Nant y Moch Wind Farm

Scoping Document
April 2010

Scottish and Southern Energy Renewables

Nant y Moch Wind Farm, SSA D Ceredigion

Scoping Report

Request for a Scoping Opinion under Regulation 8(1) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009

April 2010

Contents

1 Introduction

Background

1.1 The Nant-y-Moch Wind Farm development is proposed by Scottish and Southern Renewables Holdings (UK) Limited (SSE Renewables). The parent company, Scottish and Southern Energy plc, whose headquarters are in Perth, Scotland is an integrated electricity and gas supplier and generator, listed on the London Stock Exchange. SSE Renewables is responsible for the development and construction of SSE Group's European portfolio of renewable energy projects, including onshore and offshore wind, hydro, marine, biomass, and solar. SSE is the leading generator of renewable energy in the UK and Ireland, with over 2,200MW of renewable electricity generation capacity and a portfolio of over 15,000MW of renewable energy projects in construction, with consent or in development.

1.2 The Nant-y-Moch Wind Farm proposal is part of a portfolio of renewable energy projects being developed and managed by SSE Renewables with the support of its Wales based principal consultant, Dulas Ltd. Dulas, based in Machynlleth, is Wales' leading renewable energy company. Dulas was established in mid Wales in 1982, with experience of over 60 planning applications and environmental statements resulting in the consenting of over 315MW in renewable energy projects. The Dulas development team specialises in technical site layout, planning and environmental impact. The company currently has over 60 employees, and in recent years has gained the Renewable Energy Association award for best renewable energy company, Queens Award for Enterprise, the Welsh Exporter of the Year, and Welsh Small and Medium Enterprise of the Year awards.

1.3 The Nant-y-Moch Wind Farm site has been selected with careful regard to national and local guidance on land use and renewable energy planning policy in the UK and in particular Welsh policy and guidance. SSE Renewables also applies its own site identification and development criteria to ensure it develops schemes that are unlikely to lead to significant impacts. These criteria include avoiding nationally designated landscapes and ecologically sensitive areas, and respecting regional or local designations through appropriate wind farm design. A selection of other factors have been reviewed in the process of establishing the Nant-y-Moch Wind Farm proposal, including air-safeguarding and electro-magnetic interference issues, connection to the electricity grid network, site access through the local road network, and ensuring the protection of noise amenity to local residents.

1.4 The above approach to site selection has been further guided by the Welsh Assembly Government's issue of a revised Technical Advice Note 8: Renewable Energy (TAN8) in 2005. This guidance, in part, sets out seven wind farm zones called Strategic Search Areas (SSAs). These areas have been identified as being suitable for large scale wind energy development as part of the Assembly's policy to meet climate change objectives, including the generation of 4TWh of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020. One of the areas, SSA D – Nant y Moch, encompasses the area proposed for the Nant-y-Moch Wind Farm development.

1.5 Feasibility assessments considering a range of environmental and technical factors have confirmed that a wind farm is viable on the proposed site east of the A487 between

Machynlleth and Aberystwyth and north of the A44 between Aberystwyth and Llangurig, hence the decision to progress this potential development into the formal planning process. An application will be submitted to the Infrastructure Planning Commission (IPC) under the provisions of the Planning Act 2008 for Nationally Significant Infrastructure Projects.

1.6 Consultations with microwave and telecommunications operators have commenced to determine whether any constraints arise as a result of the proposed development which would affect these operators. Previous studies of the SSA D area by ARUP and Garrad Hassan included preliminary consultation on and consideration of aviation issues, which will be complemented by detailed consultation with the Ministry of Defence, Civil Aviation Authority and National Air Traffic Services in respect of the specifics of the proposed Nant-y-Moch Wind Farm development. Further detailed consultations with the full range of statutory and primary consultees have been conducted regarding part of the Nant-y-Moch Wind Farm site, in respect of a previous development proposal known as Moel Fferm, which has now been incorporated within the larger Nant-y-Moch Wind Farm proposal. This document forms the next step in more detailed consultation with relevant statutory and non-statutory organisations regarding the Nant-y-Moch site in order to meet the pre-application consultation requirements of the Planning Act 2008.

1.7 This Scoping Report has been produced for consultation with the IPC and consultees for the purpose of determining the Scoped Issues for inclusion in an Environmental Statement to accompany an application for a Development Consent Order under the Planning Act 2008 for the proposal. A previous Scoping Opinion for the scheme was provided by DBERR in July 2008, which is appended to this report (Appendix B).

1.8 The proposed wind farm site lies within the local authority area of Ceredigion County Council in mid Wales, whilst a small portion of the site to the north is based in Powys County Council. The location of the proposed development site is shown in Figure 1.

Scoping Consultation Document purpose

1.9 In order to facilitate the formulation of a Scoping Opinion by the IPC under Regulation 8 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 this Scoping Report presents relevant provisional information which describes the development and the potential environmental issues that may arise from construction, operation and decommissioning of the wind farm scheme. In addition the methodologies of assessment are included.

1.10 This scoping consultation document outlines the technical details of the proposed wind farm and the perceived and/or likely environmental effects that should be addressed by an environmental impact assessment. Once a Scoping Opinion has been issued by the Commission and on the basis of the scoping consultations, SSE Renewables will ensure that its appointed consultants will address the matters raised and specified.

Scoping Report structure

1.11 Section 2 provides the policy context and legal framework applicable to the proposed wind farm.

1.12 Section 3 provides an overview of the proposal, including a brief description of the nature and purpose of the proposed development and its possible effects on the environment.

1.13 Section 4 provides an indication of the environmental baseline of the Nant y Moch site area and the potential environmental impacts arising from the development.

1.14 Section 5 provides an outline of the proposed contents of the Environmental Statement.

1.15 The Appendices provide information relating to the environmental assessment methodologies that will be used. In addition the DBERR Scoping Opinion issued in July 2008 under the Electricity Works (EIA) (England and Wales) Regulations 2000 is presented.

1.16 Figure 1 shows the location of the site of the proposed development and Figure 2 demonstrates the site development boundary and proposed site infrastructure.

2 Renewable Energy and Wind Power

Policy Context

2.1 Renewable energy sources are natural energy sources such as sunlight, wind, waves and tides, which are continuously replenished and do not run out. Of these, wind power is the most economical and technically advanced of the different renewable energy technologies (see Planning Policy Statement 22: Renewable Energy). It offers benefits in terms of electricity generation that is free from emissions of carbon dioxide (the main 'greenhouse' gas associated with global warming) and other pollutants.

2.2 Wind energy is an efficient means of generating electricity. Research has shown that a modern wind turbine will recover all of the energy expended in its manufacture, operation and decommissioning within approximately three to five months[1]. Although exact figures for the energy balance for a particular wind farm will vary depending on the type of turbine, location, etc, this proposal is predicted to generate at least 50 times more energy than it costs over its 25 year projected lifespan.

2.3 The UK government, as part of its strategy to reduce greenhouse gases and tackle global warming, has now placed a national obligation on all electricity suppliers to provide 10 per cent of their electricity from renewable sources by 2010, and 15% by 2015. This is the Renewables Obligation. It is likely that these targets will be increased over time. It is these obligations on the suppliers that are driving the identification and development of wind farms in the UK.

2.4 Recent relevant policy directions by UK government for renewable energy are as follows:

- Energy White Paper (2003)
- Planning Policy Statement 1: Planning and Climate Change Supplement (2007)
- Renewable Energy Strategy (2009)
- National Policy Statements for Energy and Renewables, draft (2009)

Planning Act 2008

2.5 On-shore wind energy proposals of 50 MW or more are now to be determined by the IPC, which is the consenting authority under the provisions of the Planning Act 2008. Proposed developments that are defined as Nationally Significant Infrastructure Projects come under the auspice of the Act and are therefore subject to the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulation 2009. The IPC determines applications for development consent orders under the Planning Act 2008.

2.6 SSE Renewables proposes to submit an Environmental Statement as part of its planning application to the IPC in 2010. Accordingly, the application will be an EIA application and it has not been necessary to request a screening decision from the Commission as to whether EIA is required.

[1] Hansard, Written Answers to Questions, 4 February 2004, Jacqui Smith, Minister of State for Industry and the Regions (152448)

2.7 The purpose of an ES is to describe the proposal, predict and evaluate the impacts on the environment (both positive and negative) and identify mitigation measures that can be taken to prevent, reduce or offset any significant adverse effects arising as a result of such impacts. The EIA process begins at project initiation and progresses through several inter-linked stages:

- Scoping and pre-application discussions;
- Environmental studies, including baseline surveys;
- Preparation of an Environmental Statement (ES);
- Submission of an ES along with an application for a development consent order;
- Review and evaluation of the ES by the IPC and consultees;
- Decision; and
- Implementation and monitoring.

2.8 In reality the EIA process is both iterative and cyclic, and runs in tandem with project design. As potential significant effects are identified, the design of the project, e.g. the layout of the turbines and associated infrastructure, will be adjusted and either avoidance or mitigation measures proposed in the event that the layout cannot be adjusted. Consultation, a vital component of the EIA process, continues throughout each stage up to submission of the ES and contributes both to the identification of potential significant adverse effects and avoidance built in at the design stage, or mitigation measures to offset such effects.

2.9 In the case of the Nant y Moch scheme, which has been in development since 2005, considerable work has already been undertaken in respect of scoping and environmental research. An opinion on the scope of an EIA was given by DBERR in July 2008 and this is in presented in Appendix B. It is expected that this will form the scope of the ES that is to be submitted in support of the application for this project, but as the application is now to be for a development consent order to the IPC it has been decided that it would be advisable to request a formal scoping opinion from the IPC. Any Opinion forthcoming on the scope of EIA works that varies from the current brief will be scrutinised and scopes of work varied if required.

2.10 It is our expectation that the EIA process provides the opportunity to develop wind farm projects, for which the significant environmental effects have effectively been avoided altogether or minimised through iterative design. In many cases significant effects on, for example, ecology, archaeology and noise can be avoided through sensitive site selection, and design via the introduction of buffers zones. Others, for example the effects of construction, can be mitigated effectively through the adoption of best practice construction techniques.

2.11 At this early scoping stage, however, it is important to identify all ‘potential’ effects (either positive/negative) so that a rigorous assessment process, with input from independent experts, is followed based on sound objective evidence. The *potential* effects of the proposed Nant y Moch Wind Farm development are therefore described in Section 4 of this report.

Further Authorisations

2.12 Where any relevant authorisations are required that are associated with the development these will be highlighted in the Environmental Statement accompanying a planning application.

3 Description of the Proposal

Site location

3.1 The potential wind farm site is located east of the A487 between Machynlleth and Aberystwyth and north of the A44 between Aberystwyth and Llangurig. More specifically the site would adjoin the Nant-y-Moch Reservoir in the south east, be located to the north and east of Bont-goch, to the east of Tal-y-bont and Tre-Taliesin, to the north of Ponterwyd and to the north-east of Capel Bangor. The site is located in an area of upland rotational forestry and agricultural grazing upland. The proposed wind farm would be approximately two to three kilometres east of the existing Mynydd Gorddu wind farm at its closest point. Please see Figure 1 for the site location.

3.2 The surrounding area is typified by rural farming and upland rotational forestry. Bontgoch, approximately 3km from the western edges of the upland rotational forestry at Nant y Moch, is the only village that would be in close proximity to the proposed wind farm. However, there are a number of isolated properties, particularly situated in and around Cwm Einion (Blaeneinion, Llwyngwnau, Bronwion), Cwm Ceulan (Blaen-Ceulan), along the Afon Leri (Alltgochymynydd, Cyneiniog), and at Angler's Retreat (single isolated property)Bontgoch, Cwm Einion, that may be affected by the development.

3.3 There are no main roads in or close to the development site. Several smaller C class roads access Bontgoch and the dispersed properties in the area along the river valleys descending from Nant y Moch. Use of these roads is largely limited to residents although some use by recreational users such as walkers would be expected.

3.4 The site itself is not in any known designated areas for landscape and ecology. The nearest landscape designation to the development site is Snowdonia National Park which is located approximately 4km to the north of the proposed site. Some of the areas of the site to the east form part of the Upland Ceredigion Historic Landscape, which is not a statutory designation but an area delineated by Cadw and CCW for its historical importance. The area of the Upland Ceredigion Historic Landscape takes in a large swathe of the Cambrian Mountains and is noted for the following: prehistoric to recent mining remains and settlements; Sarn Helen Roman road; medieval settlements; Strata Florida Abbey and lands; Drovers' routes; Parliamentary Enclosures; historic literary and artistic associations and the setting for Thomas Johnes's Hafod.

3.5 There are three ecological designations within or on the edge of the development site itself. These are Mwyngloddf Brynyrafr SSSI on the east side of Drosgol, a locally prominent hill in the south of the development site, Mwyngloddfa Nant-y-Cagr SSSI, which is old mine workings on the western edge of the development site, and the Craig y Pistyll SSSI designated for moss and fern rich deposits. The nearest other protected areas are the Pencreigiau'r Llan SSSI approximately 2km to the north of the site, and the Pumlumon SSSI approximately 2km to the east of the site. In addition the Coed Cwm Einion SSSI and SAC is close to the site boundary whilst some watercourses in the site of the proposed development drain into the Penllyn a'r Sarnau SAC at the Dyfi Estuary.

3.6 Pumlumon Fawr, the locally prominent hill east of Nant y Moch, is located approximately 3km south east of the proposed site. The character area of Pumlumon Fawr is described in LANDMAP as: *Rocky series of ridges, summits reaching 727m AOD and slopes forming a plateau with extensive panoramic views in all directions, extending across an unending succession of moorland and mountain ridges. The area is unenclosed and vast in scale, wild and exposed. Streams cut into the steep slopes and there is a small reservoir located in the centre of the area. Vegetation cover is continuous windswept moorland and grass land, with nardus and fescue grassland and cotton grass and bog*

vegetation in the low-lying wet areas. The mosaic of vegetation and variations of landform and occasional rock outcrops provides subtle variations. Added to this are seasonal variations in colours. The area has no human habitation and is remote. There is limited public access consisting of a couple of footpaths.

3.7 With reference to LANDMAP, devised by the Countryside Council for Wales (CCW), it is possible to identify through the Visual and Sensory Layer the landscape character areas in and surrounding the location of the proposed wind farm. Thirteen landscape character areas have been identified that could be directly affected by a development at Nant-y-Moch.

- Afon Ceulan: classified as an Upland/Upland Valley, this character area stretches from the village of Talybont up Cwm Ceulan towards the western boundary of the Nant-y-Moch forestry plantation. The value of the landscape has been evaluated as Outstanding, on the basis of the distinctive and dramatic valley displaying the transition between lowland pasture and upland grazing.

- Pen-y-Sarn Ddu: classified as Upland/Exposed Upland/Plateau/Upland Grazing, this character area lies immediately to the east of Tre Taliesin and north of Cwm Ceulan. The value of the landscape has been evaluated as Moderate based on balancing dramatic panoramic views against a partially degraded landscape of fenced improved pasture.

- Cambrian Mountains (North): classified as Upland/Exposed Upland/Plateau/Upland Moorland, this character area extends intermittently from the Llyfnant Valley in the north to Pumlumon Fawr in the east and southwards to Cwm Ystwyth. The character area covers part of the land included within the Nant-y-Moch Wind Farm site boundary. The value of the landscape has been evaluated as Outstanding due to the remote, wild and expansive landscape with coherent and distinctive character throughout.

- Artists Valley: classified as Upland/Upland Valleys/Open/Wooded Mosaic Upland Valleys, this character area extends from Furnace up Cwm Einion (Artist Valley) to the boundary of the Nant-y-Moch forestry plantation. The value of the landscape has been evaluated as Outstanding due to the dramatic wooded valley which includes waterfalls and historic features.

- Llechwedd Melyn Scarp Moorland: classified as Upland/Hills, Lower Plateau & Scarp Slopes/Hillside & Scarp Slopes Moorland, this character area lies at the head of Cwm Rhaiadr south east of Glaspwll. The value of the landscape has been evaluated as High.

- Mynydd Bychan Woodlands: classified as Upland/Exposed Upland/Plateau/Wooded Upland & Plateaux, this character area comprises primarily areas of upland rotational forestry plantation south of Forge. The value of the landscape has been evaluated as Moderate.

- Pumlumon Moorlands: classified as Upland/Exposed Upland/Plateau/Upland Moorland, this landscape character area comprises open moorland areas lying to the north and east of Pumlumon Fawr, extending to the head of Cwm Rhaiadr in the north, to Staylittle in the east and across the A44 to the south. The character area covers part of the land included within the Nant-y-Moch Wind Farm site boundary. The value of the landscape has been evaluated as Outstanding.

- Pumlumon: classified as Upland/Exposed Upland/Plateau/Barren/Rocky Upland, this character area is focussed on Pumlumon Fawr. The evaluation of value is described as Outstanding, due to its highly dramatic and distinctive upland landscape, grass/moorland vegetation and rock exposures, and importance for tourism.

- Nant-y-Moch Reservoir: classified as Water/Inland Water (Including Associated Edge)/Lake, this character area comprises the Nant-y-Moch Reservoir and lake margins. The value of this area is evaluated as High, based on the surrounding upland landscape and the impressive and complementary feature of the dam.

- Plantation: this character classification includes the upland rotational forestry areas of Nant-y-Moch and Nant-yr-Arian. The character area covers a large portion of the land included within the Nant-y-Moch Wind Farm site boundary. The evaluation of value is described as Moderate.

- Upper Rheidol Valley: described as Upland/Upland Valleys/Open Upland Valleys, this character area covers a narrow stretch from Nant-y-Moch reservoir to Ponterwyd. The value of this area is evaluated as High, with high values ascribed for scenic quality and character, and a series of dramatic features throughout.

- Leri Valley: this character area is typified as Lowland/Lowland Valleys/Mosaic Lowland Valleys and is limited to the valley area and sides of the Afon Leri. This character area is evaluated as of High value due to the distinctive and coherently defined landscape with array of visual elements.

- Mynydd March Margins: classified as Upland/Exposed Upland/Plateau/Upland Grazing, this character area includes the upland area between the Ceulan and the Leri, and a large swathe of land between the A44 and the existing wind farm at Mynydd Gorddu. The character area covers part of the land included within the Nant-y-Moch Wind Farm site boundary. The value of the landscape has been evaluated as Moderate, predominantly because of improved pasture, limited visual interest and loss of fabric features such as hedgerows.

Outline Proposal

3.8 The proposed wind farm would generate renewable electricity from wind power. Wind power, in contrast to many other conventional forms of electricity generation, does not produce waste, emissions to air, or contribute to global environmental problems during its operational phase, and has the potential to reduce carbon dioxide (CO_2) emissions through the avoided use of fossil fuels.

3.9 The potential wind farm site is located substantially in north Ceredigion with part of the proposed site area crossing the county boundary into Powys. Figure 2 presents a proposal consisting of 80 wind turbines, although the expectation is that this is likely to be amended to approximately 65 wind turbines throughout the course of the environmental impact assessment process. Each turbine would be up to 2.5MW in capacity, giving the site an expected rated capacity of approximately 162.5MW (based on 65 turbines). This translates to an output of approximately 367,920MWhrs per annum, which is equivalent to the annual average domestic electricity needs of approximately 78,280 homes (based on an average energy consumption per household of 4.7MWhrs per year and a capacity factor of 30%).

3.10 At this stage it is envisaged that each turbine will have a maximum height to the nacelle of up to 100m, and a rotor diameter of up to 93m, giving a maximum tip height of up to 146.5m.

3.11 The indicative capacity target for SSA D set out in TAN8 is 140MW. Delivery of the Nant-y-Moch Wind Farm proposal would enable the target to be met or exceeded.

3.12 Current operational wind farms within the local area include Mynydd Gorddu (x19 500kW turbines), Rheidol (x8 300kW turbines), and two turbines above the Centre for Alternative Technology (x1 75kW turbine and x1 500kW turbine). In the general area, operational wind farms include Cefn Croes (x39 1.5MW turbines), Llangwyryfon (x11 850kW turbines), Carno (x56 600kW turbines), Carno Extension (x12 1.3MW turbines), Cemmaes (x18 850kW turbines), P&L (x103 300kW turbines) and Bryn Titli (x22 450kW turbines. Numerous other wind farm proposals have been or are expected to be lodged within the mid-Wales SSAs (B, C and D).

3.13 For the purpose of constructing the wind farm, the following will be required:

- Minor modifications of main highways to site, and upgrade of certain local roads and / or existing Forestry Commission access tracks for transporting the turbines and construction materials to site, in consultation with the Highway Agency and Highways Authorities;

- Upgrade of existing on-site access tracks and construction of new site access tracks where necessary so that the turbines can be erected at the desired locations. On site access tracks will need a running width of 6 metres, with some additional width on bends, during construction to allow wide loads and cranes to traverse the site safely. The tracks would comprise hardcore granular sub-base material and would not therefore be metalled roads. Designs can be incorporated for the tracks so that they respect and do not adversely hinder hydrological flows;

- The provision of three temporary construction compounds (up to 50 metres by 50 metres) with temporary security palisade and, a number of temporary laydown areas for the storage of large wind turbine components (each up to 150 metres by 100 metres) and a temporary batching plant for the on-site batching of concrete (up to 50m by 50m), all to be reinstated after construction;

- The provision of crane pads / hardstandings for installation cranes at each turbine location (of similar construction to site access tracks). The area of hardstanding required for each turbine would be approximately 2500m^2.

- The erection of wind turbine generators and anemometry masts on concrete foundations. For the turbines these are expected to be approximately 18m x 18m, up to 2.5m depth, sunk to 3.5m below surface level, and then covered over with up to a metre of soil and reseeded. The foundations for the anemometry masts would be approximately 8m x 8m and 1.5m depth;

- Provision of on site cabling generally along the route of the site access tracks to an on-site substation and switchgear facility (up to 100 by 200m);

- Working of borrow pits at 10 separate locations in order to source aggregate for use in construction of the wind farm. These would include some new borrow pits as well as the re-opening of certain previously worked locations. The locations identified are expected to have the potential to supply up to 520,000m^3 of crushed stone for use in construction of the wind farm.

- Felling of existing upland rotational forestry in order to allow sufficient space for the construction of the above components and suitable management of the surrounding crop; and

- Reinstatement of all temporary features of the wind farm site and commencement of habitat improvement and reinstatement measures, as agreed with consultees.

3.14 It is unlikely there will be any additional permanent features to the site except in the form of small transformers (each approximately 5.25m x 2.5m x 2.8m) next to the base of the towers. It is the developer's preference to locate transformers outside the towers on health and safety grounds. All temporary features, such as the construction compound, will be entirely removed and the area re-instated once construction is completed.

3.15 Currently there are two options for accessing the site with abnormal loads and construction vehicles. One route is from Ellesmere Port or Mostyn in the north via the M53, A55, A483 (Oswestry-Welshpool-Newtown), A470, A44 and then to site. Significant disruption is anticipated along the southern part of this route where the highway network becomes progressively narrower and hence less capable of accommodating the abnormal loads. Several route options have been proposed by various wind farm developers and a strategic study into transport issues is currently ongoing to review the issues associated with delivery of turbine components to SSAs B and C. In addition the British Wind Energy Association Wales (now Renewables UK) set up a group to address transport issues associated with delivering on TAN8 targets in September 2008. An independent consultant is developing a tool to assess cumulative AIL impacts in mid Wales and coordinate traffic management planning. At least 10 developers in mid-Wales are aiming to coordinate trial runs from Ellesmere Port to TAN8 Area B, C, and D in the first half of 2010.

3.16 Considerable congestion along this route for the duration of the construction stages for the multiple wind farms in SSAs B and C is expected and as such SSE Renewables has been investigating other options for moving transport vehicles to the site.

3.17 Another, preferred option is from Swansea docks via the A483, M4, A48, A40, A478, A487, A4120, A44 and then to site. A dry run of this route has already been conducted and it appears likely that the route is viable. The route would be as follows:

- depart from Swansea Port,

- join the M4 and on to the A48,

- A48 / A40 Carmarthen,

- A40 / A478,

- A478 / A487 Cardigan,

- A487 Aberaeron,

- A487/A4120 Penparcau (Aberystwyth),

- A4120 / A44 Llanbadarn Fawr,

- A44 / A4159 Lovesgrove, and

- A487 potential site entrance

3.18 It is likely the abnormal loads with turbine components will be routed from either Swansea or Ellesmere/Mostyn ports, whilst the construction machinery and vehicles are likely to be sourced from a regionally based supplier.

3.19 There are currently two options for accessing the Nant y Moch site from the trunk road network with abnormal loads. They would either be off the A487 at the entrance to the forestry haul track between Tre'r Ddol and Furnace, or off the A44 at the Nant yr Arian visitor centre. Other construction traffic would access the site via one or both of the options above, and off the A44 via an existing minor road which runs through the site area. A further access track to the site from the main highway at Talybont is currently under consideration but does not look likely as a viable route to site when compared with the other options.

3.20 Currently estimates of the expected vehicle movements associated with construction of the wind farm are for approximately 150,000 return journeys, including all construction vehicles from abnormal vehicles to vans transporting construction staff. An estimated 1224 return vehicle journeys for abnormal loads (turbines, transformers etc) are currently expected, although the return journeys will be with empty loads and the vehicles will be collapsed. Peak average daily movements within the locality of the wind farm are predicted to be 248 return vehicle movements a day. AIL deliveries would be expected over a period of 10 months: at their peak they will equal no more than 6 movements per day.

3.21 Construction of the wind farm is expected to last for 30 months. Construction would be timed to commence no earlier than 2013, subject to the relevant approvals.

3.22 In regard to the grid connection for the development, the wind farm will have a dedicated 132kV connection from the Nant y Moch site to a very large substation (the "hub" substation) being proposed by NGET. This substation will serve Strategic Search Areas B, C and D. The location of the hub substation within the County of Powys has not as yet been identified by NGET. The NGET substation will itself be connected by a lengthy new 400kV line which will be promoted by NGET.

3.23 SSE is intending to promote, and construct, the 132kV line from the wind farm to the NGET substation. The 132kV connection is expected to be a wooden pole line and would itself be subject to the requirement for an IPC development consent order.

3.24 NGET are only at a preliminary stage in terms of identifying the route of the 400kV line and the location of the substation. The substation will be a planning application to Powys County Council, as "associated development" is not permitted in Wales under the IPC regime.

3.25 NGET started national and regional consultation in relation to the substation and the 400kV line project in Spring 2009. More detailed consultation began in August 2009 and is expected to continue until winter 2011 after which the applications will be finalised and submitted.

3.26 The grid connection will be subject to a high level assessment as described in Section 4 below.

3.27 Project operation will entail the following:

- Wind turbines generally start to generate electricity when wind speeds at the nacelle (top part of the tower) achieve approximately 4 metres per second. They normally

attain their maximum output at around 12-15m/s. At windspeeds above 25m/s the turbines will automatically shut down for operational and safety reasons;

- When generating, the rotational speed of the blades is determined by the turbine gearbox, an asynchronous generator and its connection to the national grid frequency, in conjunction with the wind turbine's control algorithms. The output is three-phase power output at 690V, which is conducted to the base of the tower via internal cables. Here it is stepped up to a higher voltage of 11kV or 33kV by a transformer and then transferred to the site substation via underground cable, for export to the grid;

- The blades will rotate clockwise (when viewed upwind), in the same direction, and average 9 to 19 revolutions per minute, dependent on windspeed and final turbine model selected;

- During the site operational period the existing agricultural activities can continue up to the base of the wind turbines. In plantation areas, normal forestry activities will also be maintained outwith the area that was cleared for turbine installation. Within this area, natural regeneration of positive habitat management will provide for enhanced ecological value where appropriate. However, certain potential maintenance operations may require the area to be cleared. Given the minimal land loss associated with the scheme, land use throughout the site will largely remain unchanged; and,

- Turbines generally have an operational life of approximately 25 years. After that time, all above ground and surface features will be removed entirely from the site unless repowering is considered.

3.28 Decommissioning of the wind farm site will be secured through a Decommissioning Bond or equivalent (e.g. parent company guarantee) set up through agreement between the developer and the local authority and/or the IPC. Decommissioning is likely to take up to 18 months.

3.29 The wind turbines will be dismantled and removed from the site, at which stage they will either be sold on to another scheme or recycled at an appropriate site. The on-site access tracks will also be removed unless the landowners express a preference to retain them.

3.30 Site cable runs and below ground elements of turbine and met mast foundations are likely to remain in situ unless otherwise agreed with the relevant planning authority and consultees.

Alternative Considerations

3.31 The Nant y Moch wind farm development site is within Strategic Search Area D, an area of land identified under TAN8 as a wind farm zone capable of delivering 140MW installed capacity. The selection of the site by SSE Renewables was consequently based on devolved policy from the National Assembly for Wales. SSE Renewables was awarded the rights to develop the site by Forestry Commission Wales, whilst it also signed up the rights to develop land adjoining the upland rotational forestry through agreements with a large number of local private landowners. The selection of the Nant y Moch site was predicated therefore on national policy which spatially prescribed this area for wind energy development. Whilst no other sites were considered by SSE

Renewables in tendering for the rights to develop Nant y Moch, it is currently pursuing considerable opportunities for developing wind energy throughout the United Kingdom.

3.32 Currently alternative power line routes to the site are being considered, as explained above. The grid connection options for the 132kV line to the NGET hub substation are being investigated by SSE Renewables, and alternatives will be outlined and explained in a separate application for a development consent order.

3.33 Given that SSE Renewables has been investigating the potential for a wind energy scheme at this location for over 3 years, a number of different designs for wind farm infrastructure and turbine locations have been considered. These have been evaluated on the basis of their practicality in optimising wind energy capture at the site, whilst ensuring that the designs have protected known sensitivities in and around the site, including ecology, visual amenity, noise sensitive properties, rights of way, archaeology, and hydrological features. A full explanation of the design process and the evolution of the site will be presented in an ES supporting an application for a development consent order.

3.34 A range of turbine options has been considered at the site. Based on currently available commercial wind turbines it has been established that turbines in the range of 2 – 2.5MW would be appropriate for the site. Due to the presence of upland rotational forestry, it is necessary to attempt to clear the canopy of the trees by ensuring hub heights are as high as possible in order to reduce the dampening effects of the trees on the wind resource and hence energy capture. As such 100m towers are proposed. The rotor diameter on such turbines will be approximately 93m, which will permit the optimal harnessing of the wind across the site.

3.35 A full explanation of the site selection, design criteria, consideration of alternative designs and components, and the evolution of the design of the development site will be presented in an ES.

Relevant policy and planning authorities

Draft National Policy Statements

3.36 A development of this scale is defined as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008. As such the relevant consenting body would be the IPC. Relevant policy in the form of National Policy Statements is currently drafted and has been issued for consultation. Relevant to this particular development are draft NPS EN-1 Overarching Energy Issues, and draft NPS EN-3 Renewable Energy.

3.37 Draft NPS EN-1 Overarching Energy Issues sets out the case for a diverse energy mix and the imperatives of addressing climate change and security of supply. The NPS highlights the importance of renewable energy as a potential source of low-carbon electricity generation. The Government believes that we need 43 GW net additional electricity capacity by 2020 and 60 GW by 2025, of which 26 GW and 35 GW respectively are expected to be delivered by renewable energy sources. Whilst the UK has committed to sourcing 15 per cent of its total energy from renewable sources by 2020, the Government's lead scenario in its Renewable Energy Strategy 2009 suggests that as much as 30 per cent could be delivered by 2020. The draft NPS explains that "the Government's policies in its Renewable Energy Strategy, designed to meet its EU target for significant increases in the proportion of energy supply from renewable sources, mean that a very large amount of new renewable energy generation capacity will be needed (para 3.3.8)". The central role of onshore and offshore wind energy for

providing this new renewable energy is expressly acknowledged. The draft NPS sets out five guiding principles for the IPC when determining applications:

- If the development contributes to meeting the need and is in accordance with the NPS then consent should be given.
- Regard should be had to local impact reports (produced by local authorities) and other matters considered relevant and important.
- National, regional and local benefits (environmental, social and economic) should be taken account of.
- Adverse impacts should be considered, along with longer-term and cumulative impacts, and proposed mitigation measures should be set out.
- If the IPC considers that the adverse impacts (after mitigation) outweigh the benefits, then consent should be refused.

3.38 Draft NPS EN-3 Renewable Energy is the primary decision-making guidance document for the IPC on nationally significant onshore renewable energy infrastructure projects in England and Wales. Section 2.7 on onshore wind provides detailed guidance, and states that onshore wind farms are the most established, large-scale source of renewable energy in the UK, and that onshore wind farms will continue to play an important role in meeting the UK's renewable energy targets. Applicants for onshore wind farms are instructed that all impacts of a proposal should be identified, together with proposals for their avoidance or mitigation wherever possible. The following advice is provided in EN-3:

- 2.7.7 it is the decision of individual applicants as to whether a wind resource assessment for a wind farm is required or not;
- 2.7.9 advises that the two main impact issues that determine the acceptable separation distances between houses and turbines are visual amenity and noise. It advises that appropriate distances should be maintained between wind turbines and residential properties to protect residential amenity; and
- 2.7.10 identifies that separation distances between turbines, whilst usually 6 rotor diameters in the prevailing wind direction and 4 rotor diameters perpendicular to this, is a matter for the applicant to determine.

3.39 Further detailed advice in EN-3 relates to the following:

- access routes;
- decommissioning;
- project lifetimes;
- temporary nature of wind farm developments;
- flexibility in applying the 'envelope' approach to applications;
- micrositing of turbines;
- biodiversity and geological conservation;

- historic environment;
- landscape and visual matters;
- noise;
- electrical grid connection;
- shadow flicker; and
- traffic and transport.

Renewable Energy Strategy 2009

3.40 In 2009 UK Government issued the Renewable Energy Strategy 2009. Whereas the Government had been working towards a UK 2020 target of 20% of electricity coming from renewable sources, the adopted scenario in the RES is that this figure is now to be raised dramatically. The Government has signed up to the EU requirement that 15% of all energy consumed in the UK should be from renewable sources by 2020, but as the RES points out this also covers fuel and heating – i.e. all energy sources and not just electricity. In the light of the difficulties in providing significant elements of fuel and heating from renewables by 2020, the proportion of electricity supply that will have to come from renewables to balance this out will need to be raised substantially, to 30% or more.

3.41 Onshore wind and offshore wind are expected to provide about 64% of all the electricity from renewable sources by 2020, made up of 29% onshore and 35% offshore. This is estimated to mean that a potentially further 6000 wind turbines will need to be installed onshore by 2020 and 4000 offshore (where turbine sizes are bigger).

3.42 The RES also proposes major changes to the grid infrastructure and indicates new grid interconnectors to facilitate export of both onshore and offshore wind away from the production areas to the areas of greatest consumption. One of the key features set out in the RES is that instead of looking forward to 2020 as the next target date, the EU Directive requires that every two years each Member country has to submit details of its performance on the targets against indicative levels that have to be met to keep the country on its trajectory to meet the 2020 figure. Therefore instead of looking 11 years ahead, there will be benchmark targets as early as 2011-2012, and further steps along the way all of which are expected to be met. Given that the UK starts out from the position that it is already well behind the prospects of meeting the 2010 target of just 10% of electricity from renewables, the need for a rapid escalation of renewables electricity and especially onshore wind in the coming months is quite clear. All regions are now expected to carry out detailed resource and constraints planning, but the RES makes it clear that the Government expects each to contribute its proportion of the overall target.

NAfW Ministerial Interim Planning Policy Statement (MIPPS) and Technical Advice Note 8 (TAN8)

3.43 The National Assembly for Wales does not have devolved powers on energy and as such relevant policy and guidance on energy emerges from UK Government. However, Wales does have devolved land use planning powers. In July 2005 the Ministerial Interim Planning Policy Statement (MIPPS) was issued along with Technical Advice Note 8: Renewable Energy. The MIPPS supersedes certain sections of Planning Policy Wales 2002 (PPW). Current land use planning policy is contained in PPW which provides the

strategic policy framework for the effective preparation of local planning authorities' development plans. This is supplemented by 20 topic based Technical Advice Notes (Wales) (TANs), including TAN8 on renewable energy.

3.44 The MIPPS amends sections 12.8 to 12.10 of the PPW and it provides the impetus for TAN8, identifying the need for renewables and the potential for 800MW in renewables.

3.45 Technical Advice Note 8: Renewable Energy provides technical advice to supplement the policy set out in PPW and the MIPPS on Renewable Energy. The TAN8 identifies that the Assembly Government has a target of 4TWh of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020. In order to meet these targets the Assembly Government has concluded that 800MW of additional installed (nameplate) capacity is required from onshore wind sources and a further 200MW of installed capacity is required from off shore wind and other renewable technologies.

3.46 TAN8 concluded that, for efficiency and environmental reasons amongst others, large scale (over 25MW) onshore wind developments should be concentrated into particular areas defined as Strategic Search Areas (SSAs). Nant y Moch is one such SSA. The guidance in the TAN on the SSAs is as follows:

The SSA boundaries are at a "broad brush" scale. Not all of the land within the SSAs may be technically, economically and/or environmentally suitable for major wind power proposals; however the boundaries are seen as encompassing sufficient suitable land, in one or more sites, to deliver the Assembly Government's energy policy aspirations. It is a matter for local planning authorities to undertake local refinement within each of the SSAs in order to guide and optimise development within each of the areas. If there is robust evidence that land outside (but close to) the SSA is suitably unconstrained local planning authorities might wish to consider the possibility of development of wind farms in these areas as well.

3.47 The TAN identifies that each of the SSAs has an indicative target. The target for SSA D Nant y Moch is 140MW. Further guidance explains the principles for identifying the SSAs:

- extensive areas with a good wind resource (typically in excess of 7 metres per second);
- upland areas (typically over 300m above ordnance datum) which contain a dominant landform that is flat (plateau) rather than a series of ridges;
- generally sparsely populated;
- dominated by conifer plantation and/or improved/impoverished moorland;
- has a general absence of nature conservation or historic landscape designations;
- of sufficient area to accommodate developments over 25MW, to achieve at least 70MW installed capacity and to meet the target capacity; and
- largely unaffected by broadcast transmission, radar, MoD Mid Wales Tactical Training Area (TTA) and other constraints.

Local Planning Authorities

3.48 The two principal local planning authorities within whose administrative areas the potential wind farm site will be located are Ceredigion County Council and Powys County Council. Their relevant development plan frameworks are presented below.

Ceredigion County Council

3.49 Work on the Ceredigion draft Unitary Development Plan 2001 – 2016 (Deposit Version 2002) has now ceased and the Council is instead focussing on the preparation of the Local Development Plan, as required under the Planning and Compensation Act 2004. However, the draft UDP is still considered to be relevant in determining planning applications. Relevant policies include:

- GEN2.2: Development in Rural Areas,
- GEN4.1: General Planning Principles,
- ENVL1.1: Special Landscape Areas,
- ENVL1.2 Landscape Considerations,
- ENVL1.4: Protection of Agricultural Land,
- ENVL1.5: Protection of Individual and Groups of Trees,
- ENVL1.6 Hedgerows,
- ENVL1.7 Forestry Operations,
- ENVL1.8: Ancient Woodlands,
- ENVL1.11 Historic Landscapes,
- ENVN1.1 Biodiversity Conservation,
- ENVN1.3 National Nature Conservation Sites,
- ENVN1.5 Species Protection,
- ENVB1.4 Conservation Areas,
- ENVB1.8 Development Affecting the Setting of a Listed Building,
- ENVB1.13 Archaeological Sites,
- ENVE1.3 Wind Energy Developments,
- ENVE1.4 Individual Turbines,
- ENVM1.12 Borrow Pits,
- ENVM1.13 Peat,
- ENVP1.1 Availability and Protection of Water Resources,

- ENVP1.2 Water Conservation,
- ENVP1.3 Pollution,
- ENVP1.4 Air Quality,
- ENVP2.1 Flooding, and
- ENVP2.2 Surface Water Drainage

3.50 Policy ENVE1.3 on Wind Energy Developments states the following:

In designated areas and localities, wind energy developments will only be permitted provided the impact of the development is judged to be, or by practicable mitigation measures capable of being, compatible with the purpose of the designation.

In non-designated areas, wind energy developments will be permitted provided:

1. The development would not have an unacceptable impact on the landscape settings of towns, villages, scattered settlements and holiday parks;

2. The appearance, siting and arrangement of associated developments, such as access roads, power lines, ancillary buildings and structures, fences, etc., would not significantly detract from the visual appearance of the area, nor from the amenities enjoyed locally. It will be expected that all such developments be kept to a minimum, and it is desirable that all or part of new connections to the National Grid will be located underground;

3. The development would not lead to noise levels detrimental to the amenity of occupiers of nearby properties, of holiday accommodation or of the surrounding area. In particular, wind farm noise should be within the limits advised by the DTI Working Group on Wind Turbine Noise, at any dwelling. In assessing the impact of the noise it must be recognised how much of an effect topography and local conditions can have;

4. The development would not lead to any significant risk or nuisance to the public arising from the wind turbine structures, shadow flicker or visual disturbance caused by the rotation of the turbine blades. In particular there should be no such risks on or near to public roads and public rights of way;

5. The development will not lead to any television or radio interference, or interference to other telecommunications services, and especially those of the emergency services. It may however be possible to agree arrangements for remedial measures where the consequences of development are difficult to assess;

6. Provision is made for the removal of all temporary structures, plant and equipment from the site and the restoration of land, including the access roads after completion of the construction phase;

7. Provision is made for the removal of all structures, plant and equipment including the turbine(s) from the site and the restoration of the land following cessation of the production of electricity from the turbine(s). The period of restoration work shall be linked to the date of cessation and will be determined before any permission is granted;

8. Wind turbines shall be sited in sympathy with existing landscape features particularly where they adjoin a hilltop or ridge. In such cases any turbines should be sited below the level of the hilltop or ridge so as to reduce their impact. Where turbines constitute a wind

farm they shall be grouped in a formation to reflect the topography of the locality. In assessing compliance with this criterion, particular consideration will be given to the visual impact from near and distant viewpoints;

9. The site is not within 5 km of another existing or authorised wind farm;

10. The siting and design of the wind farm will not have an unacceptable impact on the natural environment;

11. The development would not have an unacceptable landscape impact when viewed from National Parks adjacent to Ceredigion.

3.51 Consultation on the pre deposit version of Ceredigion LDP Preferred Strategy 2007 - 2022ceased in April 2009. The key strategic policies of the preferred strategy include:

- Policy 6: Development in the Open Countryside,
- Policy 15: Energy Sources,
- Policy 17: Biodiversity and Nature Conservation,
- Policy 18: Landscape,
- Policy 20: General Environmental Protection, and
- Policy 22: Transport.

3.52 Policy 15 on energy sources states the following:

The LDP will facilitate the development of additional renewable energy generating capacity and associated reduction in carbon emissions by:

1. Jointly with Powys, providing for the delivery of the Assembly target of 140 MW capacity from large scale wind turbines within the refined boundary of the Nant y Moch Strategic Site Search Area (SSA D), illustrated at Figure 3.

2. Not permitting medium sized wind farms outside the refined SSA D;

3. In respect of community wind farms and single wind turbines, taking a positive and encouraging policy stance.

4. In respect of other forms of renewable energy generation developments, adopting a permissive approach to such developments.

5. Adopting a permissive approach to micro-generation technologies except where it would be more efficient in new development to install district heating and/or electricity generating schemes.

3.53 Until the LDP is adopted, the existing Dyfed Structure Plan remains the relevant adopted Development Plan for the County. The Structure Plan, adopted in November 1990, is largely out of date with current UK and Welsh Assembly policy and planning policy guidance. The remaining policy, EN18, on renewable energy is as follows:

EN18: it is the policy of the County Council to encourage development proposals for energy conservation for the use of renewable energy sources where they:

(i) have regard to the character of the area

(ii) are to be built to a high standard of design, layout and materials

(iii) do not create any significant transport, amenity, or public service provisions objections

(iv) area limited in countryside locations to developments for which such a location is essential

(v) minimise any adverse effects upon agriculture or forestry

(vi) make use wherever possible of existing derelict areas or redundant buildings.

Powys County Council

3.54 The development plan for Powys comprises the Powys Unitary Development Plan, adopted in March 2010. Work is currently underway to consolidate the Deposit Draft Unitary Development Plan with the 2007, 2008, 2009 and 2010 modifications. Once this work is complete the Adopted Powys Unitary Development Plan will be made available Relevant policies under the Plan that may be altered as modifications are incorporated are as follows:

- POLICY ENV 1: Agricultural Land,
- POLICY ENV 2: Safeguarding the Landscape,
- POLICY ENV 3: Safeguarding Biodiversity & Natural Habitats,
- POLICY ENV 4: Internationally Important Sites,
- POLICY ENV 5: Nationally Important Sites,
- POLICY ENV 6: Sites of Regional & Local Importance,
- POLICY ENV 7: Protected Species,
- POLICY ENV 14: Listed Buildings,
- POLICY ENV 15: Demolition of Listed Buildings,
- POLICY ENV 16: Landscapes, Parks and Gardens of Special Historic Interest,
- POLICY ENV 17: Ancient Monuments & Archaeological Sites,
- POLICY ENV 18: Development Proposals Affecting Archaeological Sites,
- POLICY ENV 19: Amenity Open Spaces,
- POLICY E3: Wind Power, and
- POLICY E4: Removal of Redundant Wind Turbines.

3.55 Policy E3 on wind power states the following:

The council will approve applications for windfarms including extensions to existing sites and individual wind turbine generators where:

1. They do not unacceptably compromise the environmental and landscape quality of Powys, either on an individual basis or in combination with other proposed or existing similar developments. Where the cumulative impact of proposals in combination with other approved or existing windfarms would be significantly detrimental to overall environmental quality they will be refused.

2. They do not compromise or threaten wildlife habitats or species that are of international, national or local importance.

3. They do not significantly threaten the health or amenities enjoyed by the occupants or users of sensitive properties (usually dwellings) by reason of noise, vibration, shadow flicker or reflected light.

4. They do not unacceptably impact upon any buildings or features of conservation or archaeological interest.

5. They do not compromise the enjoyment and safe use of highways and the public rights of way network, especially bridleways (including during the construction phase).

6. They would be capable of being served by an acceptable means of highway access and any new roads and accesses required would not have unacceptable environmental impacts.

7. Applicants are able to demonstrate through land management schemes that there would be adequate mitigation or compensation for any adverse impact on environmental quality, wildlife habitats or heritage features.

8. Any ancillary structures or buildings are so sited and designed (including the use of locally appropriate construction materials) so as to adequately blend into their setting.

3.56 The above policy does not appear to be in line with current NAfW planning policy guidance in the MIPPS 2005 and TAN8, particularly with respect to the prescribed spatial Strategic Search Areas. This is fundamental given that Powys has 3 SSAs located within its administrative boundaries.

3.57 Powys County Council's response to the MIPPS and TAN8 was the issue of *Interim Development Control Guidance for Onshore Wind Farm Developments* in 2008 following a refinement study of the SSAs. It is understood that the refinement study did not entail minor adjustments of the SSA boundaries but considerable removal of significant areas within the SSAs. The current weight to be attributed to the interim development control guidance is unclear.

3.58 The Council is currently not very well advanced in the preparation of the Local Development Plan. The Council consulted on a Draft Delivery Agreement for the Powys LDP in June 2008. Since this consultation, the Council has received a direction from the Welsh Assembly Government in relation to the Powys Unitary Development Plan which has delayed the preparation of the Powys Local Development Plan.

3.59 The Council has stated that it intended to consult on a revised Draft Delivery Agreement for the Powys LDP in 2009, but nothing further has been progressed. It is anticipated that the preparation of the Powys LDP will commence in April 2010.

4 Environmental baseline and potential effects

4.1 Although the wind farm layout has not yet been fully established, past experience of wind farm developments, combined with some knowledge of the baseline environment of the site, enables the possible significant effects of the wind farm development on the environment to be identified.

4.2 Consultation has been held with key consultees, including the two relevant local authorities, CCW, the RSPB, Cadw and the Environment Agency Wales. These discussions will help identify possible effects and ensure that the development of the proposal is as responsive as possible to local issues and concerns. Such consultations are ongoing.

4.3 This section is structured to present the general approach to surveys to establish the environmental baseline for the site area, and how predictions of effect are undertaken. Information is also provided on initial features or sensitivities that may be relevant to each environmental discipline. More detailed presentations of the methodologies of surveys and environmental assessments are presented in Section 5 of this report, including the methods for determining 'significance'.

4.4 Whilst we have presented below the typical environmental disciplines requiring environmental assessment for a wind energy development, e.g. landscape and visual, noise, ecology etc, this is not meant to prejudice the eventual scope of EIA works which is a matter for IPC to determine.

4.5 Establishing the baseline environment will entail a description of the environment in and around the area of the proposed development as it currently exists, and the predicted state of the environment if the proposal is not implemented over the lifetime of the development. The study areas for each environmental discipline are set out in each of the sections below. The assessment of the effects of the proposal will entail a comparison between this existing and predicted baseline and the predicted state of the environment at key stages in the lifetime of the proposed development.

4.6 In terms of assessing the predicted effects of the development, all of the environmental disciplines presented below will assess the effects of the construction, operation and decommissioning of the proposal. In addition, mitigation measures designed to negate significant effects will be prepared where relevant alongside each discipline. Where required the cumulative and sequential effects with other developments will be taken into account in the assessment process.

Landscape and Visual

Baseline

4.7 The proposed wind farm at Nant y Moch comprises several areas described under LANDMAP, which is a CCW derived GIS (Geographical Information System) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. The 6 LANDMAP areas comprising or on the edge of the Nant y Moch development are:

4.8 **Artists Valley**: *Distinctive wooded upland valley with rugged valley sides and hummocky skyline. Imposing and highly dramatic in places. These are glimpsed through deciduous woodland along the only road through the area. The stream corridor is occasionally visible adding movement and light. It is fast flowing and tumbles over*

boulders and waterfalls. Along the valley base, small irregular improved pasture fields are enclosed by fences, with woodland in field corners and occasional overgrown hedges. The fields are bright green and contrast with the tan colours of bracken and dark green of gorse. At the entrance to the valley is a historic mill, adjacent to a cascading waterfall and this provides a dramatic feature along the main road. There is also some evidence of past mining. Plantations exist to the east, although these are generally not visible within the wooded valley.

4.9 **Llechwedd Melyn Scarp Moorland**: *A transitional landscape type between the Plinlimon Upland Moorlands and the more regulated /cultivated farmlands of the Dyfi Valley, the aspect displays a variety of landcover with open moorland type heather and bracken scrub on the upper levels and a weakly enclosed marginal grazing land on the lower slopes. Steep plateau edge the area is a distinct landform that affords some dramatically beautiful views over the Dyfi Valley, rock exposure and scree are a frequent feature along the plateau edge.*

4.10 **Mynydd Bychan Woodlands**: *Extensive predominantly single species forestry in its upper levels that sits at odds in the landscape and in harsh contrast to the open moorland of the Plynlimon Moorlands. Greater species diversity and "feathering" of the mass planted structure is achieved on the lower slopes where the plantation follows drainage patterns and follows valleys coming off the plateau side. A more diverse visual appeal than other upland forestry within the study area.*

4.11 **Nant-y-Moch Reservoir**: *Large reservoir occupying head of Rheidol Valley and retained by dam which towers spectacularly above the Rheidol Valley. Edges are generally sharp and follow the sinuous curves of the valleys in which it sits. The surrounding landscape is barren and open although increased enclosure is provided by steeper valley sides to the north and plantations to the southwest. Elsewhere, the adjacent landscape slopes more gently to the waters edge. The reservoir forms a dramatic and interesting feature within the visually simple and open landscape*.

4.12 **Pen-y-Sarn Ddu**: *Exposed upland plateaux with improved pasture enclosed by a mix of stone walls and gappy overgrown hedges and fences. Some local exposures of rock occur, along with evidence of past mining activity, such as spoil heaps and derelict stone buildings. Tree cover is windblown and generally sparse. Wet flushes and gorse contrast the smooth green pasture and add interest. There are extensive open panoramic views west and north across Dyfi Estuary and marshland and also east to Cambrian Hills. The area is sparsely populated and feels remote*.

4.13 **Plynlimon Moorlands**: *An extensive complex of open moorland that occupies much of the borderlands between Ceredigion and Montgomeryshire. Wide expanses of heather and bilberry low vegetation with numerous stream courses including the source of the River Severn and River Wye, exposed rock outcrops and screes are frequent features in the higher areas. Open, exposed wide skies dominate with long distance dramatic views north towards the upland peaks of SNP, Cadair Idris and west to Plynlimon in Ceredigion.*

Study Area

4.14 The study area for the LVA will be established in accordance with current guidance. It is expected that the LVA will require a 35km study area for assessing the effects of the proposed development and a 60km study area for the cumulative assessment. Only those projects either operational, under construction, consented or in the planning system will be included within the cumulative assessment. However, if there are any other schemes not yet in planning but which are expected to be submitted as

applications during the timeframe for the Nant y Moch determination these may also be taken into consideration.

Landscape designations

4.15 The potential wind farm is not located within any national landscape designation. The nearest national park is Snowdonia National Park, approximately 4km north of the site boundary. The site does however fall within the Ceredigion Uplands Special Landscape Area under the Ceredigion County UDP.

Potential effects

4.16 Landscape and visual effects are perhaps the most obvious of an operating wind farm, and while opinions on this are individual and varied, a clear and objective assessment of effects can be made using established guidance and procedures. The effects of the proposed wind farm on the landscape are assessed on the basis of the magnitude of change that this will bring, and the sensitivity of the receptor (for example area of landscape or viewpoint) to that change. The presence of a designated area is one factor that would increase the sensitivity of receptors.

4.17 The size and scale of a wind farm in particular determines the extent of the impacts on the landscape and visual amenity, in addition to the presence of existing features in the landscape and the scale and character of the landscape. The landscape and visual impacts can be reduced and modified through careful site design, layout and choice of turbine.

Landscape fabric and character

4.18 The wind farm will potentially affect the landscape fabric and character of the landscape within which it is located by altering the existing baseline condition. Given the landscape character of the site it is possible that the wind farm is likely to have a localised significant effect on the landscape character area, subject to the finding of a detailed assessment, within which the wind farm sits. Landscape fabric (the actual composition of the landscape in terms of field patterns, hedgerows, built infrastructure etc) may potentially be affected to a minor degree, but this can often be offset with enhancement and mitigation measures to restore the landscape features of the site.

Visual amenity

4.19 The location of this wind farm is likely to impact on some aspects of visual amenity, due to its proximity to a number of settlements and individual properties. Under ideal conditions it is reported that turbines can be discerned in views of up to 20-30km and more. At this range they are however only marginally visible, and only when the visibility conditions are near perfect. At this range the effects of the wind farm on the visual amenity are generally very limited. It is only at a much closer range that significant effects on the visual amenity might be expected. The exact range at which these effects might become significant depends on the detailed layout of the wind farm, the location of the viewpoint and the context of the view. As a result of the combinations of factors, which will result in significant (or otherwise) effects, it is not possible to predict a distance within which all effects will be significant. Depending on circumstances the effect on some closer views may be not significant due for example to topography screening views, whilst others from a greater range may be significant as a result of the specific context, for example due to the high sensitivity of that receptor, and content of the views.

4.20 The visual receptors of greatest sensitivity are likely to include the villages, settlements and individual properties surrounding the site. These settlements and properties include Bontgoch/Elerch and houses at the eastern end of Artists Valley.

4.21 Larger settlements within 20km include Machynlleth and Aberystwyth. There will be no views of the site from Machynlleth, and distant views of approximately 10 km from Aberystwyth.

4.22 Consultations on appropriate viewpoint locations for the Landscape and Visual Assessment have been undertaken with relevant statutory bodies, including Ceredigion and Powys County Councils, and CCW. The list of preliminary viewpoints for analysis are as follows:

Vpt. No.	**Viewpoint**	**Grid Reference**	**Distance from turbines (km)**
1	Plynlimon Fawr	278963, 286898	3.8
2	Foel Uchaf	280330, 291123	2.9
3	Aberdyfi	261326, 295915	9.8
4	Cefn Croes*	280845, 280071	8.5
5	Wellington Monument, Pendinas Hill	258479, 280232	13.2
6	A4120 Capel Seion	263461,279289	9.9
7	Ffridd Rhosfarch, Near Pennal	268677, 302554	9.25
8	Public House, Talybont	265467, 289165	3.5
9	A493, Pennal	270319, 300409	6.5
10	Bryn Dinas	263950, 299684	10
11	Public House, Rhyd y Pennau	262941, 285915	7
12	A485/Approach to Ledrod	264106, 269914	17.6
13	Cadair Idris	270997, 312152	17.5
14	A4120, west of Devil's Bridge	270685, 278383	7.6
15	Bont Goch	268883, 286756	1
16	B4353, Borth	261486, 292830	8.1
17	Cefn modfedd	278600, 297000	5.3
18	A482, north of Llanddeinio	256335, 273654	18.9
19	Nant-y-Moch reservoir dam	275563, 286248	0.6
20	A493, Nant Cwm-sylwi	267788, 298931	7.2
21	A485, north of Tregaron	267467, 260936	25.4

22	A493, north of Machynlleth	275092, 302260	7.5
23	Dyfi Forest	280462, 309399	16
24	Afon Dyfi, west of Cemmaes	281716, 305112	13
25	B4343, Ffair -Rhos	273963, 268092	17.9
26	Borth Station	260931, 290089	8
27	Beach at Ynyslas	260784, 294062	9.2
28	Foel Fadian	282832, 295363	6.9
29	Nant-y-Moch road, north of Ponterwyd	275128, 281872	4.2

4.23 The above list is currently the subject of finalisation with CCW and the relevant local planning authorities.

4.24 In addition to the above, visual impact upon areas of tourist activity or amenity may also prove significant. These areas include:

- Nant y Arian Forest Visitor Centre;
- Snowdonia National Park;
- Glyndwr's Way National Trail; and
- Pumlumon.

Cumulative effects

4.25 The assessment will consider the cumulative landscape and visual impacts of the proposal in relation to wind farms within a specified radius of the site, to include those which are built, with consent and not yet built, and those for which applications for consent have been submitted but are still within the determination process as at a date to be agreed with the local planning authority. At this current time, cumulative sites include Mynydd Gorddu (x19 500kW turbines), Rheidol (x8 300kW turbines), and two turbines above the Centre for Alternative Technology (x1 75kW and x1 500kW turbines). In the general area, operational wind farms include Cefn Croes (x39 1.5MW turbines), Llangwyryfon (x11 850kW turbines), Carno (x56 600kW turbines), Carno Extension (x12 1.3MW turbines), Cemmaes (x18 850kW turbines), P&L (x103 300kW turbines) and Bryn Titli (x22 450kW turbines). Numerous other wind farm proposals operational, under construction, consented, submitted or expected to be lodged within the mid-Wales SSAs (B, C and D) and in the region and within the study area generally include:

Blaengwen/Alltwalis	Bryn Titli
Braich Ddu	Bryngydfa
Brechfa Forest	Carno 3
Carreg Lwyd Hill	Carnedd Wen

Cefn Croes	Cemmaes 3
Derwydd Bach	Esgair Cwmowen
Hafoty Ucha	Llangwyrfon
Llandinam RePowering	Llaithddu
Llanbadarn Fynydd	Llanbrynmair South
Llanfynydd	Mynydd Waun Fawr
Mynydd Clogau 1	Mynydd Clogau 2
Mynydd y Gwynt/y Foel/Sweet Lamb	Nant Bach
Neuadd Goch	Tirgwynt
Waun Garno	Wern Ddu

4.26 All these sites will be appraised to determine whether they will be included in the cumulative landscape and visual assessment.

Linear sequential effects

4.27 The size and scale of the proposed wind farm indicates that the experience of travellers is likely to be affected from some local roads and public rights of way. The assessment will take account of the sequential appreciation of the wind farm (including any cumulative effects with other wind farms as described) as this affects the landscape resource, the perception of this and the visual amenity.

4.28 There are two public roads within the site boundary, a minor road routed from Ponterwyd to Nant y Moch and a further road from Talybont to Nant y Moch. There are a number of public rights of ways within the site boundary.

Construction and other effects

4.29 The development of the proposed wind farm will potentially have different effects on the above considerations during the different phases of its lifecycle and these will be considered through the assessment. Typically the resultant effects associated with construction, operation, and the decommissioning impacts of the wind farm and any changes subsequent to this would be considered within the assessment. Please refer to the appendices which outline the proposed assessment methodology.

Ecology and nature conservation

Study Area

4.30 The study area for the ecological assessment is focussed on covering all land within 500 metres of the site boundary for the development. The cumulative ecological assessment, largely relating to species that can move over significant distances, e.g. birds and bats, will take into consideration other relevant developments within 10km of the site boundary.

Baseline

4.31 There are no international ecologically protected areas such as SPAS, SACs and Ramsar sites that may be affected by the proposed development. As such an appropriate assessment under the Habitats Regulations is not required.

4.32 The site boundary encompasses a number of small SSSIs, including the Craigpistyll SSSI (moss and fern rich deposits), and Pen creugiau'r SSSI to the north which has an expansive area of upland plant communities. Plumlumon SSSI lies to the south and east of the site and is another important expansive habitat that supports a large number and variety of raptors. In addition the Coed Cwm Einion SSSI and SAC is close to the site boundary whilst some watercourses in the site of the proposed development drain into the Penllyn a'r Sarnau SAC at the Dyfi Estuary.

4.33 The proposed site encompasses three main river catchments: Afon Leri, Afon Einion and Afon Rheidol. Each of these may be important spawning areas for salmon, sea trout, brown trout and lamprey. The upper watersheds of these rivers may provide habitat for protected species such a water vole and otter.

4.34 Peatland habitats are highly likely to be present within the site boundary, the extent and condition will need to be assessed.

4.35 Apart from the coniferous forestry, a wide range of habitat types have so far been recorded. These include extensive swathes of unimproved and semi-improved acid grassland, a number of large blocks of acid dry dwarf shrub heath and smaller areas of wet dwarf shrub heath. Other habitats that featured strongly were marshy grassland, wet modified bog and blanket bog.

4.36 The majority of the grassland in the study area was categorised as acid grassland and comprised examples of both unimproved and semi-improved. Extensive areas of unimproved acid grassland are found on the western flank of Banc Llechwedd Mawr in the east of the study area, and between Bryn Mawr and Banc Bwlchygarreg in the centre of the study area. The grassland is almost all heavily grazed, signified by the abundance of mat-grass and, in places, heath rush *Juncus squarrosus*. Semi-improved acid grassland is more prominent in those areas that are more accessible, eg, Bryniau Rhyddion towards the south of the study area and between Foel Goch and Moel y Garn in the west.

4.37 Marshy grassland is also a prominent habitat type. It supports a common range of higher plants, and is particularly characterised by an abundance of rushes. In the study area, soft rush *Juncus effusus* forms the principal component of the vegetation. The habitat also lacks *Sphagna spp.*, thus differentiating it from acid/neutral flushes. There is one extensive area of marshy grassland in the study area, east of Esgair Gorddi and south and north of Bryn Moel (east of study area).

4.38 Improved and poor semi-improved grassland is of very limited extent in the study area, with only two large fields at Esgair Las featuring this habitat type.

4.39 The most extensive mire type in the study area is wet modified bog. This occurs where a history of overgrazing (perhaps coupled with burning) has modified the original bog vegetation to such an extent that it supports characteristic bog species in only small quantity. Conversely, purple moor-grass *Molinia caerulea* is abundant over large areas of wet modified bog in the study area. Large areas of wet modified bog, dominated by purple moor-grass, with few associated 'bog species', are found in the south east of the study area, around Nant y Baracs, and the western side of Drosgol, north of Esgair Gorddi and in the centre of the study area, in the Bwlch y Garreg area.

4.40 In areas where cotton grasses *Eriophorum spp.* are more frequent, and *Sphagnum* species are a prominent component of the vegetation, the habitat has been categorised as blanket bog. In general, blanket bog is only present as small examples, juxtaposed with more modified bog, and small areas of wet heath. However, larger areas are found on the eastern flank of Moel y Garn (western side of study area) and on the ridge at Cefn yr Esgair. In addition, a large mosaic of blanket bog and wet heath is found on the western side of Afon Hyddgen (east side of study area). Acid flushes are found throughout the study area, wherever there is some flow of water.

4.41 Acid dry dwarf shrub heath is by far the most widespread heathland type in the study area. This is characterised by heather and bilberry *Vaccinium myrtillus*, with crowberry *Empetrum nigrum* forming a more minor component of the vegetation. In addition, very small areas of western gorse *Ulex gallii* are present on some of the steeper slopes. More extensive areas of dry dwarf shrub heath are present on the summit and eastern flank of Banc Llechwedd Mawr and also on Moel y Llyn. Dry dwarf shrub heath also seems to from the principal habitat type in areas of previously felled conifers.

4.42 Few other habitats are found in the study area, aside from those detailed above (or mosaics of these habitats). Coniferous forestry is dominant throughout much of the study area. A range of bryophytes are also present, in particular some species typical of Western oakwoods, such as *Rhytidiadelphus loreus*. Areas of broad-leaved woodland, especially semi-natural broad-leaved, are very scattered. Small examples of willow carr have developed in sheltered areas of impeded drainage. Small areas of spoil are found adjacent to the numerous former mine sites.

4.43 Over 60 bird species have so far been recorded within the development site boundary, either in the conifer plantations, on the upland pasture or on lakes and reservoirs. Despite this figure, birds occurred in small numbers and there were few areas of heavy activity.

4.44 Buzzard *Buteo buteo*, red kite *Milvus milvus* and raven *Corvus corax* have been regularly recorded species during the breeding season VP watches. Both hobby *Falco subbuteo* and goshawk *Accipiter gentilis* were also recorded, but only on one or two occasions. In the winter overflying birds were still sparse with only occasional buzzard and raven over the conifers. Ravens were more conspicuous on moorland. Kestrel was sparsely recorded. Both merlin *Falco columbarius* and hen harrier *Circus cyaneus* have also been recorded over the site.

4.45 No waders such as curlew *Numenius arquata* or golden plover *Pluvialis apricaria* have been recorded on the development site or within the buffer area. As would be anticipated on an upland site of this nature, meadow pipit *Anthus pratensis* and skylark *Alauda arvensis* are abundant on the sheep grazed moorland pasture.

4.46 With respect to bats, in general the results show lots of common *Pipistrellus pipistrellus* and soprano pipistrelles *Pipistrellus pygmaeus* within forests (along roads i.e. woodland edge) and some across open moors. Occasional *Myotis spp* bat records have also been picked up in forest and possible brown long-eared *Plecotus auritus* infrequently. No horseshoe bats *Rhinolophidae spp* or noctule bats *Nyctalus noctula* have been recorded.

Potential effects

4.47 As mentioned previously this wind farm is proposed as part of the response of SSE to targets set by UK government to increase the proportion of electricity generated from renewable sources and hence reduce the UK's contribution to climate change. Climate

change is the single most important threat to the global environment, particularly to biodiversity and to birds. Most recent research suggests that climate change could drive between 18 and 35% of species to extinction by 2050.

4.48 There will be some change to, and loss of, areas of vegetation and plant communities on the site due to the siting of turbines and other infrastructure. This will be assessed in the light of detailed botanical, hydrological and ground condition information for the site. Avoidance measures will be adopted were appropriate dependant on the sensitivity of the habitat; where avoidance measures are not possible and significant adverse effects are considered likely to arise, mitigation measures will be developed in order to offset these effects

4.49 Habitats on site will be surveyed using methods that follow accepted best practice and up-to-date industry standards. In addition, walkover surveys of the site, biological records and consultations with relevant organisations will be used to determine the extent of any additional surveys for breeding birds or protected species that may be present on the site. CCW and other relevant organisations will be consulted on the methods and scope of all ecological surveys. The findings of these surveys will be used to inform the design of the wind farm through, for example the avoidance of badger setts, and to develop any mitigation measures where required, in order to offset any potential significant effects which may arise.

4.50 With respect to potential effects to water quality and associated aquatic ecology an assessment of construction related, sequential and cumulative impacts will be undertaken of the likelihood and significance of potential sediment run-off to watercourses.

4.51 Please refer to the Appendix A which outlines the proposed methodology to be followed.

Cultural heritage

Study Area

4.52 The study area for the cultural heritage assessment is focussed on potential direct impacts to archaeological features within the site boundary, and potential direct setting impacts to SAMs within 10km of the site boundary and listed buildings and parks and gardens/conservation areas within 5km of the site boundary. The cumulative cultural heritage assessment will take into consideration other relevant developments within 10km of the site boundary that may have an impact on SAMS, listed buildings and parks and gardens, and conservation areas. In relation to landscapes of historic interest a separate methodology for cumulative assessment based on the ASIDHOL methodology will be employed.

Baseline

4.53 For the purposes of this document, ‘cultural heritage’ resources include World Heritage Sites, Scheduled Ancient Monuments, other archaeological features, listed buildings, conservation areas, historic gardens and designed landscapes, and other cultural heritage designations.

4.54 There are twelve Scheduled Ancient Monuments (SAM) within the boundaries of the proposed wind farm:

- Carn Owen, Cerrig yr Hafan (CD045): SN732882,
- Llainwen Round Cairns (CD142): SN691922,
- Ystrad Einion Lead Mine Buildings and Water Wheel(CD143): SN706938,
- Nant Bwlch-glas Lluest Farmstead (CD208): SN716869,
- Waun Lechwedd Llyfn Long Hut (CD209): SN716861,
- Fridd Newydd, Stone Circle (CD234): SN700911,
- Pencraig y Pistill Round Cairn (CD250): SN715864,
- Carneddau Round Cairns, Drosgol (CD252): SN759878,
- Foel Goch Round Cairn (CD257): SN695928,
- Banc Llechwedd-mawr Round Cairns (MG307): SN775898,
- Craig y Dullfan Ring Cairn (MG308): SN771887, and
- Afon Hyddgen Stone Row (MG309): SN780894.

4.55 An assessment of physical and non-physical direct effects to these archaeological features and others on the SMR or identified during fieldwork will be undertaken, including construction, operational, cumulative and sequential effects.

4.56 Also, the following sites which are within or on the edge of the development boundary have been recommended for Cadw to consider for scheduling as sites of national importance following the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) Uplands Survey (Plynlimon Project):

- Lluest Fawr Deserted Rural Settlement: SN 7537 9083,
- Afon Llechwedd Mawr Long House: SN 7553 9025,
- Banc Llechwedd Mawr Cairns: SN 775 898, and
- Magwyr y Rhos Long House: SN 756 891.

4.57 The development lies within the Upland Ceredigion Landscape of Outstanding Historic Interest (CCW / Cadw / ICOMOS Register of Historic Landscapes). The ASIDOHL assessment system (please see Section 6 below for details) provides a best practice methodology for assessing the impact of development within Historic Landscapes (see revised Cadw/CCW “Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process”, 2007).

4.58 The cultural heritage assessment will also take account of all listed buildings, conservation areas and historic parks and gardens within 5km of the site boundary. Physical effects to such designated historic features are unlikely; however, effects to the ‘setting’ of such features are possible as a result of the wind turbines and may potentially in some instances be significant. Accepted methodologies for the assessment of effects to historic features such as listed buildings will be employed, as set out in Section 6:

Archaeology and Historic Landscape. Protection to the setting of such features may well influence the development of the wind farm.

Noise

Study Area

4.59 The study area for the noise assessment will focus on those properties directly adjacent to the proposed development. The construction and operational noise assessment will take into account therefore all properties located within approximately 1km of the proposed development. Significant noise effects outside of this study area are not to be expected. Further a cumulative assessment will take into account the potential for cumulative effects with other wind farms adjoining the development. In reality this is likely to be limited to the Mynydd Gorddhu scheme only.

Methodology

4.60 Noise can arise from both the construction and the operation of a wind farm. During wind farm construction, noise can arise from both on-site activities such as the construction of access tracks, turbine foundations, substation buildings etc., and also from the movement of construction related traffic both on-site and travelling on public roads to and from the site.

4.61 Well established standardised techniques for calculating construction noise levels in accordance with BS4142 'Method for rating industrial noise affecting mixed residential and industrial areas' and BS5228:1997 'Noise and Vibration Control on Construction and Open Sites' will be employed.

4.62 During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise is caused by the interaction of the turbine blades with the air. Mechanically generated noise is generally caused by the operation of mechanical components, although in some instances a noise source may arise from the presence of transformers located outside the wind turbines. However, the level of both aerodynamic and mechanical noise radiated from current technology wind turbines due to improvements in blade design, and nacelle design and insulation is generally engineered to a low level.

4.63 Over recent years, many wind farms have been constructed within the UK and a better understanding has been gained into what constitutes an acceptable level of noise from these types of development. As a result of this increased understanding, a methodology for assessing the impact of noise from wind farms has been formulated by the Department of Trade and Industry (now DBERR). This methodology was developed by a Noise Working Group that comprised a cross section of interested persons including, amongst others, environmental health officers, wind farm operators and independent acoustic experts. The outcome recommendations are presented in the report ETSU-R-97, '*The Assessment and Rating of Noise from Windfarms'*.

4.64 The ETSU-R-97 recommendations provide a robust basis for assessing the noise implications of an operational wind farm and have become the accepted standard for such developments within the UK. Indeed, the use of ETSU-R-97 is recommended as the appropriate good practice for the assessment and rating of wind farm noise in PPS22. More recent advisory notes, such as that provided in the Institute for Acoustics bulletin March/April 2009, are also taken into account.

4.65 Noise problems are uncommon with modern wind turbines and noise can be minimised by careful site selection, turbine design and wind farm layout. The methodology for assessing noise levels will be agreed with specialist noise consultants appointed for the environmental assessment, and local authority environmental health officers. Guidance given in *The Assessment and Rating of Noise from Wind Turbines,* (ETSU Report ETSU-R-97, 1996) will be followed as appropriate.

Access Transport and Traffic

Study Area

4.66 The study area for the transport and traffic assessment will be inclusive of the entirety of the two optional routes from the port of entry through to the site entrance. An assessment of effects to the public roads close to the site will also be included. In respect of the option to utilise the route from Ellesmere/Mostyn, a cumulative transport assessment taking account of other wind farm proposals will be undertaken utilising the methodology currently being devised by an independent consultant contracted by the BWEA.

4.67 Current estimates of the expected vehicle movements associated with construction of the wind farm are for approximately 150,000 return journeys, including all construction vehicles from abnormal vehicles to vans transporting construction staff. An estimated 1224 return vehicle journeys for abnormal loads (turbines, transformers etc) are currently expected, although the return journeys will be with empty loads and the vehicles will be collapsed. Peak average daily movements within the locality of the wind farm are predicted to be 248 return vehicle movements a day. Construction of the wind farm is expected to last for 30 months. Construction would be timed to commence in 2013 subject to the relevant approvals.

Proposed Methodology

4.68 Currently there are two options for accessing the site with abnormal loads and construction vehicles. One route is from Ellesmere Port or Mostyn in the north via the A483 (Oswestry-Welshpool-Newtown), A470, A44 and then to site. The other, preferred option is from Swansea docks via the A483, M4, A48, A40, A478, A487, A4120, A44 and then to site. It is likely the abnormal loads with turbine components will be routed from either of these ports, whilst the construction machinery and vehicles are likely to be sourced from a regionally based supplier. Details of the volume of traffic, timing of construction, and options for delivery routes are provided in Section 3 above.

4.69 Whichever is the preferred route following a transport analysis and consultations, an assessment of the route's suitability for the delivery of abnormal loads and ability to accommodate construction traffic will be undertaken. Given the scale of the proposed wind farm there is potential for adverse, significant transport effects during construction of the wind farm although it is anticipated that there will be negligible transport effects during the operational phase.

4.70 A preferred access route will be identified and assessed, and traffic management measures in the form of a Traffic Management Plan proposed to minimise traffic effects on the main public roads during construction will be proposed. However, it is likely that both access options will be assessed at part of the EIA in order to enable the use of either of these options if necessary when it comes to construction.

4.71 It is anticipated that there will be potential significant transport impacts during the construction phase of the development. These will be mainly associated with off-site traffic movements, for example, the use of abnormal vehicles for turbine delivery. There would be negligible transport effects during operation. Access routes will be carefully selected and traffic management measures taken to minimise traffic flows on the main public roads during construction. In addition, HGV traffic on the main road network will be reduced by sourcing stone for road construction, wherever possible, from sensitively located on-site borrow pits. In addition, the cumulative and sequential effects of transport movements associated with other development will be taken into account

4.72 During the construction of the wind farm, it may give rise to some emissions of dust. It is not possible to completely eliminate these, but the use of best management practices will reduce the impact of dust using suppression measures such as damping down in periods of dry weather for example. During the operational phase the wind farm will generate no emissions to air; therefore local air quality will not be adversely affected.

Socio-economic

Study Area

4.73 The study area for the socio-economic study will largely focus on the local economy, populace and amenity features within 25km of the proposed development although account will also be made of potential beneficiaries of the project through construction and supply contracts who are nationally and regionally based.

4.74 Economic modelling and the social effects of potential cumulative impacts with other wind farms within the region will also be undertaken. The study area will incorporate the expected corridors for transport and grid but will focus in more detail on the mid Wales region.

Local employment

4.75 In terms of local benefits, the scale of the wind farm would be likely to provide significantly increased local employment opportunities during the construction and decommissioning phase of the project.

Land use and ownership

4.76 The principal land use on the site is upland rotational forestry and agricultural farming. The wind farm is not expected to significantly change the existing land management practices during operation.

Recreation and tourism

4.77 The effects of the wind farm on tourist and recreational routes and facilities will be addressed as part of the environmental assessment. Specific landscape and visual effects on tourist routes and facilities will be addressed in the detailed landscape and visual impact assessment.

Hydrology and ground conditions

4.78 This section will cover the assessment of hydrology, geology including site drainage, water quality and ground conditions. Potential effects on hydrology (including private water supplies) will be fully assessed during the EIA, and in particular effects on: catchment watercourses, flood risk and private water supplies. Potential hydrological impacts from borrow pits will also be investigated.

Study Area

4.79 The study area for the hydrological assessment is focussed on covering all land within 500 metres of the site boundary for the development. A cumulative hydrological assessment is not considered necessary as there are no other wind energy proposals in close proximity to Nant y Moch that will lead to cumulative effects.

Baseline

4.80 The area of the proposed development is within the vicinity of metal mining activity from the past. This historical land use will be included in the assessment to identify areas of contamination, such that contaminated land can be accounted for in the design process.

4.81 The area of Nant y Moch is typified by a large number of springs, streams and rivers, as well as small lakes and the artificially created Nant y Moch lake. The area is significant for its hydrological features and consequent value: a number of large rivers have their source at Nant y Moch and the surrounding catchments, including the Rivers Wye, Severn, Einion, Leri and Rheidol.

4.82 There are also a number of licenced abstractions outside of the proposed site boundary, including abstractions for the Rheidol hydro electric plant and by Dŵr Cymru (Welsh Water). Potential effects of construction will need to taken into account in the wind farm design process.

4.83 On-site track design will be addressed as part of the environmental impact assessment process and with the aim of mitigating potential disruption of groundwater flows. Road drainage would also be designed to have minimal effect on the hydrology.

4.84 Potential effects on the surface and groundwater environment may also occur as the result of erosion or sedimentation associated with construction operations, accidental spillages, or tree-felling. These can be addressed by following best practice guidance together with appropriate pollution prevention plans.

4.85 Mitigation strategies would be devised in consultation with CCW and the Environment Agency Wales and will follow best practice guidelines.

Airsafeguarding

4.86 Wind turbines have the potential to interfere with military and civil aviation operations, primarily through effects on radar systems but also in respect of their location within military low flying areas. Various aviation interests, including the Ministry of Defence (MOD) and Civil Aviation Authority (CAA) have joined with the British Wind Energy Association (BWEA) to publish guidance on these issues: *Wind Energy and Aviation Interests: Interim Guidelines* of the Wind Energy, Defence & Civil Aviation Interest Working Group (DTI, 2002).

Study Area

4.87 The study area for the aviation assessment is less easy to define. All air-safeguarding constraints in the form of TTAs or protected air space in the vicinity of the wind farm will be taken into account. A cumulative effects study is not required as decisions on the acceptability of impacts to air-safeguarding interests are dealt with by the relevant authorities on a project by project basis.

Baseline

4.88 A review of the NATS website and available data indicates that the proposed site is located in a region that is unlikely to interfere with operational infrastructure of NATS, when assuming a wind turbine development with a height of between 80 and 146.5m.

4.89 Currently consultations with the Civil Aviation Authority and the Ministry of Defence are ongoing but based on preliminary discussions no objections have been identified.

4.90 The following civil airports have been identified within 100km of the site, and may hold the potential for wind farm impacts on Air Traffic Services and/or to degrade signals from the primary radar:

- Welshpool;
- Aberporth.

4.91 Effects to these airports will be assessed through consultations with the relevant air safeguarding organisations.

4.92 There are no airfields within the local area associated with the proposed development.

Telecommunications and television/radio transmissions

4.93 The experience of existing wind farms is that television reception and other communications services, including nearby communications masts, can be affected by the rotating blades of wind turbines.

Study Area

4.94 The study area for the telecommunications will take account of all regionally based transmission infrastructure likely to be affected by the turning blades of the wind farm turbines. A cumulative effects study is not required as decisions on the acceptability of impacts to telecommunications are dealt with by the relevant authorities on a project by project basis.

Consultations

4.95 Preliminary consultations with organisations responsible for public and private communications services are advanced. Any interference problems identified would be mitigated during the design process via established remediation techniques. Such remediation techniques include micro-siting of infrastructure to avoid known telecommunications links and buffers, provision of signal boosting infrastructure if required, replacement of domestic analogue receivers with digital receivers or satellite dishes or the installation of repeater stations.

Grid Connection

Study Area

4.96 The study area for the high level assessment of the grid connection option for the 132kV line will incorporate a 10km buffer area around the likely grid connection route. A description of the proposed 400kV transmission line from the central substation will also

be included. Inherently a cumulative effects assessment of the grid connection in relation to other wind farm proposals and their commensurate grid connections would be included along the route of the 132kV line.

Outline Description

4.97 The wind farm will have a dedicated 132kV connection from the Nant y Moch site to a very large substation (the "hub" substation) being proposed by NGET. This substation will serve Strategic Search Areas B, C and D. The NGET substation will itself be connected by a lengthy new 400kV line which will be promoted by NGET.

4.98 NGET are only at a preliminary stage in terms of identifying the route of the 400kV line and the location of the substation. The 400kV line will be an IPC application. The substation will be a planning application to Powys County Council.

4.99 NGET started national and regional consultation in relation to the substation and the 400kV line project in Spring 2009. More detailed consultation began in August 2009 and is expected to continue until winter 2011 after which the applications will be finalised and submitted.

4.100 SSE is intending to promote, and construct, the 132kV line from the wind farm to the NGET substation. It will be an overhead line, and will therefore be an IPC application in its own right.

4.101 The location of the NGET substation is not expected to be decided until some time after the submission of this wind farm application. The route of the 132kV grid connection from the wind farm to the proposed NGET substation "hub" (the SSE grid connection) will not be decided by the time of this wind farm application.

4.102 SSE is not in a position to delay the wind farm application until the proposed NGET substation “hub” location has been decided because of a contractual planning permission determination date in their agreement with the main landowner, the Welsh Assembly, and will incur financial penalties if the deadline is not met.

4.103 On this basis it is proposed that the environmental impact assessment will include, under each of the assessment disciplines to be addressed in an ES, a high level desk top assessment of the options for grid connection both to the “hub” and subsequently for the associated 400kV transmission line. This desk top assessment will be conducted on the basis of available information on the grid infrastructure and routing at the time of the ES preparation, and the uncertainties relating to available information at that time will be highlighted. A record of the latest NGET position on the grid options will be presented.

Peat Assessment

Study Area

4.104 The study area for the peat assessment will focus on the land within the site boundary that will be directly affected by the development, and those areas hydrologically downstream of the development which themselves may be typified by peat deposits and may be affected by any change in hydrological flows.

4.105 A cumulative assessment of peat impacts with other proposals will not be required as it is not anticipated that other developments will come forward that have a combined effect on peat deposits.

Baseline and Approach

4.106 The location of the potential Nant y Moch wind farm development is in an area of known peatlands. The effects of development on peatlands have recently become more of a concern due to the biodiversity value of the habitats and their capabilities as carbon sinks.

4.107 The objectives of the proposed peat resource assessment will be to enable:

- An assessment of the extent to which the windfarm design will avoid impacting on peat deposits and their associated ecological habitats (peat observations and probes have already been made by hydrological, ecological and geotechnical specialists working on the EIA for the site during the iterative site design process conducted to date)

- To quantify and characterise, with reasonably achievable accuracy, the depth, quality and nature of the peat (or lack of) and its associated hydrology, upon which infrastructure is currently proposed to be located and use this information to:

    - Assess the carbon release from said peat and the future loss of the ability of these areas to continue to sequester carbon from the atmosphere

    - Assess the loss of peat habitat and the extent to which this is acceptable in terms of ecological criteria (this will eventually need to be viewed within the context of the proposed habitat mitigation and restoration elsewhere within the site area)

    - Assess the likelihood of peat slide risk in these areas

- Where possible, within the context of other on-site constraints (and the governmental desire to appropriately develop a large (c. 140MW) windfarm scheme within this area), to identify whether further viable movement/relocation of turbines, track or other associated infrastructure may enable peat to be avoided

4.108 Following the completion of the work proposed within this document and prior to submission, it is proposed that a second phase of the work is conducted, which will seek to identify suitable construction practices and mitigation activities to minimise any localised and wider negative impact on peat habitats. This second phase of work will also set such impact within the context of other habitat enhancement involving peatland within areas of the proposed Nant y Moch wind farm site not directly affected by the currently proposed infrastructure. It is expected that the requirements to avoid negative impacts on peat habitats would be addressed in both a Construction Method Statement and a Habitat Management Plan.

4.109 The socio-economic assessment and environmental benefits chapter of the ES will present a calculation of the expected carbon balance of the proposal, based on the guidance issued by SNH in 2003. The carbon debt of the proposed development (based on the manufacturing of turbines and the construction phase) will be assessed against the carbon savings associated with renewable energy generation to give a carbon balance for the overall scheme.

4.110 A fuller description of the peat assessment methodology is presented in Appendix A.

Other issues

4.111 There are a number of additional matters requiring attention in the assessment process. The study area for these matters is largely confined to the site development area and its boundaries. The matters include:

- Air quality and climate change,
- Environmental benefits arising from the wind farm, including the carbon balance of the proposed scheme,
- Effects to Utility infrastructure,
- Health and safety considerations, including ice throw and shadow flicker,
- Land use and recreation impacts, and
- Socio-economic impacts.

5 Draft Outline of the Environmental Statement

Introduction

5.1 It is proposed at this stage that the Environmental Statement will comprise a single A3 document combining text and A3 illustrations. A separate A4 Non-Technical Summary of the information contained in the Environmental Statement will also be provided.

5.2 Detailed specialist reports, as required, will be included as separate Technical Appendices forming part of the Environmental Statement.

5.3 A separate Planning Statement will be prepared in support of the application for consent. The Planning Statement will not be part of the Environmental Statement. It will discuss the energy and environment policy origins of wind energy development, the Government's policies towards renewable energy development and the national and local planning policy context for the proposed wind farm.

5.4 It is proposed that the text of the Environmental Statement will be divided into 2 parts, as described below.

Part 1: Introduction

5.5 Part 1 will comprise five chapters, as follows:

- **Chapter 1** will provide an introduction to renewable energy development and wind power in particular. It will give a description of the site, proposed development and the potential benefits of the wind farm in terms of reduced emissions.

- **Chapter 2** will include an overview of the impact assessment methodology used by the team, including scoping and consultation responses and the identification of key environmental effects. It will describe the way in which mitigation of environmental effects has been considered during site selection, wind farm design and layout and the EIA process. It will also describe any measures designed to mitigate the significant environmental effects arising from the proposal, and emphasise its commitment to do so. This section will conclude by providing an overview of the Environmental Statement structure.

- **Chapter 3** will describe the wind farm site selection process and the main reasons for the choice of this site, taking into account the environmental effects. This chapter will include the design strategy and development of the layout, and will describe the way in which the mitigation of environmental effects has been considered during the site selection, wind farm design and EIA process. As such, a description and explanation of any alternative design options, including turbine parameters, considered during the development of the site will be presented. The full iterative design process will be explained in order to demonstrate how constraints and sensitivities have been taken into account during the development process.

- **Chapter 4** will provide details of the site and a description of the proposed wind farm development. This will include details of the size, layout and design of the turbines, access tracks, borrow pits, switchgear control building / sub-station, on-site grid connection and other associated infrastructure. Temporary infrastructure, e.g. laydown areas, will also be included. This chapter will also outline the construction, operational and decommissioning requirements of the project.

- **Chapter 5** will present an overview of the relevant statutory planning guidance (e.g. *National Policy Statements*) and Development Plan policies which apply to the wind farm development on the proposed site.

Part 2: The Environmental Impact Assessment

5.6 Part 2 will contain a number of chapters reporting the findings of the impact assessment on each of the topics that have been identified for inclusion in the EIA process during this scoping exercise.

5.7 The topics which will be addressed in the Environmental Statement are listed below, in the order in which it is currently envisaged that they will appear in the Environmental Statement:

- Landscape and visual,
- Ecology,
- Ornithology,
- Peat,
- Noise,
- Hydrology, hydrogeology and geology,
- Archaeology and cultural heritage,
- Traffic, transport and access,
- Socio-economic effects and environmental benefits, and
- Other issues such as aviation, telecommunications, television and radio interference, ice throw and shadow flicker.

5.8 Each of these 'assessment chapters' will be prepared by the relevant expert environmental consultants. SSE Renewables will provide input as required.

5.9 The assessment chapters will be structured using the same format, where practicable. Each chapter will begin with a brief introduction. This will be followed by a description of the method of assessment for the particular topic under discussion. This will include an outline of relevant consultations undertaken, documentation studied and the means of defining the Study Area for that topic. Should there be any difficulties (technical deficiencies or lack of know-how) encountered in compiling the required information, this will be noted.

5.10 The existing baseline conditions for the topic will then be described.

5.11 An assessment will then be made of the nature, magnitude, duration and significance of the likely effects of the construction, operation and decommissioning of the proposed wind farm on the topic. Mitigation measures that have been committed to will be taken into account in the assessment. These mitigation measures will be used to avoid, reduce and, if possible, offset any significant effects, where practical. An assessment will be made of the significance of the likely residual effect, following mitigation. In addition, the assessment will take into account the potential grid connection infrastructure, subject to the availability of information at the time of assessment.

Confidential annex

5.12 A confidential annex may be provided which would contain any sensitive, confidential information, e.g. ornithological information. Initial circulation will be restricted to the IPC, CCW and RSPB, with circulation to other parties subject to agreement by all those organisations.

Appendices:

Appendix A: Environmental Impact Assessment Methodologies

Appendix B: DBERR Scoping Opinion 2008

Appendix C: Supporting Figures

Appendix A: Environmental Impact Assessment Methodologies

A-1: Landscape and Visual Impact Assessment (LVIA)

The Landscape and Visual Impact Assessments will address the potential effects of the proposals upon the landscape and visual amenity of the area and comprise three distinct stages of work, as follows: baseline; advice on wind farm layout and design; and detailed landscape and visual assessment.

Stage One: Baseline

Project Inception
We would initially review the preliminary layout and detailed project description and related plans, including the location of any ancillary components of the wind farm such as the switch room/control building, any anemometer mast(s), access tracks and grid connection and details of initial construction operations (including excavation of borrow pits), final decommissioning and proposals for the reinstatement of the site. We would also review turbine dimensions and co-ordinates of other wind farms to be included in the cumulative assessment, if available.

Desk Study
We would carry out a desk study of relevant available background material including Scoping Opinion (when available), Development Plan(s) for the study area, published Landscape Character Assessments, Ordnance Survey maps and preliminary Zones of Theoretical Visibility (ZTVs). We would also identify landscape designations within the study area. This will enable us to complete the baseline landscape character assessment and to confirm potential receptors and viewpoint locations to be considered in the assessment.

Site Visit
We would carry out a preliminary site visit to verify locations of sensitive landscape and visual receptors within the study area to be included in the assessment, including specific viewpoint locations, as well as familiarising ourselves with the landscape character of the parts of the study area.

Baseline Survey
The baseline survey would classify the existing landscape character and visual amenity of the study area and identify potential receptors and their related sensitivities to the type of development proposed. This would involve a review of existing LCA characterisations of the study area. The baseline study would also identify the Landscape Character Types and designated landscapes likely to be affected by the proposals, as well as the range of visual receptors – residents, visitors, walkers or road users.

Consultation
We would consult with representatives of CCW and the relevant county local councils for the site in order to confirm the scope and methodology to be used in the LVIA, as well as to confirm the number and location of viewpoints to be included in the assessment. It would also be important to confirm the scope of the cumulative assessment. This would usually be limited to existing/consented wind farms and developments for which applications have been submitted.

The viewpoint selection would be informed by the preliminary ZTVs (preferably including cumulative ZTVs) and our initial site visit, as well as drawing on any advice from the local

planning authority and other relevant consultees based on their local knowledge of the area and specific landscape issues which they would wish to see addressed in the assessment.

Stage Two: Advice on Wind Farm Layout and Design

Following the baseline work, we would review the preliminary scheme and map showing all on-site constraints and would seek to optimise the layout to achieve a best fit within the context of the various technical and other environmental considerations.

SSE Renewables would use ReSoft's Windfarm programme to support the LVIA and would review alternative layouts, as appropriate, with corresponding wireline diagrams from a limited number of key receptor locations. Consideration would also be given to related siting, layout and construction methods for ancillary components of the scheme including on-site access tracks and borrow pits (if applicable). We would also take into consideration landscape and visual considerations related to any necessary off-site road works.

Stage Three: Detailed Landscape and Visual Impact Assessment

Methodology
Once the wind farm layout has been finalised, the LVIA would be carried out in accordance with the agreed methodology and to consider the effects of the proposed development during construction, operation and de-commissioning stages on the landscape and visual receptors identified in the agreed study area.

The assessment would be based on the following sources of guidance:

- Guidelines for Landscape and Visual Impact Assessment produced by the Landscape Institute and Institute of Environmental Management and Assessment (GLVIA) (2002);
- Landscape Character Assessment (The Countryside Agency and Scottish Natural Heritage 2002);
- Guidelines on the Environmental Impacts of Wind Farms and Small Scale Hydroelectric Schemes, published by Scottish Natural Heritage (2002);
- Visual Assessment of Windfarms: Best Practice published by University of Newcastle and Scottish Natural Heritage (Revised April, 2005); and
- Visual Analysis of Windfarms: Good Practice Guidance, Consultation Draft, Scottish Natural heritage. Produced by the Scottish Renewables Forum and the Scottish Society of Directors of Planning, July 2005;

The cumulative assessment would draw on the following guidance:

- Guidance: Cumulative Effect on Wind Farms, Version 2, Scottish Natural Heritage (Revised 13.04.05); and
- A Guide to the Assessment of Cumulative Effects of Wind Farm developments prepared by ETSU/DTI (2000).

The detailed LVIA would identify the predicted visibility of the proposed wind farm in the study area and assess the residual impacts arising from the optimised design on landscape and visual receptors. The prediction of magnitude of change and assessment of significance of residual landscape and visual impacts would be based on pre-defined criteria, as discussed below.

Field Work
A second more detailed stage of field work would be carried out once the design has been finalised to refine the landscape character assessment of the study area and to visit and

photograph each of the agreed viewpoints. Wireline diagrams based on the final layout would be taken to site to assist in the assessment process.

Sensitivity
The sensitivity of the landscape to changes is defined as high, medium, low or negligible based on professional interpretation of a combination of parameters[2] including:

- the value placed on the landscape. landscape quality;
- existing land-use;
- the pattern and scale of the landscape;
- visual enclosure/openness of views and distribution of visual receptors;
- the scope for mitigation, which would be in character with the existing landscape; and
- the degree to which the particular element or characteristic contribution to the landscape character and can be replaced or substituted.

Viewpoint sensitivity is defined as high, medium, low or negligible based on an interpretation of a combination of parameters, as follows:

- location and land use at the viewpoint;
- landscape character and quality in the immediate vicinity of the viewpoint;
- landscape character and quality of the intervening landscape and backdrop to the development;
- frequency of use; and
- whether the receptor is static or transitory.

In relation to land use at the viewpoint, visual sensitivity is generally defined as follows:

- High: Users of outdoor recreational facilities including strategic recreational footpaths and vantage points, cycle routes and rights of way, where the viewer's attention may be focused on the landscape; important landscape features with physical, cultural or historic attributes; principal views from residential properties; beauty spots or picnic areas.
- Medium: Other footpaths; secondary views from residential properties, people travelling through the landscape on roads, trains or other transport routes.
- Low: People engaged in outdoor sports or recreation (other than appreciation of the landscape), commercial buildings, and other locations where people's attention may be focused on their work or activity.
- Negligible: Views from industrial areas.

Magnitude
The magnitude of change to landscape and visual amenity is determined by a combination of largely quantifiable parameters, as follows:

- the distance of the viewpoint from the development;
- the duration of predicted effects;
- in the case of character areas and/or designated areas, the extent of the landscape affected;
- in the case of roads, cycleways and footpaths, the length of the route affected by the development;
- the extent of the view affected by the proposed development (i.e. the horizontal angle subtended by the development);
- the elevation of the proposed development in relation to the receptor; and

[2] Based on criteria in paragraph 7.16 of the Guidelines for Landscape and Visual Impact Assessment (Landscape Institute and Institute of Environmental Management and Assessment, Second Edition, 2002).

- the extent of other built development visible, particularly vertical elements.

Magnitude of change is described as substantial, moderate, slight, negligible or none. These terms are explained in the table below:

Level of Magnitude	Definition
Substantial	Total loss or considerable alteration/interruption of key elements, features or characteristics of the landscape character and/or composition of views.
Moderate	Partial loss or modest alteration to one or more key features or characteristics of the baseline, resulting in localised change within a broader unaltered context.
Slight	Limited loss or small alteration to one or more key elements, features or characteristics of the baseline conditions. Change arising from the loss/alteration will be discernible but underlying landscape character or view composition will be similar to baseline.
Negligible	Very limited or imperceptible loss or alteration to one or more key elements/characteristics of the baseline. Change may be barely discernable.
None	No aspect of the development would be discernable. The development would result in no appreciable change to the landscape resource or view.

Cumulative Magnitude
The additional parameters which would be used to evaluate magnitude of cumulative change are the number of wind farm developments visible; distance to each of the wind farms; direction in which each of the other wind farms is located relative to the viewpoint; and increase in the proportion of view occupied by turbines.

Significance
The significance of effects would be assessed as major, moderate, minor or none by combining viewpoint or landscape sensitivity and predicted magnitude of change, as indicated in the table below. Major and major/moderate effects are considered to represent significant effects in terms of the EIA Regulations.

These matrices are not used in an arithmetic way or as a prescriptive tool. The methodology and analysis of potential effects at any particular location must allow for the exercise of professional judgment.

It is important to note that, with the exception of potential impacts on the landscape fabric of the site, no determination is made in the assessment to whether effects are beneficial or adverse. This is because such a conclusion necessitates some subjective judgements to be made. It is felt that, at this stage of the decision-making process, the role of the LVIA should be to present information on the nature and extent of landscape and visual effects to assist the local planning authority in determining their acceptability.

Significance of Landscape and Visual Effects

Sensitivity	Magnitude of Change			
	Substantial	**Moderate**	**Slight**	**Negligible**
High	**Major**	**Major/ Moderate**	Moderate	Moderate/ Minor
Medium	**Major/Moderate**	Moderate	Moderate/ Minor	Minor
Low	Moderate	Moderate/ Minor	Minor	Minor/None
Negligible	Moderate/Minor	Minor	Minor/None	None

Report
The LVIA report would include the following sections:

- Introduction;
- Methodology;
- Baseline landscape character and visual amenity to include topography, land use and vegetation;
- Landscape planning policy;
- Landscape designations and classifications;
- Project description (i.e. aspects of the proposed wind farm with potential to give rise to landscape and/or visual effects);
- Embedded mitigation – design optimisation;
- Assessment of residual effects including cumulative effects – including visibility analysis and assessment of effects on landscape and visual receptors; and
- Conclusions and discussion.

Figures
Figures in the LVIA would include:

- A Topography plan for the agreed study area;
- A Landscape Designation plan for the agreed study area;
- A Landscape Character Plan for the agreed study area;
- ZTVs; and
- Photographs of existing views, 3D wirelines and or photomontages, as appropriate.

ZTVs present the "maximum potential effect" insofar as they are based on Ordnance Survey (OS) digital terrain data at 50m horizontal interval resolution and therefore do not take account of local landforms and vegetation (e.g. trees, hedges and forestry), nor any built forms in the landscape. This means that the visibility predicted on the ZTVs will be more extensive than actual visibility on the ground. Where the ZTVs show no visibility, it is generally predicted that no turbines would be seen.

Cumulative ZTVs will ascertain the potential cumulative visibility of the proposed development in conjunction with the other wind farms considered in the cumulative assessment.

The viewpoint analysis is illustrated by a range of tools including photographs, wirelines and photomontages. The photographs used to construct the photomontages will be taken by a professional photographer using a digital Single Lens Reflex (SLR) camera with a 50mm lens.

This conforms to the Guidelines for Landscape and Visual Effect Assessment because this lens size is considered to most closely represent the view obtained by the human eye. Wirelines were generated using the same OS digital data used to generate the ZTVs and therefore take no account of the screening effect of local landform or vegetation.

A-2: Noise Assessment

Noise Planning Guidance

The noise assessment will be based on the recommendations contained in ETSU-R-97, The Assessment and Rating of Noise from Wind Farms, as referred to in TAN8, Renewable Energy. The noise assessment will address potential noise issues arising from construction, operation and decommissioning of the wind farm.

Provisional Noise Predictions

Noise predictions will be carried out for an initial turbine layout using the highest source sound power level which occurs up to a 10m height wind speed of 10 m/s for an agreed turbine type. The results will be plotted in the form of noise contours and residential properties where the ETSU-R-97 simplified criterion of 35 dB LA90 is exceeded will be identified. A sample of such properties will be selected for baseline noise monitoring such that the prevailing background noise, required for determination of the full ETSU-R-97 noise limits, can be derived.

Liaison with Local Authority and Access to Monitoring Locations

The Local Authority Environmental Health Department (or equivalent) will be informed of the intended assessment methodology and suggested baseline noise monitoring locations and response to any particular concerns will be invited. Access to the suggested monitoring locations will be arranged through Dulas or SSE REnewables or their landowners.

Noise Monitoring

Noise monitoring equipment consisting of IEC651 Type 1 sound level meters fitted with ½" microphones inside custom double skin wind shields mounted at 1.2m height will be installed at each of the agreed monitoring locations. These will be configured to log existing noise levels using a variety of measurement indices over successive 10 minute intervals, concurrent with wind speed measurements on the site, over a period of two weeks. Wind speed measurements will preferably be carried out at the intended hub height for the proposed turbines or at two heights less than hub height such that hub height wind speed can be derived from the measured wind shear for each 10 minute period.

Noise Predictions

Noise predictions will be carried out based on the ISO9613-2 methodology assuming a worst case of downwind propagation over hard ground and warranted source noise levels for a representative turbine type. Predicted noise levels will be derived at each assessment locations represented by the baseline measurements for wind speeds for which source noise data is available, preferably from cut-in to 12m/s as required by ETSU-R-97.

Noise Assessment

Baseline noise data expressed in terms of the LA90 measurement index will be plotted against 'standardised' 10m height wind speed (converted from hub height using reference ground roughness), or actual 10 metre height wind speed if this is not available, for the 'quiet day-time' and 'night-time' hours as defined in ETSU-R-97. A best fit polynomial curve will be plotted through this data to define the 'prevailing' background noise as required by ETSU-R-97. Noise limits will be derived from this according to the requirements of ETSU-R-97 which specifies that

noise should not exceed a value of X dBLA90 or 5 dB above the ‘prevailing' background noise level, whichever is the greater. The value of X is 35-40 during the day, 43 at night and 45 for properties occupied by persons with a financial involvement in the site. A detailed construction and decommissioning noise assessment will also be provided. The assessment will also take account of the advisory guidance in the Institute of Acoustics bulletin March/April 2008.

Mitigation

Where predicted operational noise levels are found to exceed the derived noise limits appropriate mitigation will be identified to ensure that the final proposed design will meet the required noise criteria.

Final Report

The final report will cover the assessment and results together with an evaluation of other factors which may be of concern to interested parties such as tonal noise, amplitude modulation, wind shear and infrasound. The predicted noise levels will be deemed to be not significant where the ETSU-R-97 criteria are met.

A-3: Ecological Assessment, including Ornithology

The intended methodologies for ecology site surveys are summarised below. These will be supported by consultations and by desk-based assessment (such as examination of local maps, aerial photographs and site plans) to identify important habitats and priority areas for targeting survey effort. The logic for the specification of study areas will be set out and supported, where possible, by reference to professional guidelines and site habitat/species.

This ecological impact assessment will be carried out according to the "*Guidelines for Ecological Impact Assessment*" produced by the Institute of Ecology and Environmental Management (IEEM 2006), which is recognised as current best practice.

As recognised in the IEEM Guidelines, the assignment of a value to an ecological receptor is a "*complex and subjective process"* which involves the "*application of professional judgement*". However, it recommends that when assessing value consideration is given to: site designations and features; biodiversity value; large populations or important assemblages of species; potential value, secondary or supporting value; social/community value; and economic value.

The potential ecological effects of the development are considered during both its construction, operation and decommissioning phases, encompassing the entire lifetime of the proposal. The decommissioning phase is considered to be similar to the construction phase in terms of potential impacts.

Baseline ecological information for the site will be collected through both desk-based study and original field survey.

The study area is defined here as being all land within 500 metres of the component parts of the Development, including new turbines and tracks.

Phase 1 and protected species surveys would be conducted in accordance with the following guidance:

- Bat Conservation Trust (2007). Bat Surveys – Good Practice Guidelines. BCT
- Bibby CJ et al (2000) Bird Census Techniques – Second Edition. Academic Press
- Gilbert et al (1998). Bird Monitoring Methods. RSPB, Sandy
- English Nature (1999) Water voles: Guidance for planners and developers. English Nature
- English Nature (2001) Great crested newt mitigation guidelines. English Nature
- English Nature (2002) Badgers and Development. English Nature
- English Nature (2004) Bat Mitigation Guidelines. English Nature
- Froglife Advice Sheet 10: Reptile Survey. Froglife
- IEEM (2006). Guidelines for Ecological Impact Assessment. IEEM, Winchester
- JNCC, (2003), Field manual for Phase 1 habitat survey - a technique for environmental audit. JNCC
- Natural England (2008). Bats and Onshore Wind Turbines – Interim Guidance
- Scottish Natural Heritage (2005). Survey methods for assessing the impacts of onshore wind farms on bird communities. SNH, Battleby
- Scottish Natural Heritage – Otters and Development (Scottish Wildlife Series) online

Surveys are proposed in the following format:

Survey type	Season/ months	Description
Winter vantage point	October to March	6 hours per vp per month.
Bats and Roosting sites	April – September	See below
Water voles *	Late April - September	1 survey visit
Badgers	March - May	1 survey visit
Reptiles*	April - May, also September	Up to 7x visits using artificial refugia. Visits can be doubled up with other surveys.
Phase 1 and hedgerow survey + site flora assessment	Any time but preferably May – September	Summer visit ideal for identifying many plant species
Water Body Assessment	February to mid-March	Assess need and extent of Great Crested Newt survey
Great Crested Newt Presence/ Absence *	Mid-March - mid-June.	2 to be done between mid-April and mid-May
Great Crested Newt Population Estimate *	Mid-March – mid-June.	2 extra surveys in the event of great crested newts being present

*Required only if suitable habitat identified in Phase 1 survey

The species records held by the local Biological Records Centre will be referenced in identifying the baseline ecology for the site, including records of the Special Wildlife Sites.

Birds

Vantage Point Study
In accordance with best practice guidance for onshore wind farm avian impact assessment (Scottish Natural Heritage 2005), vantage point survey will be the means used to monitor and depict wintering bird flight activity at the study site. The study area will be visited to give a total of 6 hours observation per vantage point per month over the winter period 2008/9.

Observations and records will focus on 'target' bird species: 'target' species status is based on professional experience and published reviews of avian species at risk from wind farm developments (Langston and Pullan 2003; Scottish Natural Heritage 2006). Species groups recorded include waterfowl (ducks, geese and swans), waders, and birds of prey.

During the vantage point surveys, data will be recorded for each target species sighting. Data recorded for each observation will include: time of sighting, bird count, direction of flight, estimated height(s) of flight in metres, description of flight behaviour/activity, length of time observed, special notes (e.g., sex of bird observed, mobbing, hunting), and a map reference number. Maps will be drawn of all flight paths observed during each vantage point survey.

Phase 1 Survey

All habitats encountered within the site boundary and a 500m study area will be assessed and coded according to the survey methods outlined in '*The Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*' (JNCC, 1993).

During the Phase 1 survey, additional target notes will be made to record key habitat features too small to be mapped (<100m^2) and to provide greater detail on other features of ecological interest. Areas of particular botanical interest will be surveyed in greater detail with species lists prepared and a record made of relative abundance on the DAFOR scale.

Badger Survey

The current status of badger populations within the site and the 500m study area will be established by undertaking a detailed search for field signs including badger setts, badger paths, latrine sites, evidence of foraging and dung pits following methodologies described by Harris et al. (1989).

Where survey results indicate that further information will be required from outside the study area, this boundary will be accordingly increased (e.g. where survey results suggest that a main sett may be located just outside the study area and locating this sett would provide useful information regarding the local distribution of social groups).

Water Vole and Otter Surveys

This will follow guidance from the Water Vole Conservation Handbook, and will cover all areas within 50 metres of all waterbodies located in the Phase 1 survey. Latrines, feeding stations, burrows and other field signs will be recorded.

Otter surveys will be undertaken subject to the findings of the Phase 1 habitat survey. It is unlikely that the site is suitable for otters, but, subject to a Phase 1 survey, if suitable habitats are found or consultees during scoping give notification of known otter territories in the area then detailed surveys will be undertaken in the spring/summer 2008. In general otter surveys can be carried out at any time of the year, as otters are active throughout the year.
On Welsh rivers otters are generally secretive and nocturnal, and are rarely seen. Their presence is therefore determined by searching for field signs including:

- Spraint;
- Footprints;
- Feeding remains (usually fish but sometimes frogs as well);
- Holts; and,
- Couches (resting places above ground).

Spraint (faeces) are used by otters as scent markers and are deposited in prominent places within the river corridor and inside lie-up sites and holts. Therefore, surveys will, if required, focus on searching the following for spraints: rocks, headlands, tree stumps, ledges under bridges and any other protruding/prominent natural or manmade features along the riverbanks.

Surveys will also pay close attention to soft substrates at the water margin as this will usually be the most likely place to find footprints.

Bat Survey

Bat survey methods are as detailed below:

Spring (mid-April to mid-May):

- One visit by 2 bat workers to conduct a 2-3 hour transect survey.
- The objectives of the transect survey are to (1) scout the site for areas of high bat activity, (2) characterise any bat use of the site that may be unique to early in the season, and (3) set the transect route.

Summer (mid-June to end-August):

- 2 bat workers conduct a day of roost search and assessment within 500m of the proposal.
- Two separate visits by 2 bat workers to conduct 2-3 hour dusk surveys via transect.
- The objectives of the transect surveys are to (1) identify the suite of species present on the study site, (2) identify areas of high bat activity, (3) to identify linear features being used by commuting bats, (4) quantify the level of bat activity on the site, and (5) investigate emergence from, and returns to, potential bat roosts.
- One visit by 2 bat workers to conduct an all-night survey via transect followed by listening station(s).
- The all-night survey objectives are to (1) sample any bat activity unique to late night and early morning hours, and (2) investigate dawn returns to a potential roost site.

Autumn (September to mid-October):

- Two visits by 2 bat workers to conduct all-night surveys via transect followed by listening station(s).
- The survey objectives are to continue the summer objectives, and to identify any migratory movements across the study site, and any autumn swarming activity.

Evaluation and Impact Assessment

Species have been evaluated against recognised Conservation Criteria as set out below:

- Annex 1 species listed in the Birds Directive;
- Migratory species (for which SPA can be selected); population thresholds for SPA selection are given;
- Species listed under Schedule 1 of the Wildlife and Countryside Act – birds and nests protected by special penalties at all times;
- Species of Conservation Concern as identified by BTO/JNCC/RSPB (2002). These are categorised as red-listed (high conservation concern), amber listed (medium concern) and green-listed (lower concern). Only red and amber listed species are given here; and
- Species listed under national or local Biodiversity Action Plans.

The criteria used for defining the ecological value of populations found within the study area follow those recommended in the IEEM Guidelines for Ecological Impact Assessment (2006). These are:

- International;
- UK;
- National (i.e. England/Northern Ireland/Scotland/Wales);
- Regional;
- County (or Metropolitan - e.g. in London);
- District (or Unitary Authority, City, or Borough);
- Local or Parish; and
- Within zone of influence only (which might be the project site or a larger area).

For the purposes of this assessment, and not part of generic guidance, the population threshold at which a species is considered to be important at a geographic level is 10%. For example, one territory of Cetti's warbler is considered to be important at County level because it exceeds 10% of the county population (6-8 pairs), but it is not considered important at regional level because the population is less that 10% of the regional population (202 singing males). Sometimes

figures for populations are not available; in this case a judgement has to be made based on the extent of available habitats within the geographic area.

The assessment methodology for this chapter follows the "*Guideline for Ecological Impact Assessment*" developed by the IEEM whereby in order to determine the ecological effects and the significance of impacts, a standard process is followed. This involves the steps listed below:

- Evaluate features to geographical scale;
- Define conservation objectives for each feature;
- Identify ecological impacts;
- Determine confidence in ecological impacts;
- Determine significance of impacts; and
- Determine confidence in significance assessment.

An ecologically significant impact is defined as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area (IEEM, 2006).

Impacts on valued ecological receptors together with the degree of certainty to which the assessment is made will be outlined. Based on the fact that a 5% confidence level is conventionally chosen as the lowest limit for acceptable statistical significance in common scientific practice, the following four-point scale is used is to describe the level of certainty in the assessment of predicted impacts:

- Certain/near-Certain: probability estimated at 95% chance or higher;
- Probable: probability estimated above 50% but below 95%;
- Unlikely: probability estimated above 5% but less than 50%; or
- Extremely Unlikely: probability estimated at less than 5%.

The assessment of whether an impact is significant or not is based on the geographical level at which the receptor is valued, but may be applied also to lower levels of ecological value. So impacts not significant on a receptor of national value may be significant at a more local level.

A-4: Hydrology/Hydrogeology/Geology

Based on our understanding of the site following a review of OS mapping the following scope of works will be undertaken:

- Desk top study of information collected from the Local Authority Private Water Supplies register, the Environment Agency (EA) public register and other published sources of information;
- Walkover survey of the site and surrounding area up to 250 metres from the site boundary where access is permitted, including consultation with landowners to identify the hydrological baseline environment and water features/water supplies;
- Identification of existing surface water features, hydrological features, geological and geomorphological features which may be affected by the respective proposed developments;
- Preparation of a water features survey/hydrological baseline review, together with a risk assessment and mitigation strategy in the form of an Environmental Statement chapter, to address the potential effects of the development on groundwater and surface water hydrology.

Assessment Methodology and Significance Criteria

The hydrology assessment methodology is based on the collection of a wide range of data and information from published material, plus consultation with statutory bodies (e.g. Environment Agency Wales) relating to the local and wider environment. Data sources referred to within the assessment will include those outlined within the following table.

Data Sources

Topic	Source of data and information
Climate Rainfall	Flood Estimation Handbook (Centre of Ecology and Hydrology, NERC, 1999); Environment Agency; CEH Hydrometric Register
Topography Elevation, relief	Ordnance Survey Explorer 1:25,000 mapping
Surface Water Flooding Water Quality Fisheries	Environment Agency Wales (www.environment-agency.gov.uk) – Consultation and published sources on their website
Groundwater Aquifer	Environment Agency Wales consultation and data collection (e.g., water levels, quality and use Source Protection Zones Groundwater Vulnerability Mapping of England and Wales (scale 1:1,000,000), Environment Agency
Geology Solid and drift	BGS Solid & Drift Geology Mapping and relevant memoir BGS Borehole Logs
Soils Soil type	Soil Survey of England Mapping (Scale 1:250,000)
Water resources Abstractions Discharges	Environmental Health Department Environment Agency Local property door to door surveys

Site walkover surveys will be undertaken. This will enable the status and location of water features to be identified prior to the survey. The survey will obtain photographic evidence of important water features where access is permitted.

The assessment will have regard for statutory and general guidance. Such guidance in Wales includes:

- Planning Policy Wales (2002) (Chapter 13)
- Technical Advice Note 15: Development and Flood Risk (2004)

Other relevant UK guidance that will also be considered in the assessment includes the following documentation:

- Planning Policy Statement PPS25 – Development and Flood Risk (DCLG 2006);
- Development and Flood Risk: A Practice Guide Companion to PPS25 'Living Draft' (DCLG 2007);
- Environment Agency Pollution Prevention Guidance Notes (PPG):
- PPG 1 General guide to the prevention of water pollution;
- PPG 2 Above ground oil storage tanks;
- PPG 5 Works in, near or liable to affect water courses;
- PPG 6 Working at construction and demolition sites;
- PPG 7 Refuelling facilities;
- PPG 21 Pollution incident response planning;
- PPG 23 Maintenance of structures over water;
- CIRIA Report C532 Control of water pollution from construction sites (2001);
- CIRIA Report C650 Environmental good practice on site;
- CIRIA Report C502 Environmental good practice on site;
- EA Groundwater protection: policy and practice (GP3) (October 2007);
- EA Policy regarding culverts; and
- DEFRA Good practice guide for handling soils (MAFF 2000).

In addition to the general guidance, there is a range of environmental legislation that any development must adhere to throughout its life. Key legislative drivers relating to the water environment considered within the assessment will include:

- EU Water Framework Directive, Groundwater Daughter Directive, Groundwater Directive and Freshwater Fish Directive;
- Water Resources Act 1991;
- Environment Act 1995;
- The Environmental Damage (Prevention and Remediation) Regulations 2009;
- The Groundwater (England and Wales) Regulations 2009; and
- The Water Supply (Water Quality) Regulations 2000 and The Private Water Supplies Regulations 2009".

The baseline description of the area will also include the potential effects of climate change over the lifetime of the development on the hydrology of the study area, as described in Chapter 13.2 of Planning Policy Wales 2002, particularly in respect of potential flooding issues.

Assessment Criteria

There are no published guidelines or criteria for assessing and evaluating effects on hydrology, hydrogeology or soils within the context of an EIA. The assessment will be based on a methodology derived from Institute of Environmental Management and Assessment (IEMA)

guidance. The evaluation will also be based on Environment Agency guidance within their recently revised Pollution Prevention Guidance documentation. The methodology sets a list of criteria for evaluating the environmental effects, as follows:

- The type of effect (i.e. whether it is positive, negative, neutral or uncertain);
- The probability of the effect occurring based on the scale of certain, likely, or unlikely;
- The policy importance or sensitivity of the resource under consideration in a geographical context (i.e. international, national, regional or local); and,
- The magnitude of the effect in relation to the resource that has been evaluated, quantified using the scale high, medium or low.

Definitions of Policy Importance and Sensitivity: Water and Soils

Importance and Sensitivity Context	***Water and soils definition***
International and /or High	Important on a European or global level e.g. Coastal locations, Habitat Directive Sites
National and/or High	Important in England (e.g. SSSIs.Agricultural resources, strategic water resources)
	Local water supplies, including private water supplies, where there is no alternative to private supplies
Regional and /or Medium	Important in the context of the region; eg Sites of Special Scientific Interest (e.g. SSSI) Local Nature Reserves, catchment scale issues
	Private water supplies, located within vicinity of mains water supply. Private water supplies used only for agricultural purposes and not drinking water.
District and/or Medium	Important in the context of the local district eg. minor aquifer, important private water supplies
Local and/or Low	Important within watersheds to which the site may drain; within the site and immediate vicinity e.g. non-aquifer, minor watercourses up to 2 km from the site

Magnitude of effect	***Runoff regime***	***Surface water quality***	***Water Supply***	***Riverine flow regime***	***Riverine morphology***	***Groundwater levels***	***Groundwater quality***	***Geological changes***
High	Change (>50%) in proportion of site rainfall immediately running off, changing surface water flows, flood risk or erosion potential	Change in water quality, changing water quality status with respect to EQS[3] for more than one month	Change in the quality of the supply with respect to DWS; Change in the flow of supply leading to reduction in water pressure and loss of supply	Change in flows of >5% resulting in a measurable change in dilution capacity or flood risk	Changes in erosion and deposition, with conservation interests put at risk	Change in groundwater levels leading to an identifiable change in groundwater flow regime and artesian flow, affecting water supplies	Change in groundwater quality, changing site quality with respect to DWS[4] for more than 1% of samples	Disturbance or loss of cited features of geological Sites of Special Scientific Interest (SSSI) such that the integrity of the designation is harmed
Medium	Change (10-50%) in proportion of site rainfall immediately running off, changing flood risk or erosion potential	Change in water quality, changing site status with respect to EQS for less than one month	Measureable change in the quality of the supply for less than 1% of samples with respect to DWS; Temporary discolouration and elevated sediment content.	Change in flows between 2-5% resulting in a measurable change in dilution capacity and flood risk	Some change in deposition and erosion regimes	Change in groundwater levels leading to an identifiable change in groundwater flow regime. Measurable change in flow to water supplies and base flows	Change in groundwater quality, changing site quality with respect to DWS for less than 1% of samples	Some disturbance or loss to cited geological features of SSSIs but no harm to the integrity of the designation

[3] EQS – Environmental Quality Standard, as laid down in relevant EU Directives and national legislation
[4] DWS – Drinking Water Standards

Magnitude of effect	***Runoff regime***	***Surface water quality***	***Water Supply***	***Riverine flow regime***	***Riverine morphology***	***Groundwater levels***	***Groundwater quality***	***Geological changes***
Low	Change (<10%) in proportion of site rainfall immediately running off, but no change to flood risk or erosion potential	Measurable change in water quality but no change with respect to EQS	Measurable change in water quality, but no change with respect DWS. No change in pressure or flow	Measurable change in river flows of <2%, but no change in flood risk	Slight change in bed morphology and sedimentation pattern. Minor rates of erosion	Measurable change in groundwater levels, though no appreciable change in groundwater flow regime	Measurable change in groundwater quality, but not changing status with regards to DWS	No disturbance or loss to SSSIs

Professional judgement is used to assess the findings in relation to each of these criteria to give an assessment of significance for each effect. In order to determine the significance of effects, reference is made to the guidance material referred to within the assessment. Effects are considered to be of major, minor, or negligible significance. As a guide a significance table has been developed whereby the combination of sensitivity and magnitude give the significance of the effect. In some circumstances it is not possible to apply a simple sensitivity and magnitude level to an effect as there may be many variables that influence the significance of the effect. In such cases a full description of the reasoning behind the evaluation is given. Where an effect is deemed to be Major, this is defined as significant in EIA terms.

Evaluation of Effect Significance

Sensitivity of Impact	***Magnitude of effect***		
	Low	**Medium**	**High**
International/High	Minor / Major	**Major**	**Major**
National/High	Minor / Major	**Major**	**Major**
Regional/Medium	Minor	Minor / Major	**Major**
District/Medium	Not significant / Minor	Minor / Major	Minor / Major
Local/Low	Not significant	Minor	Minor / Major

Reporting

Preparation of hydrological assessment reports will consider the risks to surface water, groundwater and water used for drinking and other uses. This will include a qualitative risk assessment of these water uses together with a risk assessment during the construction, operation and decommissioning of the wind farm development. Where risks are identified a mitigation strategy will be developed. Mitigation will be based on the specific industry guidance, such as the requirements of PPS25, the EA Pollution Prevention Guidance (PPG) notes and guidance provided by CIRIA. Additionally, measures will be recommended based on SSE's experience of developing such strategies for wind farm sites. Preparation of a single hydrological features drawing for the site will be undertaken, assuming that digital mapping data can be provided in AutoCAD or ArcGIS format.

It is anticipated that there will be the need for discussions with the Ecology Consultant and the Civils Consultant. An amount of time has been set aside for this element of the project.

A flood risk assessment (FRA) is required for all developments over one hectare in size even if they are outwith a floodplain. It is SSE's experience that for wind farm developments an independent FRA would be required if the built aspect of the wind farm (access roads, turbine bases, substation compounds, etc.) totals more than one hectare in plan area. For Nant y Moch Wind Farm the built environment will total more than one hectare due to the scale of the site. As such SSE have anticipated the need for an independent FRA report.

A-5: Archaeology and Historic Landscape:

The scope of this assessment will meet the requirements of current planning regulations set out in Planning Policy Wales (2002). The archaeological resource is a material consideration in the determination of planning applications. It is explicitly stated in PPW that "*It is important that the historic environment – encompassing archaeology and ancient monuments, listed buildings, conservation areas and historic parks, gardens and landscapes – is protected*" (para 6.1.1). More specifically it states that "*the desirability of preserving an ancient monument and its setting is a material consideration in determining a planning application, whether that monument is scheduled or unscheduled. Where nationally important archaeological remains, whether scheduled or not, and their settings are likely to be affected by proposed development, there should be a presumption in favour of their physical preservation in situ. In cases involving lesser archaeological remains, local planning authorities will need to weigh the relative importance of archaeology against other factors, including the need for the proposed development*" (para 6.5.1.).

Consequently it is expected that a full archaeological and cultural heritage assessment would be undertaken as part of the EIA process.

Baseline Conditions

The cultural heritage and archaeological assessment of the proposed wind farm will aim to identify the presence or absence of any archaeological features in the proposed site areas and assess the likely impact of the developments upon them. The study will collate known archaeological information on the proposed areas; identify any previously unknown archaeological sites or monuments through walkover surveys, inspection of aerial photographic records and cartographic records. The study area is defined as the area within the proposed development boundary for physical, direct effects, and for an area of up to 10km from the boundary of the site for cultural heritage setting effects.

Data will be gathered from the following main sources or archives:

- The National Monuments Record (of Wales);
- Local Authority Historic Environment Records;
- Lists of Scheduled Ancient Monuments and Listed Buildings; and,
- Readily available written sources held in local and national archives.

Other sources of data (e.g. local libraries and archives) will also be consulted if considered applicable during the assessments. The type of data that will be assessed will include archived descriptions, historical maps and plans, historical photographs and depictions, aerial photography (various dates from the 1940s to the present), historical references, various publications and unpublished reports of archaeological fieldwork. The baseline data section of each report will include a general discussion of the history and archaeology of the area around each wind farm.

All sites and monuments of cultural heritage interest within 1km of the edge of the proposed wind farm development area and all Listed Buildings, Conservation Areas and Listed Parks and Gardens within a distance of up to 5km from the edge of the proposed wind farm will be identified in the relevant assessment. We will additionally

identify Scheduled Ancient Monuments no more than 10 km away, and identify any of those that might be subject to visual effects on their archaeological settings through the use of Zone of Theoretical Visibility analysis.

An archaeological walkover survey of each proposed wind farm development area will be undertaken with the aim of identifying any previously unknown remains. All archaeological sites and monuments will be assessed in the field for their survival extent, significance and relationship to other sites. A systematic approach will be undertaken in which total and even coverage of the proposed development areas will be ensured. Weather and any other conditions affecting the surveys will also be recorded. All individual features will be recorded, photographed and sketched. All features will be marked on plans, at a relevant scale keyed by means of Grid References to the Ordnance Survey mapping.

Impact Assessment Method

International heritage charters (e.g. the Burra Charter) and National Legislation, Guidance and regulation all define cultural value in terms of the extent to which a given monument can inform this and future generations. Thus the yardstick by which cultural value is measured is that of information content. An adverse impact on cultural value can therefore be measured in the extent to which it reduces the information content of the monument. Based on the baseline conditions thus identified, the reports will identify areas where the proposed developments may impact on the archaeology identified or elements of the historic landscape. The assessments will also consider the potential visual impacts of the proposed wind farm upon the archaeological setting of statutory protected and nationally important monuments within the wider areas of the proposed wind farm. Given baseline conditions the ES will also comment upon the potential of encountering hitherto unknown/unrecorded cultural heritage remains within the proposed development area. Please note that for the purposes of this assessment a site is a physical object, or arrangement, not now visible at ground surface made, caused or installed by human activity, that by its survival holds the potential to inform us and future generations about persons, actions, periods, or events. A monument is defined as any physical object visible at ground level that by its survival holds the potential to inform us and future generations about persons, actions, periods, or events in the past.

Cultural heritage sensitivity
Our method of classifying cultural heritage sensitivity will be guided by the classification criteria used nationally by English Heritage in designating Scheduled Ancient Monuments and Listed Buildings. This will involve consideration of whether the sites/monuments/buildings are of local, regional or national cultural heritage significance, and will include consideration of such factors as their type, age, rarity, group value, site context, historical associations (i.e. with well-known persons or historical events), quality, character and style of construction and condition.

The criteria used to rate archaeological and architectural heritage sensitivity in the proposed development area are presented in the Table below:

CRITERIA FOR ESTABLISHING RELATIVE CULTURAL VALUE	
Cultural Value	**Criteria**
International and National	World Heritage Sites or Iconic Sites and Monuments; or

	Scheduled Ancient Monuments (Actual and Potential; or Grade I and II* Listed Buildings; or Remains of national or international importance, or fine, little-altered examples of some particular period, style or type
Regional	Grade II Listed Buildings; or Remains of regional or more than local importance, or major examples of some period, style or type, which may have been altered; Remains of national importance that have been partially damaged.
Local	Remains of local importance, lesser examples of any period, style or type, as originally constructed or altered, and simple, traditional sites, which group well with other important remains, or are part of a planned group such as an estate or an industrial complex; Cropmarks of indeterminate origin; Remains of regional importance that have been partially damaged or remains of national importance that have been largely damaged.
Negligible	Relatively numerous types of remains, of some local importance; Findspots of artefacts that have no definite archaeological remains known in their context; Remains of local importance that have been largely damaged; Isolated findspots; Undesignated structures

Magnitude of impact

Our classification of the magnitude of impact on cultural heritage sites will be rigorous and based on consistent criteria. This will take account of such factors as the physical scale and type of disturbance to them and whether features or evidence would be lost that are fundamental to their historic character and integrity. We will consider both direct and indirect (e.g. visual) impacts on cultural heritage remains.

The magnitude of the physical impact upon monuments caused by the developments will be rated using the classifications and criteria outlined in the Table below.

CRITERIA FOR CLASSIFYING MAGNITUDE OF PHYSICAL IMPACT	
Physical impact	**Criteria**
High	Major loss of information content resulting from total or large-scale removal of deposits from a site whether or not the site is associated with a monument; Major alteration of a monument's baseline condition;

	Any physical alteration to a Scheduled Ancient Monument; Any alteration to a Grade I Listed Building, massive alterations to a Grade II* or Grade II Listed Building
Medium	Moderate loss of information content resulting from material alteration of the baseline conditions by removal of part of a site, whether or not the site is associated with a monument. Moderate alteration of a monument's baseline condition Moderate alternations to a Grade II* or Grade II Listed Building
Low	Minor detectable impacts leading to the loss of information content. Minor alterations to the baseline condition of a monument. Minor alterations to a Grade II* or Grade II Listed Building
Negligible	Very slight or barely measurable loss of information content; Loss of a small percentage of the area of a site's peripheral deposits. Very slight and reversible alterations to a monument.
None	No physical impact anticipated

The potential for the proposed wind farm to visually impact upon the setting of statutory and nationally important cultural heritage sites within 10km of the wind farm boundary will be determined, in the first instance through Zone of Theoretical Visibility (ZTV) analysis. Each potentially impacted monument will be visited. The state of survival and the extent of the monument will be noted. The orientation of particularly sensitive views from the monument site will be recorded, as will any existing impacts upon the setting of the monument. A distinction will be made between monuments for which a relationship with their settings is predicated by their design or function and those with no 'pre-programmed' relationship with place. For the former, impacts can be severe, on purely functional grounds. However, in the light of recent PLI outturns, there is a need to consider the aesthetics of the monument in its setting, almost as a piece of art in its context. Based on the information thus gathered, the magnitude of impact upon each site will be determined. In determining visual impacts upon cultural heritage receptors the key issue will be the degree to which impacts upon a monument's setting will result in the loss of information content, essentially a functional matter, and the degree to which the aesthetics of the monument are altered, essentially an amenity impact issue.

CRITERIA FOR CLASSIFYING MAGNITUDE OF VISUAL IMPACT	
Physical impact	**Criteria**
High	Substantial visual impact on a designed-in sightline to or from a ritual monument or prominent fort; Major alteration to the penumbral or close settings of a Scheduled Ancient Monument; Substantial visual impact within a Cultural

	Landscape as defined by *The Operational Guidelines to UNESCO's World Heritage Convention (*2008); Substantial visual impact within or affecting an Iconic Site or Monument
Medium	Oblique visual impact on an axis adjacent to a designed-in sightline to or from a ritual monument but where the designed-in sightline of the monument is not obscured. Interruption of views to or from the glacis of a prominent fort (based on the proportion of the glacis that would be obscured). Alteration to the setting of a SAM outwith its penumbral setting or alteration to the setting of a Grade I, II* or II Listed Building beyond its curtilage. Appreciable but not major visual imposition within a Cultural Landscape.
Low	Peripheral visual impact on a designed-in sightline to or from a ritual monument. Alteration to the setting of a SAM outwith its penumbral setting or alteration to the setting of a Grade I or II* Listed Building beyond its curtilage. Minor visual imposition with a Cultural Landscape
Negligible	All other visual impacts
None	No intervisibility

Significance of impact

Our method for rating the significance of direct impacts on each cultural heritage receptor incurring a potential impact will be based on a matrix that is a function of both the cultural heritage sensitivity and magnitude of impact at each receptor. Our classifications of significance of effect generally include None, Negligible, Minor, Minor-to-Moderate, Moderate, Moderate-to-Major, Major and in some very rare cases Extreme. This matrix is presented in the Table below.

METHOD OF RATING SIGNIFICANCE OF IMPACT ON ARCHAEOLOGICAL / ARCHITECTURAL HERITAGE RECEPTORS BY THE PROPOSED DEVELOPMENT					
	Archaeological sensitivity				
Magnitude of Impact	***Negligible***	***Local***	***Regional***	***National***	***International***
High	Minor-moderate	Moderate	Moderate-major	Major	Extreme
Moderate	Minor	Minor-moderate	Moderate	Moderate-major	Major
Low	Negligible	Minor	Minor-moderate	Moderate	Moderate-major
Marginal	Negligible	Negligible	Minor	Minor-moderate	Moderate
None	None	None	None	None	None

The predicted significance of visual impact upon Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and Historic Parks and Gardens will be determined by considering their relative visual sensitivity in conjunction with the magnitude of visual impact predicted on them. The factors to be considered in determining the significance of the visual impacts will include the scale and proximity of the wind farm; issues of putative intervisibility of specific types of monuments; vistas and sightlines to and from monuments where these were designed-in elements of the monuments, the integrity of the setting i.e. is it in an unaltered state relative to a major phase of the biography of the monument? These factors are integrated in an evaluation of the significance of impact, treating each monument as a potential 'art-historical' entity in its immediate and larger landscape setting. This is a standard approach to assessing aesthetics in art and architectural history.

The method of classifying the magnitude of visual impact is shown in the Table below.

SIGNIFICANCE OF VISUAL IMPACTS ON THE CULTURAL VALUE OF MONUMENTS				
Importance of site or monument				
Impact magnitude	Negligible	Local	Regional	International or National
High	Minor	Minor	Moderate	Major
Medium	Negligible	Minor	Minor	Moderate
Low	None/Negligible	Negligible	Minor	Minor
Negligible	None	None	Negligible	Minor
The impacts recorded in highlighted cells are 'significant' in terms of the Environmental Impact Assessment (England) Regulations 1999				

Mitigation

Once the potential impacts upon cultural heritage have been identified, we will consult with the relevant local authority archaeologists and Cadw / the archaeological curator in devising any draft mitigation strategies. A brief review of local planning policy guidance will also be undertaken on relevant planning controls.

The draft mitigation strategies will take account of the impact assessment classifications and will aim to minimise adverse effects on cultural heritage. It will address impacts on both the known and the unknown/unrecorded cultural heritage remains.

The mitigation recommended in the assessments will aim to comply with the national planning policies that pertain to heritage, as expressed in PPG15 and PPG16. We will also be guided by English Heritage's guidelines relating to the treatment of Scheduled Ancient Monuments and Listed Buildings.

ASIDOHL

The Welsh Archaeological Trusts have in recent years completed a programme of historic landscape characterisation in association with Cadw, CCW and ICOMOS (UK) which identified landscapes of particular historic importance (incorporated in the Register of Landscapes of Historic Interest in Wales) and subdivides each of these

historic landscapes into separate Historic Character Areas (HCAs), each defined by their unique or significant historical and cultural associations.

Within the 15km radial band from the edge of the proposed development area there are three Registered Historic Landscapes, Uplands Ceredigion (HLW No.4), the Clywedog Valley (HLW No.55) and the Dysynni Valley (HLW No.17). Preliminary analysis of a Zone of Theoretical Visibility (ZTV) map indicates that only the Uplands Ceredigion landscape will be significantly affected by the proposed development. Both the Dysynni Valley and the Clywedog Valley are considered to be significantly screened from the proposed development by topography and intervening forestry plantations.

To ensure a consistent approach in defining the potential impacts of development on historic landscape areas, Cadw and CCW have developed a staged process, which quantifies the direct and indirect impacts on individual HCAs. The methodology for the Assessment of the Significance of the Impact of Development on Historic Landscape Areas on the Register of Landscapes of Historic Interest in Wales (or ASIDOHL2) is outlined in Cadw's document Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (2nd edition revised 2007). The ASIDOHL2 process has five stages.

The methodology for assessing the effects of any significant development proposal on a historic landscape, termed an Assessment of the Significance of the Impact of Development on a Historic Landscape Area (or ASIDOHL for short), was first published by Cadw in conjunction with the Countryside Council for Wales (CCW) in 2003. A revised version – ASIDOHL2 – was published in 2007. The study of the effects of the proposed wind farm development will be undertaken according to ASIDOHL2.

Reporting

A report for the wind farm, in the form of cultural heritage and archaeology chapter, will be produced as a result of the environmental impact assessments, summarising findings and where appropriate, avoidance and mitigation measures.

A series of figures (including modern and historic maps and photographic plates) would be supplied as part of each report. Tables would also be included to summarise the ratings of cultural heritage sensitivity, and the magnitude and significance of impacts.

All cultural heritage sites and monuments identified during the assessments will be given unique numbers. The known extent of each of these will be plotted onto location maps and tied into the national grid co-ordinates. We will also plot the proposed development areas onto the map base to show its extent in relation to cultural heritage sites and monuments.

The appendices will include a cultural heritage site gazetteer (ordered by site no.) containing information about each site including the site name, site type, period/date of origin, grid reference, NMR/SMR no., protective designations and other descriptive information, where known or applicable.

A-6: Peat Assessment

Desk Study

The following sources of information are available for use in the desk top study of peat across this site.

Resource	Date	Source	Use
Phase 1 habitat map	2008	As produced by consultant	Can be used to help identify areas of Mire (peat depth usually > 0.5m), as well as good/reasonable areas of existing habitat
National Vegetation Classification (NVC)	2008	As produced by consultant	Provides a finer grain approach to classifying and evaluating habitats. Can be interpreted using other classification systems e.g. in a Welsh context (i.e. Turner categories)
Mapping of hydrological flows and features	2008	As produced by consultant	Can be used to identify areas where disturbance of hydrological flows by the proposed infrastructure may impact on existing peat habitat
Map showing area of poor forestry where peat habitat has been identified for restoration (see Figure 3)		As produced by consultant	Identify area of particular interest for habitat restoration
Peat depth map (point data) - see Figure 2	2008	As produced by consultant	Identifies points of; - no peat - peat depth < 0.3m - peat depth < 0.5m - Peat depth <1.0m etc
Peat mapping prior to FCW plantation		FCW	Currently uncertain whether this exists. Request for information lodged with FCW.
Pre-planting aerial photography		Royal Commission of Ancient Historical Monuments	Can be used to identify areas and boundaries of mire habitat Allows geomorphology to be assessed and identification of where peat is likely to form. Evidence of instability may also be identified.
Aerial photography	Existing	As produced by consultant	As above Allows identification of areas where tree planting has failed or resulted in stunted growth indicating poorly drained areas

			where peat habitat may still exist in reasonable condition Also allows identification of potential peat instability features (former landslips, larger scale tension cracks etc)
British Geological Survey Maps		BGS	Allows geomorphology to be assessed and identification of where peat is likely to exist.
Ordnance Survey Maps		OS	General information of terrain
Soil Maps		Cranfield University	Provides an assessment of soil distributions. Although this may be quite general it remains a necessary source.
Digital terrain map of site		As produced by consultant	Provides digital representation of ground surface topography

Table 1: Data sets to be used in desk top study

The sources of information listed in Table 1 will be used in combination to create a digital map representation of areas where peat is likely and unlikely to occur. This will be overlaid on a map of the proposed site infrastructure to inform the resolution of the field surveying required at each location. The desk study should identify any data gaps and additional information that is required to undertake a comprehensive assessment of the peat resource on site and subsequent impact assessment.

The understanding of peat deposits in the development area is an iterative process combining both desk studies and field surveys. During the desk study the sum of field information gathered to date will be combined and assessed. Based on the site data already gathered we shall indicate the discrete areas where peat may be an issue and where indirect effects on peat are likely to occur via the disturbance of hydrological flows which feed them. These areas have largely been investigated during the design process but may require higher resolution of data to determine the nature and extent of impacts.

Areas of likely peat may exist under forestry canopy which were not obvious during field visit. It is anticipated that these areas may be identified from early aerial photography prior to forestry planting.

Areas where peat is likely to be absent shall be delineated from existing data and archives so that the focus of the field work is concentrated towards the deeper peat, whilst still gathering baseline data to prove the extent of little or no peat

Site work to date has shown that much of the deeper peat is defined by local catchments / hydrological parameters and associated favourable topography. The desk studies should identify areas of mire or peat habitat with depth ≥ 0.35m that are most likely to be affected directly or indirectly as a result of the proposed development.

Additionally areas of observed ground instability or characteristics favourable to future instability will be delineated.

The indicators of potential peat instability are detailed in "Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2006)", Scottish Executive.

A summary of five indicators of peat instability identified by CCW within Table 1 and Point 3.2.5 of their letter of the 24th July 2009 will also be used in this context.

The desk study shall also cover an assessment of NAYAK input parameters. The purpose of this is to define which parameters should be determined in the field and which parameters from published data or professional judgement.

Currently we propose to determine the following parameters directly:

- Peat Depth
- Peatland characterisation
- Bulk Density, soil pH and Organic Matter content through soil sampling and laboratory analysis
- Likely water table depth by visual observation
- Habitat types
- Site assessment of relevant drainage around drainage features

Field study

The area of survey will focus on the current areas of proposed infrastructure as described previously, with additional field survey being guided by the gap analysis conducted as part of the desk top study. The wind farm layout is the most recent revision and is subject to future changes; subsequent changes will be assessed in a similar way as described here if this is necessary to provide a complete picture of the potential impact on peat from the perspectives of carbon balance, habitat mitigation and management, and peat slide assessment. Probing will be conducted outside the infrastructure footprint as necessary to understand peat morphology and proposed restoration areas.

Peat Probing

In order to meet these objectives, peat probing is required. Assuming the relationship between terrain and peat deposits is upheld by the desk study this can be segregated into detailed work and baseline work. It is necessary to investigate the areas with little or no peat but not to the same extent as the areas of significant peat. The resolution of peat probing will vary dependent on whether the desk top study identifies that peat deposits are likely and this variation is reflected in the Tables 2 and 3 below.

Probing should utilise metal peat probes where possible. Peat depth should be recorded to the nearest 10cm. The 10 figure grid reference of each probing location should be recorded using GPS.

Feature	*Sampling Methodology*	
	Initial Sampling	**Amended sampling if deep peat identified**
Access Tracks	NEW TRACK - 50m intervals along the track centreline	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Turbine Locations	At turbine location and at 25m separation on cross hairs oriented N, E, S and W	Where any point on the cross hairs indicates peat over 0.5m deep, cross hairs to be extended by a further 25m
Sub-station Location	At longitudinal centre line of sub-station probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Construction Compound Locations	At longitudinal centre line of construction compound probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Batching Plant Location	At longitudinal centre line of batching plant location, probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Proposed Peat Restoration Area	Transects at right angles to the watercourse, with probing at 50m intervals along each transect and transects spaced every 100m	Transects at right angles to the watercourse, with probing at 50m intervals along each transect and transects spaced every 100m

Table 2: Proposed Peat Probing Resolution in Areas where desktop shows peat or mire likely

All the above are subject to reasonable variation as a result of limitations on access due for example to topographic or forestry constraints, and may be supplemented or amended if an experienced operative judges this to be necessary.

Feature	*Sampling Methodology*	
	Initial Sampling	**Amended sampling if deep peat identified**
Access Tracks	NEW TRACK - 100m intervals along the track centreline.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Turbine Locations	At turbine location and at 25m separation on cross hairs oriented N, E, S and W.	Where any point on the cross hairs indicates peat over 0.5m deep, cross hairs to be extended by a further 25m
Sub-station Location	At longitudinal centre line of sub-station probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Construction Compound Locations	At longitudinal centre line of construction compound probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Batching Plant Location	At longitudinal centre line of construction compound probing at 50m intervals and at similar intervals along transects 50m either side of centre line.	Where 2 consecutive readings of over 0.5m deep peat are obtained also a transect at right angles between the points with probing at 25m intervals as far as required to delineate the extent of the deep peat.
Proposed Peat Restoration Area	N/A	N/A

Table 3: Peat Probing Resolution in areas where peat is unlikely to occur or in areas where Desk Top Study indicates there is no peat or mire

All the above are subject to reasonable variation as a result of limitations on access due for example to topographic or forestry constraints, and may be supplemented or amended if an experienced operative judges this to be necessary.

Other Surveying Techniques To Be Used

Other than peat probing and recording, observational data shear strength shall be gauged in relative terms via hand shear vanes. We acknowledge the short fallings in this method for determination of absolute shear strength but believe it to be suitable for this stage of assessment. When undertaking the peat depth measurements at the turbine locations, in situ strength data will also be obtained using a Geonor H50 Hand Shear Vane; this will enable strength values to be obtained for the peat which can then be implemented with regard to potential peat slides. At the same location a slope angle will be obtained. These measurements will allow a calculation to be undertaken with respect to potential peat slides.

Peat probing is considered to be a suitable method for the identification of peat and measurement of peat depth but to understand the characteristics of peat, core samples will need to be taken using a peat coring tool. Peat probing without core sampling can pick up soft clays and silts which, if present, can be conducive to peat slide. Sampling of peat cores will also facilitate the assessment and characterisation of peat hydrology. Recording of data based on the Von Post Classification will be undertaken at all probing locations where peat depth >1.0m is recorded.

Methodology	Frequency	Comment
Shear Vane	All turbines where peat ≥ 1.0m Representative track sections where peat ≥1.0m for 100m or more	Tests at 300mm depth centres and one within 200mm of peat base. Test in underlying stratum if possible. Additional areas may be selected from desk studies if prudent.
Slope inclination	All shear vane locations	
Von Post descriptor	All cored locations i.e. turbines where peat is ≥1.0m	Relative degree of humification is determined from peat cores when retrieved, and will be noted.
Soil pH	Representative sub-samples from peat cores (e.g. 3 per peat body)	To identify the range of pH rather than be specific at each location for NAYAK.

Table 4: The proposed data acquisition in areas of peat >1.0m

Notes on methodology

Each handheld GPS used should record the grid reference at locations with known grid references such as trig points on or near site in order to correct for errors in GPS data recorded.

The peat probing should be 'calibrated' to ensure that what 'feels' like peat actually is. This can be achieved using a peat coring tool to sample the soil. Peat cores will be taken at all locations where a probing depth >1.0m is recorded.

It should be noted that some areas of infrastructure may be inaccessible or have no GPS reception due to dense plantation forestry. However, data collected from accessible locations should allow the ground proofing of the indicative peat map generated from the desk assessment. This will enable a more robust and accurate

set of outcomes than would be possible from desk-based information alone. Where no GPS is available probes can be located via pacing on compass bearing if necessary. Any areas that are truly inaccessible for the purposes of accurate assessment will be clearly identified and presented within the set of figures accompanying the final report (to be incorporated within the Environmental Statement accompanying the planning application).

With respect to the assessment methodologies of potential effects to peat, the discrete ES sections relating to project description (slide risk), hydrology (catchment regeneration, watercourses etc) and ecology (species assemblage and habitats) will provide predictions of effects and the significance of such effects to peat deposits in the study area in accordance with their respective methodologies.

Appendix B: DBERR Scoping Opinion July 2008

BERR | Department for Business Enterprise & Regulatory Reform

BERR Ref:
Your Ref:

Conrad Trevelyan
Senior Project Manager
Dulas Limited
Unit 1
Dyfi Eco Park
Machynlleth
Powys
SY20 8AX

25 July 2008

Dear Dr Trevelyan

NANT-Y-MOCH WIND FARM – SCOPING OPINION

I refer to your letter of 5th June 2008 requesting a scoping opinion under Regulation 7 of the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000, enclosing a scoping document dated May 2008. The Environmental Scoping Study set out the information that Dulas Ltd intends to provide, on behalf of Airtricity, in the Environmental Statement (ES) required in respect of the necessary consent application under section 36 of the Electricity Act 1989.

The Secretary of State hereby gives his opinion as to what information should be included in the environmental statement. The matters to be covered are listed below and in no particular order of merit:

(1) landscape – including capacity, character, quality and value and visual effects (cumulative – taking account of any other existing wind farm or application for a wind farm in the planning system within a 30km radius from the boundary of the site);

(2) construction noise;

(3) operational noise;

(4) construction traffic;

(5) site selection including other sites considered and why they were rejected. This section should provide justification for taking the indicative layout proposal outside the Strategic Search Area D.

(6) the amount and source (e.g. borrow pit, existing quarry or waste products) of

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construction material required for access tracks, etc that will be required;

(7) details of the proposed electricity Grid connection with likely impact and mitigation measures;

(8) flora and fauna, including the impact on any area or species protected under the Habitats Regulations or the Wildlife and Countryside Act 1981;

(9) impact on designated areas such as National Parks, SSSIs, rights of way, bridle paths etc.

(10) impact on the local economy, including tourism, job creation, benefits;

(11) impact on sites of historic landscape and registered parks and gardens;

(12) impact on archaeology;

(13) impact on cultural heritage within 10km from the boundary of the site;

(14) impact on aviation; and

(15) hydrology, hydrogeology and geology.
Paragraph 8.10 states that "sufficient information shall be provided to support the determination of active and/or sensitive peat bog habitats". The applicant may wish to refer to a recent publication by the Scottish Executive which details methods to calculate the impact of wind farm developments on the soil carbon stocks held in peats[1]. The decision to use of the "carbon calculator" should be made by the applicant if loss of peat is deemed a 'significant effect' during the assessment process.

Cumulative impacts for the above should be considered where applicable.

I enclose copies of the detailed comments received in response to my letter of 10th of June. Where appropriate these comments should also be taken into account along with any other comments you may have received direct. I am also enclosing copies of comments which we have received from Cadw and the Wildlife Trust of South and West Wales/Montgomeryshire Wildlife Trust. I will forward to you and copy recipients any further comments that I may receive.

I am copying this letter and enclosures to:

Sue Byrne of the Countryside Council for Wales;
Louise Edwards of the Environment Agency;
Lynn Griffiths of the Welsh Assembly Government;
John Evans of Ceredigion County Council;

[1] http://www.scotland.gov.uk/Publications/2008/06/25114657/0

Steve Packer of Powys County Council;
Mark Smailes of the Civil Aviation Authority; and
Sarah Allen of NATS;

Yours Sincerely,

Gareth Leigh
Manager, Onshore Power Consents

Stephen Burgess, B.Sc., C.Eng., M.I.C.E
Pennaeth Adfywio a Datblygu
Head of Regeneration and Development

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Ebost / Email: steve.packer@powys.gov.uk
Eich cyf / Your ref:
Ein cyf / Our ref: PS/SP/MW
Dyddiad: Date: 1st July 2008

Mr Gareth Leigh
BERR
Energy Group
1 Victoria Street
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Dear Mr Leigh,

RE: Request for formal scoping decision under Part III, Paragraph 7 of Statutory Instrument 2000 No. 1927- proposed Nant-y-Moch Wind Farm

Further to your letter of 10th June 2008 addressed to Dr Conrad Trevelyan and received in these offices on 11th June and following a meeting in the offices of Ceredigion County Council to discuss the scoping consultation document in detail, I am offering the following comments on behalf of Powys County Council. You will be aware that Powys has part of the site within its boundaries and 12 of the proposed turbines if the indicative layout is adhered to.

I will not attempt to address the technical matters which will be responded to by other consultees, namely ecology, hydrology, archaeology, mining and contamination. I do wish to comment on issues of policy landscape and visual appraisal, highway access and grid connection which I will deal with in turn below.

Planning Policy

At the scoping meeting it was drawn to the applicants attention by my Ceredigion colleagues and myself that, given the fact that the site boundary and indicative layout take the proposal outside the boundaries of Strategic Search Area D, there will need to be a fully reasoned justification for this within the body of the Environmental Statement. It was also pointed out that the layout extends beyond the refined Nant y Moch boundaries produced for Ceredigion and Powys County Councils by Arup. In this respect it was suggested to the developer and their consultants that it is important that they respond to the consultation that Powys County Council is currently undertaking on its Interim Control Guidance which contains these boundaries. The guidance seeks to restrict large scale windfarms to within those refined areas which it is considered are more than sufficient to meet Government targets unless substantial reasons are presented for layouts which extends proposals outside the refined SSA's.

Landscape/ Visual Impact

Powys County Council is not wholly satisfied with the fifteen view points suggested in the body of the scoping document only two of which are within Powys and omit a view from the carpark at Nant y Moch Reservoir. It was also suggested that in terms of any cumulative appraisal, developers would need to take into account proposals in Strategic Search Areas B and C which were beyond the 30 kilometre calculation limit used in their ZVI exercise.

In terms of visual impact it was agreed that wire frames would be produced for small settlements and individual dwellings where there was concern that a substantial amount of the horizon would be taken up by wind turbines in close proximity. It was also agreed that impact of shadow flicker would be assessed.

Access

It is considered that transportation and highway issues need to have a separate section in the Environmental Statement to include a full traffic impact assessment. It is understood that the applicants are attempting to initiate a strategic approach with Trunk Roads Agency, the Highway Authorities and other developer members of the British Wind Energy Association and will have regard to the Regional Transport Plan.

Grid connection

It was agreed that this requires a separate section within the Environmental Statement which should include as much information as possible on routing and impacts and the applicants indicated that they are in active discussions with the grid providers and other developers in order to include as much information as possible within their submission and to reduce impacts to a minimum.

Without prejudice to the response of other consultees Powys County Coucils view is that the scoping document in other respects forms a sound basis for progression towards an Environmental Statement.

Yours sincerely,

Steve Packer
Specialist Services Manager

C.C. Dr Conrad Trevelyan, Snior Project Manager, Dulas Limited, Unit 1, Dyfi Eco Park, Machynlleth, Powys, Wales, SY20 8AX.

Mr John Evans, Department of Environmental Services and Housing, Neuadd Cyngor Ceredigion, Penmorfa, Aberaeron, SA46 0PA.

Directorate of Airspace Policy

Civil Aviation Authority

Mr Gareth Leigh
Department for Business, Enterprise & Regulatory Reform
Energy Group
Bay 2121
1 Victoria Street
LONDON
SW1H 0ET

11 June 2008

Reference: ERM/DAP/Wind/NantYMoch

Dear Mr Leigh

Proposed Nant-y-Moch Wind Turbine Development – Scoping Opinion Comment

Thank you for your recent correspondence relating to the proposed Nant-y-Moch wind turbine development. You sought related Civil Aviation Authority (CAA) scoping opinion comment; I trust the following is useful.

Like any wind turbine development, the proposed subject development has the potential to impact upon aviation-related operations; the DTI / BERR-sponsored document 'Wind Energy and Aviation Interests' refers. The related need to establish the scale of the potential impact of the Nant-y-Moch development (or indeed any other wind turbine related) proposal is evident. The best means by which to initiate the aviation related consultation process is via the completion and submission of an associated aviation pre-planning proforma in line with the process described within the aforementioned DTI guidance document. To date I can find no record of the submission of a pre-planning proforma in respect of a Nant-y-Moch wind turbine development.

Notwithstanding the comment above and without wishing to pre-empt any formal investigation initiated through submission of the pre-planning enquiry, I have studied the information provided and can advise that I do not believe that the CAA would wish to make any site-specific observations. However, more generically, I must highlight that all parties should be aware that:

- There might be a need to install aviation obstruction lighting to some or all of the associated wind turbines should development proposals be progressed.

  This comment is made specifically if there were concerns expressed by other elements of the aviation industry, ie the operators. For example, if the Ministry of Defence (MoD) or a local aerodrome had suggested such a need, we the CAA (sponsor of policy for aviation obstruction lighting) would wish, in generic terms, to support such a claim. We would do so if it could reasonably be argued that the structure(s), by virtue of their location and nature, could be considered a significant navigational hazard. That said, if the claim was clearly outside credible limits (ie the proposed turbine(s) was/were many miles away from an any aerodrome or it/they were of a height that was unlikely to effect even military low flying) the Authority would play an 'honest-broker' role. Whilst responsibility for establishing further lighting related comment rests with the developer, I should highlight that, in isolation, the CAA would not make any related case or recommendation for aviation lighting.

- An anticipated amendment to international aviation regulatory documentation will require that the rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines that are deemed to be

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an aviation obstruction should be painted white, unless otherwise indicated by an aeronautical study. It follows that the CAA advice on the colour of wind turbines would align with these international criteria. As with the potential need for lighting, in isolation, the CAA would make no special case for marking. I would suggest that this marking requirement is linked to the lighting issue; if there is no requirement for lighting, there should be no specific requirement for special markings in respect of paint colour.

- There is a civil aviation requirement in the UK for all structures over 300 feet high to be charted on aviation maps. Should this development progress and the 300 feet height be breached, to achieve this charting requirement, developers will need to provide details of the development to the CAA and Defence Geographic Centre.

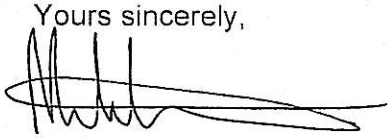
- The number of pre-planning enquiries associated with windfarm developments has been significant. It is possible that the proliferation of wind turbines in any particular area might potentially result in difficulties for aviation that a single development would not have generated. It is, therefore, not necessarily the case that, because a generic area was not objected to by the aviation industry, future, similarly located potential developments would receive the same positive response. There is a CAA perceived requirement for a co-ordinated regional wind turbine development plan, aimed at meeting renewable energy priorities, whilst addressing aviation concerns and minimising such proliferation issues.

- The relative perspectives of both the MoD and NATS should be established and any related concerns addressed.

Any associated Environmental Impact Assessment (or similar) should mention and, where applicable, address the issues highlighted

Whilst none of the above negates the need, where applicable, for planning authorities to consult in accordance with ODPM / DfT Circular 1/2003, I trust that this information and guidance is of assistance. Please do not hesitate to contact me if you require further input or clarification of any point. Any requests from other agencies for scoping comment related to wind turbine development in the area in question will be answered in line with the comments above.

Yours sincerely,



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Gareth Leigh
BERR - Energy Group
1 Victoria Street
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SW1H 0ET

22nd July 2008

Your Ref: E6021
Our Ref: N/SFG/W(F)8169

Dear Sir,

Wind Turbine/Farm: Nant-y-Moch

The proposed development has been examined from a technical safeguarding aspect and does not conflict with our safeguarding criteria. Accordingly, NATS (En Route) Public Limited Company ("NERL") has no safeguarding objection to the proposal.

However, please be aware that this response applies specifically to the above consultation and only reflects the position of NERL (that is responsible for the management of en route air traffic) based on the information supplied at the time of this application. This letter does not provide any indication of the position of any other party, whether they be an airport, airspace user or otherwise. It remains your responsibility to ensure that all the appropriate consultees are properly consulted.

If any changes are proposed to the information supplied to NERL in regard to this application which become the basis of a revised, amended or further application for approval, then as a statutory consultee NERL requires that it be further consulted on any such changes prior to any planning permission or any consent being granted.

Yours faithfully,

Sarah Allen
Technical Administrator
On behalf of NERL Safeguarding Office

Cyngor Sir CEREDIGION
ADRAN Y GWASANAETHAU
AMGYLCHEDDOL A THAI
Bryan Thomas MCIEH, FRSH
Cyfarwyddwr
Director

CEREDIGION County Council
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Dyddiad
Date
2nd July 2007

Gofynnwch am
Please ask for
Mr J. Evans

Llinell Uniongyrchol
Direct line
(01545) 572130

Eich cyf
Your ref

Fy nghyf
My ref
JE/ Misc/ Nant-y-Moch

Dear Sir

Request for a formal scoping decision under Part III, Paragraph 7 of Statutory Instrument 2000 No 1927 – Proposed Nant-y-Moch Wind Farm.

I refer to your copy letter of the 10th June 2008 to appropriate consultative bodies requesting their views on the content of the Scoping report prepared by Dulas Ltd on behalf of Airtricity. The following may be considered to be the formal views of the County Council, however, it is based on the information before the Council at the present time and the County Council reserves the right to hold a different view should circumstances change.

The County Councils concerned hosted an informal Scoping meeting on the 30th June 2008 which a number of non consultative bodies attended. A number of those bodies expressed a wish to comment on the content of the Scoping Report but have yet to provide their comments. I would hope that BERR will allow time for those comments to be taken into account and I understand that Dulas would have no objection to an extension of time for the issue of a formal scoping decision.

The County Council consider the following should be included in the Environmental Statement:-

(i) an assessment of the need for the project in global and national terms;

(ii) a robust assessment of the site selection process and the reasons for rejection of sites in favour of the proposed site. The assessment should be made in a national if not a regional context;

(iii) a description of the physical characteristics of the proposed wind farm **and the proposed grid connection** including restoration/reinstatement methods, and the land use requirements during the construction and operational phases;

Cyfarwyddwyr Cynorthwyol
Assistant Directors

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(iv) an assessment of ground conditions in the vicinity of the proposed site and an assessment of the impacts of any pre-construction ground investigations. There are unknown mine workings in the area of the site and the ground may be contaminated by lead mine spoil. There may also be peat deposits within or close to the site. Where there are known mine workings or peat deposits these should be avoided. The ES should contain robust method statements for the carrying out of pre-development investigation work where unknown mine shafts, mine workings or peat deposits are found;

(v) a description of the main characteristics of any proposed production processes, for instance the nature of any proposed concrete batching plant, the nature, quality and quantity of any materials to be imported to or extracted from the site;

(vi) an estimate, by type and quantity, of expected residues/emissions resulting from the proposed wind farm during construction and operation including water and water borne material, wind blown material – particularly as a result of any workings in areas of contaminated land, soil pollution, noise, vibration, and light;

(vii) an assessment of the following aspects of the environment that may be significantly affected by the development:

- population and culture;
- landscape quality;
- landscape character;
- visual amenity;
- cumulative impact over an area to be agreed;
- historic landscape, archaeology and heritage;
- rights of way and public access land;
- hydrology – impact on private water supplies;
- flora and fauna – in particular ground nesting birds, Water Voles and bats;
- waste and its disposal – the favoured option is to recycle and disposal on site;
- noise;
- light – the potential need to provide aircraft warning lights;
- communications.

The assessment should consider the inter-relationship with those factors.

(viii) a traffic impact assessment particularly addressing the impacts on settlement in the area.

(ix) socio-economic impacts.

(x) restoration of the site – it is standard practice of the authority to require a bond for the restoration of the site.

The characteristics of the potential significant effects of the proposed wind farm and grid connection works should be set having regard in particular to:-

- the extent of the impact;
- the trans-frontier nature of the impact;
- the magnitude and complexity of the impact;
- the duration, frequency and reversibility of the impact;
- the forecasting methods used to assess the impact;
- a description of the measures envisaged to prevent, reduce, and where possible, offset any significant effects.

The Scoping Report submitted on the 5th June 2008 appears to be fairly comprehensive, however, little information is given on grid connection.

From the responses to consultation the ES should take into account the fact that:

- There are Scheduled Ancient Monuments within the boundaries of the site and other sites have recently been selected for scheduling;
- The site lies within the Upland Ceredigion Landscape of Outstanding Historic Interest. The ASIDOHL assessment system should be used to assess the impact of the wind farm on the historic landscape;
- There may be other unknown historic features that should be taken into account, however, the difficulty of identifying unknown archaeological resources within forestry is recognised. Both Cambria Archaeology and CADW may have further comment to offer on this matter;
- A phase 1 habitat survey would be required;
- there are some 42 protected sites within 15km of the site and the impact of the proposed development on these sites needs to be assessed;
- The Tir Gofal Scheme operates in the area and may affect the landowners concerned;
- The proposed height of the turbines indicates that a 35km sweep for the Theoretical Zones of Visibility would be more appropriate, particularly in terms of the National Park;
- The cumulative impact of the proposed wind farm with existing wind farms and those at an advanced planning stage should be assessed over a minimum of 60km;
- Critical viewpoints should be agreed with the Council in consultation with CCW and there may be a need for more than the 15 suggested;
- The Welsh Mines Preservation Trust should be included in any consultations;

- The County Councils concerned have carried out refining work on SSA D which will be material to their consideration of any proposal. That work has concluded that there is no reason to extend the boundary outwards by any significant degree on the basis that the land outside the published SSA boundary has been demonstrated to be either unacceptable in landscape and visual terms for the development of large scale wind farms forming part of the SSA; or not needed to contribute to the 2010 indicative capacity by virtue of there being sufficient available resource located within better environmentally performing parts of the SSA. Where the development proposal prejudices the findings of the refining process the Council would expect robust and detailed justification for any extension of the SSA boundary outwards by any significant degree in order to achieve greater installed capacity than that capable of being provided within the SSA;
- The site falls within the Ceredigion Uplands Special Landscape Area as identified in the Ceredigion UDP and within the Uplands SLA as identified in the Structure Plan;
- The Ceredigion Biodiversity Action Plan should be taken into account;
- The Crown very often have an interest in mines where precious metals are concerned;
- Receptors at sea should be taken into account;
- The Snowdonia National Park will be consultees on the application.

Landscape impact and noise are likely to be the key issues. The County Council will need to agree those noise sensitive properties where measurement should be taken in the context of the noise assessment.

The proposal, whilst not proposing clear felling of substantial areas of forestry, involves the key holing of turbines into forestry and it is considered that this would present significant opportunity for habitat enhancement. That opportunity would exist at other parts of the site.

The other issues discussed at the scoping meeting related to the need to adopt a strategic approach to the planning of abnormal loads being delivered to the site and the resolution grid capacity issues. With a potential for over 1,000 abnormal loads to service the site the Council consider this to be significant in the context of trans-frontier effects of the construction phase. It is understood that prevarication over the primary hub for the distribution of generated power is preventing the developer from identifying the preferred route of grid connection. The Council has historically taken the stance that the combined effects of wind farms and grid connection should be considered concurrently and there are no cogent reasons to adopt a different view in this case.

The Council consider, as a minimum, the production of the Non-technical Summary in the medium of Welsh.

I trust that this is of assistance to you.

Yours faithfully

ar ran Cyfarwyddwr Gwasanaethau Amgylcheddol a Thai
for Director of Environmental Services and Housing

creu lle gwell
creating a better place

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

Mr Gareth Leigh
Department for Business Enterprise & Regulatory Reform
Energy Group
1 Victoria Street
London
SW1H 0ET

Our ref: SH/2008/105262/01-L01
Your ref: E6021

Date: 17 July 2008

Dear Mr Leigh

REQUEST FOR A FORMAL SCOPING DECISION UNDER PART 111, PARAGRAPH 7 OF STATUTORY INSTRUMENT 2000 NO. 1927 - PROPOSED NANT-Y-MOCH WIND FARM

Thank you for referring the above consultation, which we received on 12 June 2008

Our comments are as follows:

Groundwater and contaminated land

Wind farm developments have the potential to derogate local water supplies and surface waters. Each proposal must be considered on a site-specific basis, as the degree of risk to controlled waters is dependent on many factors. It is for the relevant planning authority to determine whether a full EIA will be necessary for all environmental aspects of this proposal.

For the purposes of protection to controlled waters we would require that the developer undertake a preliminary site assessment containing the following information:

From our records, the area of the proposed development appears to be within the vicinity of metal mining activity. We would ask that a section on historical land use be included in the assessment to determine any areas that may have been subject to contamination through historical uses. This should include:

- all previous uses
- potential contaminants associated with those uses
- a conceptual model of the site indicating sources, pathways and receptors
- potentially unacceptable risks arising from contamination at the site

Depending upon the findings of this, suitable mitigation measures may need to be agreed.

The preliminary site assessment should also include:

- A map identifying water features in the area, including springs and water supplies (Water Feature Survey)
- Consideration of the relationship between the location of the turbine and the likely catchment area for each of these water features;
- If the turbine is likely to be in the catchment for any of these then the reduction in recharge to the system and potential effects of this (such as loss of supply) should be considered;
- Should a potential impact on the water balance be identified then the Environment Agency will require proposals for monitoring water features and mitigation plans for any loss;
- The likely depth of excavation and construction are required in addition to the area of impermeable footprint associated with the turbine.

A Water Features Survey should include the following:

- Identification of all water features both surface and groundwater (ponds, springs, ditches, culverts etc.) within a 300 metres radius of the site.
- Use made of any of these water features. This should include the construction details of wells and boreholes and details of the lithology into which they are installed;
- An indication of the flow regime in the spring or surface water feature, for example whether or not the water feature flows throughout the year or dries up during summer months;
- Accessibility to the spring/well;
- This information should identified on a suitably scaled map (i.e. 1:10,000), tabulated and submitted to the Environment Agency. It would be useful for the developer to photograph each of the identified water features during the survey.

Based on the results of the survey the applicant must assess the likely impacts from the development on both quantity and quality of the surface water and groundwater. This should take into consideration both the preferred methods of construction and the assumed hydrogeology in the vicinity of the development.

The Environment Agency may require identified groundwater features to be monitored during the proposed workings. We would therefore recommend that the survey be undertaken as soon as possible to enable the developer to carry out suitable baseline monitoring prior to the commencement of workings at the site.

Hydrology

Section 8.9 of the Scoping Consultation Document details the provision for an assessment of the development on site hydrology.

We have listed the concerns that we have over the potential impact of this type of development on site hydrology, particularly on surface water and sub-surface drainage. These are followed by points for consideration in the impact assessment process and subsequent reporting for both the construction and operational phases.

Cont/d..

Interception of subsurface drainage by trenches dug for cables (and pipelines where relevant).

Unmitigated trench construction and backfill/gravel packing around cables/pipes in sensitive areas may result in development of a preferential flow path, interception and conveyance of sub surface flow to an alternative point of discharge. The effects of this could include increased drainage and localised drying out. Mitigation measures may include use of impermeable bunds built into the trenches to prevent preferential flow paths from developing and backfill that consists of low permeability material to as great extent as possible.

Interception and rerouting of surface water flows through road drainage systems.

Road construction may block the route of overland flow/run off where fill is laid whilst any cut and associated drainage system can intercept and convey water to an alternative point of discharge. In a worse case this could even result in some inter-catchment transfer of flow.

If simple and appropriate mitigation measures are incorporated into road and trench design and implemented during the construction phase of the project then the risk of any adverse impact on the hydrological regime for the catchment may be reduced. Mitigation measures can include:

- Identification of catchment boundaries and their protection in any drainage system
- Ensuring that, where a surface water feature, such as a stream, spring or depression that would discharge storm run off, has been identified in the route of the road, that an appropriately sized culvert is included to allow existing streamflow and storm run off to flow unimpeded along its natural course.
- Where a drainage system is proposed that the point of discharge is as close to that as would naturally occur.

Site management to prevent storm run-off

The construction phase can provide a period of high risk where ground cover is removed or disturbed and soil exposed, and drainage and trenching systems are incomplete. The site could be vulnerable to rapid run off and erosion in any storm event with resultant water quality problems. These issues can be addressed by simple site management methods that may include:

- Flow interception, attenuation and use of sediment traps at likely discharge points for run off or dewatering flows;
- Control of construction operations to minimise the amount of exposed ground at any one time;
- Immediate land restoration using appropriate techniques.

We therefore request:

Cont/d..

- a comprehensive water feature survey is completed including an assessment of mechanisms of water supply for sensitive and protected wetland areas.

- submission of a plan of proposed road layout , road drainage systems and associated mitigation options to protect and maintain the existing hydrological regime with specific reference to sensitive wetland habitats.

- submission of a plan of proposed underground cable routes, an assessment of potential impact on subsurface flow and description of mitigation measures for trenching operations including provision of design and method statements.

- details of how the site will be managed throughout the construction and operational phases specifically the phasing of construction to reduce the risk of uncontrolled run-off through measures such as identification of high risk areas (i.e. protected areas) and the provision of site management plans and method statements.

Water Resources

It is the responsibility of the applicant to ensure that the development will not affect any existing legal water interests in the area, and that any necessary consent are applied for.

Existing Licences

There are a number of licensed abstractions just outside of the proposed site boundary. These include abstractions by E.On UK plc and by Dŵr Cymru Cyfyngedig. Some of their abstraction involve piping water to and from reservoirs in the area; some of these pipes are likely to run underground through the proposed site boundary.

Following the implementation of Section 6 the Water Act 2003, abstractions of $20m^3$ or less per day now no longer require a licence. Following this many abstraction licences were 'deregulated'; there are at least three deregulated abstractions in the area, one of these is within the proposed site boundary. There maybe a number of other abstractions exempt from licensing that the Agency may not necessarily aware of in the area. The locations of private domestic abstractions may be held by the local authority on the register required by the Private Water Supplies Regulations 1992. There are a number of registered private water supplies in this area, many within the proposed site boundary.

Licensing Regulations

Under the terms of the Water Resources Act 1991, an Impounding Licence may be required from the Agency for the impounding of any watercourse, ditch or stream (e.g. by dam, weir etc.). This should be considered if the developer intends to alter or divert any existing watercourses during the construction phases.

Under the terms of the Water Resources Act 1991an Abstraction Licence may be required from the Agency for the abstraction of water from any inland water or underground strata. The developer should consider this if water is needed to be abstracted for any purpose, such as for use in concrete manufacture, or for dust suppression.

Cont/d..

The Agency should be contacted well in advance if the developer requires any licences. Further details can be obtained by contacting the Environment Agency.

Flood Risk

The Scoping Consultation Document does not provide detail of the access tracks through the site. Nevertheless, it will probably be necessary for the access tracks to cross various watercourses (mainly 'ordinary' watercourses - only the Afon Rheidol is a designated 'main river'). Any access culverts (temporary or permanent) will require a formal consent from the Environment Agency under Section 23 of the Land Drainage Act 1991 or Section 109 of the Water Resources Act 1991. The applications should demonstrate that the culvert capacities are adequate for each watercourse crossing.

Similarly, where it is necessary for cables to cross watercourses, the temporary work involved with their installation will require the Environment Agency's formal consent.

The applicant should contact our Development Control team at Bangor (on 01248 484172) to discuss the consent application process.

A drainage plan for the site will need to be included as part of the Environmental Statement. Where access tracks cross watercourses, the natural flow paths of the watercourses must be maintained. Where possible the road drainage and the natural drainage must be kept separate. The attenuation of surface water runoff may be necessary for the larger site compounds.

Biodiversity

The Nant-y-Moch Wind Farm proposal raises a number of biodiversity issues with the developer proposing to commission a number of surveys for habitat, birds and other protected species.

The site boundary encompasses a number of small SSSIs including the Geological sites Mwyngloddfa Nant y cagl SSSI, Mwyngloddfa brynyrafr SSSI (old copper-lead-zinc mines with interesting deposits) and Craigpistyll SSSI (moss and fern rich cliffs). Pen creugiau'r Llan SSSI lies adjacent to the north boundary as an expansive area of upland plant communities with rare birds such as ring ouzels.

Plumlumon SSSI lies to the south and east of the site as another important area of expansive upland that supports an impressive list of raptors including Red Kite, Buzzard, Hen Harrier, Peregrine, Merlin and Short-eared owl. Golden plover, Red grouse and ring ouzel also occur.

Surveys of breeding and wintering birds will be needed in the Ecological assessment for the site. Information on the distribution and status of large slow flying raptors such as red kite, buzzard, hen harrier and short-eared owl will be needed to assess risk of bird strike with the turbine blades. Goshawk, sparrowhawk and long-eared owl may also be present within woodland habitat.

The site boundary encompasses three main river catchments; Afon Leri, Afon Einion and Afon Rheidol. Each of these may have important spawning areas for salmon, sea trout, brown trout and lamprey. Protection of spawning gravels during the construction of access roads and turbine bases may require suitable mitigation measures.

Cont/d..

The upper watersheds of these rivers may provide habitat for protected species such as water voles and otters. Surveys to map out their distribution will be required to inform the design of the access routes to each turbine. In particular it will be necessary to identify otter resting sites as these are protected features under European legislation.

Badgers, pine marten, polecat, red squirrel, dormouse, hedgehog and bats are all other mammals of Biodiversity concern that may occur within the footprint of the scheme and therefore require survey information. The various mine sites within the site boundary may have particular significance for hibernating bats.

Consideration may also be given to assessing the impact of the proposals on reptiles such as slowworms and lizards.

Environment Management

Developers should consult with environmental health about private water supplies

An EIA should incorporate rainfall figures and construction operations during wet weather, and problems associated with construction in historic mining area, particularly road going through middle of Bwlch Glas mine site. Pollution prevention measures for run off from dry and wetland areas. There is a Potable water supply within southern boundary therefore pollution prevention plans must accommodate this.

We will require details and plans of road construction for windfarm site, drainage and construction plans for turbine sites and cable trenches and concrete batching plants.

A Method Statement detailing all necessary pollution prevention measures for the construction phase of the development should be submitted. The Method Statement shall identify as a minimum:

- storage facilities for all fuels, oils and chemicals
- construction compounds, car parks, offices etc
- details of surface water drainage arrangements to be installed to intercept and treat contaminated surface water run-off
- details of measures to ensure no polluting discharge from haul roads/disturbed areas
- details of nature , type and quantity of materials to be imported on to the site
- measures for dealing with any contaminated material (demolition waste or excavated waste)
- identification of any buried services, such as foul sewers, so that they are protected
- details of emergency contacts, for example the Environment Agency Pollution hotline 0800 807 060

The Method Statement should then be efficiently communicated to all contractors and sub-contractors (for example, via toolbox talks) and any deficiencies rectified immediately.

There are forested areas within the proposed development area. What measures would be in place to minimise sediment run off, soil erosion, release of acids and nutrients from the soils.

Forestry re-planting, plans/ management. Forestry and Water guideline (version 4, book) and Forestry and Soil Guideline to be followed.

Cont/d..

They must considered the implication of disturbing metal mines and metal mines spoils to mitigate any metals being released into the environment. Should consult with Spirit of the miners (Ceredigion) and Ceri Jones and Paul Edwards (Environment Agency).

What measures/precautions will be in place to mitigate any land slides, suspended solids run off, etc.

From looking at the location it is believed the proposed area for development is within a high water table area and high rainfall. There are a number of water issues within this area, which drain either into the Afon Rheidol, Afon Eleri and tributaries of the Afon Dovey.

What measures would to be in place to protect surface and ground water from sites activities and storage areas (such as oil, fuels storage of excavation material).

Haulage road construction, measures would need to be in place to control sediment runoff and water run off from the haulage road, any silt traps? Would the clean water be diverted away from the haulage road and how? lessons learnt should be considered.

Will there be a wash down area for the vehicles?, if so where will it be located, disposal of the wash water and sediment?. If there is no wash down area what control measures would be in place to minimise mud and debris on the road.

Will the cement/concrete be manufactured on site? If so where will this be undertaken, how, measures to stop pollution.

Disposal of Hazardous waste from the site, must comply with The Hazardous Wastes Regulations 2005.

During the construction and excavations of the wind turbines, the trenches to lay the cables and other excavated pits, what measure will be in place to reduce sediment run off from these exposed areas and entering a watercourse? Can we limit the time period of exposure to the elements.

Once they have excavated cable trenches, foundations for the turbines and other excavated pits if they flood how will they be dewatered and where? Or are there measure to mitigate this form happening?

Ensure weather conditions are considered within Environmental Impact Assessment. The time of year the development is carried out will influence the risk factors of pollution incidents. If the work is to be carried out during the summer months, they need to consider impact on rivers which discharge onto designated bathing beaches.

Water courses crossing points. In the past these crossing points could potentially be sources of pollutions (suspended solids run off etc). Any measures to limits potential pollution .

Any waste excavation material or building waste generated in the course of the development must be disposed of satisfactorily and in accordance with section 34 of the Environmental Protection Act 1990.

Cont/d..

Carriers transporting waste from the site must be registered waste carriers.

The activity of importing waste into the site for use as, for example hardcore, must be registered by the Environment Agency Wales as an exempt activity under the Waste Management Licencing Regulations 1994.

To comply with the Freshwater Fish Directive dissolved oxygen should not fall below 5mg/l. How will the contractors comply with this at all times. During non-operational times will there be any control on sediment as sediment impacts dissolved oxygen. As a result of the elevated sediment we could have a dissolved oxygen sag at night

For further guidance please refer to our Pollution Prevention Guidelines PPG2, PPG5, PPG6 and PPG 13, which can be found on our website.

Discharge consents may be required for any sewage or trade effluent discharges to land or controlled waters.

Yours sincerely

L Edwards

Miss LOUISE EDWARDS
Planning Liaison Officer

Direct dial 01437 783014
Direct fax 01437 783091
Direct e-mail edwarl.Haverfordwest1.WLS@environment-agency.wales.gov.uk

End

Llywodraeth Cynulliad Cymru
Welsh Assembly Government

Mr Gareth Leigh
Manager, Onshore Power
Consents
Onshore Electricity
Development
Consents - V 2121
Department for Business
Enterprise and Regulatory
Reform
1 Victoria Street
LONDON SW1H QET

Eich cyf . Your ref
Ein cyf . Our ref

24 July 2008

PROPOSED NANT Y MOCH WIND FARM SITED IN NORTH CAREDIGION AND WEST POWYS WITHIN THE STRATEGIC SEARCH AREA 'D'
REQUEST FOR COMMENTS ON SCOPING DOCUMENT

I refer to your letter and enclosures of 10 June 2008 addressed to Dr Trevelyan of Dulas Limited, referring to his request for a Scoping Opinion under Regulation 7 of the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations ('the 2000 Regulations').

Following distribution of the Scoping Consultation Document within the Welsh Assembly Government, additional information has been requested to be included in the formal Scoping Opinion. This information is set out as follows:

Parc Cathays
Caerdydd
CF10 3NQ

Cathays Park
Cardiff
CF10 3NQ

Ffôn • Tel: 02920 823555
GTN:1208
Ffacs • Fax: 02920 825137
Ebost • Email:lynn.griffiths@wales.gsi.gov.uk

Section B Environmental Issues and Matters for Development Control

Description of Development:

This is a very large site and will generate a large number of Abnormal Indivisible Load (AIL) movements between Mostyn/Ellesmere Port docks to the site, via Newtown, then A489/A470/A44/A487 to the site south of Machynlleth. Very little of this route is suitable for AIL movements and will require a combination of localized widening, construction of large laybys and extensive traffic management as a minimum. Even these minimalistic works are likely to have environmental impacts, given the proximity of SAC's along the route.

The EIA also should consider that this route is likely to be shared with several other wind farm developments sited in Strategic Search Area D in Mid Wales and take into account their cumulative nature and indirect impacts. The EIA should therefore include all the necessary highway works as well as the impact on all of the communities and traffic along the access routes, as required by the EU Directive (85/337/EC), Annex 2. The WO Circular of 1999, relating to EU Directive 97/11/EC, requires "a description of the likely significant effects of the development, which should cover direct effects and any indirect secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects of the development".

The cumulative effect of a large number of AIL movements along the access routes from the ports (including the A55/A483 in North Wales) to the SSAs will be significant and therefore individual applications should not be considered in isolation.

Landscape and Visual Assessment:

In addition to the key viewpoints proposed in the scoping document Cadw requests that consideration be given to assessing the visual impact of the development when viewed from the following local historic sites/attractions:

	X	Y
Dyfi Furnace (Cadw Guardianship monument)	268494	295099
Castell y Bere (Cadw Guardianship monument)	266777	308560
Bryntail Lead Mine (Cadw Guardianship monument)	291353	286856
Llywernog Silver Lead Mining Museum	273205	281017

Archaeological Issues:

Cadw wish to point out that there are twelve Scheduled Ancient Monuments (SAM) within the boundaries of the proposed wind farm and advise that digital mapping information and detailed site descriptions can be provided on request:

Monument name and number	NGR
Carn Owen, Cerrig yr Hafan (CD045)	SN732882
Llainwen Round Cairns (CD142)	SN691922
Ystrad Einion Lead Mine Buildings & Water Wheel(CD143)	SN706 938

Nant Bwlch-glas Lluest Farmstead (CD208)	SN716869
Waun Lechwedd Llyfn Long Hut (CD209)	SN716861
Fridd Newydd, Stone Circle (CD234)	SN700911
Pencraig y Pistill Round Cairn (CD250)	SN715864
Carneddau Round Cairns, Drosgol (CD252)	SN759878
Foel Goch Round Cairn (CD257)	SN695928
Banc Llechwedd-mawr Round Cairns (MG307)	SN775898
Craig y Dullfan Ring Cairn (MG308)	SN771887
Afon Hyddgen Stone Row (MG309)	SN780894

Also, the following sites have been recommended for Cadw to consider for scheduling as sites of national importance following the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) Uplands Survey (Plynlimon Project):

Lluest Fawr Deserted Rural Settlement	SN 7537 9083
Afon Llechwedd Mawr Long House	SN 7553 9025
Banc Llechwedd Mawr Cairns	SN 775 898
Magwyr y Rhos Long House	SN 756 891

Evaluation has yet to take place but will involve desktop analysis of available information and where appropriate site visits.

The EIA therefore needs to assess the impact of the wind farm on all historic features, scheduled and unscheduled, and should also take account of the potential for the presence of buried archaeology within the development area. When considering the impact of the development, it is important to ensure that due consideration is given not only to direct physical impact but also to the effect of the development on the essential setting of monuments.

The development lies within the Upland Ceredigion Landscape of Outstanding Historic Interest (CCW /Cadw / ICOMOS Register of Historic Landscapes). This landscape has been subject to a detailed historic landscape characterisation exercise, details of which can be obtained from Cambria Archaeology. Information from this work should be used to inform the EIA. The ASIDOHL assessment system provides a best practice methodology for assessing the impact of development within Historic Landscapes (see revised Cadw/CCW "Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process", 2007).

<u>Any other issues:</u>

Land Use: The issues listed under Section B of the consultation document do not include a section on land use. It is usual to find a land use section within on-shore wind farm EIAs, to describe the existing land use and how the development will affect it, significantly or otherwise. Apart from being an important agricultural resource, it is usually the case that the agricultural use of the agricultural land within the site boundary is a key environmental determining factor, and a change in management practices may have significant consequences. The Nant y Moch

proposal appears to be similar to other upland sites, so a failure to include a land use section would be inconsistent with past practice.

Borrow Pits: At the early planning stages of wind farm projects, it is usual to find that there are varying degrees of uncertainty over the amount of aggregate required to create the infrastructure, where this material will be sourced, and the need for borrow pit excavations within the site. Despite this uncertainty, it is usual for wind farm EIAs to tackle the issue of borrow pits where such developments are considered to be likely, and the issue may need to be pursued in the Nant y Moch wind farm EIA. Welsh Assembly Government policy towards borrow pits may be found at paragraph 18, Minerals Planning Policy Wales, and highlight the matters to be addressed where appropriate.

As you will see from our response to this consultation there are key aspects which the Scoping Report has been asked to address and we trust you will carefully consider these comments made by the Welsh Assembly Government. I would be grateful to be kept informed of progress and the next stages in the process.

This proposed project relates to activity on land managed by Forestry Commission Wales (FCW) and is part of the wind farm programme they are currently undertaking. They have therefore decided to respond to this scoping request separately. BERR will wish to ensure that it takes full account of FCW's comments.

MRS LYNN GRIFFITHS
Sustainable Energy and Industry

Cyngor Cefn Gwlad Cymru
Countryside Council for Wales

Cyngor Cefn Gwlad Cymru
Countryside Council for Wales

CADEIRYDD/CHAIRMAN: JOHN LLOYD JONES OBE
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SY23 3EE

Gareth Leigh
BERR – Energy Development Unit
1, Victoria Street
London
SW1H OET

Ein cyf/Our ref SN79 Gen:
Eich cyf/Your ref:

11 July 2008

By e-mail

Dear Gareth

SCOPING OPINION FOR WINDFARM/WIND TURBINE DEVELOPMENT AT NANT Y MOCH CEREDIGION AND POWYS

Thank you for consulting the Countryside Council for Wales' (CCW) regarding this proposal. Please note that our comments are without prejudice to any comments we may wish to make on any subsequent planning applications.

In discharging its functions under Section 130 of the Environmental Protection Act 1990 the Countryside Council for Wales (CCW) champions the environment and landscapes of Wales and its coastal waters as sources of natural and cultural riches, as a foundation for economic and social activity, and as a place for leisure and learning opportunities. CCW aims to make the environment a valued part of everyone's life in Wales.

In general we have found the Scoping Consultation Document produced by Dulas to be useful. Our detailed comments are provided in the attached Annex I, but we would particularly draw your attention to the following key issues.

It is CCW's view that the impacts of grid connections and transport links should be covered in the Environmental Impact assessment (EIA) since both of these have the potential for significant impacts on landscape and nature conservation interests beyond the currently defined boundaries of the proposed development site and outside Strategic Search Area D.

Appropriate management of peatlands in upland areas such as SSA D, is an important issue. Peatlands contain large amounts of stored carbon. Damage to peatlands and in particular hydrological damage, can lead to the release of significant quantities of stored carbon. We recommend that detailed consideration is given both to measures to prevent damage to peatlands, and to opportunities to restore currently damaged peatlands in the area. It will be important that any mitigation and compensation measures relating to nature conservation form part of a strategic management plan which identifies the most appropriate management for each area.

Because there are as yet few other wind-farms of this scale and size, in particular in relation to the height of the proposed turbines, there is little data available on which to base any assessment of impacts, in particular in relation to birds and bats. It will therefore be important to develop appropriate monitoring programmes and contingency plans to address this issue.

If you have any queries in relation to this advice please contact me for matters relating to Ceredigion, or CCW's Montgomeryshire Team Leader, Dr Carol Fielding in our Newtown office for matters relating to Powys.

Yours sincerely

Dr Sue Byrne
Ceredigion Team Leader

Encl. Annex I: CCW Scoping advice for Nant y Moch Windfarm

cc: John Evans, Planning Department, Ceredigion County Council
Steve Packer, Planning Department, Powys County Council
Conrad Trevelyan, Dulas Ltd.

Noddir gan
Lywodraeth Cynulliad Cymru
Sponsored by
Welsh Assembly Government

Gofalu am natur Cymru - ar y tir ac yn y môr • Caring for our natural heritage - on land and in the sea

Prif Swyddfa/Headquarters
MAES-Y-FFYNNON, PENRHOSGARNEDD, BANGOR LL57 2DW FFÔN/TEL: 01248 385500 FFACS/FAX: 01248 355782
http://www.ccw.gov.uk

ANNEX I: THE COUNTRYSIDE COUNCIL FOR WALES' (CCW's) SCOPING ADVICE FOR AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE PROPOSED WINDFARM AT NANT Y MOCH

General

The impacts of grid connections and transport links should be covered in the EIA, since both of these have the potential to affect landscape and nature conservation interests beyond the currently defined boundaries of the proposed development site and outside SSA D. It will be important to include consideration of alternative routes for transport and grid connections. We recommend that the applicant provides us with maps of alternative routes at the earliest opportunity. We will then be able to provide any relevant information we hold and advise on any additional survey work required.

We recommend that the description of impacts in the ES distinguishes between those impacts resulting from the location of turbines within the refined SSA boundary (Ceredigion County Council/ Powys County Council, April 2007: TAN8 Annex D study of SSA D: Nant y moch), those resulting from turbines outside the refined boundary but within SSA D, and those resulting from turbines outside both boundaries.

In assessing the potential impacts of the proposed development on ecological and landscape interests, the EIA should consider the potential cumulative impacts of this wind energy development along with:

- Other wind energy developments in the area that already exist or have planning permission; and
- Proposals for other wind energy developments in the area that are in the public domain (e.g. those that are presently under consideration in the planning system).

Ceredigion and Powys County Councils should be able to provide information in this respect.

Guidance

We recommend that the EIA make reference to the latest policy guidance including the following documents:

National Documents

- Welsh Assembly Government (March 2002). *Planning Policy Wales.* Welsh Assembly Government, Cardiff.
- Welsh Office (1996). *Planning Guidance (Wales). Technical Advice Note (Wales) 5 Nature Conservation and Planning.* Welsh Office, Cathays Park, Cardiff.
- Welsh Assembly Government (January 2006). *Draft Revised Technical Advice Note 5 Nature Conservation and Planning.*
- Welsh Office Circular 11/99: *Environmental Impact Assessment (EIA).*
- Welsh Assembly Government (2005). *Planning Guidance (Wales) Technical Advice Note (Wales) 8 – Planning for Renewable Energy.* Welsh Assembly Government, Cardiff.
- Welsh Assembly Government (2005). *Ministerial Interim Planning Policy Statement 01/2005 Planning for Renewable Energy.* Welsh Assembly Government, Cardiff.

Local Documents

- Ceredigion County Council: Deposit Draft Unitary Development Plan
- Powys County Council: Deposit Draft Unitary Development Plan (as amended by proposed modifications)
- Powys County Council (May 2008): *Second Draft Interim Development Control Guidance on Wind Farm Developments in Powys.*

Nature conservation

Digital boundaries for Sites of Special Scientific Interest within the within the land under consideration for the proposed project may be downloaded from CCW's website (www.ccw.gov.uk). In addition the Coed Cwm Einion SSSI and Special Area of Conservation (SAC) is close to the area. Some of the watercourses in the site of the proposed development drain into the Penllyn a'r Sarnau SAC at the Dyfi Estuary. Citation documents for these sites are attached. In line with the Conservation (Natural Habitats &c.) Regulations 1994 (as amended), an assessment will be required as to whether the proposed development is likely to have a significant effect on the integrity of the Penllyn a'r Sarnau SAC. We would anticipate that the EIA process will provide sufficient information for this judgement to be made and CCW will be happy to provide further guidance on this. The key issue here will be the prevention of excessive sediment inputs to watercourses. On the basis of the information provided to date CCWs view is that the project is unlikely to have a significant effect on the Coed Cwm Einion SAC. However, this and other statutory sites may require further consideration once the routes for grid connections and transport links are known.

There are a number of sites and species of local conservation interest within the Ceredigion portion of the proposed development area and information held by CCW on these sites is attached. There are a number of metal mine sites in the area and many of these are of local interest for their mineralogical features or for metalliferous lichens. I understand that the applicant does not intend to carry out any works on metal mine sites. Should this change, CCW should be contacted to provide information which we hold and to advise on additional survey work which may be required.

We agree with the proposal in the Scoping Consultation Document to carry out a Phase I Habitat Survey of the proposed development area, together with more detailed Phase II surveys on areas of interest. The Phase I survey should be undertaken in accordance with the NCC Phase 1 survey guidelines (NCC (1990). *Handbook for Phase 1 habitat survey.* NCC, Peterborough) and should be carried out during the summer. Phase II survey should be to NVC sub-community level. I attach a copy of Phase 1 data held by CCW which we hope will assist in this work. However, it should be noted that most of these data are now over 10 years old.

The Ceredigion Biodiversity Partnership has prepared a limited number of Local Action Plans. The Powys Biodiversity partnership has prepared a wider range of plans. These are available on the Ceredigion County Council and Powys County Council websites www.ceredigion.gov.uk. and www.powys.gov.uk. The following prepared plans are relevant to the proposed development; brown hare, water vole, curlew, pipistrelle bat, otter and red kite. In addition the following national priority species and habitat action plans should be considered; blanket bog, upland heath, otter, skylark, purple moorgrass and rush pasture, upland oak woods. We would recommend that the applicant discusses these issues with the Emma Durward, Powys County Council Biodiversity Officer and with Liz Allan of Ceredigion County Council's Coast and Countryside Section.

In addition to the organisations listed in the draft scoping document we recommend that the applicant contacts the following for biological records which they may hold:

Biodiversity Information Service for Powys and Brecon Beacons National Park, 1st Floor Offices, Coliseum House, 7 Wheat Street, Brecon, Powys. www.b-i-s.org

West Wales Biological Records Centre West Wales Biodiversity Information Centre, Landsker Business Centre, Llwynybrain, Whitland, Carmarthenshire SA34 0NG www.wwbic.org.uk

CCW regards the potential damage to peatland habitats as a key issue. There is potential for the development to damage peat through direct disturbance (i.e. turbine bases, access tracks and associated infrastructure) or indirectly through the effects of changes to site hydrology leading to drainage, drying out and subsequent oxidation and loss of peat. We are unclear as to the extent or condition of peat deposits in the proposed development area. It may well be that the development site includes areas of peat which are currently degraded and oxidizing, and thus especially vulnerable to further damage. We recommend that the site should be surveyed for the extent, depth and condition of peat deposits. We would expect to see turbines and infrastructure located off peat, and we recommend that the potential to halt the deterioration of existing degraded peat and/or to restore active peat forming vegetation, is considered as apart of a strategic environmental management plan for the site. We recommend that a carbon balance for the peatland post windfarm construction is included in the EIA.

We recognise that there is uncertainty as to how some of these issues are best investigated and their impacts quantified. We would welcome the opportunity to discuss this with the applicant.

Birds

The Environmental Impact Assessment should consider the potential impacts of the proposals on birds, in particular those that are:

- Notified features of statutory nature conservation sites within or in the vicinity of the proposed development;
- Legally protected through the provisions of Section 1 of the Wildlife and Countryside Act 1981 (including those listed on Schedule 1 of the Act);
- Listed on the local Powys and Ceredigion Biodiversity Action Plans
- Listed as priority species for Wales under Section 42 of the Natural Environment and Rural Communities (NERC) Act (2006); and
- Listed on the Welsh red and amber lists of birds of conservation concern.

Desk study information and an initial walkover survey should be used to assess the potential of the site and surrounding land to support birds encompassed by the above. Consultation with the RSPB and the Welsh Kite Trust, as proposed in the draft scoping document, should be of assistance here.

An assessment of the windfarm's potential effect on birds should consider each of the three potential risks for each bird species that uses the site:

1. Displacement through indirect loss of habitat if birds avoid the windfarm area and surrounding land due to turbine operation and maintenance/visitor disturbance;
2. Death through collision or interaction with turbine blades;

Direct or indirect habitat degradation or loss through the construction of windfarm infrastructure or land use change that may happen as a result of improved access to the site with the construction of new tracks. More specific survey work will be required for those species considered to be at risk. Ornithological surveys should follow the guidance set out in *Survey Methods For Use In Assessing The Impacts of Onshore Windfarms on Bird Communities* (Scottish Natural Heritage, 2005). We would expect any

variation in survey methodology and level of effort from that recommended in the guidance to be justified and discussed and agreed with CCW in advance.
We recommend:

- Breeding bird survey;
- Non-breeding winter bird survey
- Appropriate surveys in the migration periods
- Vantage point surveys
- Crepuscular surveys if snipe are present.
- Surveys for nightjar

Bats

Research indicates that bats are affected by wind turbine developments and there is increasing evidence that a number of bat species are present at upland sites. We would refer you to Natural England's interim guidance on '*Bats and Onshore Wind* Turbines' (May 2008) and the Eurobats guidance. Therefore, we recommend that desk studies and field surveys are undertaken to establish:

- The presence of roosts within the development site and within 2km of the development site;
- The significance of any roosts identified within the development site and within 2km of the development site;
- Whether there are any key bat flight lines from roosts within 2km of the development towards the development site; and
- Bat flight-lines through the development site and bat foraging areas within the development site.

All surveys for bats should be carried out in accordance with '*Bat Surveys: Good Practice Guidelines*' (Bat Conservation Trust, 2007) and should be undertaken in favourable weather conditions (ie. avoiding cold, wet and windy weather). Survey methodology used must provide a good baseline and be repeatable in post-development monitoring.

We would recommend a minimum of three visits, ideally during June, July and August. In addition, autumn visits should be undertaken of any abandoned mine shafts close to the development site. Bat surveys should be carried out by suitable qualifies and experiences surveyors, along transects or in areas of likely foraging value (i.e cwms, scrubland and forestry fringes).

Activity surveys should identify specific species and record flight behaviour, the height above ground that observed bats were seen, and the proximity of observed bats to landscape features used as commuting corridors. Frequency division and time expansion equipment must be used.

Other protected species

CCW holds records of water voles within the proposed development site and we therefore recommend that water courses and water bodies are surveyed by a suitably qualified and experienced surveyor for signs of the presence of water voles, and the potential to support them. Although we are not aware of any records for great crested newts in Ceredigion, there are now records of the species in Powys within 6 km of the proposed development site. Recent surveys for wind-farms in Powys have recorded great crested newts in peat pools at a relatively high altitude. We therefore recommend that water bodies on the site are inspected and a risk assessment carried out of their potential to support great crested newts, in line with the guidance provided in English Nature's *'Great Crested Newt Mitigation Guidelines'* (2001). It would be sensible to survey for signs of use of watercourses and water bodies by otters.

We would recommend that potential sites for turbines or other works are inspected for their potential to support these and other protected species, in order to comply with UK and European Legislation which is set out in the attached annexe.

It should be noted that in many cases, no proactive survey work will have been undertaken to survey for species and the absence of records for a site should not be taken to indicate the absence of species of interest, but may reflect a lack of information.

Streams and wetlands

The EIA will need to assess how the proposed construction and engineering works will impact on any streams and wetland habitats present on and off the site. It should be the aim of the proposals to ensure no net change in run-off rates but in addition the EIA should identify and address:

1. What are the potential impacts on any of the streams during construction and how they will be avoided?
2. What changes to the run-off regime might occur and how any adverse effects on the streams or surrounding habitats will be avoided (for example, through use of Sustainable Urban Drainage Systems (SUDS) principles or using a matting/web material etc. for road construction).
3. What physical changes to the site drainage (due to construction of turbine bases, infrastructure, roads etc.) are likely and how any adverse effects on the water balance, both in the streams in the wetland habitats, will be prevented. This will need to consider winter and summer conditions.

Some of the watercourses drain mine sites. We note that the Environment Agency have been consulted and that their advice will be relevant here.

Monitoring

Monitoring must be linked to appropriate contingency plans. It may be necessary to amend construction procedures if the monitoring programmes identify adverse impacts linked to construction or post construction activities and CCW would wish to be consulted in such an event. Scottish Natural Heritage (SNH) is in the process of developing generic guidance on this subject.

Landscape And Visual Impacts

We recommend that CCW's LANDMAP methodology, including use of all five aspects (see below), (www.landmap.ccw.gov.uk) is used to describe the existing landscape. LANDMAP is an all-Wales GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. LANDMAP comprises five spatially related datasets known as Evaluated Aspects, the five layers are the Geological Landscape, Landscape Habitats, Visual & Sensory, Historic Landscape and Cultural Landscape. All information is managed through a Geographical Information System and associated Collector database.

All five aspects of LANDMAP data for Powys are available. However only one, the Visual and Sensory aspect, is currently available for Ceredigion. We expect the remaining aspects to be available by December 2008. Jill Bullen in our Aberystwyth office will be able to advise you on this. If the applicant experiences difficulty in getting the Powys data from the LANDMAP website it should be possible to get the data by contacting Jenny Kamp in our headquarters.

The landscape character areas (LCAs) have been characterised for the area of the site in Powys. You should contact Powys County Council for this data.

There are particular characteristics associated with wind farm developments that are sources of impact on landscape character and visual amenity:

- Frequent location in elevated/exposed sites which are often highly scenic and exposed to view over a wide area,
- Movement of turbine blades attracts attention,
- Sound of the turbines can attract attention,
- Shadow can add to the sense of movement,
- Colours of turbines, particularly if they catch the sun can increase their visual prominence,

Such issues should all be addressed in the Environmental Statement and visual appraisal of the scheme in addition to specific site issues such as:

- Development infrastructure – substation, cabling, ancillary buildings, working compounds, borrow pits and sediment settling ponds should all be considered in the assessment, even if "temporary" ie only for the duration of construction works. – The removal and disposal of any soil – is this to be disposed of on site or removed?
- Creation of new and re-profiling of existing access tracks
- Transmission route connections to the main power grid; it is important that a landscape assessment of the connection route from the wind-farm development to the power grid is included for consideration, particularly given the potential for other wind-farms in the near and wider vicinity.

In line with standard good practice, the visual impact assessment should be based on a Zone of Visual Influence (ZVI) study extending to 30km radius and should take into account of any forestry design plans and felling programmes.

We note that the Snowdonia National Park lies within 2km to the north of the proposed development and the impact on the Park must be fully addressed. We are particularly concerned about the potential impact on the Park of turbines to the north and west of the refined SSA boundary.

We note that the applicant is consulting with Cadw and the Dyfed Archaeological Trust. We recommend that Assessments of the Significance of Impact of Development on Historic Landscapes (ASIDOHL2 exercises) are carried out for areas within 15km of the proposed development which are identified in the Register of Landscapes of Special Historic Interest and the Register of Landscapes of Outstanding Historic Interest. Methodology should follow that in the 2nd revised edition of the Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (Cadw 2007 / copies available from CCW).

Selected viewpoints

We would welcome the opportunity to work with the applicant to select a suitable range of viewpoints which should include a good spread across prominent, populated and heavily used locations. This may require more than the 15 viewpoints proposed in the Scoping Consultation Document. We understand that initial wireframes will be used to inform this selection. We would also recommend that both photomontages and wireframes are produced for each viewpoint. On the basis of the information provided in the draft scoping report we have the following comments.

Only one of the proposed viewpoints is situated in Powys to the east of the site. The suggested viewpoint 2 should be moved to the top of Foel Fadian (SN828953and an additional viewpoint included for the

Wynford Vaughan Thomas viewpoint at SSN835959. An additional viewpoint should be taken from Glyndwr's Way near Machynlleth in the vicinity of SN 777959

Further consideration is needed in the VIA on users of the Nant y Moch road from Tal-y-Bont to Ponterwyd. This scenic route takes users along one of the remotest roads in Wales and some of the turbines would be seen in sequence as the route is travelled.

Additional viewpoints are required:
Borth - from the railway platform
Ynyslas - from the visitor centre

Recreational interests

Some of the land covered by the proposed development has been mapped as access land under the Countryside and Rights of Way Act 2000 and there are public rights of way across the site. Glyndwr's Way National Trail passes close to the proposed development site. The EIA should take regard to TAN 8 with respect to distance from turbines to public rights of way (Appendix C, para 2.25-2.27).

Provision of appropriate access for off-road vehicles, and damage from illegal access, is an issue in upland mid Wales. It will be important to ensure that the creation of access tracks does not encourage illegal access. The Cambrian Mountains Offroading Project is a mjoint project between Ceredigion County Council, Powys County Council and the Countryside Council for wales and is designed to address this issue. CCW will provide the applicant with a copy of the final report, which should be available by March 2009.

APPENDIX 1:
EUROPEAN PROTECTED SPECIES - LEGISLATIVE PROTECTION

European Protected Species include:

- Great crested newt (*Triturus cristatus*)
- Common otter (*Lutra lutra*)
- all British bats

The animals themselves and the places they use to rest and breed are legally protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation (Natural Habitats &c.) Regulations 1994 (as amended) – known as the Habitats Regulations 1994 (as amended).

Under Regulation 39 of the Habitats Regulations (as amended): -
A person commits an offence if he or she

(a) deliberately captures, injures or kills any wild animal of a European protected species;
(b) deliberately disturbs[1] animals of any such species in such a way as to be likely significantly to affect i) - the ability of any significant group of animals of that species to survive, breed, or rear or nurture their young, or ii) the local distribution or abundance of that species;
(c) deliberately takes or destroys the eggs of such an animal
(d) damages or destroys a breeding site or resting place of such an animal

Under S.9(4)(b) and (c) the Wildlife and Countryside Act 1981 (as amended):-
A person commits an offence if he/she intentionally or recklessly

- disturbs any such animal while it is occupying a structure or place which it uses for shelter or protection; or
- obstructs access to any structure or place which any EPS animal uses for shelter or protection.

Where the legal protection afforded European protected species under the Habitats Regulations is likely to be compromised by a proposed development, the development may only proceed under a licence issued by the National Assembly for Wales (NAW). Under Regulation 44(1) of the Habitats Regulations, NAW may issues licences for the purposes of:

> 'preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature, and beneficial consequences of primary importance for the environment.'

Furthermore, a licence can only be issued by NAW if the following two conditions are also met:

- That there is 'no satisfactory alternative', and that
- 'the development will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

In addition, regulation 3(4) of the Habitats Regulations 1994 requires all local planning authorities in exercise of their functions, to have regard to the provisions of the Habitats Directive in so far that they might be affected by those functions.

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[1] For further information on this offence, please refer to "Disturbance and protected species: understanding and applying the law in England and Wales: A view from Natural England and the Countryside Council for Wales." CCW, Bangor
http://new.wales.gov.uk/depc/ecm/habitats/Disturbance_of_protected_sp1.pdf?lang=en

APPENDIX 2: LEGISLATION CONCERNING BADGERS

Badgers and their setts are protected under the Protection of Badgers Act 1992. Legal protection makes it an offence to;

- wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;
- intentionally or recklessly interfere with a sett.

Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. If the proposed development is likely to compromise the legal protection afforded badgers, a licence will be required from the Countryside Council for Wales.

APPENDIX 3: LEGISLATION CONCERNING WATER VOLES

Water voles receive legal protection under S.9 (4) of the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to intentionally or recklessly:

- damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection;
- disturb water voles whilst they are using such a place.

There is no provision for licensing the intentional destruction of water vole burrows for development. All reasonable efforts must be made to avoid committing an offence.

The proposed development area includes the following Sites of Special Scientific Interest: Mwyngloddfa Nant y Cagl, Mwyngloddfa Bryn yr Afr, Craig y Pistyll. The following SSSI are close by or adjacent: Coed Cwm Einion, Pencarreg Gopa a Moel Hyrddod, Pencreigiau'r Llan, Pumlumon.
Citations for all of these are attached and digital boundaries are available at www.ccw.gov.uk

We hold records of the following uncommon and interesting plant species within the proposed development area:
Hymenophyllum wilsonii SN 703882 (1956), SN704880, SN700869
Wahlenbergia hederacea SN705881
Viola lutea SN705881
Hammarbya pauldosa (nationally scarce) SN709883
Diphasiastrum alpinum SN759878
Festuca vivipara SN741933
Isoetes echinospora SN739926
Cryptogamma crispa SN739926

We hold information suggesting the following areas are of local conservation interest:
A variety of areas in/around the Cyneiniog valleg including:

Coed Dol Gar Wen SN703880 semi-natural broad leaved woodland
Cae Coed Dipws SN 705883 area of flushed poor fen
N facing side of Cwm Cyneiniog SN 700883 unimproved wet vegetation rich in sedges and wet grassland herbs. The small pearl bordered fritillary butterfly has been recorded from here
Cwm Cyneiniog SN699881 wood pasture important for invertebrates

Allt Goch y Mynydd SN709883 extensive area of bog with *Vaccinium oxycoccus*
Llyn Moel y Llyn SN712916 upland lake with good marginal aquatic vegetation including large patches of *Carex rostrata*.
Allt Fawr SN585886 woodland with some coppice oak and birch plus some conifers
Coed Pant Cwta SN692888 two neighbouring woods connected by a narrow strip, Coed Pant Cwtta young coppiced and self sown oak, Coed Ty Nant older coppice.

There is a record of the blind freshwater shrimp *Niphargus aquilex* from the stream adjacent to Llyn Conach.

CCW holds records of water voles from a 1992 survey, a record of a former kite nesting site, one record of otter signs and records of hibernation sites for brown long-eared bats, Myotis bats, and for greater and lesser horseshoe bats, plus records of bat roosts. I am checking protected species licensing requirements and will forward the detailed data once this is completed.

I am sending hard copies of the CCW 1992 Phase I survey of the area. Please note there are some areas where we hold no data.

I am also sending hard copies of maps showing data which we hold on the locations of metal mine sites within the proposed development area.

Sue Byrne
July 2008

DYFED

PENCREIGIAU'R LLAN SSSI

Ceredigion District

POWYS

Montgomery District

Date of Notification: April 1988 and May 1989

National Grid Reference: SN 745945

OS 1: 50,000 Sheet No: 135
1: 25,000 Sheet No: SN 79

Site area: 233.5 hectares (577.0 acres)

Description:

An extensive area of upland plant communities lying at 300-500 metres (985-1640 feet) above sea level on Silurian shales forming the north-eastern corner of the upland plateau of north Ceredigion. All of the main types of upland vegetation characteristic of the District are well represented, including acidic heath, acid grassland, blanket mire, basin mire, cliff and scree.

On north-facing slopes the topography, high rainfall and lack of intensive grazing have resulted in deep stands of heather Calluna vulgaris on bog-mosses Sphagnum spp. Lesser twayblade Listera cordata occurs here at its only known site in Ceredigion. Elsewhere extensive areas of blanket mire are dominated by purple moor-grass Molinia caerulea, cross-leaved heath Erica tetralix, deergrass Tricophorum cespitosum and cottongrasses Eriophorum spp. and are traversed by mineral-rich flushes containing flea sedge Carex pulicaris. On drier parts, sheep's-fescue Festuca ovina and mat-grass Nardus stricta are dominant in some areas; heather, bilberry Vaccinium myrtillus and crowberry Empetrum nigrum in others. A large basin mire has bog rosemary Andromeda polifolia frequent on bog-mosses, and bottle sedge Carex rostrata forms extensive stands by water channels. A smaller basin mire with several pools is rich in dragonflies typical of oligotrophic waters, including common hawker Aeshna juncea and black darter Sympetrum danae. East-facing cliffs at the head of Cwm Llyfnant are dry and support few plant species, but a colony of the scarce hawkweed, Hieracium argenteum, is present. Ring ouzel, wheatear and redstart are known to breed here.

Remarks:

The boundary of the south-eastern corner of the site was amended in May 1989, resulting in a 0.5 ha (1.2 acres) increase in the total site area.

DYFED

CRAIGYPISTYLL SSSI

Ceredigion District

Date of notification: 1979

National Grid Reference: SN 714857

O.S. 1:50,000 Sheet No.: 135

1:25,000 Sheet No.: SN 78

Site area: 15 hectares (37 acres)

Description:

These extremely steep south-east facing cliffs, which vary in height from 252 - 397 m (825 - 1300 feet) form a boundary between the Upper and Middle Llandovery Series of the Silurian. The cliffs possess a rich assemblage of flowering plants,ferns and bryophytes, representing upland heath, grassland, damp-ledge and wet-flush communities. Of special interest are the wet-flush communities indicative of a slightly higher base status in which the mosses Ctenidium molluscum and Breutelia chrysocoma occur, along with butterwort (Pinguicula vulgaris). Wilson's filmy-fern (Hymenophyllum wilsonii) also occurs on some damp ledges. Three flowering plants worthy of mention are wood spurge (Euphorbia amygdaloides) occurring in its only known inland locality in Ceredigion, the hawkweed (Hieracium lasiophyllum) in its second known locality in Ceredigion and rock stonecrop (Sedum forsteranum), which only grows in one other known locality in Ceredigion.

Remarks:

DYFED

MWYNGLODDFA NANT-Y-CAGL (EAGLEBROOK MINE) SSSI

Ceredigion District

Date of Notification: March 1992

National Grid Reference: SN 735892

OS 1: 50,000 Sheet No : 135
1: 25,000 Sheet No : SN 78

Site Area: 7.7 hectares (19.0 acres)

Description:

This old copper-lead-zinc mine, situated just north-west of Nant-y-moch Reservoir, is of particular interest owing to the well developed gossan (the part of the vein nearest the surface where the ores have been weathered and, in particular, oxidised). The ore, as first deposited, consisted of galena, chalcopyrite and sphalerite contained in a gangue of quartz, dolomite and calcite in a brecciated country rock, but supergene oxidation, forming much gossany material, has resulted in the formation of an unusually wide array of secondary minerals. Commonly found phases are green velvety malachite, acicular cerussite and serpierite, as well as leadhillite, hemimorphite, native copper with cuprite, brochantite, langite, linarite, devilline and the recently reported rare copper sulphate, wroewolfeite. Additional occurrences of pyromorphite, covelline, chrysocolla, chalcocite and bindheimite have also been reported. Many of these secondary phases are well crystallized, but microscopic, specimens.

Remarks:

This site has been selected as a result of the Nature Conservancy Council's Geological Conservation Review (in press), a national survey and evaluation of sites of geological and physiographical interest.

DYFED

PENCARREG-GOPA A MOEL HYRDDOD SSSI

Ceredigion District

Date of notification: 1982

National Grid Reference: SN 714953

O.S. 1:50,000 Sheet no: 135

1:25,000 Sheet no: SN 79

Site area: 196½hectares (485½ acres)

Description:

An area of upland, ranging in altitude from 230-447m (755-1467ft), supporting luxuriant tussocky blanket mire and dwarf-shrub heath communities, as well as an area of sessile oak woodland. There are four types of blanket mire in the site, mainly clothing the eastern half which includes the two hills, Moel Hyrddod and Pencarreg-gopa. The mire types are characterised by the following broad plant associations - heather-cottongrass; heather-cottongrass rich in bog mosses; heather-cottongrass-bilberry and heather-deergrass. Plants such as cross-leaved heath (Erica tetralix), crowberry (Empetrum nigrum), bog asphodel (Narthecium ossifragum) and round-leaved sundew (Drosera rotundifolia) are frequent, and there is a diverse moss and liverwort flora. On the drier areas blanket mire vegetation merges into sub-montane dwarf-shrub heath dominated by heather (Calluna vulgaris). This community becomes much more dominant in the south-western part of the site, where tall, lightly grazed heather moor grades into blanket mire. In the south-west corner of the site is a small mire containing heather, cross-leaved heath, purple moor-grass (Molinia caerulea), cottongrasses (Eriophorum spp.), bilberry (Vaccinium myrtillus), and cranberry (V. oxycoccus), together with flushes containing soft rush (Juncus effusus) and the bog moss, Sphagnum recurvum .

This upland area is important ornithologically, particularly as foraging territory for the red kite and other carrion-feeding species. The site also includes the wooded valley of Nant Dynyn and Afon Cymere, known as Coed Fedw-fach, which is predominantly sessile oak (Quercus petraea) with occasional downy birch (Betula pubescens) and ash (Fraxinus excelsior). In places the wood is very wet with an abundance of alder (Alnus glutinosa) and eared willow (Salix aurita). The flora includes wood-sorrel (Oxalis acetosella), herb-robert (Geranium robertianum), goldenrod (Solidago virgaurea) and an exceptional abundance of yellow pimpernel (Lysimachia nemorum).

Remarks:

CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

CEREDIGION **MWYNGLODDFA BRYNYRAFR**

Local Planning Authority: Ceredigion Council

Date of Notification: 1 July 2002

National Grid Reference: SN 745879

OS Maps: 1:50,000 Sheet number: 135
1:10,000 Sheet number: SN 78NW

Site Area: 1.35ha

Description:

Located approximately 8km north of Ponterwyd and 9km east of Tal-y-bont, Mwyngloddfa Brynyrafr is situated on the ENE-trending Hafan Lode, one of a series of major mineralized veins which collectively form the Central Wales Orefield. The spoil tips associated with this mine are of special scientific interest because they provide one of the best sites for studying the textures associated with vein mineralization in the Central Wales Orefield. The large dumps are rich in vein material from both the early (A1) and late (A2) phases of mineralization. Superbly textured breccias and cross-cutting crustiform veins are present in abundance; boulders of such material, when cut and polished, have produced fine, museum-quality specimens. The site is of unparalleled quality for demonstrating the repeated sequence of re-brecciation and cross-cutting which characterizes the primary paragenesis of the Central Wales Orefield. Additionally, fine specimens of millerite, a rare nickel sulphide mineral, are abundant.

Remarks:

Mwyngloddfa Brynyrafr has been selected following the completion of a joint research initiative undertaken on behalf of CCW by the National Museums and Galleries of Wales. The site is a revision to the former Nature Conservancy Council's Geological Conservation Review, a national survey and evaluation of sites of geological and geomorphological interest. The site is described in the forthcoming GCR volume entitled Mineralization in Great Britain (Bevins *et al.*, in prep.).

CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

CEREDIGION	COED CWM EINION
Local Planning Authority:	Ceredigion County Council
Date of Notification:	July 1998
National Grid Reference:	SN 691947
OS Maps:	1: 50,000 Sheet Number: 135 1: 10,000 Sheet Number: SN 69SE SN 69NE
Site Area:	20.3 hectares (50.2 acres)

Description:

Coed Cwm Einion is located in the lower part of the Einion valley, which runs ESE from the village of Furnace, near Machynlleth. The site is located at a height of 50-110 metres, occupying both the north and south sides of the valley. The site is of special interest for its range of woodland types, and is particularly notable for its ash Fraxinus excelsior woodland which contains abundant small-leaved lime Tilia cordata. The bryophyte and lichen floras are exceptionally rich, with a large number of Atlantic species, several of which are nationally scarce. The lichen species Parmelia robusta occurs here at its only known locality in Great Britain.

The geology is varied, with Silurian rocks underlying the western end of the valley and Ordovician at the eastern end. The Silurian rocks are mainly Upper Llandovery, but a narrow band of Lower Llandovery crosses the valley from NNE to SSW at the boundary with the Ordovician. On the slopes, soils vary from shallow, well-drained, loamy soils to thin acid humus over rock. On level ground at the base of the slopes flushing has given rise to deeper, more base-rich soils, waterlogged in places.

On the moderately base-rich slopes of the north side of the valley, a calcicolous woodland community occurs, with ash the most common canopy species. Small-leaved lime is found as scattered trees and as local sands, here at probably its most abundant in Ceredigion. The ground flora is restricted by heavy grazing, but wood avens Geum urbanum, false brome Brachypodium sylvaticum, herb-robert Geranium robertianum, remote sedge Carex remota and lady-fern Athyrium filix-femina are all present. The same community, also rich in small-leaved lime, occurs in the narrow dingle above the main body of the wood, and in places along the river banks.

The more acidic slopes support sessile oak Quercus petraea and downy birch Betula pubescens, dominated woodland. In the north-west of the site downy birch is the dominant canopy species, but sessile oak is also frequent. In the understorey coppiced hazel Corylus avellana is common, with scattered hawthorn Crataegus monogyna and isolated crab apple Malus sylvestris. The ground flora is dominated by grasses, especially common bent Agrostis capillaris, sweet vernal-grass Anthoxanthum odoratum and red fescue Festuca rubra. Bell heather Erica cinerea is present in small quantities. Mosses are a consistent feature, with Isothecium myosuroides swathing tree bases and rocky outcrops and

Dicranum majus, Polytrichum formosum and Rhytidiadelphus loreus common on the ground. To the north-east, sessile oak is the dominant canopy species, with birch only occasional. Hazel and rowan Sorbus aucuparia are frequent in the understorey. Mosses dominate on the ground, intermixed with wavy hair-grass Deschampsia flexuosa and locally abundant great wood-rush Luzula sylvatica. A small block of this community occurs on the south side of the river, but here ferns are more prominent due to the absence of grazing. These include scaly male-fern Dryopteris affinis, broad buckler-fern D. dilatata and hard fern Blechnum spicant. Further east, a rocky outcrop above a waterfall carries colonies of Tunbridge filmy-fern Hymenophyllum tunbrigense and hay-scented buckler-fern Dryopteris aemula, both of which are of very limited oceanic distribution.

A number of wet flushes near the river carry mixed alder Alnus glutinosa and ash woodland, with species such as yellow pimpernel Lysimachia nemorum and meadowsweet Filipendula ulmaria characterising the ground flora. In one of these flushes marsh hawk's-beard Crepis paludosa occurs in abundance, here near the southern edge of its British range.

The flushes support a good selection of land molluscs, including species characteristic of undisturbed woodland, such as Spermodea lamellata, Zenobiella subrufescens and Vertigo substriata. Common dormouse Muscardinus avellanarius and polecat Mustela putorius have been recorded at the site.

The south side of the valley is dominated by plantations of conifers and broadleaves, but on the lower slopes important areas of semi-natural woodland remain. The plantations help maintain the moist, shaded microclimate essential to the bryophytes, lichens and ferns on the banks of the river below.

Remarks:

The north-western part of the site is owned by the Royal Society for the Protection of Birds, which has instituted a tree-planting programme in the bracken-dominated area. The majority of the site to the south of the river is owned by the Forestry Commission.

The entire site lies within the Cambrian Mountains Environmentally Sensitive Area.

Common dormouse is listed under Schedule 5 of the Wildlife and Countryside Act 1981, (as amended).

DYFED - Ceredigion District
POWYS - Montgomery District

PUMLUMON (PLYNLIMON) SSSI

Date of Notification: February 1979, September 1983, December 1984 and April 1986

National Grid Reference: SN 79087O - SN 83095O

O.S. 1:5O,OOO Sheet No: 135
1:25,OOO Sheet No: SN 78, 79, 88 and 89

Site area: 3848 hectares (95O8½ acres)
1591 hectares (3931½ acres) in Ceredigion
2257 hectares (5577 acres) in Montgomery

Description:

One of the most important upland areas for nature conservation in Wales, being of special interest for its vegetation types and bird fauna. It extends from Pumlumon Fawr (753 metres, 2,468 feet) in the south (the highest point in Dyfed) to Foel Fadian (564 metres, 1,85O feet) in the north.

This upland block is built of Ordovician mudstones, shales and coarse sandstones, overlain by soils ranging from acid brown earths in the better drained parts to deep blanket peat in the wetter places. The rivers Severn and Wye rise within the site. Most of the land is a traditional sheep walk.

The principal vegetation types are acid grassland, blanket bog communities and dwarf-shrub heath. Amongst the grassland types is an uncommon one in mid Wales, consisting mainly of sheep's-fescue (Festuca ovina) with varying amounts of bilberry (Vaccinium myrtillus), fir club-moss (Huperzia selago), alpine club-moss (Diphasiastrum alpinum) and the lichen, Cladonia impexa. The extensive areas of blanket bog support three distinct vegetation types. In each heather (Calluna vulgaris) is a dominant plant, but in one hare's-tail cottongrass (Eriophorum vaginatum) is co-dominant, in another deer-grass (Trichophorum cespitosum) and in the third purple moor-grass (Molinia caerulea). The most extensive area of dwarf-shrub heath is around Glaslyn, where heather is dominant, in contrast to areas dominated by bilberry and crowberry (Empetrum nigrum) on and around Foel Fadian to the north. A number of uncommon plants occur in wet flushes and on rocks and cliffs scattered about the site. Starry saxifrage (Saxifraga stellaris) occurs near its southern-most limit in Britain.

Most of the birds characteristic of upland Wales are found on the Pumlumon range, either feeding there or also breeding. Birds of prey include peregrine falcon, red kite, merlin, hen harrier, short-eared owl, kestrel and buzzard. Ring ousel, golden plover, red grouse, common sandpiper, wheatear, whinchat and teal breed there, and Greenland whitefronted geese roost during the latter part of the winter on Bugeilyn, the best lake for aquatic plants and animals in the entire site.

Remarks:

Parts owned by the Crown Estate Commissioners, Forestry Commission and Central Electricity Generating Board.

About 162 hectares (4OO acres) are owned by the Montgomery Trust for Nature Conservation and managed as a nature reserve, known as Glaslyn.

Parts are registered as common land.

Part of the site is used by the Institute of Hydrology in its comparative studies of the Wye and Severn headwaters.

Site enlarged by 292O hectares (7216 acres) in 1983 and reduced by 4 hectares (1O acres) in 1984.

Site reduced by 3 hectares (7½ acres) in 1986.

CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

CEREDIGION	COED CWM EINION
Local Planning Authority:	Ceredigion County Council
Date of Notification:	July 1998
National Grid Reference:	SN 691947
OS Maps:	1: 50,000 Sheet Number: 135 1: 10,000 Sheet Number: SN 69SE SN 69NE
Site Area:	20.3 hectares (50.2 acres)

Description:

Coed Cwm Einion is located in the lower part of the Einion valley, which runs ESE from the village of Furnace, near Machynlleth. The site is located at a height of 50-110 metres, occupying both the north and south sides of the valley. The site is of special interest for its range of woodland types, and is particularly notable for its ash Fraxinus excelsior woodland which contains abundant small-leaved lime Tilia cordata. The bryophyte and lichen floras are exceptionally rich, with a large number of Atlantic species, several of which are nationally scarce. The lichen species Parmelia robusta occurs here at its only known locality in Great Britain.

The geology is varied, with Silurian rocks underlying the western end of the valley and Ordovician at the eastern end. The Silurian rocks are mainly Upper Llandovery, but a narrow band of Lower Llandovery crosses the valley from NNE to SSW at the boundary with the Ordovician. On the slopes, soils vary from shallow, well-drained, loamy soils to thin acid humus over rock. On level ground at the base of the slopes flushing has given rise to deeper, more base-rich soils, waterlogged in places.

On the moderately base-rich slopes of the north side of the valley, a calcicolous woodland community occurs, with ash the most common canopy species. Small-leaved lime is found as scattered trees and as local sands, here at probably its most abundant in Ceredigion. The ground flora is restricted by heavy grazing, but wood avens Geum urbanum, false brome Brachypodium sylvaticum, herb-robert Geranium robertianum, remote sedge Carex remota and lady-fern Athyrium filix-femina are all present. The same community, also rich in small-leaved lime, occurs in the narrow dingle above the main body of the wood, and in places along the river banks.

The more acidic slopes support sessile oak Quercus petraea and downy birch Betula pubescens, dominated woodland. In the north-west of the site downy birch is the dominant canopy species, but sessile oak is also frequent. In the understorey coppiced hazel Corylus avellana is common, with scattered hawthorn Crataegus monogyna and isolated crab apple Malus sylvestris. The ground flora is dominated by grasses, especially common bent Agrostis capillaris, sweet vernal-grass Anthoxanthum odoratum and red fescue Festuca rubra. Bell heather Erica cinerea is present in small quantities. Mosses are a consistent feature, with Isothecium myosuroides swathing tree bases and rocky outcrops and

Cadw

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Eich cyfeirnod Your reference	E6021
Ein cyfeirnod Our reference	A-CAM011-09-qA693232/1
Dyddiad Date	9 July 2008
Llinell uniongyrchol Direct line	01443 336096
Ebost Email:	Suzanne.whiting@wales.gsi.gov.uk

Dear Mr Trevelyan

NANT-Y-MOCH WIND FARM SCOPING CONSULTATION

Thank you for your letter of 12th June 2008 inviting comments from Cadw on the above named document. Following the meeting attended by Dr Kate Roberts, please find below Cadw's comments which I hope you will find useful.

There are twelve Scheduled Ancient Monuments (SAM) within the boundaries of the proposed windfarm. Two location maps and core SAM information will be sent in the post separately. Digital mapping information and detailed site descriptions can be provided on request:

Monument name and number	NGR
Carn Owen, Cerrig yr Hafan (CD045)	SN732882
Llainwen Round Cairns (CD142)	SN691922
Ystrad Einion Lead Mine Buildings and Water Wheel(CD143)	SN706938
Nant Bwlch-glas Lluest Farmstead (CD208)	SN716869
Waun Lechwedd Llyfn Long Hut (CD209)	SN716861
Fridd Newydd, Stone Circle (CD234)	SN700911
Pencraig y Pistill Round Cairn (CD250)	SN715864
Carneddau Round Cairns, Drosgol (CD252)	SN759878
Foel Goch Round Cairn (CD257)	SN695928
Banc Llechwedd-mawr Round Cairns (MG307)	SN775898
Craig y Dullfan Ring Cairn (MG308)	SN771887
Afon Hyddgen Stone Row (MG309)	SN780894

Also, the following sites have been recommended for Cadw to consider for scheduling as sites of national importance following the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) Uplands Survey (Plynlimon Project):

Lluest Fawr Deserted Rural Settlement	SN 7537 9083
Afon Llechwedd Mawr Long House	SN 7553 9025
Banc Llechwedd Mawr Cairns	SN 775 898
Magwyr y Rhos Long House	SN 756 891

Evaluation has yet to take place but will involve desktop analysis of available information and where appropriate site visits.

The EIA needs to assess the impact of the wind farm on all historic features, scheduled and unscheduled, and should also take account of the potential for the presence of buried archaeology within the development area. When considering the impact of the development, it is important to ensure that due consideration is given not only to direct physical impact but also to the effect of the development on the essential setting of monuments.

The development lies within the Upland Ceredigion Landscape of Outstanding Historic Interest (CCW /Cadw / ICOMOS Register of Historic Landscapes). This landscape has been subject to a detailed historic landscape characterisation exercise, details of which can be obtained from Cambria Archaeology. Information from this work should be used to inform the EIA. The ASIDOHL assessment system provides a best practice methodology for assessing the impact of development within Historic Landscapes (see revised Cadw/CCW "Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process", 2007).

Key viewpoints

In addition to the key viewpoints proposed in the scoping document consideration should be given to assessing the visual impact of the development when viewed from the following local historic sites/attractions:

	X	Y
Dyfi Furnace (Cadw Guardianship monument)	268494	295099
Castell y Bere (Cadw Guardianship monument)	266777	308560
Bryntail Lead Mine (Cadw Guardianship monument)	291353	286856
Llywernog Silver Lead Mining Museum	273205	281017

Contact points in Cadw

Cadw officers are available to provide professional advice regarding the scope, content and appropriate methodologies to gather and evaluate the necessary information required for the Environmental Impact Assessment:

Kate Roberts (Inspector of Ancient Monuments – West Wales)	01443 336013
Judith Alfrey (Inspector of Historic Landscapes)	01443 336052
Jonathan Berry (Assistant Inspector) – scheduling	01443 336073

Please contact me should you have any further queries regarding this matter.

Yours sincerely

Mrs Suzanne Whiting
Gweinyddu Henebion/Ancient Monuments Administration

Cc: John Evans
Ceredigion County Council

South and West Wales
De a Gorllewin Cymru

Dr Lizzie Wilberforce
The Wildlife Trust of
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Reg Charity
No. 1091562

Company No.
4398959

John Evans
Planning Department
Ceredigion County Council
Neuadd Cyngor Ceredigion
Penmorfa
Aberaeron
SA46 0PA

8 July 2008

Dear John,

Re: Nant y Moch Windfarm Scoping Consultation

Many thanks for offering to collate and pass on our views, as a non-statutory consultee regarding this development. We are grateful for the opportunity to comment on the proposal.

I am responding on behalf of the Wildlife Trust of South and West Wales, who are responsible for the Ceredigion-based part of the development, and also Montgomeryshire Wildlife Trust, on the Powys side.

We would like to provide comments on several (but not all) aspects of the scoping exercise, under the following headings:

Extent of development site
We would not be in favour of extending the development outside the revised SSA D (Arup) boundary, and certainly not outside the original TAN 8 boundary, unless every other alternative has been explored and eliminated with sufficient and explicit justification. However, we accept that some factors were not incorporated into the original estimates of capacity in the TAN 8 area, and that alternatives may need to be considered to reach output targets. Therefore we would not object to areas outside SSA D being included in the scoping exercise, in order to maximise the potential for information gathering in the most efficient manner. This would better inform future consideration of relative impacts in the different areas.

Extent of study area
We would advocate expanding the radius of visual impact to 30km, especially if the turbines are going to require lighting (which in turn should be examined for potential effects on wildlife)

Viewpoint receptors
Although outside the 30km visual impact radius, we would recommend a viewpoint receptor somewhere near Lake Vyrnwy, as an area of significant landscape value where views could be impacted. Another that could be considered for inclusion that falls within the zone of theoretical visibility is the viewpoint just south of Borth, in Ceredigion, which is extremely popular with tourists (approx SN605879). Otherwise we support the existing 15 recommended receptors.

Ecology
We would welcome the range of surveys proposed (Phase I, NVC, Winter and Breeding Birds etc) but would welcome reassurance that bats will be afforded the same level of investigation. Threats to bats from this development are two-fold; (a) impacts of installed turbines on bat flightlines / strike rates, and (b) impacts on roosting/hibernating bats in the extensive mine systems. In relation to the latter we would welcome a full investigation of bat use of these mine systems at all times of year, in relation to potential physical disturbance of the mines during construction, but also the potential impacts of disturbance (vibration through the ground) both during construction and during the working life of the wind farm. Changes in habitat resulting from the development (eg keyhole clearance of forestry) and their likely impacts on bat foraging behaviour and potential strike should also be considered.

Assessment of use of the site by birds is laid out in the consultation document. However we believe it is important that the scoping study should aim to determine bird use of this area not only for potential disturbance and habitat loss, but also to minimise the risks of bird strike, in relation to bird passage through this area.

We welcome the recognition of the Ceredigion LBAP and the significance of assessing impacts on the habitats and species concerned. We would also draw attention to the presence of an LBAP in Powys. In addition, the LBAPs should not be considered an exhaustive list of species and habitats to consider locally (in addition to statutory protected species). Ceredigion LBAP is still in preparation and does not contain the full suite of Section 42 species and habitats that are present in, and characteristic of, the county. We would recommend that consideration of BAP features should focus on nationally identified BAP habitats (LBAPs are becoming more habitat, rather than species, focussed). Information is available about which BAP habitats are present in each county, regardless of whether or not they have a full local action plan to date. Please see attached.

We would also like to see some assessment of the restoration potential of land and habitats under consideration for turbine locations, not just an assessment of current condition. Whilst we appreciate that some land may not presently be available for wildlife habitat restoration/creation (eg commercially viable forestry), other areas, eg degraded peat bog, may have potential for restoration to high quality habitat. Wildlife Trusts Wales are currently running a landscape-scale conservation project in this part of Wales (Pumlumon Project, hosted primarily by Montgomeryshire Wildlife Trust) which aims, where possible, to restore habitats in this way. We would like to see turbine proposals to avoid both areas of currently valuable habitat and those with restoration potential.

We would also like to see a thorough scoping of the potential impacts of lighting as well as noise, both during construction and during the lifetime of the windfarm, on local wildlife.

Peat

We would object to the siting of any turbines in deep peat. There are many ecological and environmental reasons for avoiding peat areas, and many of these have been exemplified by problems that arose as a result of such excavations during the construction of Cefn Croes windfarm. In addition, without avoiding destroying priority section 42 habitats, Ceredigion and in turn the Welsh Assembly Government will fail to meet targets laid out in the Environment Strategy for Wales.

Healthy peat deposits are both carbon sinks and water holding areas. Removing them reduces both carbon storage and the ability of the upland area to retain water for longer and reduce the flashiness of runoff profiles downstream. We appreciate the intention to do a complete carbon budget for the turbines to demonstrate net reduction in carbon emissions. However, avoidance should remain the first strategy in terms of siting turbines, to minimise carbon loss, even where there is a net reduction overall. Any proposals to site turbines in deep peat should be accompanied by:

(a) Justification for not siting the turbine elsewhere
(b) Figures for estimated peat displacement
(c) Details of what will be done with the extracted peat
(d) Carbon budget for the turbine, incorporating the very long term effect of the loss of peat that will not reform for thousands of years
(e) Assessment of potential impacts on the often significant biodiversity value of the habitats associated with that area of peat

(f) Assessment of the changes to hydrology resulting from the replacement of water-retaining peat with concrete.

As an essential contributor towards this, a thorough and accurate map of peat deposits throughout the development area is an absolutely essential component of the scoping exercise.

Grid Connection and Access

We would object to any permissions being granted for this development in the absence of confirmed plans describing both the access to the site and the grid connections that will be required. As such we believe that this scoping exercise should, as far as possible, incorporate a strategic approach to scoping the grid connection. The ecological impacts of the grid connection and access routes are likely to be as great, if not greater, than of the turbines themselves. They will also affect the locations of the infrastructure associated directly with the turbines. This in turn might influence the need to gather specific ecological data, which should be performed as early as possible in the environmental impact assessment exercise.

We would like to reiterate our appreciation of the opportunity to comment on these proposals. Should you require any further information on any of the areas we have raised, please do not hesitate to contact us.

Yours sincerely,

Dr Lizzie Wilberforce
Wildlife Trust Officer (Ceredigion)

APPENDIX 3

Wales and UK Priority Habitat Targets disaggregated by LBAP partnership

The accompanying tables present an attempt to break down the new Welsh BAP habitat targets for each LBAP area, with additional information.

The underlying principle behind this exercise is that the value of the targets for maintenance, restoration, expansion and condition have been derived in direct proportion to the amount of the habitat present in each LBAP. This figure has been taken from Jones *et al*, (2003). However, for many of the habitats presented, the new baseline figure for the habitat used during the target review exercise differs, mostly only slightly, from that given in PHW. This may be due to an acknowledged decline in the habitat area during the intervening period between the Habitat Survey of Wales and the setting of Welsh targets (especially so for grasslands). Woodland figures are very different because the definition of what is included within the woodland HAP has been extended to include all native woodland. Additionally, further examination of the Welsh target by FC Wales, has shown that there is an overestimation of the amount of native woodland in the target review figures. An alternative, lower total habitat area is therefore given alongside the published figure in the accompanying table. Data on the amount of woodland habitat in each LBAP can only be derived from the Habitat Survey of Wales; it is assumed that the distribution is similarly spread across LBAPs for the higher baseline values of native woodland used in the examples.

Hedgerow and arable margin targets have been set for Wales, but as comprehensive data is not available at this time, figures for Welsh LBAPs have not been provided. Priority areas for hedgerow and arable action have been identified in the spreadsheet.

All figures in the tables have been rounded to the nearest number if less than 1 (>1). The LBAPs partnerships holding greater than 1% of the total resource are given an equal share of the target, despite their actual percentage contribution.

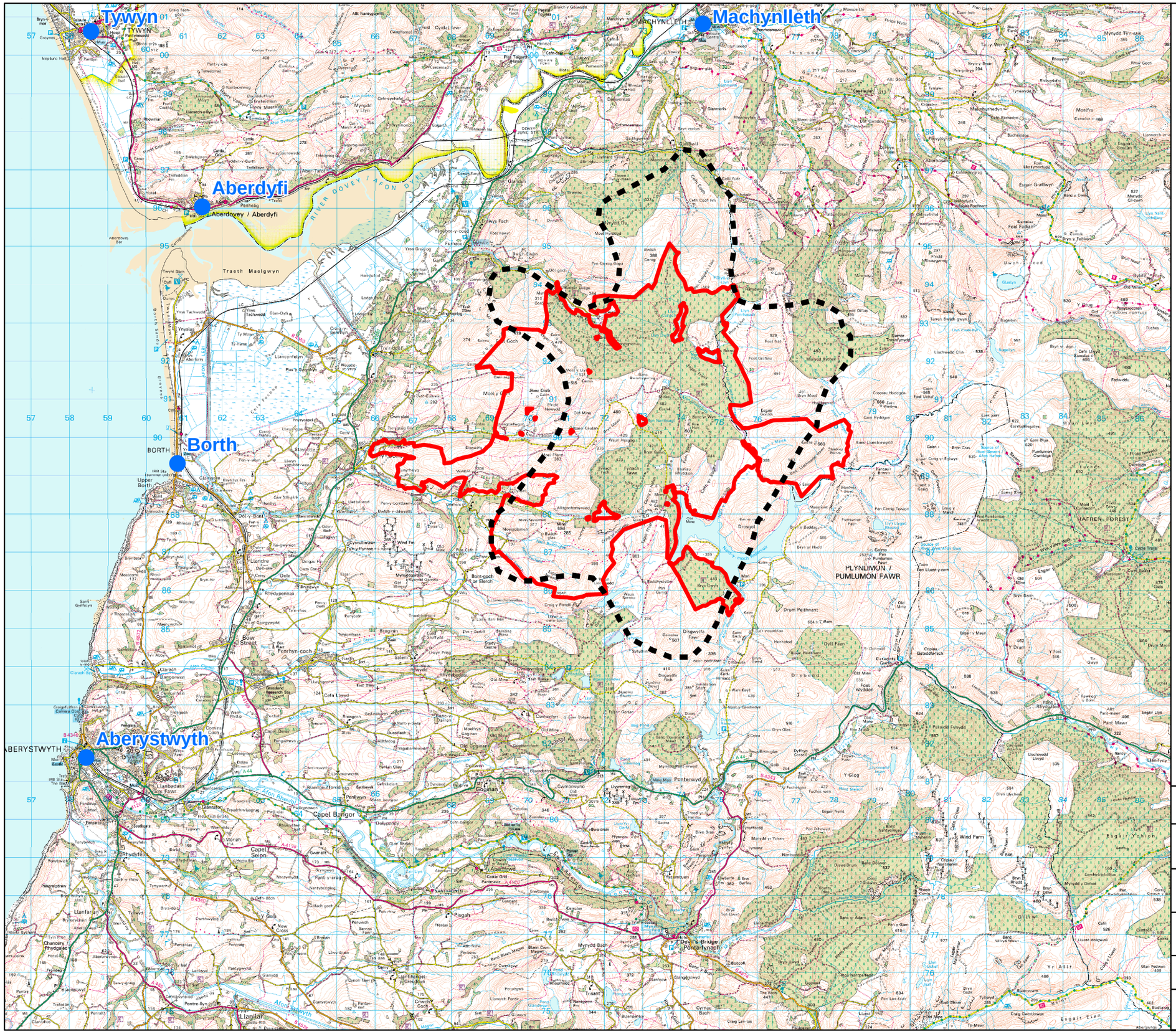
For several of present habitats, and all the new S42 habitats, the UK groups have not yet set the full range of targets for restoration, expansion or condition improvement. These are shown as blanks in the table. Once these figures become available, this appendix will be update. The full Wales or UK targets where appropriate can be seen in Appendix 2.

In all cases, the areas of habitat given on the tables should be used as an indication of the amount of habitat that would be required to meet the Welsh targets when summed over the whole of Wales. They are not meant to be prescriptive, just a guide to the relative amounts of restoration or expansion that need to be undertaken if we are to meet our targets. LBAP partnerships may decide to, or have the opportunity to do much more in some circumstances. CCW have tried to indicate the priority LBAP areas for action for each habitat on a scale of 1=highest and 5= lowest. Again these are indicative only and are not meant to reflect in any judgemental way on the habitat present in each LBAP area. [After Liz Howe, CCW.]

Appendix C: Supporting Figures

Figure 1: Proposed Nant y Moch Wind Farm Site Location

Figure 2: Proposed Nant y Moch Wind Farm Site Layout



N

Legend

- Site Boundary
- TAN8 SSA D Boundary

0 1 2 4 Kilometers

Scale (at A3): 1:100,000

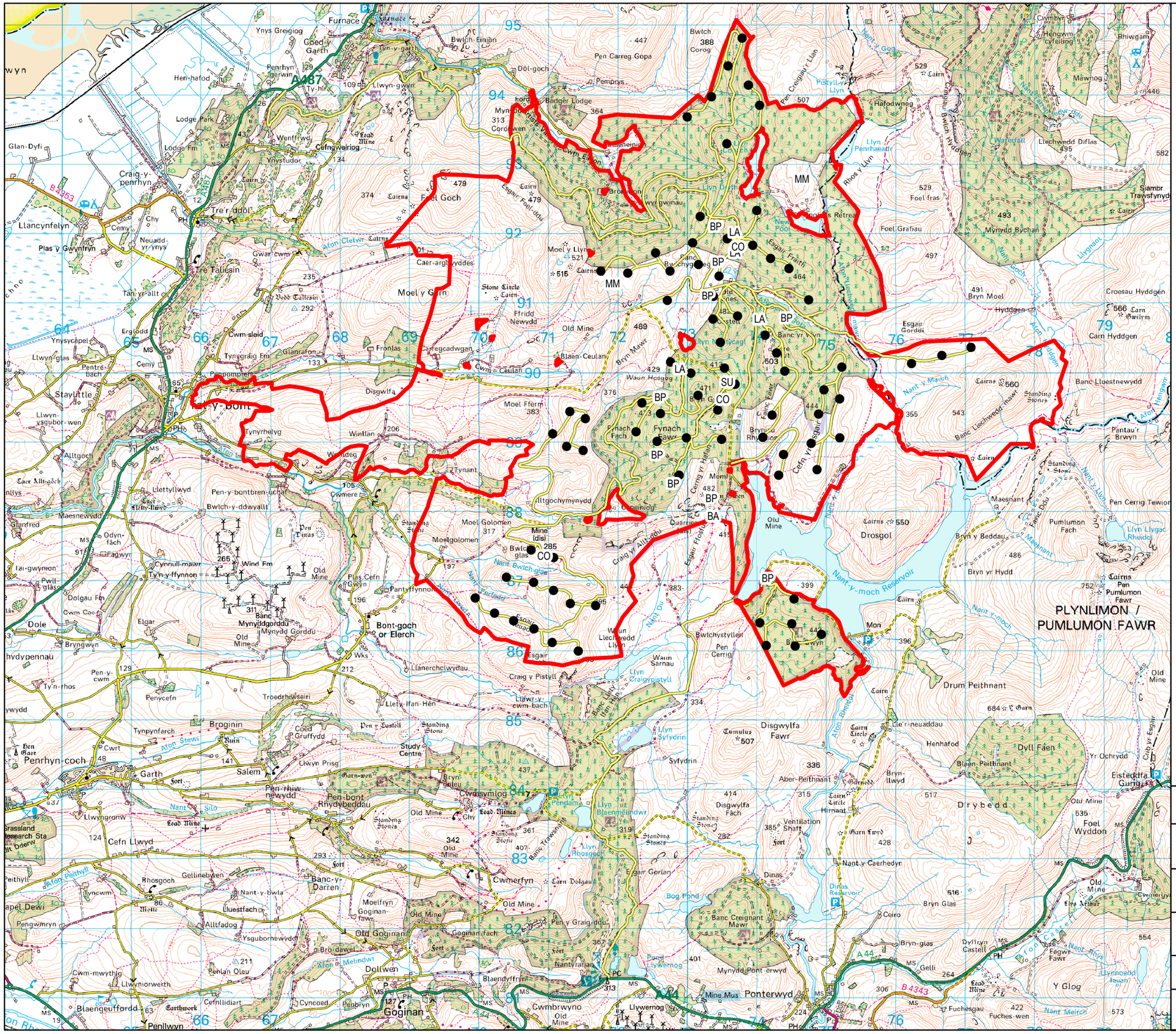
Date: April 2010

Prepared by: dulas ReSolutions

Client: SSE Renewables

Nant-y-Moch Wind Farm

Figure 1: Site Location Plan



N

Legend

- Site Boundary
- Access Track
- Turbine

CO	Temporary Compound
LA	Temporary Laydown Area
BA	Temporary Batching Plant
SU	Substation and Control Building
BP	Borrow Pit
MM	Met Mast

0 0.5 1 2 Kilometers

Scale (at A3): 1:55,000

Date: April 2010

Prepared by: dulas ReSolutions

Client: SSE Renewables

Nant-y-Moch Wind Farm

Figure 2: Proposed Site Layout