** issues identified at the scoping stage were assessed during the EIA and the results presented within the technical chapters of the ES
- **Technical assessments:** the assessments predicted potential effects, informed the layout design and proposed mitigation measures to be adopted
- **Wind farm layout iteration process:** the wind farm design has undergone four main layout changes, with the main drivers being ornithological, landscape and visual and noise issues. Since the layout presented at scoping, the major design change has resulted in the turbines being located only on the eastern side of the A9. This layout has gradually been refined to reflect landscape design requirements and to ensure ornithological impacts are acceptable.
- **Preparation of Environmental Statement:** the results of the EIA are reported within the ES.

Following the scoping exercise the following technical assessments were undertaken:

- Landscape and Visual;
- Ecology;
- Ornithology;
- Geology, Hydrogeology and Hydrology;
- Cultural Heritage;
- Noise;
- Traffic and Transport;
- Tourism, Socio-economic and Landuse;
- Shadow Flicker; and
- Miscellaneous Issues

## 4 Environmental Impact Assessment

### 4.1 Landscape and Visual

The following components were assessed separately and collectively within the assessment:

- Direct effects on the landscape;
- Effects on the character of the landscape;

- Effects on landscape designations;
- Visual amenity through the assessment of viewpoints;
- Sequential effects on receptors using the main transportation routes; and
- Cumulative effects of the proposed wind farm in combination with other existing and proposed wind farms

In response to the emerging understanding of the existing landscape and visual character of the study area, and the predicted effects from the proposed development, the number of turbines and their configuration on the site has evolved. The objective has been to form a compact and visually coherent grouping in views from the wider landscape to remove or minimise anticipated significant effects.

Turbines have been arranged to complement existing patterns observable within the landscape of the site, with access and maintenance tracks re-using existing farm tracks on site where practicable. The area proposed for turbines has been kept back from the nearby settlement of Spittal, behind an intervening ridge line. The turbines have also been kept clear of the summit of Spittal Hill, and while the same turbine model has been used, those nearest the summit have been mounted on smaller towers, to avoid dominating this local landform.

This results in a wind farm which relates closely to the natural contours of the north and eastern slopes of Spittal Hill.

The direct effects of the development on the physical landscape are not considered significant. The turbines will modify only a small area of land. The access and maintenance tracks re-use or upgrade existing tracks where possible, and where new tracks are required, these follow existing field or drainage patterns. The stone for tracks and foundations will use existing quarries on site, supporting these local facilities and avoiding the need for these materials to be transported onto site.

The existing character of the landscape has been assessed through desk and site survey, and predicted effects have been determined through detailed assessment of thirty viewpoint locations, chosen to reflect the range of landscape types across the study area. Significant effects on landscape character are only predicted in the area to the immediate north and east of the site. This area is on the lower slopes from where the turbines are located, and on the rising ground on the far side of the valley.

There are no national or international landscape designations in the study area. No significant effects are predicted on the four Areas of Great Landscape Value within the study area, or on any of the Historic Gardens and Designed Landscapes or Conservation Areas within the study area.

The predicted effects on the visual amenity have also been assessed in depth through analysis of thirty viewpoints. Significant visual effects predominate in the area to the north and east of the site, generally in close proximity to where the turbines are located. There is also one occurrence of an anticipated significant effect to the west, for new housing recently constructed at *Olgrinmore*. Here, the absence of any planting and the orientation of the new housing allows open views over to Spittal Hill and the proposed turbines.

The proximity of Spittal Hill to the junction of the A9 and A882 has been carefully considered in the assessment of sequential effects. In developing the final turbine layout, the impact on the visual amenity of the A9 has been a determining factor in restricting the turbines to the north and east facing slopes. As a result, there are no significant sequential effects predicted for the A9. The only routes which are anticipated to experience a significant effect are the A882 and the B874, for relatively short sections of these routes which cross the landscape to the immediate north and east of the site.

Consideration of the overall capacity of the receiving landscape for wind farm development was undertaken through a review of relevant national and regional guidance, and concluded that in landscape terms, this large scale and open landscape is an appropriate location for wind farm development. However, as a settled area, the very fact that this is an open landscape means that there are potentially a high number of viewers who might see any wind farm development. The acceptability of wind farm development in such a location is dependant on appropriate siting and through introducing such development in a way which forms another overlay to the visible layers of human activity already present, without overwhelming them.

A total of thirteen other existing and proposed wind farms have been considered in the assessment of cumulative effects. These have been assessed through a combination of cumulative viewpoint assessment, and analysis of cumulative zone of theoretical visibility diagrams. No significant cumulative effects are predicted in combination with any of the existing wind farms in the study area. However, with other proposed wind farms, there are potentially significant cumulative effects. The location of the turbines at Achairn and Flex Hill near the A882 would result in significant cumulative effects on the A882, and on residents who can view both proposals in the landscape to the north of this road. Also, the predicted visibility of Baillie Hill and South Shebster heading north on the A9 would result in significant cumulative effects on this route in this direction, as wind farms would be visible for a substantial proportion of the length of this route. Finally, there are significant cumulative effects anticipated for residents at a limited number of properties between Spittal Hill and Baillie Hill who will be able to see both proposals.

The turbine layout has created a compact and unified grouping which achieves the optimal landscape and visual 'fit' within the site area. The layout makes an efficient use of the site, and relates to existing elements. Nevertheless, there remains a relatively limited area from where significant landscape and visual effects are predicted, within the landscape to the north and east of the turbines. Also, in combination with some of the other proposed wind farms in the study area, there are anticipated to be significant effects. Importantly however, there are no predicted significant effects on any of the larger settlements within the study area, only individual residences; and there are no predicted significant effects on any landscape designations. In the context of the overall study area, it is considered that the landscape and visual effects from the proposed wind farm are acceptable.

## 4.2 Ecology

The potential ecological effects of the wind farm have been assessed through consultations, desk-based studies and field surveys.

The site itself is not covered by any statutory or non-statutory designations but lies between 4 and 7 km of a number of sites designated for their peatland interest, including the Caithness and Sutherland Peatlands Special Area of Conservation. The wind farm is predicted to have no effect on the ecology of these sites over the distances involved. The most valuable habitats ecologically within the site are wet heath and dry heath. While both are common and widespread in Caithness and upland Scotland generally, the development has been designed to ensure minimum loss of these sensitive habitats.

The ecological field surveys have revealed there to be a regionally important otter population on the site. The potential for temporary disturbance to this European Protected species during construction will be minimised through the design of the development and the recognised best construction practices in this regard.

Bats are the only other protected animals known to occur on the site. Although the size of their population(s) have not been established it has been assumed, as a precaution, that these could be regionally significant. The design of the scheme avoids the disturbance of potential roost

sites identified from surveys, although currently there is no robust way to predict the frequency of collisions with turbine rotors.

Providing the recommended mitigation measures are implemented no significant ecological effects are predicted.

#### 4.3 Ornithology

The assessment of potential impacts of the wind farm development on ornithological interests was informed by consultations, desk-based studies and field surveys. These studies primarily focussed on the following:

- Breeding bird populations of the site;
- Flight activity over the site;
- Extent to which this flight activity involved the swans and geese for which the Caithness Lochs, approximately 2 km away, have been designated a Special Protection Area (SPA).

The survey results show the site to be of low importance for breeding waders and raptors, but of moderate conservation importance for migratory whooper swans and 'grey geese' (greylag and pink-footed geese). These results were assessed in the light of the potential for disturbance during construction, the potential displacement from foraging or roosting areas and the estimated mortality due to turbine collisions.

A collision risk model making use of information obtained from the flight activity surveys, does predict some greylag and pink-footed goose mortality from turbine collisions, but using SNH's most recent recommended avoidance rates for geese (99%) this is assessed as being a relatively minor risk, one which will be reduced further by managing fields on-site to make them less attractive to the geese.

It is concluded that the proposed development will have no significant residual impacts on the ornithological interests of the site itself, or on the swans and geese that represent the SPA's qualifying interests, either singly or in combination with other relevant plans and projects.

An addendum to the Environmental Statement containing an additional third year of survey data will be submitted to the Scottish Executive in September 2007

#### 4.4 Geology, Hydrogeology and Hydrology

The hydrological, hydrogeological and geological baseline assessment indicated that site hydrology has been extensively modified by the development of a concentrated network of drainage channels provided on site to drain poorly draining soils. The existing soil and peat resource was also assessed. A very limited, poor peat resource was identified, modified by extensive draining to improve the land for grazing. Overall, a number of receptors were identified as 'very high' sensitivity:

- Spittal Quarry and Banniskirk Quarry are both classified as geological Sites of Special Scientific Interest in respect of fossil interest. Both are working quarries;
- The site drains to a network of lochs in the area, including Loch Scarmclate and Loch Watten. These are widely used for fishing and are stocked with brown trout by local angling clubs; and

- The River Thurso is designated under the Freshwater for Fish Directive and is a Special Area of Conservation, used for fly-fishing and recreational use by canoeists. Water quality is classified as 'Excellent' under SEPA's River Classification Scheme.

The existing peat resource was assessed following guidelines on Peat Landslide Hazard Risk Assessment issued by the Scottish Executive (March 2007), both access tracks and turbine locations were surveyed. Very little peat is associated with the site, with peat soils in hollows with little slope, and only just qualifying as peat soils on depth criteria. No previous history or evidence of failures and instability were identified. Turbine 13 is currently located adjacent to a small area of deep basin peat (105 cm depth) in a localised hollow. To mitigate potential effects on peat, minimal micro-siting within 25 m may be required.

A range of on site activities will have the potential to cause significant erosion and runoff, and to a lesser extent, potential spillages of chemicals used on site. The most important receptors are surface watercourses on site, which whilst being of low ecological and morphological quality, can convey material to a number of lochs around the area which support an extensive fisheries and recreational water use resource. Access and visibility of the geological resource is a key management feature for the two quarries, designated as Sites for Special Scientific Interest.

Mitigation comprises a mixture of design, and site mitigation. The site infrastructure has been designed outwith the River Thurso catchment, and no impacts are anticipated on the River Thurso or any of the qualifying interests.

The Environmental Statement has committed to a wide range of site pollution prevention measures to minimise and prevent conveyance of potentially polluting material to the loch systems. The two geological Sites for Special Scientific Interest are located within existing operational local quarries. Agreements regarding exposure and management of geological outcrops will be carried out in consultation with SNH.

Following the assessment of significance, with mitigation measures in place, it is anticipated that the impact of the site will be of minor significance.

#### 4.5 Cultural Heritage

A desk-based assessment and walkover survey was carried out for the proposed wind farm.

With the exception of Spittal Farm Broch, a scheduled monument and the only prehistoric site within the application boundary, the landscape within the proposal boundary is predominantly 18<sup>th</sup> and 19<sup>th</sup> century in character. The landscape consists of ruined crofts within drystone-walled fields, now used predominantly for grazing. Spittal Farm Broch lies within close proximity to an existing working quarry on-site.

Construction work, mainly relating to the infrastructure rather than the turbines, will encounter few of these later features, and all construction and other activities will be considerably distant from the broch, ensuring that it will not be directly affected by the development. Some direct disturbance to three sites is possible, although avoidance and monitoring during the construction period will limit the direct impacts to these sites to a minimal level.

ZVI data was used to analyse the indirect effects on statutorily protected sites in the locality of the wind farm site. This identified that several scheduled ancient monuments and listed buildings will have their setting altered by the development, notably Spittal Farm Broch (ND15SE2), Chapel of Dunn (ND25NW 12), Gallow Hillock (ND25SW 2), Fairy Hillock (ND15SE 3), Grey Cairn broch (ND25NW 3), Mill of Knockdee chambered cairn (ND16SE 4) and Ballone Broch (ND15SE 8).

The wind farm is predicted to have no direct effects of significance on cultural heritage assets within the site boundary or wider area. Indirect effects on the setting of Spittal Farm Broch and several other scheduled monuments in the vicinity of the wind farm have been assessed as of moderate significance.

#### 4.6 Noise

An assessment of noise during wind farm construction and operation has been carried out.

During construction, noise may be generated by the following activities: construction of access tracks, laydown areas, contractors compound and turbine foundations; erection of turbines; site cabling and substation installation. Noise levels have been predicted for the worst-case scenarios, i.e. for the construction activities occurring at their closest likely point to houses. The predicted noise levels have been compared to criteria established by the World Health Organisation, which defines levels of outdoor noise likely to cause annoyance to the majority of people.

The assessment has concluded that for the majority of construction activities, the noise levels would be lower than those that would annoy the majority of people. An exception to this is noise from the construction of access tracks, which may reach annoying levels for short periods of time, when the construction occurs close to houses. This is anticipated to last for no longer than one week at any particular location.

Construction will only occur within times agreed with Highland Council, except where it is essential to work outwith these times for safety or other reasons. Where possible, agreement will be sought with the council prior to working outside of the agreed times. Any equipment used routinely at night (such as pumps for dewatering excavations) will be chosen to produce the lowest possible levels of noise to avoid disturbance to residents. The site contractors will provide details of the project programme and named contacts for daytime and out of hours to residents of neighbouring properties.

Noise levels during decommissioning of the wind farm are likely to be lower than during construction.

Noise during operation of the wind farm has been assessed in accordance with the appropriate government guidelines (ESTU-R-97 The Assessment and Rating of Noise from Wind Farms). This defines limits on the level of noise that it is acceptable for wind farms to cause at nearby properties, which are related to the existing, background noise levels. The noise levels likely to be generated have been calculated using a recognised prediction technique, and are below the limits defined in the guidance for all existing properties in the area around the site. The predicted noise levels may exceed the guidelines for one property that has been granted planning permission, but that has not yet been constructed, at a small range of wind speeds at night. If necessary, the noise levels can be kept within the defined limits by shutting down a few of the nearest turbines at night when the wind is blowing from the wind farm towards this property.

#### 4.7 Traffic and Transport

The proposed wind farm is likely to generate notable levels of traffic only during its construction and decommissioning phases. During operation, occasional visits will be required for maintenance, but these will not generate noticeable increases in traffic.

Turbine components will be transported by sea to Wick Harbour, and from there by road, either via the A822 to the site, or alternatively via the A99/A9 via Latheron and Spittal. A study has

been carried out to ensure that the road network can physically accommodate the large vehicles used for transport of the turbine parts. Some careful manoeuvring and the temporary removal of one street sign will be required in Wick, and a new turning area will be required to the east of the junction of the A822 with the unclassified road at South Dunn. The alternative route has previously been used to transport turbines to the Causeymire wind farm.

Access to the site will be from the unclassified road to the south-east which leads from South Dunn to Crofts of South Dunn. Turbine components transported via the A99/A9 will access the site to the north of Spittal using the existing access to the quarry on Banniskirk Mains Farm.

Local contractors will be employed during construction as far as possible, and this may result in construction traffic approaching the site from a variety of routes. It is anticipated that approximately 50% of the traffic will approach from the south on the A9, turning at Mybster onto the B870 towards the site entrance. The remaining 50% will be evenly split between originating in the direction of Wick, and travelling north on the A822 and coming south on the A9 and A822 from the direction of Thurso. It is anticipated that construction traffic passing through Spittal will be minimised.

The number of vehicle movements occurring during each month of construction has been calculated and compared to existing traffic flows, which were obtained using automated counters in July 2006. The increase in traffic numbers was then calculated for each route. It was found that these would not exceed 10%, for either total traffic or for HGVs alone, which is a recognised threshold of significance. The projected increases in traffic are therefore not considered to be significant.

There may be temporary local effects such as delays to other drivers at the A822 junction at South Dunn, and noise and dust at properties situated close to the site entrance. A traffic management plan will be prepared in consultation with Highland Council, which will ensure that effects such as these are minimised.

Traffic numbers during decommissioning would be less than those during construction. A traffic assessment will be carried out before works starts, and mitigation measures agreed with the appropriate authority.

#### 4.8 Tourism, Socio-Economic and Land-use

An overview of the likely effects of the wind farm on tourism, the socio-economics and land-use of the area was carried out.

- 1.1 With reference to tourism within the Caithness area, tourist attractions were identified. In order to evaluate potential effects on such attractions reference was made to surveys which have looked at the effect of wind farms on tourism in Scotland. A MORI poll commissioned by the Scottish Renewables Forum and the British Wind Energy Association in 2002 found that over 90% of visitors would return to Scotland for a holiday whether or not there were wind farms in the area. 80% said they would go to a wind farm visitor or information centre during their stay.<sup>1</sup>

A second survey by the Visit Scotland tourism agency recorded that 75% of visitors were either positive or neutral towards wind farm development in general, and 63% said it would make no difference to their decision to holiday in Scotland if the number of wind farms increased<sup>2</sup>.

<sup>1</sup> Source: "Tourist Attitudes Towards Wind Farms", MORI Scotland, 2002, Sample: 307 Tourists

<sup>2</sup> Source: "Investigation into the Potential Impact of Wind Farms on Tourism in Scotland", VisitScotland, 2002, Sample: 180 Visitors

A report by the University of St Andrews and the Macaulay Institute<sup>3</sup> in November 2005 found that overall people are not opposed to wind power, rather individual sites and that people became more positive about wind farms after their construction.

Effects on the amenity of tourists will result from indirect visual effects when visiting attractions. It is considered unlikely that the wind farm will generate direct adverse effects on any tourist attractions in the area.

There will be opportunities and benefits for local business created during the construction, operational and decommissioning phases, including construction jobs and sourcing of materials. Construction of the wind farm will not result in any fundamental or long-term changes in population, structure of the local community, local services or employment.

Developers are actively exploring with the local community the most appropriate and effective form for the community involvement in the scheme. As a minimum this might be a specified amount of money per megawatt per annum paid into a locally controlled fund. Community benefit might involve turbine ownership if there is sufficient interest in the area.

Land lost due to the development will include agricultural land. None of the nationally valuable features of the Caithness landscape, in particular the Flow Country, will be lost or directly impacted on by the construction and operation of the proposed wind farm development.

#### **4.9 Shadow Flicker**

Shadow flicker can sometimes occur at houses close to wind farms, when the shadow of a moving turbine passes over a window, causing a flickering effect to be noticeable within the property. The likelihood and duration of the effects depends upon the location of the turbines relative to houses, their size, the weather conditions at the time and the times of day and year. The effect only occurs within a distance of ten times the rotor diameter of the turbines, as beyond this distance the blades do not appear to be wide enough to completely obscure the sun as they pass in front of it, and therefore only produce weak shadows.

The times and duration of shadow flicker effects has been calculated for houses within 800m (ten rotor diameters) of a wind turbine using a recognised computer programme. Four houses may be affected, three of which are owned and occupied by parties that have a financial interest in the proposed wind farm. The fourth is a house that has been granted planning consent but that has not yet been constructed.

The effect can be prevented by using an automated control device to shut down the turbines at times that flicker occurs. This device will be employed as required.

#### **4.10 Miscellaneous Issues**

An examination of the impacts arising due to the construction and operation of the wind farm on health and safety, waste and communications was carried out. Communication includes telecommunications, television and radio broadcasting links and civil aviation, military, maritime and emergency services and other infrastructure.

Consultation with the appropriate organisations raised no concerns relating to air traffic controls, military radar, military low flying zones or maritime and emergency service communications. Consultation with telecommunications organisations confirmed that no interference with their links is predicted. Potential interference to domestic television reception may occur, but after

mitigation it is not anticipated that that the wind farm will cause any significant negative effects on television or radio broadcasting in the area.

The following mitigation measures have either been included within the design of the wind farm or will be adopted during construction:

- Health and Safety procedures will comply with legislative requirements;
- Hazardous areas will be fenced off and machinery stored in the site compound or immobilised to prevent unauthorised use;
- Access to the site will be temporarily restricted during the construction phase to safeguard the public. Appropriate signage will be used for re-direction;
- Any interference to domestic television reception resulting from wind farm operations will be further investigated and rectified by the developer
- Waste streams will be managed appropriately and according to best practice; and
- Existing underground services will be demarcated on site by Scottish Water prior to construction commencing.

## **5 Statement of Significance**

The turbine layout has undergone a number of fundamental modifications in response to environmental constraints identified during the assessment period. The main drivers resulting in changes to layout have been:

- Design of wind farm to fit with the local landform;
- Avoidance of significant impact on qualifying interests of the Caithness Lochs SPA; and
- Siting of turbines to ensure noise impacts on nearby receptors are acceptable.

Remaining impacts will be mitigated by further measures including implementation of a Pollution Prevention Plan. Monitoring will be carried out as required by these plans.

Individual effects have been identified and their magnitude assessed within each technical assessment. The findings show that other than landscape and visual effects, which are inherent to the technology proposed, mitigation measures proposed within the design, construction and operational phases will minimise environmental impacts to an acceptable level.

<sup>3</sup> Journal of Environmental Planning and Management