Supplementary Planning Guidance for Wind Energy Proposals in Perth & Kinross

PERTH & KINROSS COUNCIL
Planning & Transportation

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Contents

Background

1 Introduction

1.1 There is a widespread consensus on the need to move towards sustainability in energy provision. Renewable energy technologies are diverse and, therefore, have very different effects upon the local environment. In Perth and Kinross, the renewable energy technologies that offer the greatest potential, at least in the short term, in addition to the existing large-scale hydro schemes, are wind energy, small-scale hydro and the use of forest residues.

1.2 Modern wind energy technologies and developments offer opportunities in supporting and developing the economy of Perth and Kinross to the benefit of its residents. However, the development of wind farms, especially on a large scale, may have significant local impacts on the environment. There is a need therefore, to examine the balance between the benefits and disadvantages of wind energy development. The purpose of this policy and guidance note is to enable the wind energy industry to expand, but not at the cost of the natural and built environment.

2 Scottish Context

2.1 The Scottish Executive supports the development of renewable energy as an integral part of the UK Government's climate change programme and to make an equitable contribution to the UK's obligation to reduce greenhouse gas emissions under the Kyoto Protocol. The UK target for electricity generation from renewable energy generation is 10% by 2010. The Scottish Executive's comparable target of 18% electricity generation from renewable energy sources by 2010, while seemingly higher, includes the contribution made by existing large-scale hydro schemes.

2.2 The Scottish Executive expects established technologies such as on-shore wind and hydro to play a major part in achieving the 18% target by 2010. Beyond that target, the Scottish Executive has an aspirational target of 40% of Scotland's electricity generated from renewable sources by 2020. However, it is of the view that the cumulative impacts of on-shore wind farms, coupled with the scarcity of suitable remaining sites for large-scale hydro, make it unlikely that Scotland could achieve this target on these technologies alone. Instead, it considers that if Scotland is to exploit its renewable energy future to the full, there is a need to promote the development of new technologies such as off-shore wind, biomass, wave and tidal power.

3 National Planning Guidance

3.1 Scottish Executive Planning Guidance is given in NPPG 6 – Renewable Energy Developments published in late 2000. This seeks to ensure that the planning system *"plays a full part by making positive provision for such developments",* and importantly ensures that *"development control decisions are taken efficiently, consistent with national and international climate change policy commitments and obligations",* while at the same time ensuring that the environment and local communities are protected from inappropriate developments in inappropriate locations.

3.2 With regard to wind energy developments, NPPG 6 recognises that the following issues need to be considered and where appropriate addressed. These relate to:

- Visual impact
- Landscape
- Birds and habitats
- Other considerations (these are dealt with in more detail in PAN 45 - Renewable Energy Technologies)

3.3 NPPG 6 also makes it clear that the Development Plan should set out the criteria against which developments will be assessed. This can also include guidance on a broad area of search where wind energy developments are likely to be permitted.

4 The Wind Resource in Perth & Kinross

4.1 The UK has one of the windiest climates in Europe, and it has been calculated that wind energy could theoretically supply more energy than the current UK demand for electricity. However, for practical reasons this resource could not all be exploited. Significant areas of Perth & Kinross have mean annual wind speeds in excess of 7 metres per second (m/s), which is considered suitable for commercial wind energy generation. Less windy areas may become commercially attractive in the future but are currently attractive only to smaller schemes for community or individual use.

4.2 The wind resource was modelled at a resolution of 1km^2, 'cell' forming the unit of analysis. While not a definitive guide to the wind resource of the area, it gives a reasonable indication to those areas likely to be of most interest to developers. The wind speeds are notional averages for each 1 km square – in practice there are likely to be significant differences in wind speed within any one square. From this it is estimated that some 2798km^2 (around 50%) of Perth and Kinross has a wind speed greater than 7m/s and gives the 'technical' resource. However, the area available is reduced by the application of a number of technical, environmental and social constraints. With the constrained areas removed it is estimated that the available area remaining is some 757km^2 or some 14% of the land area of Perth and Kinross.

5 Commercial and Community Wind Energy Schemes

5.1 Wind energy proposals vary considerably from single, small turbines to major wind farms covering several square kilometres. There is an important distinction to be made between developments that are primarily intended to service a local demand or need (e.g. for an individual household, farm, business, institution or community co-operative) and those that are primarily intended to supply electricity to the national distribution network – and meet the Executive's renewable energy targets. Although there is no mechanism in planning law to distinguish between types of development on the basis of who it is for, or to whom it belongs, in practice, the different scales of these proposals allow a distinction to be made in terms of planning policy; generally, it is expected that proposals for local users will be for small-scale schemes (in terms of numbers, size of turbines and output), which are likely to

be much more acceptable visually, even in areas which may be sensitive to large wind farms. This is in line with the Structure Plan Environment and Resources Policy 14 which gives specific support to community based renewable energy schemes. However, it is accepted that there will also be schemes which are largely 'commercial' in nature but may have community involvement through an equity stake or even a number of large turbines being owned by the community but part of a commercial development

5.2 Locally owned wind turbines, whether as individual installations or as clusters, offer communities, co-operatives, small businesses and families the opportunity to harness the wind, and thereby generate electricity, protect the environment and stimulate the local economy. Community based wind clusters can therefore provide a good rural development tool as they can help alleviate fuel poverty when combined with affordable housing schemes, provide an extra source of income which is particularly significant in rural areas and provide some employment opportunities.

6 Policy and Guidelines

6.1 In response to the above the Council has developed this Policy and detailed Policy Guidelines. It has undertaken considerable public consultation with the draft document published in June 2004 and again in December 2004. The Council has adopted the following policy and guidelines as a material consideration in its determination of wind energy proposals and in its consideration of proposals submitted under S36 of the Electricity Act. It is our intention to incorporate the Policy and Guidelines into Local Plans as they are reviewed.

6.2 It should also be noted that there are a number of policies contained in the Structure and Local Plans which are of relevance when considering proposals for wind energy developments.

Part 1

Policy

Perth & Kinross Contribution to National Target

7.1 The Council wishes to contribute to the Scottish Executive's target of providing 40% of Scotland's electricity from renewable sources provided that the impact on amenity, landscape, archaeology, habitats is managed by ensuring the most sensitive locations are avoided; nonetheless, it recognises that the most significant constraint on development is the landscape or visual impact of proposals and does not propose an absolute ceiling on wind energy generating capacity in Perth & Kinross unless there are major impacts on landscape character.

7.2 The Council recognises that the 2020 target is an ambitious one and that its policy guidance will need to be kept under review as new renewable energy schemes and other renewable energy technologies come forward.

Wind Energy Policy 1

The Council will encourage the development of commercial wind energy schemes which assist in achieving the Scottish Executive's target of electricity generated from renewable sources by 2010 and also community wind energy schemes to provide local electricity needs in locations least damaging to landscape character, amenity, habitats, and species in Perth & Kinross as shown in Diagram 1. In the period to 2010, the Council will look favourably on those schemes within the 'Broad Area of Search' which meet the criteria set out in the Council's Wind Energy Policy Guidelines.

The Council will work, in conjunction with public agencies and the private sector, to ensure that Perth and Kinross makes an appropriate contribution to meeting the Scottish Executive's 40% aspirational target of electricity generated from all renewable sources by 2020. The contribution to be made in Perth and Kinross to this target will be subject to a later review as wind energy schemes are implemented and other technologies come forward

Commercial and Community Wind Energy Schemes

7.3 The policy makes a distinction between two types of wind energy development which require different policy responses; **community schemes** and **commercial schemes**. The classification below is used within the following policy:-

Table 1: Scale of development

Type	Scale	Example
Community	Domestic	single small turbine (typically up to 7m to hub height, and blade diameter of 4 m)
	Single	Single 'standard' turbine (typically more than 20m to hub height and blade diameter more than 20m)
	Cluster	2-5 turbines (typically no more than 30m from ground to blade tip) in a single installation
Commercial	Cluster	2-5 turbines (up to 120m from ground to blade tip) in a single installation
	Wind Farm	6 or more turbines (up to 120m from ground to blade tip) in a single installation

Locational Policy

7.4 The Broad Area of Search shown in Diagram 1 should be used in conjunction with the Council's detailed policy guidance on Wind Energy Developments. Policy 2 below gives an indication of the type(s) of wind energy developments that may be acceptable within the Broad Area of Search and Strategically Sensitive Areas. Table 2 shows the 'sensitivities' used to define the Strategically Sensitive Area.

Table 2: Sensitivities Used to Define Strategically Sensitive Area

Interest	**Sensitivity**
Landscape	National Scenic Areas, Historic Gardens and Designed Landscapes, Perth Green Belt, Areas of Great Landscape Value,
Biodiversity	Natura 2000 Sites, Ramsar Sites, National Nature Reserves, Sites of Special Scientific Interest, Annex I Habitats (active raised bogs, blanket bog, degraded raised bogs, Upland Heath, Montane (key habitats from Tayside Biodiversity Action Plan)
Aviation	Airport consultation zones, communication, navigation and surveillance (CNS) systems consultation zones

7.5 Amongst the key habitats identified in the Tayside Biodiversity Action Plan are Upland Heath and Montane (habitats above the tree line) which contain extensive areas of peat bog. As well as being sensitive habitats in their own right, these areas are carbon sinks and also represent some of Perth and Kinross' more remote and wild parts where any built development would be an intrusion into the area where there are few human-made structures.

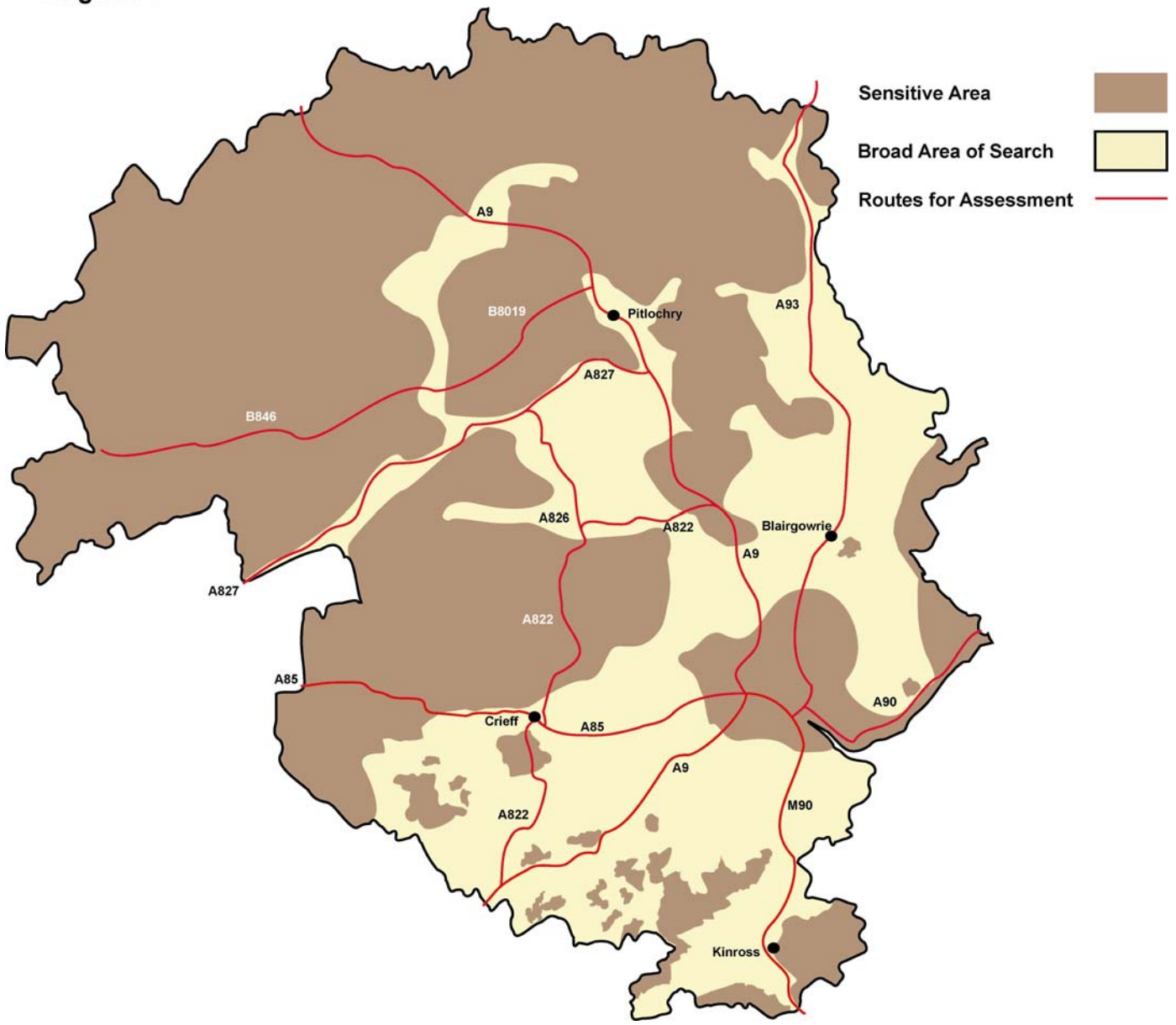
Wind Energy Policy 2

In the **Broad Area of Search**, Community and Commercial wind energy developments (see Table 1) will be supported where they would be consistent with the Council's detailed Policy Guidelines and it has been demonstrated that they utilise turbines of a size and a scale appropriate to their location, are in locations least damaging to settlements, landscape character, visual amenity, habitats, and will not have unacceptable cumulative impacts.

Within the **Strategically Sensitive Area** there is a presumption against wind energy developments unless it has been demonstrated that they utilise turbines of a size and a scale appropriate to their location, are in locations which will have a slight or no significant impact on settlements, landscape, character, visual amenity, habitats, will not have unacceptable cumulative impacts and would be consistent with the Council's detailed Policy Guidelines. Community schemes as defined in Table 2 will be supported where they meet the criteria in the Council's detailed Policy Guidelines.

All wind energy proposals should be subject to a detailed environmental assessment covering matters included in the Council's detailed Policy Guidelines.

Diagram 1



Part 2

Detailed Policy Guidelines

1 Introduction

1.1 Diagram 1 in the Council's Policy only establishes the principle that an individual wind energy proposal may be acceptable within the Broad Area of Search and the Strategically Sensitive Areas. It will still be necessary to consider the proposal at the chosen location against the detailed guidance below and whether there may be any cumulative impact with other proposals.

1.2 The detailed guidance covers the following matters: landscape impacts; visual impacts; cumulative landscape and visual impacts; biodiversity; cumulative ornithological impacts; operational impacts; water resources; aviation interests; carbon sinks; decommissioning and re-instatement; and the protection of wind energy developments. The guidelines provide:

- the **objective** for individual policy guidelines
- detailed guidance on the **interpretation** of the guidelines
- the design measures which would help **mitigate** the impact
- an indication of how proposals for either planning applications or S36 applications should be **evaluated** against the guidelines

1 Guideline 1 - Landscape Impact

1.1 Perth & Kinross is endowed with a wide variety of landscapes of great beauty including high mountains, lochs, glens, and straths as well as large areas of less dramatic but most attractive lowland countryside including farm land and a large number of Historic Gardens and Designed Landscapes. The landscape impact of wind farm development is likely to be the greatest concern, due in part to the scale of large turbines, particularly their impact on the most sensitive landscapes and when viewed by large numbers of people. Accordingly:-

Guideline 1 - Landscape Impact

Objective:

To avoid significant adverse impacts on landscape character in Perth and Kinross

Policy Guideline

Wind energy proposals will be encouraged except in locations where they will have a substantial or moderate adverse impact on landscape character which cannot be mitigated. A commercial or community wind farm or cluster is unlikely to be acceptable on prominent ridges, hills or sensitive skyline locations in or within 5km of any of the sensitive locations listed below unless it is demonstrated to the satisfaction of the Council that the impact will be slight or not significant.

Design measures

Effects on landscape character can be minimised by use of appropriate:

- Siting in relation to other wind farms
- Selection of appropriate landscape
- Size of turbine
- Number of turbines
- Location of turbines in relation to landform and landscape characteristics
- Positioning of turbines in relation to other turbines
- Siting and design of tracks, borrow pits, buildings and any power lines
- Colours and finishes
- Reinstatement

Evaluation

Effects on landscape character will be evaluated in accordance with current best practice (issued by e.g. the Landscape Institute or SNH). The Tayside Landscape Character Assessment and more recent guidance should be used to inform the assessment. It will be particularly important to assess effects, both positive and negative, on the pattern and scale of

the existing landscape and on the following sensitive receptors:

- National Scenic Areas
- National Parks
- Historic Gardens and Designed Landscapes
- Perth Green Belt
- Areas of Great Landscape Value
- The views from major tourist routes (M90, A826, A822, A827, A85, A9, A93, B8019, B846) as shown on Diagram 1
- The views from popular public or representative viewpoints and paths as agreed with the Council
- Settlements

Visualisations such as photomontages used to assist in the assessment of developments should use a full image size of A4 or A3 for a single frame picture, giving an image height of approximately **20 cm** to give a realistic impression. Levels of impact significance should be used to standardise results of the assessment. Definitions of the levels of impact significance are described as follows:-

Evaluation of Level of Significance for Landscape Impacts

Loss of existing beneficial components or introduction of new inappropriate components	**With High Landscape Sensitivity**	**With Moderate Landscape Sensitivity**	**With Low Landscape Sensitivity**
Dominant landscape component (adverse or beneficial)	Substantial	Moderate	Slight
Clearly discernible landscape component (adverse or beneficial)	Moderate	Slight	No significant impact
Small or negligible landscape component (adverse or beneficial)	Slight	No significant impact	No significant impact

2 Guideline 2 - Visual Impact

2.1 In some locations, aspects of local visual effects may be as important as wider landscape considerations, and wind energy developments should not dominate significant surrounding features. Turbine height is important, both for the distance over which a development might be visible, and also the potential dominance of such large structures to people and buildings close to them, although dominance is not just a question of height, but also of the relative angle of elevation. This depends not only on the turbine, but also on the local topography. Dominance is not necessarily a problem in itself, but it can become oppressive when it affects residential or other high occupancy buildings and locations. A further aspect of dominance is the effect created by placing turbines adjacent to or on another significant element in the landscape. The turbines may then appear to 'dwarf' a historic building or landmark, or to 'shrink' a local hill or range of hills. It is suggested that these and other issues may be addressed by keeping turbines a distance of at least the equivalent of 20 height to blade tip (hbt) lengths away from buildings and other sensitive locations to protect their setting where no assessment has been made to satisfactorily demonstrate the impact into their effect on the available views or changes in visual amenity of the visual receptors. Accordingly:

Guideline 2 - Visual Impact

Objective:

To avoid significant visual impacts on houses or settlements, locally prominent or valued landforms and locally prominent buildings or Scheduled Ancient Monuments

Policy Guideline

Wind energy proposals will be encouraged except in locations where they will have a substantial or moderate adverse visual impact which cannot be mitigated. A commercial or community wind farm, cluster or turbine is unlikely to be acceptable within 20 times the height to blade tip of: houses and settlements, locally prominent landforms, Scheduled Ancient Monuments, significant archaeological sites and their settings, Conservation Areas and Listed Buildings where no satisfactory assessment has been undertaken and where it has not been demonstrated, to the satisfaction of the Council, that the visual impact will be slight or not significant. Domestic-scale turbines will normally be acceptable beside existing buildings where visually and functionally related to and in proportion with them.

Design measures

Visual impact can be minimised by use of appropriate:

- Siting of the wind farm in relation to significant receptor locations
- Size of turbine

- Number of turbines
- Positioning of turbines in relation to sensitive receptors
- Positioning of turbines in relation to other turbines
- Siting and design of buildings and any power lines
- Colours and finishes

Evaluation

Impacts on visual amenity are clearly distinguished from, although closely linked to, impacts on landscape character. Visual impacts relate to the quality of what people see from places they frequent or live.

Evaluation of Level of Significance for Impacts on Visual Amenity

Magnitude of Visual Change	**With High Visual Sensitivity**	**With Moderate Visual Sensitivity**	**With Low Visual Sensitivity**
Dominant (adverse or beneficial)	Substantial	Moderate	Slight
Discernible (adverse or beneficial)	Moderate	Slight	No significant impact
Small or negligible (adverse or beneficial)	Slight	No significant impact	No significant impact

In assigning levels of significance, the evaluation should take account of the number of viewers affected. If many viewers will be affected the level of significance would usually be higher than otherwise expected; if few viewers are affected it would be lower. It will be particularly important to assess effects on:

- Houses and settlements
- The setting of locally prominent landforms which contribute to the character of the locality (e.g. the Knock at Crieff, Craig a Barns at Dunkeld)
- The setting of locally prominent and or valued buildings, including Listed Buildings, which contribute to the character of the locality
- The setting of Scheduled Ancient Monuments and significant archaeological sites
- The character and setting of the National Parks

3 Guideline 3 - Cumulative Landscape and Visual Impacts

3.1 Cumulative impact is a complex and variable issue which will be increasingly relevant to the assessment of wind energy schemes as more developments are proposed in the parts of Perth & Kinross with the best wind resource and fewest technical constraints – and as developments are approved in neighbouring local authority areas.

3.2 The approach to be adopted in relation to cumulative impact is to ask whether a proposal or proposals will merely create a new feature within a landscape which otherwise retains its essential characteristics, or whether, by virtue of the presence of other wind energy developments in the area, the new proposal(s) would lead to a fundamental change in the character of the landscape. Thereafter, an assessment has to be made on whether that change is acceptable in planning terms.

3.3 There are three potential thresholds.

1. The first is when there are a number of visible turbines which are isolated features within a landscape, i.e. *there is a wind energy development in this landscape*
2. The second is when the number of visible turbines reaches a point where a wind energy development becomes a significant characteristic of that landscape, i.e. *this landscape contains a number of wind energy developments*
3. The third is when the number of developments is such that they become the dominant characteristic by which the landscape would be described, i.e. *this is a wind energy landscape*

3.4 Cumulative impacts begin at Stage 2. It may or may not be adverse, depending on the landscape in question. The visual influence of a wind energy development will vary according to whether it is a single turbine, a cluster, or a large wind farm. Assuming reasonably clear visibility then large wind turbines:

- May appear visually dominant up to 2km (this effect can be enhanced if they are sited on a hill, or are seen from a lower viewpoint, or if they are the focal point of a vista)
- They may be noticeable and intrusive in many situations up to 5km
- They may be noticeable when the blades are turning at distances of up to 15km in clear weather and can just be seen by the naked eye at over 20km. At such distances their visual impact tends not to be significant in the wider landscape.

3.5 The frequency with which wind farm developments are seen while travelling through a landscape will affect the perception of the landscape as a whole, even if only one development is noticeable at any given moment. The required cumulative impact assessment should take into account:

- The importance and frequency of use of sites (i.e. their sensitivity)
- The duration of the views of the various developments (having regard to landscape character)
- The extent to which more than one development is visible at the same time

- The extent to which, taken together, a significant proportion of resident and visitor experiences will be significantly changed should be summarised in the assessment.

3.6 Cumulative effects may also be judged unacceptable on the basis of incompatibility in design between windfarms in the same vicinity. While two windfarms of similar design on adjacent hills may be judged acceptable in landscape terms, two windfarms which contrast in size, turbine height, or layout may give rise to a visual conflict and be judged unacceptable. This may be so even if either of the designs would be suitable if replicated on both. This same issue is likely to arise frequently in relation to proposals for windfarm extensions, where because of progress in turbine technology, developers may favour larger turbines in a more widely spaced array for the proposed extension than were utilised in the original development. Accordingly:-

Guideline 3 – Cumulative Landscape and Visual Impacts

Objective:

To avoid unacceptable significant cumulative visual and landscape impacts both within and outwith Perth & Kinross

Policy Guideline

Wind energy proposals will be encouraged except in locations where there they have a substantial or moderate adverse cumulative impact on important receptors. A commercial or community wind farm, cluster or turbine when located within 40 km of another is unlikely to be acceptable where it has not been demonstrated, to the satisfaction of the Council, that the cumulative landscape and visual impact will be slight or not significant. The Council will encourage developers to co-operate over the exchange of information, where cumulative assessment has been identified as important and is needed in order to make such assessments.

Design measures

Impacts can be minimised by:

- Positioning of the wind farm and turbines in relation to landscape character and surrounding landform and other wind farms
- Positioning of turbines in relation to other turbines and wind farms
- Siting and design of the windfarm in relation to power lines
- Colours and finishes

Evaluation

It will usually be appropriate to undertake cumulative impact assessment where proposals are within 40 km of each other. The assessment should be limited to those proposals which are constructed, approved, submitted for scoping, Section 36 application or as a planning application. Cumulative visual effects should be evaluated in accordance with current best practice. It will be particularly important to assess effects on:

- The views from major tourist routes (M90, A826, A822, A827, A85, A9, A93, B8019, B846) as shown on Diagram

1

- The views from popular public viewpoints
- Settlements

The duration, frequency and nature of combined and sequential views (glimpses or more prolonged views; oblique, filtered or more direct views; time separation between sequential views) should be assessed (see paragraphs 12.3 -12.6 above)

4 Guideline 4 - Impact on Biodiversity

4.1 Large parts of Perth & Kinross have been given statutory protection because of their nature conservation interest and these designations are likely to impose constraints on the location of wind turbines and wind farms. These designations include: Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Ramsar sites. In addition, the size and depth of the foundations may have implications for ground water and aquatic habitats generally.

4.2 There is speculation about the particular risks to birds from wind turbines. The evidence to date would seem to suggest that the hazard to birds is no greater than other tall installations, although the cumulative impact of wind turbines on bird populations is an issue that needs to be considered (see Guideline 5).

4.3 Wind energy developments, by virtue of their scale, preferred location and construction, may impact on biodiversity to a significant degree. Accordingly:-

Guideline 4 – Biodiversity

Objective:

To avoid significant adverse effects on biodiversity and in particular those sites or species identified as being of international or national importance

Policy Guideline

Wind energy proposals will be supported except in locations where they would have a significant adverse impact on biodiversity. In instances where there is uncertainty about the potential impact, a precautionary approach will be adopted. Where impacts can be mitigated, a Section 75 Agreement may be required to ensure habitat enhancement work is undertaken elsewhere to mitigate for habitat loss or loss of raptor hunting ground at the wind farm area.

Design measures

Impacts can be minimised by use of appropriate:

- Windfarm design
- Siting in relation to significant habitats or species
- Siting in relation to other wind farms
- Positioning of turbines in relation to significant habitats or species
- Size of turbine
- Number of turbines
- Siting and design of tracks, borrow pits, buildings and any power lines

Evaluation

Effects on biodiversity can be evaluated in accordance with current best practice and in consultation with SNH or RSPB. It will be particularly important to assess effects on:

- Natura 2000 sites
- Ramsar sites
- National Nature Reserves
- Sites of Special Scientific Interest
- Species of national or international importance not already designated
- Important non-designated habitats and species identified in the Tayside Biodiversity Action Plan

5 Guideline 5 - Cumulative Ornithological Interests

5.1 The assessment of cumulative effects on birds is a complex and specialised process. It is likely that only species considered to be of high conservation value or vulnerable to wind farms by virtue of their behaviour will be considered. A cumulative assessment can apply at a number of levels, for example:

- an individual pair, or birds occupying a single breeding site;
- the qualifying interest of a Special Protection Area
- a regional or local population
- a national population

5.2 In some instances, assessing cumulative effects on a national population may require widespread consideration of wind farm developments nationally, and this would normally be too onerous a task to expect of a developer of a proposal which on its own may be unlikely to have more than a marginal effect. The assessment of impacts on national populations is likely best undertaken by SNH or RSPB and would not be required in the context of assessing a single proposal. Accordingly:-

Guideline 5 - Cumulative Impact on Ornithological Interests

Objective:

To avoid unacceptable significant cumulative impacts both within and outwith Perth & Kinross on ornithological interests

Policy Guideline

Wind energy proposals will be encouraged except in locations where they have a significant adverse cumulative impact on birds. A commercial or community wind farm, cluster or turbine is unlikely to be acceptable where it has not been demonstrated, to the satisfaction of the Council, that the cumulative impact on birds will be slight or not significant. Where there is uncertainty about the potential impact, a precautionary approach will be adopted.

Design measures

Impacts can be minimised by use of appropriate:

- Size and number of turbines
- Positioning of turbines in relation to other turbines and wind farms
- Siting and design of the windfarm in relation to power lines
- Technical and operational controls

Evaluation

It will usually be appropriate to undertake cumulative impact assessment where it is advised by SNH or other appropriate

body that there may be significant cumulative impacts on ornithological interests. The assessment should be limited to those proposals which are constructed, approved or submitted. It will be particularly important to assess effects in relation to breeding areas, roosting grounds and flightlines in consultation with SNH and RSPB or other appropriate body.

6 Guideline 6 - Operational Impacts

6.1 Wind energy developments may cause impacts on people by virtue of their location and operation in proximity to buildings or settlements. Noise associated with wind turbines is perceived by the public as an issue, and in quiet rural areas such levels of noise may give rise to local concern. Wind turbines may, if not carefully assessed in relation to noise impacts, be sited such that their operation leads to noise disturbance and in certain circumstances be an issue at some distance from the site. This, to some extent, depends on the turbine design. *"There are two sources of noise from wind turbines; the mechanical noise from the turbines and the aerodynamic noise from the blades. Mechanical noise can be reduced through engineering design. Aerodynamic noise depends upon rotor speed which varies with wind speed. Noise from the wind normally increases at a faster rate than the turbine noise. This means that aerodynamic noise of wind turbines is generally greatest at low speeds. However, in sheltered positions where "wind shadow" occurs, such as in leeward valleys, existing noise levels may remain low when turbines on adjacent higher ground are operating at higher wind speeds. Equally, noise levels at properties affected by prevailing winds may well be greater than in other areas. Good acoustical design and siting of turbines is essential to ensure there is no significant increase in ambient noise levels as they affect the environment and any nearby noise-sensitive property".* (PAN 56)

6.2 Currently there is some speculation that low frequency sounds can be an issue and research is currently being undertaken for DEFRA, with the results of the research expected to be published later this year.

6.3 Shadow flicker is caused by a low sun behind the rotating blades of a turbine. The shadow created by the rotating blades can cause alternating light and dark shadows to be cast on roads or nearby premises, including the windows of residences, resulting in distraction and annoyance to the residents. A related phenomenon, strobe effect, is caused by the chopping of sunlight behind moving blades, similar to the effect of the setting sun behind trees when driving along a roadway in the winter. Both of these phenomena are factors in the visual impact of a wind turbine project, and they could also be considered a nuisance to nearby property owners. However, it is possible to predict the effects of shadow flicker on sensitive locations, such as roads or dwellings around proposed developments. The potential for shadows to affect locations are site-specific, and depend on prevailing wind patterns among other factors. Developers can use software during the site planning process to avoid possible problems. It is estimated in PAN 45 that a separation distance of 10 rotor diameters should be sufficient to ensure that there is no problem. Nonetheless, shadow casting can be a problem in situations where turbines are sited very close to workplaces or dwellings.

6.4 In general, the construction impact of a wind farm development will be no different to that of developments of a similar size and are of a limited duration. However, it will be important to ensure that the impact of construction and construction traffic on people is minimised.

6.5 Wind turbines can theoretically interfere with television reception, mainly where a viewer is in the 'shadow' of the wind turbines and their aerial is pointing through the wind farm. The television signal can bounce off the wind

turbines causing loss of picture detail, loss of colour or buzz on sound. Viewers situated to the side of the wind farm may experience a delayed image or 'ghost' on the picture, liable to flicker as the blades rotate. In some cases a wind farm may also affect the re-broadcast link (RBL) feeding the transmitter. In practice these problems can usually be solved and the advent of digital services is expected to improve matters. Wind farms can also theoretically interfere with other types of transmission. Microwave links can be affected but if a clearance distance of between 30 to 200m is set between the 'boresight' of the link and any turbine, problems are unlikely to arise. Accordingly:-

Guideline 6 - Operational Impacts

Objective:

To avoid significant effects on residential amenity in terms of noise, shadow flicker, construction traffic, and electromagnetic interference from wind energy developments

Policy Guideline

Wind energy proposals will be encouraged except in locations where it has been assessed that there would be a significant adverse impact on the amenity of any dwelling within 20 hbt distance of a turbine, which cannot be mitigated, or where no assessment, satisfactory to the Council, has been made of the effects of noise, shadow flicker, construction traffic, and electromagnetic interference. Planning conditions or agreements will set:

- **appropriate noise levels and require a post construction noise monitoring survey (where sensitive residential receptors have been identified),**
- **traffic management plans where appropriate, and**
- **correction of any electromagnetic interference at the developer's expense.**

Design measures

NOISE EFFECTS can be minimised by use of appropriate:

- Turbine positioning and separation distances from residential properties
- Turbine specification
- Technical controls

SHADOW FLICKER can be minimised by appropriate:

- Turbine positioning in relation to residential properties and low sun positions
- Separation distances from residential properties

CONSTRUCTION TRAFFIC EFFECTS can be minimised by use of appropriate:

- Routeing

- Timing
- Management and co-ordination
- Community liaison and communication
- Road infrastructure improvements

ELECTROMAGNETIC INTERFERENCE effects can be minimised by appropriate:

- Turbine siting in relation to telecoms systems
- Technical solutions
- Provision of alternative services (eg cable or satellite television)

Evaluation

For the purposes of the assessment, and unless demonstrated to be otherwise, background noise levels in rural areas are assumed to be as shown in the table below:

	Wind Speed (m/s)						
	4	**5**	**6**	**7**	**8**	**9**	**10**
Background dBA	24	25	27	29	31	33	35

The loss of amenity from noise will be assessed on the following basis:

- A difference of 3dB or less – insignificant
- A difference of 4 to 6 dB – marginal loss of amenity
- A difference of 7 to 9dB – significant loss of amenity
- A difference of 10dB or more – major loss of amenity

Shadow flicker will be assessed by means of mathematical modelling.

Construction traffic will be assessed in accordance with Traffic Impact Assessment guidelines.

Electromagnetic interference will be assessed by means of consultation with relevant operators.

7 Guideline 7 - Water Resources

7.1 Wind turbines require a substantial concrete base together with a track network and these have the potential to affect the hydrology of an area. Consequently, potential impacts on local hydrology in general and on water abstraction and private water supplies in particular need to be identified together with the protective/preventative measures proposed. Methods for achieving this should be included in the Environmental Statement together with contingency plans for ensuring that private water supplies are maintained. Accordingly:-

Guideline 7 Water Resources

Objective:

To avoid significant effects on ground and surface water resources, and specifically on drinking water supplies and their catchments

Policy Guideline

Wind energy proposals will be encouraged except in locations where there is likely to be a significant adverse impact on the water environment generally and water supplies in particular and where such unacceptable adverse effects cannot be mitigated to the satisfaction of the Council. Where appropriate, measures which mitigate any identified adverse effects on groundwater will be incorporated into a planning condition.

Design measures

Impacts can be minimised by use of appropriate:

- Turbine positioning in relation to water courses or aquifers and in relation to significant habitats or species dependent upon ground and surface waters
- Appropriate separation distances from water courses and significant receptors during construction
- Siting and design of tracks, borrow pits, buildings and any power lines
- Provision of alternative water supplies where appropriate

Evaluation

Effects on ground and surface waters can be assessed using current best practice provide by SEPA.

It may be necessary to undertake a hydrogeological study to establish the long-term impact of the proposal on ground and surface waters.

Information should be provided on the number and location of private water supplies

Any study or assessment required should examine at the following unacceptable effects:

- Harm to human health;
- Harm to the quality of aquatic ecosystems or terrestrial ecosystems dependent on groundwater;

- Impairment or interference with amenities or other legitimate uses of the environment; and
- Entry of List I substances and no pollution by List II substances in terms of the Groundwater Directive (80/68/EEC) and national legislation which implements it.

8 Guideline 8 - Aviation

8.1 There are basically two ways in which the construction of a wind turbine or wind farm may impact on aviation operations:

- The physical obstruction caused by a tall structure; and
- The effects that the supporting structure and rotating turbine blades can have on communications, navigation and surveillance (CNS) systems (including radar) and other equipment.

8.2 There is therefore a need to safeguard aviation interests against developments which would impact on the safe use of aerodromes (Dundee, Edinburgh, Leuchars and Portmoak) or CNS systems (Perth DVOR at Perth Airport). In addition to the hazard posed to aircraft in approaching or departing from an airfield, wind turbines can also pose a more general potential danger to aircraft flying at low level for other reasons. Accordingly:-

Guideline 8 – Aviation Interests

Objective:

To avoid unacceptable impacts and to ensure the safe use of airports, aerodromes/airfields and to protect aviation interests

Policy Guideline

Wind energy proposals will be encouraged except in locations where they would have a significant adverse effect on the safe use of airports and aerodromes/airfields (Dundee, Edinburgh, Leuchars, Perth or Portmoak) or on communications, navigation and surveillance (CNS) systems (including radar and other equipment including the air navigation beacon (Perth DVOR)) at Perth Airport.

Design measures

Impacts can be minimised by use of appropriate:

- Windfarm location in relation to aviation interests
- Turbine height and positioning in relation to aviation interests

Evaluation

Effects on aviation interests can be assessed using current best practice in consultation with CAA, MOD and NATS.

9 Guideline 9 - Maintaining 'Carbon Sinks'

9.1 Blanket bog is one of the most extensive semi-natural habitats found on land in the UK and is common on upland parts of Perth & Kinross in areas of search for wind farm locations. These bogs act as 'carbon sinks', holding carbon dioxide (CO_2). There is currently speculation regarding the interaction of CO_2 fixed within peat bogs and wind energy developments. However, assuming windfarms displace electricity generated by coal-fired generation, then they 'pay' for any carbon loss through development on peat in 1-20 years.

9.2 The critical question is the extent to which the hydrology of the bog is affected by the windfarm development. Careful attention to the design and construction of the windfarm is required. If access tracks can in be 'floated' on the bog, then it is likely that the disturbance to the hydrology will be minimal, but deeper foundations associated with the turbine towers have the potential to have more adverse impacts.

9.3 Given the level of uncertainty, it will be necessary for the developer to demonstrate that the proposed development will not adversely affect peat bogs nor negate any advantage gained from wind farm developments and the consequent reduction in carbon dioxide emissions from thermal power stations. Accordingly:-

Guideline 9 – Maintaining 'Carbon Sinks'

Objective:

To avoid unacceptable significant adverse effects from the release of greenhouse gas emissions from wind energy developments, including access tracks.

Policy Guideline

Wind energy proposals must demonstrate to the satisfaction of the Council that the erection of turbines, buildings and access tracks will not result in an unacceptable release of CO_2 from peat bogs.

Design measures

Impacts can be minimised by use of appropriate:

- Windfarm design and construction
- Turbine positioning
- Routeing of access tracks and means of their construction

Evaluation

An assessment of the net benefit or cost in terms of greenhouse gas emissions over the estimated lifetime of the development should be undertaken using current best practice as detailed in SNH's document 'Windfarms and Carbon Savings'.

10 Guideline 10 - Decommissioning and Site Reinstatement

10.1 The estimated life span of a wind farm is currently somewhere in the region of 25 years after which operators will review the viability of the plant. Should, however, it be desirable to re-power the site with new machines, this would be classed as a new development which would require a new planning application or S36 application and Environmental Statement (ES).

10.2 In those instances where the operator chooses to decommission the site, a mechanism needs to be in place to ensure that the turbines, associated structures, related tracks and power lines are removed, but leaving foundations in accordance with best practice. However, unlike most power generation projects, wind turbines can be decommissioned easily and rapidly. Despite this, developers still need to approach the issue of decommissioning responsibly. Normally the scrap value of the turbines themselves and associated cabling will be sufficient to cover the costs of their dismantling. However, consideration must be given to the setting aside of funds or the provision of a bond or similar mechanism over the life of the project in order to ensure there will be enough money available at the end of the project's life to pay for decommissioning and other reinstatement requirements.

10.3 A reinstatement plan should be submitted giving detailed proposals of how the developer would intend to restore the ground to its former condition together with an indication of the costs involved. This should be submitted with the application and updated on a regular basis with the finalised plan submitted at least six months before the site ceases to generate electricity. Accordingly:-

Guideline 10 – Decommissioning and Site Re-instatement

Objective:

To ensure the satisfactory re-instatement of the site after the permanent cessation of generation from the site

Policy Guideline

In order to ensure the satisfactory removal of hill tracks, turbine towers and blades, and any ancillary equipment associated including overhead power lines and pylons with the wind energy development a 'decommissioning statement' will be required at the time the proposal is submitted and it should be updated on a five yearly cycle and finalised at least 1 year before the cessation of generation from the site– this may be enforced by a condition or the use of a Section 75 Agreement. A financial bond or similar mechanism may also be required to ensure that the site can be reinstated.

Design measures

Proposals will be required to provide a 'decommissioning statement' to illustrate how the site will be re-instated when the development ceases

Evaluation

In order to determine the amount of money or the size of the bond required developers should demonstrate, to the satisfaction of the Council, the costs associated with the future restoration of the site and these should be made explicit in the Environmental Statement. The statement should make it clear whether the costs are estimated on the basis of current costs or future costs and whether the costs have been determined on a discounted or undiscounted basis. The developer should also identify significant uncertainties, assumptions and judgements made in determining restoration obligations.

An assessment of the cost should be undertaken using current best practice (for example the United Nations Environment Programme's Global Reporting Initiative Reporting Framework).

11 Guideline 11 - Protection of Wind Energy Developments

11.1 In view of the substantial investment involved in establishing a wind farm and in the need to ensure its efficient operation, it will be necessary to ensure that its ability to capture the wind is not compromised by new developments. Consequently, it will be necessary for the Council to ensure that operational or approved sites are protected from inappropriate development. Accordingly:

Guideline 11 – Protection of Wind Energy Developments

Objective:

To ensure the efficient operation of developed or approved wind energy sites

Policy Guideline

Development proposals, including forestry, within 30 hbt of existing or approved wind energy sites will need to demonstrate, to the satisfaction of the Council, that the proposed development will not have a detrimental effect on productivity of any existing or approved wind energy site. Any development which would have such an adverse impact will be unacceptable.

Design measures

Impacts can be minimised by:

- Careful design and location of new developments including forestry proposals

Evaluation

As wind energy is site specific it will be necessary for the impact on wind turbines to be established in consultation with the site operator to assess the impact of that proposal on wind capture. Developments greater than 10 metres high or developments between the turbine and the prevailing wind could create turbulence problems. Any assessment should consider the following:

- direction of the prevailing wind
- local landform and topography;
- vegetation including forestry and woodland planting; and
- other structures