



Pennant Walters Ltd.

Esgair Cwmowen Wind Farm



Environmental Impact Assessment

Volume 5

Non-Technical Summary

Pennant Walters Ltd

**Proposed wind farm
Esgair Cwmowen, near Carno, Powys, Wales**

ENVIRONMENTAL STATEMENT

Volume 5
Non-Technical Summary

April 2010

WYG Planning & Design
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Cardiff CF10 3DQ

A038354

1.0 INTRODUCTION

1.1 Background

1.1.1 This document is the non-technical summary (NTS) of an environmental statement (ES), which records the environmental impact assessment (EIA) of a proposal by Pennant Walters Ltd to develop an onshore wind farm on land at Esgair Cwmowen, near Carno in Powys, Wales: see **Figure 1.1**.

1.2 The application

1.2.1 The application seeks full planning permission for the wind farm, which includes the erection of 19 wind turbines, which will generate electricity for the National Grid. The scheme has a maximum rated capacity of 47.5 megawatts (MW).

1.2.2 The site for the purposes of seeking planning permission is outlined in red on **Figure 1.2** (the main application site). The study area (that is, the area over which surveys and analyses have been undertaken) is wider than the application site and is shown in blue on the same drawing. In the case of certain assessments – such as visual impact – the study area was even more extensive.

1.3 Environmental impact assessment

1.3.1 EIA is a means of drawing together in a systematic way an assessment of the likely significant environmental effects of a particular development. This helps to ensure that predicted effects are identified and assessed and that the scope for minimising or mitigating them is considered at the time the decision is made.

1.3.2 As part of the process of designing the project and assessing its potential environmental effects, the applicant consulted a wide range of organisations, including the local planning authority and highway authority, Powys County Council, and held public exhibitions in Carno and Llanfair Careinion.

1.3.3 The ES is presented in five volumes:

- Volume 1: Main text;
- Volume 2: Application plans and other drawings;
- Volume 3: Appendices;
- Volume 4: Nature conservation survey reports; and
- Volume 5: Non-technical summary.

Copies of the planning application, the ES and the Design and Access Statement may be inspected during normal business hours at the offices of the local planning authority.

1.3.4 Copies of the ES are available to purchase at a cost of £250.00 (excluding post and packaging) while stocks last. Electronic copies are also available at a cost of £10.00 (including post and packaging). Enquiries should be made to the applicant's agent:

WYG Planning and Design
21 Park Place
Cardiff
CF10 3DQ
Telephone 02920 729000
Contact: Paul Vining paul.vining@wyg.com

1.3.5 Copies of the non-technical summary of the ES are available from the Council free of charge while stocks last.

2.0 THE STUDY AREA

2.1 Location

- 2.1.1 The study area (see **Figure 1.2**) lies in the uplands of Mid Wales, midway between the towns of Machynlleth in the west and Welshpool in the east and approximately 6.5 kilometres (4 miles) to the north-east of Carno. It is relatively remote from large settlements, the nearest town of any size being Newtown (population about 11,000), about 12km (7.5 miles) to the south-east. The area is one of scattered farmsteads and other dwellings and the predominant land use in the area is agriculture, mainly grazing.
- 2.1.2 The study area lies at an elevation of 290-440 metres above Ordnance Datum. Its landform is defined by two main ridges on a generally west-east alignment: Mynydd Dwyriw in the north and Esgair Cwmowen in the south, enclosing the valley of the upper reaches of the Afon Rhiw, a tributary of the River Severn. In the northernmost part of the study area is a smaller hill, Mynydd Garnedd-wen, and a minor valley which joins the Afon Rhiw just beyond the eastern boundary of the study area.
- 2.1.3 The study area is mainly improved upland grassland, with some small conifer plantations and a small area of broadleaved woodland at its centre. The land has been subdivided by fences into a regular pattern of large scale grazing areas, accessed by a system of unsurfaced tracks. There are a number of public rights of way in and around the study area. Other features close to the study area include the working Tan-y-Foel quarry, to the north-east, and the Carmel caravan park, to the east. There are two residential properties within the study area and a number of others nearby.

2.2 Planning designations

- 2.2.1 The study area is not located in an area of restraint such as a National Park or an Area of Outstanding Natural Beauty (AONB). The closest such areas to the site are the Snowdonia National Park to the north-west (approximately 15km/9 miles) and the Shropshire Hills AONB to the south-east (approximately 22km/14 miles).
- 2.2.2 The study area does not contain or form part of any area that has been designated for its nature conservation value.
- 2.2.3 The study area does not contain any conservation areas, buildings listed for their architectural or historic interest or landscapes, parks and gardens on Cadw's non-statutory *Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales* (Cadw, ICOMOS UK, 1999). It contains one scheduled monument: Y Capel, the remains of a prehistoric stone circle.
- 2.2.4 The study area is crossed by a number of public rights of way, including bridleways and footpaths, but does not contain any open access land designated under the *Countryside and Rights of Way Act 2000*.
- 2.2.5 The study area lies on the eastern edge of a Special Landscape Area (SLA) defined in the unadopted *Montgomeryshire Local Plan* and appears to be similarly located in relation to the SLA diagrammatically shown on the key diagram in the adopted *Powys County Structure Plan (Replacement)*.
- 2.2.6 The study area lies within Strategic Search Area B: Carno North, which has been identified by the Welsh Assembly Government in *TAN 8: Planning for Renewable Energy* (July 2005) as an area in which large scale (over 25MW) onshore wind developments should be concentrated.

2.3 Off-site areas of land

- 2.3.1 It is anticipated that the proposed development will necessitate a limited number of off-site highway works on privately owned land that is not presently included within highway limits. These areas are included within the planning application (see **Figure 1.3**).

3.0 THE PROPOSED DEVELOPMENT

3.1 The need for the development

- 3.1.1 Countries throughout the world are taking action to tackle the challenges posed by global warming and climate change. In the UK, the *Climate Change Act 2008* introduced the world's first long term, legally binding framework to tackle the dangers of climate change. It requires the Government to set a limit on the UK's net greenhouse gas emissions over consecutive five-year periods (the carbon budget). The budget must have regard to the legally binding long term target to reduce carbon dioxide by 34% by 2020 and at least 80% below 1990 levels by 2050.
- 3.1.2 In Wales, the Welsh Assembly Government is committed to playing its part in delivering an energy programme which contributes to reducing carbon emissions. As part of that commitment, the Assembly Government established specific renewable energy production targets for Wales of 4 terawatt hours (TWh) per annum by 2010 and 7TWh per annum by 2020, which would equate to just over 10% of Welsh electricity production. It is now certain that the 2010 target will not be attained. In July 2004 the Assembly Government announced that its policy would be that 800MW of renewable capacity should be provided from strategic onshore wind energy development, mostly in the form of a small number of large wind farms to be located in the strategic search areas in TAN 8.
- 3.1.3 In March 2010, the Welsh Assembly Government introduced its new energy policy statement, *A Low Carbon Revolution*, with yet more stringent targets, including, for onshore wind generation, installed capacity of up to 5 TWh by 2015/2017. This new target is to be achieved in a number of ways but, principally, by optimising the use of the existing TAN 8 strategic search areas.

3.2 Consideration of alternatives

- 3.2.1 At the **national** level, the selection of areas suitable for large (over 25MW) wind farms is effectively dictated by national planning policy, as set out in TAN 8. The application site is located in one of these areas: SSA B (Carno North).
- 3.2.2 At the **local** level, the local planning authority has undertaken two SSA refinement exercises. The application site falls within the refined SSA boundary.
- 3.2.3 At the **site** level, the applicant has investigated a series of alternative wind farm layouts within the study area. Through the process of environmental impact assessment, the number of turbines has been reduced from 36 initially to 31, 27, 22 and, ultimately, 19, as shown on the submitted layout. The principal reasons for reducing the number and spatial extent of the turbines are as follows:
- The local refinement of the SSA boundary, so as to exclude Zone B14, which covers the southern part of the study area.
 - The omission of certain turbines which were considered to be too close to occupied residential properties.
 - The omission of those turbines located on the ridge of Esgair Cwmowen, which were considered to have unacceptable visual impact.

3.3 The wind farm development

- 3.3.1 The proposed wind farm comprises 19 turbines, each capable of generating up to 2.5MW of electricity, producing a maximum rated capacity of 47.5MW for the wind farm as a whole. The on-site development will also include: electricity substation and control building; anemometer mast; site entrance; contractor's compound; and access tracks and cabling: see **Figure 3.1**.
- 3.3.2 The candidate wind turbines are of the horizontal axis type, with a rotor consisting of three blades. The blades are mounted to the turbine hub, or nacelle, at a height of up to 80m, and the turbine has a maximum tip height of 125m. The application allows for the turbines to be micro-sited within a radius of 50m. Within the available land ownership, the application plans include for an area of 95m radius around each turbine, which allows for both micro-siting and the oversail area of the rotor blades. Each turbine requires a hardstanding to be built adjacent to the turbine foundation, to provide a stable base on which to lay down turbine components ready for assembly and erection, and to site the two cranes necessary to lift the tower sections, nacelle and rotor into place.
- 3.3.2 The wind farm will be served by a new access from the existing public highway that adjoins the northern part of the application site. Immediately to the east of the site entrance, a minor improvement of the public highway will be required on its northern side to facilitate access.
- 3.3.3 A temporary contractor's compound, approximate dimensions 50 x 50m, will be provided close to the site entrance. Wheel washing facilities will be provided and the contractor's management system will ensure vehicles leaving the site pass through the facility.
- 3.3.4 Within the site, access to the turbines will be by means of a series of tracks. Wherever possible, existing tracks will be used, suitably improved; elsewhere new tracks will be constructed. Underground cables will link the turbines to each other and to the on-site substation.

3.4 Off-site access route

- 3.4.1 The existing public highway network will be used to deliver plant, equipment and construction materials to the site. It is envisaged that the majority of supplies and deliveries will come from the east, including stone and aggregate, which will be sourced from Tan-y-Foel quarry, less than 1.5 km (0.9 mile) from the site entrance.
- 3.4.2 It is envisaged that the turbine components will enter the country at Ellesmere Port and use the primary highway network to Welshpool, via the A483. From Welshpool, the selected route is the A458 to Four Crosses, to the north-east of the site, and thence via local roads to the site, via Ystrad Uchaf and Cefn Coch. The distance between the A458 and the site is approximately 14.5 km (9 miles). The applicant has identified six locations along this route where local works could be carried out to facilitate access by the abnormal vehicles delivering turbine components: see **Figure 1.3**. The applicant has concluded legal agreements with all the owners of the land involved, to ensure that these works may be delivered pursuant to a planning condition imposed on the grant of planning permission or a planning obligation in a legal agreement.

3.5 Construction programme

- 3.5.1 The overall construction period for the wind farm is estimated to last approximately 16 months. Many of the operations will be carried out concurrently, in order to minimise the overall length of the construction programme. Site restoration will be programmed to allow restoration of disturbed areas as early as possible and in a progressive manner.
- 3.5.2 All construction areas and activities will be carefully supervised to ensure public safety (particularly in relation to users of the rights of way network) and safety of stock, as well as safety of operatives constructing the wind farm.

3.6 Operational phase

- 3.6.1 During the operational phase of the wind farm, routine maintenance or servicing of turbines will be carried out twice a year, with a main service annually and a minor service at six monthly intervals.

3.7 Decommissioning and site restoration

- 3.7.1 The wind farm has a design life of 25 years, at the end of which it will be decommissioned. As part of the decommissioning process, the turbines and all other plant and machinery will be dismantled and removed from the site. The relevant parts of the site (that is, the turbine bases, substation, hardstandings and redundant tracks) will be restored to agricultural use. In the case of turbine foundations, these will be left in situ (below the adjacent ground level), with soils spread over them and allowed to revegetate naturally.
- 3.7.2 The decommissioning and restoration process is usually controlled by planning conditions or planning obligations, so that all restoration work is carried out in accordance with an approved scheme. It is also appropriate for planning conditions or obligations to be used to require one or more turbines (and associated infrastructure) to be removed and that part of the site restored in the event that a turbine ceases to be operational for a given period prior to the cessation of the planning permission.

3.8 Grid connection

- 3.8.1 The wind farm would not be able to operate without being connected to the National Grid. The applicant has entered into discussions with the network operator, SP Manweb, and holds an offer for grid connection to the planned new 132kV system that will emerge from the mid-Wales Grid Supply Point. SP Manweb's initial plans indicate that a new 132/33kV substation is being planned at a location some 500-600m west of the proposed 132kV Esgair Cwmowen substation.

4.0 LANDSCAPE AND VISUAL AMENITY

4.1 The site and landscape context

- 4.1.1 The site is within an upland landscape with well defined topography of ridges and valleys. There are fine, distant views from the higher land across the surrounding uplands and down the valley to the east to the lowland. Improvements for increased intensity of grazing have led to the opening up of formerly hedged fields and construction of tracks, and the nearby quarry and Mynydd Clogau wind farm detract from the sense of wildness and intrude on the visual quality. It is a moderately attractive landscape with few features of note and with potential for enhancement.
- 4.1.2 Two residential properties lie close to the eastern boundary: Pen-y-Ffridd to the south-east and Rhyd-y-Biswal to the north-east. One scheduled monument occurs within the study area: the remains of Y Capel stone circle. Immediately to the north-east is Tan y Foel quarry, and within 1km are several other residential properties and Carmel caravan park. The northern part of the site is crossed by the minor road between Carno and Cefn Coch. The general area is covered by a dense network of public rights of way and some areas of access land on the uplands. Within the site are three bridleways and two main public footpaths with other short lengths of footpath near the eastern boundary. A byway follows the eastern boundary.

4.2 Mitigation and restoration

- 4.2.1 On completion of construction, disturbed areas of ground will be restored around the turbines, access tracks and sub-station and during the works some hedgerows and stone walls will be rehabilitated. On decommissioning, all above ground elements will be removed and the disturbed ground restored using retained soils.

4.3 Landscape effects

- 4.3.1 The exposed upland character of the site study area will be altered so that the turbines will become the dominant landscape element. Tranquillity will be reduced by their movement and sound, although the perceptual connection of turbines with exposed wild areas may emphasise these qualities of the site. During construction, the site will undergo great change, heightened by the very large scale of the plant and machinery involved. A similar level of change will occur during decommissioning. After restoration the site will be returned to its current character. These effects were assessed as substantial adverse short term during construction; substantial neutral long term during operation; and substantial adverse short term during decommissioning, becoming neutral.
- 4.3.2 No turbine will be sited within 200m of the stone circle, which will be protected during construction and decommissioning, resulting in substantial adverse short term during construction; substantial adverse long term during operations; substantial adverse short term during decommissioning, becoming neutral.
- 4.3.3 No turbine will be sited within 125m of a public right of way, but access routes will cross some of them. Construction and decommissioning will be managed to minimise disruption and crossings will be facilitated with stiles and signs. The effects will be substantial adverse short term during construction; substantial neutral long term during operation; substantial adverse short term during decommissioning, potentially beneficial after restoration.
- 4.3.4 No turbine will be sited within 500m of a residential property, but the landscape setting and visual amenity of the properties close to the eastern boundary will be affected, in relation to the landscape character generally. The effects will be substantial adverse short term during construction; substantial adverse long term during operation; substantial adverse short term during decommissioning, becoming neutral.
- 4.3.5 Part of the study area lies on the extreme edge of a Special Landscape Area, which is very extensive and the changes arising from the wind farm will have negligible effect.

4.4 Effect on views

- 4.4.1 The extent of potential visibility was examined by reference to zones of theoretical visibility (ZTVs) up to 30 km from the site and 28 viewpoints were selected for assessment.
- 4.4.2 Of the 28 viewpoints, only 10 were assessed as receiving moderate or greater visual impact, and the viewpoint analysis indicated that the visual impact above 18km distance will be slight to negligible, and above 22km negligible or none. In mid-distant views, changes in the views will be localised during construction and decommissioning, resulting in visual effects ranging from negligible to moderate adverse, while during operations with movement of the turbine blades, the wind farm will be a noticeable addition to the views, resulting in slight to moderate adverse visual effects. In near views, the turbines will be seen as individuals and as a group and, in open views, the changes during construction and decommissioning will be prominently visible. The turbines will be an important addition to the near views in the operational period, resulting in moderate to substantial adverse effect. In very near views, where the turbines occupy most of the angle of view, the visual effect will be substantial adverse in construction, operation and decommissioning phases.

4.5 The access route

- 4.5.1 Generally, the improvements to the access route are small in scale and localised, and effects will be moderate adverse short term during construction; moderate adverse medium term during operation, until the replacement planting is well established, then slight or negligible; potential beneficial effect in the long term after decommissioning.

4.6 Cumulative effects

- 4.6.1 For the assessment of cumulative impact, other existing or proposed (consented or at planning application stage) wind farms up to 60 km from the site were considered, a total of 19 developments in addition to the Esgair Cwmowen proposal.

4.7 Combined effect

- 4.7.1 The cumulative landscape effect of Esgair Cwmowen with all existing and proposed wind farms will be considerable, resulting in a substantial effect – which, as the transformation to a wind farm landscape is an accepted effect of TAN8, is assessed as neither beneficial nor adverse but neutral. In all views, Esgair Cwmowen will be seen amongst the other wind farms of the SSA, not extending the array of turbines in the view laterally, but increasing the density of the grouping or clustering of turbines in the view, the contribution of Esgair Cwmowen is assessed as of moderate significance.

4.8 Sequential effect

- 4.8.1 Views from trunk and main roads, mainline railway and long distance foot and cycle paths were considered. There are few locations from important routes from which sequential views of Esgair Cwmowen will be obtained, and thus the contribution of Esgair Cwmowen to sequential visual effect of wind farms will be negligible.

4.9 Temporal effects

- 4.9.1 As more wind farms are developed, the importance of Esgair Cwmowen in its contribution to overall cumulative visual effects will decrease over time. The effects are assessed as moderate initially, decreasing until, if all proposals were developed, its significance would be slight.

5.0 NATURE CONSERVATION AND BIODIVERSITY

- 5.1 The proposed wind farm site does not fall within or adjacent to any statutory or non-statutory designated sites. The nearest such statutory site is Llyn Mawr Site of Special Scientific Interest (2km) and the nearest non-statutory site is Llyn Ddu Wildlife Site (2.5km). It is unlikely that the study area plays a significant role in maintaining the ecological integrity of any of the ten designated sites within 10km.
- 5.2 A number of habitat types, including semi-improved and unimproved acidic grassland, plantation woodland and mire, were identified within the study area. The majority of habitats were considered to be of local value.
- 5.3 Surveys identified the presence of foraging badgers, bats and otters within the study area, with common lizards occurring in areas of suitable habitat. Schedule 1 and Red/Amber list bird species have been recorded breeding within the site, with red kites recorded flying at the proposed turbine height. Species within the study area are considered to be of local to county value.
- 5.4 Ecological constraints have been taken into account in the wind farm layout design and measures have been incorporated to avoid or minimise the predicted impacts in any ecological receptors. As a result, there are not expected to be any significant residual impacts as a result of the scheme.
- 5.5 Monitoring surveys will be implemented throughout the construction and operational phases of the scheme to determine the level of ecological impact.

6.0 CULTURAL HERITAGE

- 6.1 The cultural heritage assessment addresses the below-ground archaeological resource, the visible archaeological resource, standing buildings and the historic landscape. The study area has been subject to detailed desk-based assessment and walkover survey.

Cadw and Clwyd Powys Archaeological Trust (CPAT), the archaeological advisors to the local planning authority, were consulted during the course of the project.

- 6.2 Early Bronze Age occupation and exploitation of the study area and its vicinity is attested by surviving stone monuments, including Y Capel stone circle and nearby clearance cairns and standing stones. There is some potential for below-ground remains of this period within the study area. There is less evidence for occupation on the uplands after the later Bronze Age, and there is a low potential for currently unrecorded below-ground remains of Iron Age, Roman or early medieval date. There is generally limited evidence for medieval settlement within the study area, but any such remains that are present may be focused upon the established dispersed farmsteads. There is a higher potential for currently unrecorded post-medieval and modern remains within the study area, particularly features related to agricultural and economic exploitation such as field boundaries, quarries, etc.
- 6.3 Information from the archaeological baseline survey has fed into the design process, and the construction of the turbines will have no direct physical impact upon currently recorded archaeological features. The current track design may directly impact upon one archaeological site, a low mound of uncertain date and function, and a possible clearance cairn. To mitigate against this, it is proposed that the mound is subject to detailed GPS earthwork survey prior to construction, and the trackways micro-sited in this location to avoid any impact upon the features.
- 6.4 The visual effect of the development on scheduled monuments, listed buildings, registered parks, registered landscapes and conservation areas has also been assessed, and overall this will be slightly adverse. The site does not lie within a Landscape of Outstanding or Special Historic Interest in Wales, but CPAT recommended that an ASIDOHL assessment (a method designed to assess the potential impact of developments upon registered landscapes) should be carried out in order to assess potential effects of development upon the wider historic landscape. The ASIDOHL assessment found that no landscape character areas will be impacted upon to a greater than moderate degree.
- 6.5 In order to mitigate against the disturbance of any currently unrecorded below-ground remains, it is proposed that the turbine base areas are subject to geophysical survey prior to base construction and any necessary further survey or mitigation works prior to, or during, construction decided in consultation on that basis, and implemented if necessary. For the remainder of the development, a programme of archaeological monitoring and recording during intrusive construction works will be suitable. There is also some potential for deposits of palaeoenvironmental significance to be preserved within organic horizons along the stream valley. It is proposed that auger samples are taken at these locations prior to construction to further assess the presence/absence of organic horizons in these locations, and the value of the deposits if they are found. If necessary, further mitigation works will be decided in consultation.

7.0 GROUND CONDITIONS

- 7.1 Information has been collected to gain an understanding of the existing geological, hydrological and hydrogeological conditions in the study area and a walkover survey has been undertaken to provide additional information on potential constraints. Mitigation measures are presented. The significance of residual impacts is assessed in light of the proposed mitigation measures.
- 7.2 The underlying bedrock geology comprises a considerable thickness of folded Penstrowed Grits which form the hills and central valley of the study area. The bedrock is overlain by a veneer of superficial deposits which is believed to be up to 2m thick and comprises glacial tills and compressible peat. With rock at shallow depth it is most likely that the foundations required to support the high structural loads imposed by the proposed turbines will be shallow and not require piling. This will need to be confirmed by undertaking a ground investigation and geotechnical assessment.

- 7.3 The implementation of specific mitigation measures within the construction and operational phases, in conjunction with good environmental controls, will ensure that any impacts and/or effects on the geology, hydrology and hydrogeology will be minor, quickly controlled and have little significant negative impact.
- 7.4 It is concluded that with suitable controls the construction and operation of the proposed wind turbines can be undertaken without causing any material detriment to the surrounding soils and water environments.

8.0 NOISE

8.1 Introduction

- 8.1.1 Noise will be emitted by equipment and vehicles used during construction and decommissioning of the wind farm and by the turbines during operation. The level of noise emitted by the various sources, and the distance from those sources to the receiver locations, are the main factors determining levels of noise at receptor locations.

8.2 Construction noise

- 8.2.1 Construction noise has been assessed by a desk based study of the outline construction programme and by assuming the wind farm is constructed using standard and common methods. Noise levels have been calculated for the receiver locations closest to the areas of work and compared with guideline and baseline values. Construction noise, by its very nature, tends to be temporary and highly variable and therefore much less likely to cause an adverse impact. Various mitigation methods have been suggested to reduce the impact of construction noise, the most important of these being suggested restrictions of hours of working to 08:00 to 18:00 Monday to Friday and 08:00 to 13:00 on Saturdays. It is concluded that overall impacts relating to noise generated through construction activities will be negligible.
- 8.2.2 Decommissioning is likely to result in less noise impact than during construction of the wind farm. The construction phase has been considered to have a negligible noise impact, therefore, decommissioning will, in the worst case, also have a negligible noise impact.

8.3 Operational noise

- 8.3.1 Operational turbines emit noise from the rotating blades as they pass through the air. This noise can sometimes be described as having a regular 'swish'. The amount of noise emitted tends to vary depending on the wind speed. When there is little wind the turbine rotors will turn slowly and produce lower noise levels than during high winds when the turbine reaches its maximum output and maximum rotational speed. Background noise levels at nearby properties will also change with wind speed, increasing in level as wind speeds rise due to wind in trees and around buildings, etc.
- 8.3.2 Noise levels from operation of the turbines have been predicted for dwelling locations around the site most likely to be affected by noise. The predictions have also been made for other existing and proposed wind farms in the vicinity of the proposed development. Reference has been made to measurement data for existing baseline noise levels at a number of these locations. Predicted operational noise levels have been compared to the minimum limit values relevant to the scheme, as set out in stringent national planning policy guidance. These comparisons have demonstrated that turbines of the type and size which will be installed can operate within the minimum limits allowing for the combined total noise level of the proposed Esgair Cwmowen wind farm and the existing Mynydd y Clogau wind farm. These combined levels are acceptable in terms of the guidance commended by planning policy for the assessment of wind farm noise, and are therefore considered not significant in EIA terms. The likelihood or potential for all other proposed wind farms in the area to be consented is not known at this time; however such a situation would necessitate dedicated noise conditions applied to several schemes to avert significant cumulative operational impacts.

9.0 TRAFFIC AND TRANSPORTATION

- 9.1 The main transportation impacts will be associated with the movements of commercial HGVs and abnormal loads associated with the turbines to and from the site during the construction phase of the development.
- 9.2 Classified 12-hour vehicle count data was obtained from Powys County Council, for several locations on the A495 and the A458. The data have been adjusted, by applying a growth factor, to traffic flows in the forecast construction year of 2016.
- 9.3 Estimates of traffic generation associated with the construction phase of the project have been derived from first principles. An assessment has been based on the scenario that all stone and concrete requirements can be supplied by the existing quarry adjacent to the site, therefore removing any external traffic movements associated with the transport of these materials.
- 9.4 The percentage impact exercise shows that for the scenario assessed, the impact on the highway network will be insignificant: 0.4% increase in background traffic flows (AADT) during a typical 10 hour period.
- 9.5 It should be noted that HGV trips used for the assessment are based on the worst-case months during the construction programme. It is expected that during the remainder of the programme, HGV trips will be less than this figure.
- 9.6 Disturbance and other effects caused by construction traffic can be limited through the implementation of a construction phase Traffic Management Plan developed in conjunction with the highway authority. It is considered that assuming all mitigation measures are satisfied, any effects on the surrounding highway network will be of an acceptable level.
- 9.7 No continued monitoring is generally considered to be necessary. However, it is recommended that daily inspections take place to confirm that the mitigation measures implemented on-site to reduce debris on the carriageway are effective.

10.0 LAND USE

10.1 Agriculture

- 10.1.1 The application site comprises Grade 5 land, which is the lowest of the agricultural land quality grading, and does not therefore comprise "best and most versatile agricultural land" for the purposes of national and local planning policy.
- 10.1.2 Land within the wind farm site falls principally into a single agricultural holding, Dwyrhiew Park, a family run farm of approximately 280 hectares. The landowner is involved in the wind farm proposal, which will help support the economics of the holding. The loss of land is small, comprising of the turbine bases and access tracks, and any disruption will be of a temporary nature, during construction of the wind farm. None of the land within the site is subject to a Tir Gofal agreement.

10.2 Public access

- 10.2.1 None of the land within the study area comprises open access land under the *Countryside and Rights of Way Act 2000*. The study area is crossed by a number of public footpaths and bridleways, which appear to be little used, if at all. The proposed turbine layout does not affect any right of way, all of which are at least 125m from any turbine. Some of the access tracks will cross the rights of way, particularly where the track is an improvement of an existing one, but it is not envisaged that any stopping-up or diversion will be necessary.

10.2.2 Potential effects on the public rights of way within the site can be mitigated by management during the periods of construction and decommissioning. The effect on access and public enjoyment is unlikely to be significant.

10.3 Employment

10.3.1 The development would create temporary employment opportunities for up to 60 personnel during the construction phase, with approximately two part time personnel during the operational phase.

10.4 Tourism

10.4.1 The effect of the proposed development on recreation and cultural heritage sites in the vicinity has been considered in terms of both visual amenity (Chapter 4) and cultural heritage (Chapter 6).

10.4.2 Several organisations have undertaken studies into the public and tourist perceptions of wind farm developments. The literature identifies that although wind farms will undoubtedly impact visually on landscapes, they have the potential to become informal tourist attractions and may increase landscape interest in their own right. In support of this, the British Wind Energy Association study's summary of findings states that only 8% of respondents felt that the presence of wind farms had impacted negatively on their impression of Argyll as a tourist destination (in comparison 43% believed that the presence of wind farms generated a positive effect).

10.4.3 A study by the Wales Tourist Board considered the effect of wind farms on tourism in a Welsh context. The study undertook surveys of businesses, organisations and individual tourists in Wales. The survey results indicated that the scenery, wild landscapes and unspoilt environment are all regarded as key strengths of Wales' tourism product. The WTB results also concur with the consensus position of the relevant literature on the topic in that only a small minority (2%) of respondents would be 'less likely to come back' to an area where wind farms exist.

10.4.4 National planning policy identifies areas within which larger scale wind farms should be located. The strategy is to concentrate the impact of wind turbines in a relatively small proportion of the country, in areas that are, on balance, environmentally better able to accommodate such impacts than other parts of Wales. These areas exclude the National Parks and Areas of Outstanding Natural Beauty in Wales, which may be regarded as particularly valuable for tourism.

11.0 ELECTROMAGNETIC INTERFERENCE, SHADOW FLICKER, AVIATION AND PUBLIC SAFETY

11.1 Electromagnetic interference

11.1.1 TAN 8 notes that one of the main characteristics displayed by the selected Strategic Search Areas (SSAs) is that they are largely unaffected by broadcast transmission, radar, MoD Wales Tactical Training Area (TTA) and other constraints. As recommended in TAN 8, the applicant has consulted radio communication operators in the UK. Of those who responded, none objected or had concerns at the proposal.

11.1.2 The quality of television reception may be affected by the operation of wind turbines and viewers may suffer loss of picture quality and acoustic interference. Where this occurs, it is of a predictable nature and can generally be alleviated by the installation or modification of a local repeater station or cable connection.

11.2 Shadow flicker

11.2.1 Supported by the English and Scottish planning guidance, it is considered that shadow flicker is not proven to occur at properties located at a distance greater than ten rotor diameters: in this case, 900m. Three properties lie within this distance, two of which (Rhyd y Biswal and Fuches Goch) are potentially affected by shadow flicker events for 90m diameter wind turbines. The worst case prediction total for the number of turbine hours per year of 67.4 hours when potentially affected by shadow flicker represents 0.04% of the total turbine hours per year for the whole wind farm. The mitigation proposed is to switch off the turbine when this effect is predicted to occur and, with this mitigation in place, there would be no residual impact.

11.3 Aviation

11.3.1 Organisations with aviation interests were consulted and, of those which replied, none objected.

11.4.2 The applicant commissioned NATS (En Route) Limited to undertake a technical assessment of the proposed wind farm. This assessment confirmed that the proposed development would have no impact on NERL navigational aids or on NERL air-ground communication systems and that NERL has no objection to the proposal.

11.4 Public access and safety

11.4.1 Construction activities are controlled by the *Health and Safety at Work, etc Act 1974* and subsequent statutory regulations, including the *Construction (Design and Management) Regulations 2007*, which are supplemented by best practice guidelines.

11.4.2 In terms of public safety, the wind farm is to be sited on private land, to which there is no general right of access. Nevertheless, the site is crossed by public rights of way and public access close to the turbines must be assumed. Wind farms have a proven track record for safety, which it is important to maintain. During the construction phase of the development, the relevant statutory requirements will be strictly adhered to and, from the planning standpoint, it is anticipated that a construction method statement will be required by condition imposed on the grant of planning permission. In particular, during construction, all potentially hazardous areas for public safety, such as excavations and electrical installation works, will be fenced in line with established methods of working. All unattended machinery will be stored in the secure site compound or immobilized to prevent unauthorised use.

11.4.3 During the operational phase of the development, no special precautions are considered necessary to preclude public access in the vicinity of the turbines. During decommissioning, similar considerations will apply as during the construction stage.

12.0 PLANNING POLICY

12.1 The relevant chapter of the ES sets out the planning policy framework within which the proposal should be considered, comprising:

- the current development plan
 - *Powys County Structure Plan (Replacement) 1991-2006*
- the national spatial plan
 - *People, Places, Futures: The Wales Spatial Plan 2008 Update*
- national planning policy guidance
 - *Planning Policy Wales*
 - *MIPPS 01/2005: Planning for Renewable Energy*
 - *TAN 8: Planning for Renewable Energy*
 - *The Energy Review Report 2006*
 - *One Wales*

- *Renewable Energy Route Map for Wales*
- *Positive Planning for Wales: Ministerial Speech, July 2008*
- *A Low Carbon Revolution, March 2010*
- the unadopted development plan
 - *Montgomeryshire Local Plan 1991-2006*
 - *Powys Unitary Development Plan 2001-2016*
 - *Powys Local Development Plan 2009-2025*
- local guidance
 - Local TAN 8 refinement study
 - *Interim Development Control Guidance.*

12.2 Consideration of the planning policy framework for the application leads to the following conclusions:

- The **development plan** permits the development of onshore wind farms subject to compliance with six criteria.
- **National planning policy** supports the development of onshore wind farms and the application site is located within an area designated expressly for that purpose.
- The **unadopted development plan** supports the development of on-shore wind farms subject to compliance with eight criteria.
- **Local guidance** has sought to refine the SSA and in doing so has reduced its footprint in the vicinity of the study area. The application site lies within the revised refined boundary adopted by Powys County Council for development control purposes.

13.0 CONCLUSION

13.1 The proposed wind farm is sited within an area (SSA B) that the Welsh Assembly Government has specifically identified as a suitable location for large scale (over 25MW) wind farms. Powys County Council has adopted a refined boundary for SSA B and the proposed wind farm is located within that area also. Reference to the relevant planning policy framework indicates that, subject to the consideration of detailed environmental criteria, the proposed wind farm should be acceptable.

13.2 This ES has assessed the potential significant environmental effects of the proposal and, where necessary, has proposed appropriate mitigation measures. As part of the EIA process the number of turbines proposed has been reduced (from 36 to 19) and the layout has been adjusted to take account of constraints, the most important of which is the remains of the stone circle, which is a scheduled monument. The proposed wind farm does not unacceptably impact upon any features of significance. Cumulative landscape and visual impacts, such as visual intrusion on settlements, valued landscapes and routes, have been assessed and found to be acceptable.

13.3 The proposed wind farm has the capability of generating up to 47.5MW of clean energy. It will assist in meeting the UK Government's and Welsh Assembly Government's target for renewable energy, particularly the increased target for 2015-17 recently announced by the Assembly Government, and will contribute to tackling the challenges posed by global warming and climate change.