

APPENDIX C

Report to:

Huntingdonshire District Council

**Cumulative Landscape and Visual Impact of
Wind Turbines in Huntingdonshire**

A Position Statement

prepared by

The Landscape Partnership

Final Draft May 2103

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1 INTRODUCTION

Purpose of the report

- 1.1 This report has been prepared by The Landscape Partnership on behalf of Huntingdonshire District Council, who commissioned a study in February 2013 to consider the cumulative impacts of wind turbines and the future capacity of the landscape to accommodate further wind turbines in the District. The study and report is a position statement to inform the officers and members of Huntingdonshire District Council. It evaluates the current cumulative situation and also proposes some guidance on potential criteria for the assessment of cumulative landscape and visual impacts arising from wind turbine proposals.
- 1.2 Cumulative effects have been defined in a generic sense as, *'impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together.'*¹
- 1.3 In terms of wind turbine development cumulative impacts have been defined as, *'the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together. In practice the terms 'effects' and 'impacts' are used interchangeably.'*²
- 1.4 It should be recognised that cumulative landscape and visual effects are just two aspects of a full range of issues that should be considered in relation to guiding a strategy for wind energy in Huntingdonshire and for any proposal for wind turbine development. The revised SPD should form the basis for assessing landscape sensitivity. The approach to a number of other issues is set out in Huntingdonshire District Council's 'Wind Turbine Developments – A Guidance Note for Applicants and Agents'. (Revised version June 2013)

Background

- 1.5 The current Huntingdonshire District Council SPD relating to wind turbines in the landscape is "Supplementary Planning Document: Wind Power" [Feb 2006]. This study was based on the landscape character units identified in an original assessment of Landscape Character Areas (LCAs) in the District that was carried out by LDA in 2002 [adopted in 2007]. The existing SPD Wind Power [2006] is also underpinned by the study "Wind Turbine Development in Huntingdonshire" prepared by Land Use Consultants in 2005. The capacities shown for each of the LCAs in the 2006 SPD were based on a situation where there were no existing wind

¹ Hyder (1999) *'Guidelines for the Assessment of indirect and cumulative impacts as well as impact interactions'*

² Scottish Natural Heritage (2012) *Assessing the Cumulative Effect of Onshore Wind Energy Developments*

turbine developments in HDC and therefore represented a projection based on best information and guidance available at the time.

- 1.6 Revisions are proposed to the 2006 SPD in the light of: changes in the planning system including the introduction of the NPPF, the new Local Plan and changes in the methodologies for assessing turbines. The Draft Revised SPD 'Landscape Sensitivity to Wind Turbine Development' (2012) offers guidance on siting and the potential capacity of each of the Landscape Character Areas to accommodate various scales of Wind Turbine Development: from a single turbine to a large scale group. The Draft SPD also indicates the cumulative landscape capacity within each landscape character area for each group size. The Draft Revised SPD "Landscape Sensitivity to Wind Turbine Development" has been subject to public consultation and is due for consideration in its post consultation state by Council Members in July 2013
- 1.7 The bulk of the text within the Draft Revised SPD concentrates on the capacity for turbines between 100m and 140m in height. However, additional general guidance is provided for the siting of turbines below 100m within Chapter 14 of the draft revised version. Further discussion about the cumulative aspects in the Draft SPD, are provided in Section 2 below.

Requirements for this study

- 1.8 Huntingdonshire District Council has identified an urgent need to provide a position statement which details the cumulative impacts of all operational and consented Wind Turbine Developments (WTDs) of all scales and turbine sizes, and an assessment of the remaining capacity within the LCA's and the District as a whole for WTDs. This independent position statement should focus on the cumulative landscape and visual impacts and in particular the remaining landscape capacity in each LCA and the district. The position statement should be compliant with the NPPF and relevant local policy.
- 1.9 The report will study the current cumulative effects of wind turbines in the district, and offer guidance to officers, members, developers and the general public on the capacity of local landscapes to accommodate further wind turbine development. Its analysis will be used in the consideration of potential cumulative impacts resulting from new wind energy proposals. The evidence it presents will support Huntingdonshire District Council's emerging local plan policies and the draft revised SPD "Landscape Sensitivity to Wind Turbine Development" and together with the "Guidance Note for Applicants and Agents" and the 2005 LUC Study "Wind Turbine Development in Huntingdonshire," it forms a suite of documents that inform these policies.

1.10 The study was identified to cover the following aspects:

- a) A review of existing renewable policy and the SPD by HDC together with the proposed Draft SPD : Landscape Sensitivity to Wind Turbine Development with regard to guidance on capacity and cumulative impacts
- b) The identification and plotting in GIS of all single turbine and wind farm developments in the District grouped into the following categories :
 - o operational
 - o consented but not built
 - o planning application or appeal stage
- c) The identification and plotting in GIS of all single turbine or wind farm developments within 10km distance from the district boundary.
- d) On site 'ground truthing' of the local context in Huntingdonshire and the current landscape and visual impacts of wind turbines and wind farms with particular reference to the sensitivity and capacity criteria in the existing and Draft Revised SPD.
- e) Review of selected recent appeal decisions in England where cumulative landscape and visual impact has been a consideration in allowing or dismissing appeals to provide some benchmarking criteria.
- f) Review of selected SPD's guidance from other LPA's for cumulative effect of wind turbines.
- g) Recommendations for assessing capacity and for considering current and future applications in HDC with regard to the cumulative landscape and visual impact.

1.11 The study provides a strategic overview of the current situation at a point in time. It also sets out a number of criteria which should be used as a guide to identifying and assessing cumulative effects. The recommendations are not to be interpreted as absolute in all respects. For each application there will still be a requirement for developers to undertake a detailed site based assessment of cumulative impacts including for any other consented wind turbine proposals and any others still 'in planning' at the time. Guidance for undertaking these studies is found at Section 5 of this report.

1.12 The findings of this report are not intended to replace the requirements of an Environmental Impact Assessment (EIA) under The Town and Country Planning (Environmental Impact

Assessment) (England and Wales) Regulations 1999 (as amended). Detailed consideration of a site may identify factors specific to that site which will need to be balanced alongside issues identified in this document.

2 POLICY AND GUIDANCE BACKGROUND

2.1 The report has considered government guidance and other studies including those carried out by and for local authorities on the cumulative impacts of wind turbines undertaken within England, Scotland and Wales. Selected Inspector decisions from public inquiries, where cumulative impacts have formed one of the main determining factors have also been included. Whilst each of these studies and inspectors' decisions must relate to the specific aspects of the landscape and views in which they are set, they do nevertheless provide 'benchmarking' on accepted approaches to considering cumulative impacts and the type of landscape and distances which are currently being considered to be acceptable or unacceptable. Creating a national picture of general principles can then be applied and related to the situation in Huntingdonshire to create a picture that is appropriate to the District.

National Planning Policy Framework (March 2012)

2.2 The key paragraphs in the NPPF relevant to the cumulative effect of WTD are 97 and 98 as set out below:

97 To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:

- *have a positive strategy to promote energy from renewable and low carbon sources;*
- *design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts;*
- *consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;*

98. When determining planning applications, local planning authorities should:

- *not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy and also recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*
- *approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.*

National Policy Statements for Energy EN1 and EN3 (both July 2011)

- 2.3 Para 97 also refers to EN1 and EN3 as being relevant considerations. National Policy Statements EN1 and EN3 were primarily produced to advise on large energy infrastructure projects (> 50MW). However, the NPPF advises that local planning authorities should follow the approach in these documents and for this reason they are still relevant. However EN1 and EN3 do not include any specific guidance on cumulative landscape and visual effects. However EN1 does state at para 5.9.19, *It may be helpful for applicants to draw attention, in the supporting evidence to their applications, to any examples of existing permitted infrastructure they are aware of with a similar magnitude of impact on sensitive receptors. This may assist the IPC in judging the weight it should give to the assessed visual impacts of the proposed development.* This would seem to support the use of other schemes where there may be cumulative impact issues to 'benchmark' any cumulative landscape and visual impact.

PPS22 Renewable Energy – A Companion Guide (2004)

- 2.4 The PPS 22 Companion Guide remains an extant document. The companion guide provides practical advice as to how the policies originally set out in PPS22 could be implemented, and the retention of the companion guide indicates that this advice is still pertinent. Section 4 states in regard to key issues in planning for renewables at the local (District) level ,

'4.5 Local planning authorities have an important role to play in the implementation of appropriate renewable energy schemes. Both as policy-makers and as more direct agents of change, they have the opportunity to engage with local communities and to achieve real progress towards national and regional targets.

4.6 Key issues in planning for renewables at the local level include:

- the introduction of the spatial planning approach within the new system provides an important opportunity for integrating renewable energy generation into the wider local planning framework;*
- local planning authorities should prepare criteria-based policies that focus on key local issues, within the framework set out by national planning policy and the Regional Spatial Strategy, or Spatial Development Strategy in London. Policies may relate to standalone schemes or the development of integrated renewables within developments;*
- supplementary planning documents can be useful in illustrating how particular types of technology, or passive solar design principles, can be applied in the particular local context;*

- 2.5 Section 5 of the Companion Guide provides guidance on the assessment of landscape and visual impact issues relating to individual development proposals, and also cumulative effects as set out in Section 5 below.

“Placing Renewables in the East of England” – Report produced for EERA by Ove Arup (Feb 2008)

- 2.6 The East of England Plan also known as the Regional Spatial Strategy was revoked in 2012. However, parts of the evidence base have still been identified as of relevance. The regional renewable energy study ‘Placing Renewables in the East of England’ (Arup) considered the potential of the Eastern Region to accommodate (among other technologies) WTD. It was based on a regional strategic and largely desk based approach that identified the landscape capacity based on the National Character Area (NCA) scale of unit. The study found that both NCA 46 (The Fens) and NCA 88 (The Bedfordshire and Cambridgeshire Claylands) had a ‘low-medium/medium’ sensitivity to wind turbines at a height of 100-140m. The findings of this assessment were due to the relatively large scale and simple nature of the two NCA landscapes assessed as a whole. However, there are some marked local variations within the claylands in particular that would indicate more variable sensitivity at a local scale.
- 2.7 With regard to cumulative impacts an estimate of the theoretical ‘maximum’ capacity of the NCA’s was undertaken. This identified that major visual effects could occur at up to 10km distance (based on research by The University of Newcastle upon Tyne). However, with modifying factors including tree screening in the region it was considered that tolerance of severe-major effects up to 5km may be acceptable in cases where there are fewer receptors, such as sparsely populated and less sensitive landscapes. In these locations a separation distance of 10km between wind farms was therefore examined to assess capacity. Where there were a greater number of receptors or a higher sensitivity landscape, greater separation distances of 15km between wind farms was considered to avoid notable cumulative impact on receptors and overwhelming the scale of the landscape involved.

Assessing the cumulative impact of onshore wind energy developments - Scottish Natural Heritage (SNH March 2012)

- 2.8 SNH have produced an updated version of their earlier 2006 document on cumulative effects and this covers the effect on landscape and birds. This study forms one of the most detailed guidance documents in the UK on assessment of cumulative landscape and visual effects. The majority of the publication guides local authorities, applicants and consultants on how to carry out cumulative assessment for specific applications. However it also provides guidance on strategic planning. Reference is made to ‘Strategic Locational Guidance for onshore Wind farms in respect of the Natural Heritage Policy statement no. 02/02’ (SNH) which notes the presence of three zones of sensitivity in Scotland.

Zone 1:

Lowest natural heritage sensitivity identifies areas at the broad scale with least sensitivity to wind farms, with the greatest opportunity for development, within which overall a large number of developments could be acceptable in natural heritage terms, so long as they are undertaken sensitively and with due regard to cumulative impact. (15% of land area of Scotland)

Zone 2: Medium natural heritage sensitivity identifies areas with some sensitivities to wind farms. However, by careful choice of location within these areas there is often scope to accommodate development of an appropriate scale, siting and design (again having regard to cumulative effects) in a way which is acceptable in natural heritage terms. (55 % of land area of Scotland)

Zone 3:

High natural heritage sensitivity identifies areas of greatest sensitivity to wind farms, which place the greatest constraint on their development, and where, in general, proposals are unlikely to be acceptable in natural heritage terms. There may however be some sites in this zone where wind farm development of appropriate scale and careful design could be accommodated if potential impacts on the natural heritage are fully explored and guarded against by employing the highest standard in siting and design. (30% of land area of Scotland)

2.9 The 2012 cumulative guidance also states from para 18 that in relation to Strategic Planning,

18. In all cases, the focus is on forward planning: setting out the vision for windfarm development; and determining the thresholds of acceptable change, where the most suitable locations for development are, and what might be an appropriate design and scale.

19. The strategic plans (often underpinned by a landscape capacity study) should consider a range of specific scenarios, in terms of the numbers, scale and distribution of windfarm developments to be accommodated. It should then make use of the resulting cumulative impact assessment to draw conclusions as to which of these scenarios is acceptable.

20. The area included within a strategic cumulative assessment should not be constrained by administrative boundaries. Effective assessments should cover the whole of a region, straddling more than one planning authority, or that of a natural heritage management unit such as a National Park or Firth Partnership area.

21. *Planning authorities are encouraged by Scottish Planning Policy to:*

- *define broad areas of search suitable for large scale (>20MW) wind farms (equal to approximately 10no. 125m turbines)*
- *identify the criteria they should meet through the development of Supplementary Planning Guidance.*

22. *This approach will have enhanced value if it is also associated with a view of the **capacity** of the area for such development and identification of the critical factors which are likely to present an eventual limit to development. We have recently published a review of landscape capacity studies which provides useful advice.*

- 2.10 The above extracts identify that the identification of thresholds is appropriate together with the fact that there would be an eventual limit to development. The approach to using various scenarios of development has been undertaken by a number of authorities in Scotland and England. However, no firm figures or hard thresholds are provided identifying the likely limit of development. Clearly the landscape capacity and other factors will vary locally.
- 2.11 Section 3 of the SNH report notes at para 45,
The cumulative impact of windfarm development on landscape and visual amenity is a product of:
- *the distance between individual windfarms (or turbines),*
 - *the distance over which they are visible,*
 - *the overall character of the landscape and its sensitivity to windfarms,*
 - *the siting and design of the windfarms themselves, and*
 - *the way in which the landscape is experienced.*
- 2.12 These factors are all important and there is no reason why these cannot form a consideration in the development of strategic advice at the local scale for Huntingdonshire District Council.

Guidelines for Landscape and Visual Impacts Assessment (LI and IEMEA) (April 2013)

- 2.13 The Guidelines for Landscape and Visual Impact Assessment (GLVIA) is now in its third edition. The updated 2013 version includes for the first time a chapter (7) on cumulative landscape and visual effects. It recognises that the study of cumulative effects for WTD has been at the forefront of the development of cumulative assessment in part due to the number and size of the structures involved. The majority of Chapter 7 in the GLVIA is focused on the process of guidance for carrying out a cumulative assessment for a specific proposal. This is logical as the primary purpose of the GLVIA is to guide those carrying out EIAs. Part of the

process includes identification of which other schemes to include in a cumulative assessment. The GLVIA indicates that this should usually be those that are existing, consented or at planning application/appeal stage. Only in exceptional circumstances should it include those not yet submitted as a planning application and in such circumstances this is more likely to apply to nationally significant infrastructure projects (i.e. > 50MW for wind turbines).

2.14 Para 7.17 of the GLVIA sets out a range of types of cumulative effects including the following which are considered to be of particular relevance to WTD:

- An extension to an existing scheme or a new development that intensifies the landscape and visual effects in addition of other existing schemes
- Filling an area with the same or different types of development over time such that it substantially alters the landscape resource, views or visual amenity
- Incremental change such that the combined landscape or visual effect becomes significant even though the individual schemes in their own right may not be – this may e.g. apply to a number of smaller turbines within an area

2.15 In relation to the extent of a study area the GLVIA suggests (para 7.21 and 7.30) that this maybe reflected through the use of LCAs as a unit to assess the effects and/or through combined Zones of Theoretical Visibility (ZTV). The GLVIA also encourages a practical and pragmatic approach to cumulative study areas to ensure that the assessment is focused on identifying the extent of 'significant' cumulative effects rather than recording any level of effect regardless of magnitude.

2.16 The GLVIA also considers cases where there may be wider concerns about cumulative impacts where it states at para 7.41,

'where the cumulative landscape and/or visual effects of the proposal combined with the cumulative baseline lead to a need for the consenting authority to take broader action, such as implementing an overarching mitigation programme or amending planning policies based on their judgement that the effects on receptors have reached or passed an acceptable threshold.'

The above extract would indicate that an approach such as that set out in this study (see Sections 3 and 4 below) have a basis for identifying thresholds and criteria to assess current and future applications where cumulative issues are involved.

Huntingdonshire District Council SPD: Wind Power (Feb 2006)

- 2.17 This document represents the currently adopted SPD on WTD which is now under review as set out below. The study was in turn based on an earlier study of 2005 Wind Turbine Development in Huntingdonshire by LUC.

Wind Turbine Development - A Guidance Note for Applicants and Agents

(revised version June 2013)

- 2.18 This note provides guidance on the factors to include in the assessment leading to planning applications whether as part of an ES or as supporting information for an application that does not require an ES. There is no specific guidance related to cumulative effects in this note.

Huntingdonshire District Council Draft Revised SPD: Landscape Sensitivity to Wind Turbine Development (2012)

- 2.19 The Draft Revised SPD sets out the intended approach of the District to wind energy. With regard to cumulative effects the capacity for each LCA to accommodate 'more than one' WTD is assessed within the details for each LCA. A limit of turbine numbers or group sizes is based on the relative landscape sensitivity of the LCA's.

Other Local Authority SPDs and related studies

- 2.20 The process of considering cumulative landscape and visual effects from WTD has also been considered by a number of local authorities who have conducted their own studies and a number have produced SPDs. While each geographical location and local authority is distinct, reference to comparable studies can be a useful means for benchmarking the approaches taken elsewhere to inform the choice of criteria used in this study. Appendix 1 provides a brief summary of reference studies considered.

Appeal Decision principles

- 2.21 A number of appeal decisions involving cumulative landscape and visual impacts have been reviewed. Each case should always be considered on its own merits and site specific circumstances. However, Appendix 2 includes a summary of relevant points from the various Inspectors findings and identifies some principles relating to cumulative issues from each appeal.

3. REVIEW OF CONSTRAINTS AND EXISTING WIND TURBINE SCHEMES IN HUNTINGDONSHIRE

3.1 The assessment of cumulative issues involves an appreciation of a number of factors. This study has identified a number of constraints relevant to WTD and represented and analysed this data using GIS. A number of the following topics are illustrated by accompanying Figures 01-04. Each of the drawings also plot the Huntingdonshire District LCA boundaries and also show a 10km buffer from the District boundary. The relative capacity of each LCA for wind turbine developments of specific group numbers has been more fully assessed in the original LUC study, the current SPD and the Draft Revised SPD Review.

Topography and watercourses

3.2 Figure 01 illustrates the underlying pattern of landform and watercourses within Huntingdonshire set against the defined LCA's. At a national scale the District is primarily located with NCA 88 (Bedfordshire and Cambridgeshire Claylands) with a proportion to the north east located within NCA 46 (The Fens). The Huntingdonshire LCAs are a refinement of the NCAs and provide a district scale focus that is applicable to the assessment of suitability for WTD. The main ridgelines in the district have been shown on Fig 01 together with an indication of the distances between ridges. The pattern of landform and drainage in each of the Huntingdonshire LCAs is summarised below:

- **The Fens:** The LCA is located to the north east of the district and is essentially a flat landscape with heights ranging by no more than 1 or 2 metres above or below sea level. There is a complex network of drains, dykes and lodes many following the reclaimed geometric field pattern. The area and associated higher land to the west drains into either, the River Nene Old Course, Yaxley Lode or the Fenton Lode/Twenty Foot Drain on route to the Wash.
- **The Fen Margin:** The LCA follows the western and southern edge of the Fens. Landform is gently sloping and typically between 2-10m AOD. There are localised areas that reach up to c. 20 metres e.g. Warboys Heath. The drainage includes a number of tributary streams that run off the claylands into the Fens to the east.
- **The Central Claylands:** The LCA is a large gently undulating plateau typically 30-40m AOD and reaching up to just over 50m to the north west. The area historically hosted a number of airfields. There are some gentle tributary valleys with associated streams in which a number of small villages are located e.g. Abbots Ripton and Broughton. The area mainly drains to the north east with some other areas draining to the south east towards the Ouse and Alconbury Brook to the south West also to the Ouse.
- **The Ouse Valley:** The LCA comprises the valley of the main river within the District. The valley sides comprise moderate to gentle side slopes with a number of associated

secondary tributary valleys. The valley is c. 5-6km wide between the flanking areas of higher ground. The central flood plain and valley floor is c. 2km wide and meanders north and then east through the area. The LCA also includes a series of water bodies associated with former mineral extraction in the valley floor.

- **South East Claylands:** The LCA forms the north west extension of a more extensive undulating area of clay plateau that continues into South Cambridgeshire District to the east. The landform slopes down to the Ouse Valley to the north and west and the land drains via a number tributary streams in shallow valleys. The LCA has similar characteristics to much of The Central Claylands.
- **The Northern Wolds:** This LCA includes land in the north western part of the District. It includes areas of relatively higher ground between 40-70m AOD. There are also a number of more marked ridges and valleys generally running in a north west /south east orientation. The ridges are separated by a number of valleys with streams including the headwaters of Alconbury Brook and Ellington Brook. The intervals between the ridges vary from between 5.5km to as little as 2km where the landform creates a greater sense of enclosure and rolling undulations.
- **The Graham Water:** The LCA is a small area focused on the reservoir and surrounding fringes. The landform encloses the reservoir that hosted the Diddlington Brook before it was dammed. The area is relatively self-contained from wider views.
- **The Southern Wolds:** The LCA wraps around Graham Water and extends to the A14 in the north and A1 to the east. The LCA includes a number of plateau areas and undulations but these are not typically as marked as in the Northern Wolds. The River Kym is the main watercourse that flows through Kimbolton eastwards to the Ouse in a broad valley c. 4km wide. Other secondary tributaries flow to the Ellington Brook to the north.
- **The Nene Valley:** This LCA is a very small LCA that forms the southern valley slopes and flood plain of the much larger Nene Valley that meandering through Northamptonshire to Peterborough and eventually to the Wash. The District boundary follows the course of the river from Elton to Alwalton. There are a few tributary streams that flow off the Northern Wolds to the Nene.

Biodiversity Designations

- 3.3 Figure 02 shows the national designations for bio-diversity including NNR's, RAMSAR, SSSI, SPA's, SAC's and Ancient Woodland. None of the designations have been 'buffered'. Consultation on any specific proposals may highlight constraints depending on the wildlife interest and designations affected. This could have a fairly modest impacts e.g. 50-100m offsets while in the case or RAMSAR sites this may have a greater impact e.g. if there were an it affected flight path so protected bird species. In addition the Great Fen Project and has been included together with the identified wider setting area. This area occupies a large part

of The Fens and smaller parts of both the Fen Margin LCA and Central Claylands LCAs. It is anticipated that turbine proposals would not be acceptable in the Great Fen Project Area and its Landscape and Visual Setting. Local Plan policy LP7 (Strategic Green Infrastructure Enhancement) and supporting text para 4.75 confirm the presumption against wind turbine development in these areas.

Heritage

- 3.4 Figure 03 illustrates a number of the main heritage designations. These include Registered Parks and Gardens (e.g. Elton Hall), Scheduled Monuments, Conservation Areas (which include numerous villages and some larger areas along the River Ouse and at Ramsey) and the Grade 1 and II* listed buildings which represent those assets of greatest heritage value. These two classes of listed building are likely to include the majority of the village churches and other major landmark buildings in the landscape as identified at para 2.12 in the Draft Revised SPD. Grade II listed buildings are also considered to be of national value but are not shown on the Figure due to the numbers involved. Grade II buildings should also be assessed as part of any proposal. Buffers have not been shown around these heritage assets as individual assessment would be required to determine the nature of any direct effects, or effects on the setting of the assets that may affect their significance as heritage assets.

Settlement

- 3.5 The pattern of settlement in the district includes a number of market towns, villages and individual properties. Proximity of settlement and in particular residential locations from WTD is an important constraint. In this study it is considered that a 'dominant effect' could occur up to 1km from a WTD where the turbines are between 100-129m to blade tip. The 1km distance indicates the likely outer extent of where a WTD could have an effect on residential amenity resulting in, *'an unpleasantly overwhelming and unavoidable presence in main views from a house or garden, (where) there is every likelihood that the property concerned would come to be widely regarded as an unattractive and thus unsatisfactory (but not necessarily uninhabitable) place to live.'*³ Clearly the specific circumstances e.g. localised screening or orientation could reduce this distance. A 2km offset identifies the distance where there are still likely to be significant impacts on visual amenity and the property could be in the 'prominent zone' of visual effect. These distances for the dominant and prominent zones for different heights turbine are shown in Table 8.

³ Enifer Downs (APP/X2220/A/08/2071880)

Existing Turbines within Huntingdonshire

3.6 The current situation within Huntingdonshire has been assessed in terms of:

- Schemes either constructed or consented but not yet built
- Schemes 'in planning' – based on an application having been submitted or at appeal

The turbines are shown on Figure 04. Figure 01 also shows the pattern of WTD in the District and illustrates the position of many of the turbines on the local ridges within the District. Figures 01 and 04 also show the turbines outside the Huntingdonshire within a 10km offset of the HDC boundary (excluding those In Planning). The turbines outside HDC have been plotted based on information from RESTA the Department of Energy and Climate Change (<http://restats.decc.gov.uk/app/pub/map/map/>).

3.7 The schemes included in the constructed and / consented but not built status are identified in Table 1 below:

Table 1: Constructed and Consented schemes in Huntingdonshire as at 1.5.13

Site Name	Planning application ref	No. turbines	Proposed Tip Ht (To nearest m)
Ashfield, Meadow Rd, Gransden	1201268FUL	1	20
Birds Nest, Parkhall Road, Somersham	1200225FUL	1	20
Brook Farm, Ellington	1000887FUL	1	25
Church Farm, Ramsy Mereside	1200669FUL	1	46
Denton Lodge, The Old North Road, Denton	0702290FUL	1	15
Float Fish Farm, Milk and Water Drove, Farcet	0901252FUL	1	18
Glebe Farm, Spaldwick	1002042FUL	1	25
Hamerton Zoo Park, Hamerton	1200670FUL	2	46
Lakeside Lodge, Pidley	0803141FUL	1	19
Wooley Hill, Ellington	1001741FUL	4	130
Foxholes Farm, Leighton Bromswold	1201829FUL	1	34
The Retreat, Wistow	1201985FUL	1	21
Red Tile Wind Farm	0302827FUL	12	100
Mereside Farm, Ramsey Mereside	0101772FUL	1	34
Cotton Farm, Graveley Road, Offord Darcy	0802296FUL	8	125
Mill House, Old Weston	120148FUL	1	15
St Marys Road, Ramsey	0400031FUL	1	125
Three Fishes Farm, Warboys	1201034FUL	3	18
Tick Fen Farm, Warboys	1300084FUL	1	74
Tick Fen Farm, Warboys	1000119FUL	1	25
Tick Fen Farm, Warboys	1101601FUL	1	46
Tilbrook Grange, Tilbrook	1101420FUL	1	25
Wood Green Animal Shelter	1101886FUL	1	102

- 3.8 The schemes that are currently still 'in planning' or at appeal stage include the following schemes listed in Table 2. It should be noted that there may be other schemes 'In Planning' outside Huntingdonshire but these are not included in the list or analysis in GIS on Figures 04, 07 and 08.

Table 2: Schemes in Planning or appeal stage in Huntingdonshire as at 1.5.13

Site Name	Planning application ref	No. turbines	Proposed Tip Ht (To nearest m)
East Lodge Farm	1200688FUL	1	27
Land South West of RAF Molesworth	1200967FUL	6	126
Land at St Mary's Road, Ramsey	1101865FUL	4	127
Galley Hill Farm, Hemingford Grey	1201244FUL	1	45
Haddon Lodge Farm	1201841FUL	1	67
Littlebury Farm, Hemingford Abbots	1200313FUL	1	42
Common Barn, Rectory Lane, Southoe	1200803FUL	3	125
Catworth Lodge, Tilbrook	1300264FUL	1	46
West of Bicton Industrial Estate	1300512FUL	3	125

- 3.9 A review of the distribution of operational and consented wind turbine developments in Huntingdonshire identifies that the majority of the existing schemes are located either within the Fens and Fen Margin LCAs (e.g. Red Tile and Ramsey) to the north east of the district, in the southern part of the district in the South East Claylands (e.g. Cotton Farm and Wood Green) or on the higher ground of the Northern Wolds (e.g. Woolley Hill and Hamerton). The major proposed schemes would lead to further intensification of turbines in the Southern and Northern Wolds close to the A1 (Common Barn), A14 (Molesworth) and B645 (Bicton).
- 3.10 An analysis of the influence of operational and consented turbines has been carried out by illustrating two criteria, namely the 'Prominent Zone' and 'Conspicuous Zones'. For a turbine at a height of 100-129m to blade tip these distances are considered to be at 2km and 5km respectively. The distances increase or decrease with taller or smaller turbines, as shown in Table 3 below. The reduction in distances do not reflect a straight forward pro-rata reduction based on height alone since smaller turbines are relatively more detracting in the landscape

by virtue of the faster rotation speeds of a cycle of the turbine blade. The distances used below have been calibrated in the field using existing turbines.

Table 3 Distances representing Prominent and Conspicuous zones

Height of turbine	<30m	30-69m	70-99m	100-129m	130- c.150m
Prominent Zone	=/<750m	=/<1.5km	=<1.75km	< 2km	=/<2.5km
Conspicuous Zone	750m-1.5km	1-5-3km	1.75 -4km	2-5km	2.5- 6km

- 3.11 The rationale for these two distances is that they provide a reasonable basis for representing the likely extent of 'significant' (in EIA terms) landscape and visual effects that would result from wind turbines of each height in the Huntingdonshire landscape. These two categories/thresholds (i.e "prominent" and "conspicuous") have also been used by a range of comparable studies in England and Scotland over the last 10 years.
- 3.12 It is recognised that the actual landscape and visual effects would be locally limited by factors including landform, vegetation cover and built development. Furthermore, some factors e.g. landform would be more consistent in flatter LCAs such as the Fens but would vary in other LCAs where there is more variation in landform pattern e.g. Northern Wolds. In some cases areas of intervening high ground may provide localised partial or complete screening of turbines from some viewpoint locations. Conversely turbines on more prominent ridges may be more widely visible from other ridges or along and across valleys. Clearly the influence of any specific proposal needs to be assessed on a case by case basis. However, the use of Prominent and Conspicuous offsets provides a useful starting point to assess the likely range of influence of a proposal and therefore to also identify locations where significant effects may begin to overlap from more than one scheme. This would thus help identify locations where potential issues of cumulative landscape or visual impact might occur and should be carefully examined as part of any specific application or proposal. This effective "separation" distance of 10km (for a 100-129m turbine) is also comparable to the approach used in the Placing Renewables in the Eastern Region study (Arup) discussed in Section 2 above.
- 3.13 Based on the built and /or consented schemes the percentage cover of the LCAs within the Prominent and Conspicuous zones for all turbines in Huntingdonshire (as listed in Table 1

above) is shown in Table 4 below. The extent of the two zones is also illustrated graphically by Figure 05.

Table 4 Zones as % of Landscape Character Areas (excluding In Planning) – to nearest %

Landscape Character Area (LCA)	Total Area(km²)	Prominent Zone (%)	Conspicuous Zone (%)	Total (%) Prominent & Conspicuous Zones
The Fens	125	33	39	72
Fen Margin	117	11	39	50
Central Claylands	186	8	30	38
Ouse Valley	79	2	63	65
South East Claylands	116	25	41	66
Northern Wolds	188	12	35	47
Grafham Water	11	0	84	84
Southern Wolds	82	12	31	43
Nene Valley	7	0	0	0
TOTAL	913			

3.14 From Table 4 it can be seen that the LCAs with the highest proportion affected by the prominent zones are The Fens (33%) and the South East Claylands (25%). The coverage in The Fens is also partially due to the proximity of other schemes in the adjacent Fenland District e.g. Glassmoor. The influence in the conspicuous zone (NB calculated as the 'donut' shape excluding the inner prominent zone) is more widely distributed, a number of LCAs having a surprisingly high percentage e.g. Grafham Water and the Ouse Valley. This is a result of schemes in neighbouring LCAs and in the case of the Ouse Valley from schemes located on the adjacent higher ground in neighbouring LCAs. However, the figure for Grafham Water should be tempered by the relatively small size of the area and the fact that there is likely to be a degree of screening by landform to the north. Other areas experiencing a relative high coverage (>35%) are The Fens, Fen Margin, South East Claylands and Northern Wolds. The Central Claylands has coverage of 30% despite not having any turbines in the areas. This is again due to the influence from schemes close by but in adjacent LCAs. However it must be noted that there are also further potential "landscape constraints" in the Central Claylands LCA – examples being the "orchard dominated landscape" in the east, and the "existing ancient woodland sites" in the north west, both mentioned in the SPD (Chapter 5).

- 3.15 Figure 06 (which combines some of the constraints illustrated in Figures 02-03 with the Prominent and Conspicuous Zones) provides an indication as to where there may be areas of remaining capacity for WTD in the Huntingdonshire. It should be remembered that there will be other site specific constraints to consider e.g. the presence of settlement together with a range of other issues as set out in the Huntingdonshire District Council’s “Wind Turbine Developments – A Guidance Note for Applicants and Agents.” (revised version June 2013)
- 3.16 By including all the schemes still in planning or at appeal (within Huntingdonshire) in the spatial analysis the areas within the Prominent and Conspicuous zones will increase. Should all current applications be approved or allowed at appeal the situation is shown in Table 5 below and also in Figure 07.

Table 5 - Zones as % of Landscape Character Areas (including In Planning) – to nearest %

Landscape Character Area (LCA)	Total Area (km²)	Prominent Zone (%)	Conspicuous Zone (%)	Total (%) Prominent & Conspicuous Zones
The Fens	125	34	39	73
Fen Margin	117	13	40	53
Central Claylands	186	8	30	38
Ouse Valley	79	12	64	76
South East Claylands	116	26	41	68
Northern Wolds	188	31	44	76
Grafham Water	11	21	79	100
Southern Wolds	82	30	58	87
Nene Valley	7	0	18	18
TOTAL	913			

- 3.17 Based on the above findings it can be seen that the LCA’s with the highest proportion of the prominent zone are The Fens (34%), Northern Wolds (31%), Southern Wolds (30%) and South East Claylands (26%). The influence of the conspicuous zone is more widely distributed; with the two LCAs most affected being the Ouse Valley and Grafham Water as a result of schemes in adjacent LCAs. It is important to note that this scenario is based on all schemes being approved. The reality will vary in time and as any new schemes are brought forward.
- 3.18 The combination of a number of the constraints together with the prominent and conspicuous zones is shown in Figure 08. This provides an indication as to where there may be areas of

remaining capacity if all the schemes were approved or allowed. The situation will vary over time and should be subject to an assessment at the point of each application. The current cumulative situation should also be read alongside the capacity ranges for each LCA as set out in the Draft Revised SPD for each grouping of turbines.

4 CRITERIA TO GUIDE THE ASSESSMENT OF CUMULATIVE LANDSCAPE AND VISUAL EFFECTS

- 4.1 A number of criteria are set out below to guide the acceptability of WTD in cumulative landscape and visual terms. Non-compliance with the cumulative landscape and visual criteria should not necessarily preclude turbine development. However, they will form an important part of the assessment of the capacity of the landscape to accept the proposed development. All the environmental factors should be carefully evaluated and then balanced by the decision maker against the requirements to contribute to national targets for renewable energy generation and the benefits of reducing carbon consumption. The guidelines should also always be considered in conjunction with a detailed study of the site and its surroundings, particularly in terms of landform, vegetation and structures that may provide visual mitigation of the cumulative landscape and visual impacts.

CUMULATIVE LANDSCAPE IMPACTS

- 4.2 The Scottish Natural Heritage Document, 'Assessing the cumulative impact of onshore wind energy developments' (2012) identifies at para 48 and 49 that cumulative landscape effects can impact on either the physical fabric or character of the landscape, or any special values attached to it.

Cumulative effects on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes, rural roads or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments.

Cumulative effects on landscape character arise when two or more developments introduce new features into the landscape. In this way, they can change the landscape character to such an extent that they create a different landscape character type, in a similar way to large scale afforestation. That change need not be adverse; some derelict or degraded landscapes may be enhanced as a result of such a change in landscape character.

Windfarms may also have a cumulative effect on the character of landscapes that are recognised to be of special value. These landscapes may be recognised as being rare, unusual, highly distinctive or the best or most representative example in a given area. This recognition may take the form of national or local designations (for example,

National Scenic Areas or Special Landscape Areas), citations in development plans, community plans or other documents, or be less formally recognised, such as Search Areas for Wild Land.

- 4.3 While there can be landscape effects on the physical fabric it is less likely to be significant in cumulative terms due the separation distances between most turbine proposals. Most significant cumulative landscape effects will be on landscape character. Chapter 14 of the Draft Revised SPD identifies a number of factors that should be considered in relation to the cumulative effect of wind turbine developments. The cumulative effect relates to the combined impact of separate wind turbine developments on a landscape. Factors to be considered in relation to Huntingdonshire District include the effects on the following: Scale and enclosure, landform and topography, settlement pattern, landmarks and visible built structures, skyline and visual connections with adjacent landscapes. They can also include the more perceptual qualities that include a measure of value and tranquillity. A number of turbine schemes including those of differing size and number could have an adverse cumulative effect on the underlying characteristics of the landscape area.
- 4.4 Huntingdonshire now has wind turbine developments that currently impact on the character of its landscapes and this effect will increase as other consented schemes are built e.g. at Woolley Hill near Ellington. Section 3 above provides an analysis of the extent of the LCAs affected by turbines within the Prominent and Conspicuous Zones. The Draft Revised SPD also provides an indication of the capacity for further wind turbines at the 100-140m range with regard to each LCA.
- 4.5 Landscapes that are identified in the Draft Revised SPD as being relatively more sensitive to the changes brought about by wind turbine development (including differing group sizes) have less capacity to accept new wind turbine development without an adverse effect on the key characteristics of the landscape. The capacity in any area for additional turbines will depend on the existing situation in terms of built and consented schemes, the number and location of the turbines proposed and the key characteristics of the landscape. The greater landscape effects will usually be within the Prominent Zone with other significant effects also likely within the Conspicuous Zone. In a more sensitive landscape effects beyond the Conspicuous Zone may also be significant where WTD would form part of a repeated pattern throughout an LCA and which could become a key characteristic. The approach taken in this study is to recommend that more sensitive landscapes/LCAs should have a smaller part of their total land area within the influence of WTD. This approach is to identify criteria to safeguard and protect the LCAs from an excessive level of WTD. This will allow scope for WTD in each LCA but provide an indicative threshold to restrict this to an appropriate level for each LCA based on its sensitivity and capacity. Indicative thresholds of capacity are proposed below

in Table 6 to allow for some further wind turbine development in the district but also to protect the underlying key characteristics of the landscape character types.

- 4.6 The principle of retaining a proportion of each LCA outside of the conspicuous zone would ensure that there are areas where the influence of WTD is less marked as a major feature in the landscape and not a key characteristic. This approach should apply to all landscapes including those with relatively higher capacity. For example in the Fens the large scale, flat landscape and geometric field pattern can be seen as relatively suitable for WTD. However, the openness, large skies and sense of remoteness and tranquillity is also valued and it is considered appropriate to have areas that retain these characteristics relatively unaffected. This principle has been used in other studies such as South Pennine Study (Julie Martin Associates - 2010) and Fenland Wind Turbine Development Guidance (TLP 2009). The approach also provides a relatively straight forward tool in GIS to calculate and compare coverage or current versus potential coverage. Another advantage of this approach is that if a scheme is located close to the boundary of a neighbouring LCA with a lower threshold then this will have a noticeable effect on the capacity for the neighbouring LCA to accommodate further turbines. This approach allows for cross LCA boundary impacts which can be a particular feature of WTD. This is the case for the Ouse Valley which already has experienced an effect from three other schemes outside its LCA boundaries. Furthermore, if no "undeveloped" areas are retained then landscape character over a whole LCA will be changed, and wind turbine development could become a defining characteristic of the LCA. This is contrary to one of the main objectives of the SPD which seeks to guide development to locations which will avoid effects on this character changing scale.

Table 6 - Proposed Thresholds of Capacity for each Landscape Character Type

NB "Current" numbers relate to constructed and consented schemes only

LCA	Total Area(km ²)	Current Prominent Zone (%)	Proposed Prominent Capacity threshold (%)	Conspicuous Zone (%)	Proposed Conspicuous Capacity threshold (%)	Current combined Prominent and Conspicuous Zone %	Total Proposed Prominent and conspicuous threshold (%)
The Fens	125	33	25	39	50	72	75
Fen Margin	117	11	15	39	45	50	60
Central Claylands	186	8	30	30	45	38	75
Ouse Valley	79	2	5	63	50	65	60
South East Claylands	116	25	25	41	50	66	75
Northern Wolds	188	12	10	35	40	47	50
Grafham Water	11	0	5	84	50	84	55
Southern Wolds	82	12	25	31	50	43	75
Nene Valley	7	0	5	0	25	0	30
TOTAL	913						

4.7 Table 6 above shows that the Fens LCA is already in excess of its proposed threshold of 25% being in the Prominent Zone. This is in part the influence of the Great Fen Project in effectively creating an additional constraint in the north west of the Fens and Fen Margin LCAs. This would indicate that the optimum way that new turbine development could be accommodated within The Fens LCA without significant cumulative landscape impacts (subject to other material constraints) would be locating new turbines close to existing turbine developments where the character has already been impacted upon. The Prominent Zone threshold has also been crossed in Northern Wolds which has a lower % threshold on account of the relatively higher landscape sensitivity. Within the South East Claylands the Prominent threshold has just been reached. The Conspicuous Zone thresholds have to date only been crossed in the Ouse Valley and Grafham Water as a result of WTCD in adjacent LCAs.

However, the existing coverage of the Conspicuous Zone is getting close to the proposed thresholds in the Fen Margin, South East Claylands and Northern Wolds.

- 4.8 The above approach also identifies areas where there is still capacity in landscape character terms for further development. The LCA with the most potential is the Central Claylands where there are no turbines schemes currently consented. In addition the SPD identifies the scope for up to more than one scheme at medium and large scale groupings in this LCA. There is capacity also for a medium scale group in the Southern Wolds, though there are currently schemes "in planning" that would affect this LCA.

Suggested thresholds and criteria

- 4.9 The percentage figures given in this section should not be seen as absolute thresholds that preclude development. However, they provide a guide as to when the cumulative landscape effects would be crossing a line where the underlying key characteristics would begin to be unbalanced due to the cumulative influence of WTD. There will usually be areas of land within each LCA where localised screening and vegetation cover may also play a role. However from more open viewpoints the influence of WTD would be more readily identified in the landscape.
- 4.10 **The Fens** LCA should not exceed 25% of its area being within the 'Prominent' zone or 75% of its area being within the 'Conspicuous' zone. There are already areas where WTD already exerts some significant cumulative effects e.g. north and east of Ramsey. This is compounded by the variety of turbine heights, models, rotation speeds and group sizes. This threshold allows for the absence of turbines within the Great Fen Project Area and its identified setting.
- 4.11 **The Fen Margin** LCA should not exceed 15% of its area being within the 'Prominent' zone or 60% of its area being within the 'Conspicuous' zone. The lower threshold compared to The Fens reflects the transitory and contrasting character of the LCA. The LCA has a narrow form and the rising ground is visually more sensitive than the adjacent Fens with some local 'hills' (e.g. Fox Hole Hill, near Warboys) being landmarks. In addition the presence of the Great Fen Project Area and its Landscape and Visual Setting within the LCA the area reduces its capacity.
- 4.12 **The Central Claylands** LCA should not exceed 30% of its area being within the 'Prominent' zone or 75% of its area being within the 'Conspicuous' zone. This LCA is identified as having the highest relative capacity in the District by the Draft Revised SPD. There are currently no turbine schemes in the LCA and the SPD indicates scope for WTD. However, there are a number of constraints including the wooded character of the sub area to the north west, orchards to the east and a number of listed buildings and small settlements that would need to be given due consideration and suitable protection.

- 4.13 **The Ouse Valley** LCA should not exceed 5% of its area being within the 'Prominent' zone or 60% of its area being within the 'Conspicuous' zone. The LCA is of particular importance for recreation and biodiversity with a number of designated biodiversity habitats and conservation areas. The narrow sinuous and low lying nature of the LCA also means that it will be affected by turbine developments in adjacent LCAs. In view of the operational and consented schemes in the adjacent LCAs there may be limited opportunity for WTD in this LCA.
- 4.14 The **South East Claylands** LCA should not exceed 25% of its area being within the 'Prominent' zone or 75% of its area being within the 'Conspicuous' zone. The LCA is already host for Cotton Farm wind farm and a single turbine at Wood Green. More sensitive parts of the LCA include the more undulating and wooded part of the area notably to the south.
- 4.15 The **Northern Wolds** LCA should not exceed 10% of its area being within 'Prominent' zone or 50% of its area being within the 'Conspicuous' zone. This LCA is identified in the Draft Revised SPD as a highly valued landscape. It is considered to be more sensitive due to its unspoilt character and the undulating landform of ridge and valley, (see Figure 01) which would potentially be undermined by inappropriate WTD. The lower prominent % threshold is provided to ensure the key characteristics of the area are retained. The natural pattern of ridges is a key characteristic of the LCA and care should be taken to avoid cumulative WTD that either follows a ridgeline or is visible on adjacent ridges or locations where there are higher levels of intervisibility.
- 4.16 **Grafham Water** LCA should not exceed 5% of its area being within the 'Prominent' zone or 55% of its area being within the 'Conspicuous' zone. The area is focused around Grafham Water which occupies the majority of the surface area and hence restricts opportunities for turbines. The Draft Revised SPD indicates that there is limited scope for WTD in this LCA. Furthermore, development of other schemes in the adjacent Southern Wolds may potentially preclude any turbines in the LCA.
- 4.17 The **Southern Wolds** LCA should not exceed 25% of its area being within the 'Prominent' zone) or 75% of its area being within the 'Conspicuous' zone. Parts of the LCA have been identified as more sensitive to cumulative development including the central ridge that divides the valleys of the Kym and Ellington Brook. Significant cumulative effects could occur from a number of single turbines, groups or combinations of sizes particularly where there is intervisibility on adjacent ridges.

- 4.18 **Nene Valley** LCA should not exceed 5% of its area being within the 'Prominent' zone or 30% of its area being within the 'Conspicuous' zone. This is a very narrow LCA of high sensitivity close to the River Nene and there is very limited scope for WTD in this area.

Alternative approaches to criteria for assessing Cumulate Landscape Effects

- 4.19 Consideration was also given to the use of different offsets (to those shown in Table 3 above) for Prominent and Conspicuous zones applied to each of the LCAs to highlight their relative sensitivity. This would have involved potentially greater offsets for more sensitive LCAs. While this approach has some merit it would result in more complex modelling in GIS on crossing LCA boundaries and the potential for inaccuracies in the GIS analysis. It may also be the case that while one LCA may be more sensitive, site specific features on the ground (e.g. woodland) may locally contain the impact on the landscape in the more sensitive LCAs. In addition there might also be a more gradual change of character at the LCA boundary rather than a clear cut change so that the change in sensitivity may also be more gradual. In any event the varying % thresholds should accommodate the variations in sensitivity at a strategic scale.
- 4.20 Another more technically accurate approach would be to plot the Zones of Theoretical Visibility (ZTV's) of all built, consisted and in planning schemes. This would identify areas where schemes are e.g. 'hidden' by landform. However, this approach would be subject to obtaining the data on all schemes which would be more difficult. It may also require additional and complex GIS mapping to show the localised screening effects. Furthermore, some smaller schemes may not have a computer based ZVT available. For these practical reasons it is not recommended to follow this approach.
- 4.21 A further option is to provide a simple distance between turbine proposals. A10km separation zone was used in the "**Placing Renewables in the East of England**" Arup study done for EERA (referred to in Section 2 above) with a 15km separation suggested for more sensitive locations. This greater distance may readily apply to the Northern Wolds which is indicated to be more sensitive. However this method takes no account of the current locations of existing operational and consented schemes which may already be inconsistent with this approach. Likewise the Arup study was based on a NCA scale approach and did not include the more local variations in the landscape as identified in the HDC LCAs. For these reasons the approach is not recommended.

CUMULATIVE VISUAL EFFECTS

Assessing Turbine Visibility

4.22 PPS22 Companion guide highlights the importance of identifying the Zone of Visual Influence (ZVI), otherwise known as a Zone of Theoretical Visibility (ZTV), for a turbine development. A Zone of Theoretical Visibility is the area from which a turbine of a given height could be seen on a very clear day, based on the landform of the area. Dependent on the approach taken the ZTV can also allow for major intervening features such as settlement, built forms and major woodland. However localised screening is not typically included. The guidance on ZTVs in the 'Visual Representation of Windfarms: Good Practice Guidance' (Scottish Natural Heritage-2006) recommends the following Zones of Theoretical Visibility extents for different sizes of turbines:

- Turbine up to 50m – ZTV 15km
- Turbine 51-70m – ZTV 20km
- Turbine 71-85m – ZTV 25km
- Turbine 86-100m – ZTV 30km
- Turbine 101-130m – ZTV 35km

4.23 Although turbines are theoretically visible over these distances, their visual impact is likely to decrease with distance from the turbine location. The Scottish Executive's document PAN45: Renewable Energy Technologies, although now superseded indicated a range of distances from turbine development and descriptions of the diminishing magnitude of the visual impact. This guidance is not specific about the heights of turbines that this applies to, which can be significant given the variation in ZTVs illustrated above. However, through use of the guidance in PAN45 and our own field evaluation work, an assessment has been made of the typical magnitude of visual impact of existing turbines within Huntingdonshire District. This has resulted in an additional category of visual impact i.e. dominant being included compared to PAN45. The category relates to closer distances to reflect situations where a turbine is in very close proximity and may have an overpowering effect on the viewer e.g. from a public right of way or residential location. The following Table 7, indicates the typical likely visual impacts used in this study for the 100-129m turbine height band at different distances from the turbine development.

Table 7 - Categories of Magnitude for Cumulative Visual Impact of Turbines

Distance from turbines	Magnitude of impact	Description
Within 1km	Dominant	Turbines form the principle element of the view and may overpower the viewer
1-2km	Prominent	Turbines form a very large element of the view, commanding and controlling the view
2-5km	Conspicuous	Turbines form a large element of the view, standing out from the surroundings and forming

		an unmistakable feature within the panorama.
5-15km	Apparent	Turbines form a medium element of the view, noticeable in panoramas, clearly visible and catching the eye.
15-30km	Inconspicuous	Turbines form a small element of the view, that is visible but not distinct or obvious on first glance or in overcast conditions
Over 30km	Negligible	Turbines form a very small element of the view, barely visible in clear conditions

4.24 It should be noted that these definitions apply where there are open or partial views of a wind turbine development. These bandings are intended to indicate the approximate point at which the visual effect of a turbine moves from one category to the next. They should therefore not be interpreted too rigidly and there will often be a transition. Equally there may be locations where due to the orientation of the viewer or nature of the view e.g. a framed view that the turbines may appear more visible than distance may otherwise indicate. Factors such as weather conditions will influence the relative visibility at any given time. In addition a level of professional judgement will be required to reflect the individual circumstances of each site.

4.25 In order to allow for alternative sizes of turbine – both larger and smaller, the bandings of visual impact have been varied as shown in Table 8 below. The distances have been calibrated in the field by visiting a number of existing wind turbine developments within Huntingdonshire and adjacent authorities within a 10km buffer from the District boundary. The schemes have been examined from a number of public viewpoints at varying distances from the developments and their impacts assessed against the descriptions identified above. As set out in Section 3 above the distances are not based on a direct pro-rata comparison with height. This is due to the relatively greater visual effect of faster rotation speeds of shorter blades on smaller turbines. Also at the lower end of turbine height, most notably <30m, the screening and relative scale of other features in the landscape e.g. trees and woodland may reduce the extent of visual effects.

Table 8 - Visual Impacts of Turbines Extrapolated for Different Turbine Heights
(rounded to closest 100m at < 1km and then to nearest 500m)

Magnitude of impact					
Height of turbine	<30m	30-69m	70-99m	100-129m	130-c.150m
Dominant	<400m	<600m	<800m	<1km	<1.2km
Prominent	<750m	<1.5km	<1.75km	< 2km	<2.5km
Conspicuous	750m- 1.5km	1-5-3km	1.75 -4km	2-5km	2.5- 6km
Apparent	1.5km-3km	3-8km	4 -12km	5-15km	6-18km
Inconspicuous	3-5km	8-16km	12-24km	15-30km	18-37km
Negligible	Over 5km	Over 16km	Over 24km	Over 30km	Over 37km

4.26 The SNH report "Assessing the cumulative impact of onshore wind energy developments" (SNH) 2012 identifies 3 types of cumulative visual impact. These are:

- Combined/simultaneous impact - occurs where the observer is able to see two or more developments from one viewpoint, without moving his or her head, which is considered to be equal to a 90 degree arc of view. This includes for the main focus of view (central 50 degree arc) and peripheral vision in the same view.
- Successive/repetitive impact - occurs where the observer is able to see two or more windfarms from one viewpoint but has to move his or her head to do so, considered to be a 180-360 degree arc of view
- Sequential impact - occurs when the observer has to move to another viewpoint to see other developments or a different view of the same development e.g. traveling along a road

4.27 Figures 05-06 illustrate the current situation in Huntingdonshire in terms of cumulative impact. The coloured circles illustrate the Prominent and Conspicuous Zones of visibility for existing and consented turbine developments. Where these circles begin to overlap there is likely to be a significant cumulative visual impact for certain locations.

4.28 Where the Prominent Zones of visibility overlap (e.g. at 4km separation between two 100m to blade tip turbines), they are both likely to be easily read in the same view from many locations. As such they are likely to demonstrate a significant cumulative impact from a number of locations and are less likely to be considered acceptable in visual terms. One exception may be if they form a relatively modest extension to an existing turbine development and are read in the same group. This is less likely to be acceptable if the

additional turbines are of a different height, spacing or design. Where the Conspicuous Zones of visibility overlap (e.g. at 10km separation between two 100m to blade tip turbines) this may also result in some significant cumulative visual impact. These impacts could have the potential for combined or successive impacts.

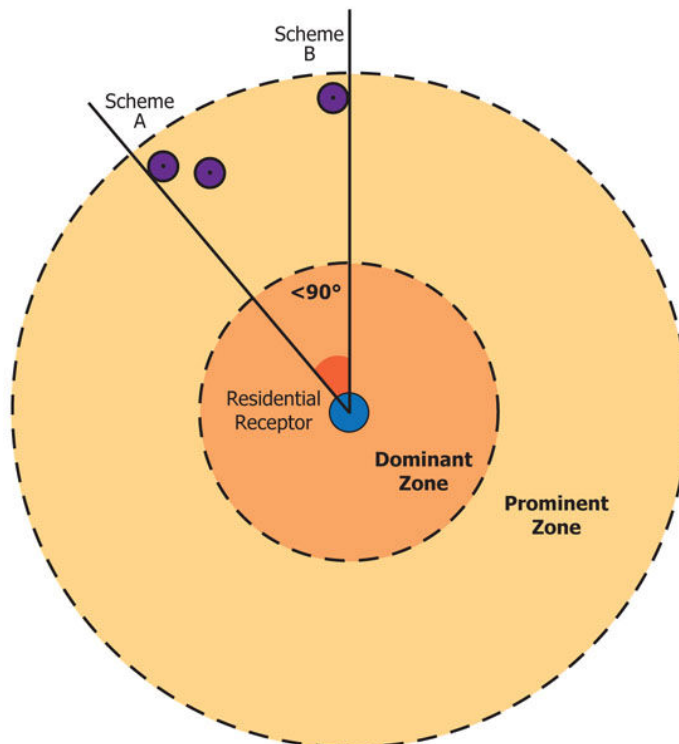
- 4.29 In order to minimise Combined/Simultaneous impacts and Successive/Repetitive impacts it is considered desirable to limit the extent of turbine visibility within the field of view. This will help to prevent residential properties and settlements becoming unduly affected by the cumulative impact of wind turbines and avoid the potential effect of living within or near a windfarm landscape. As a result criteria have been recommended to help assess the impacts on sensitive receptors at fixed points, most notably residential properties.
- 4.30 In terms of sequential cumulative visual impact this may apply for a number of types of receptors. Users of the main roads in the District, a number of which run north-south (A1M) and east-west (A14) through Huntingdonshire and the main line railway already experience an effect from a number of turbine sites. On these journeys there may be some notable magnitude effects. Despite the speed of travel these receptors may be considered to be of moderate sensitivity as they represent the way in which many people appreciate the landscape. Users of strategic recreational routes, other rights of way, and recreation facilities with a focus on the landscape, are likely to have a high sensitivity to change due to the slower mode of travel and greater focus on expectations from the experience. This would also be the case for users of minor roads enjoying the countryside, a proportion of whom will be pedestrians, cyclists and equestrians with an interest in the landscape.

Guideline thresholds and criteria

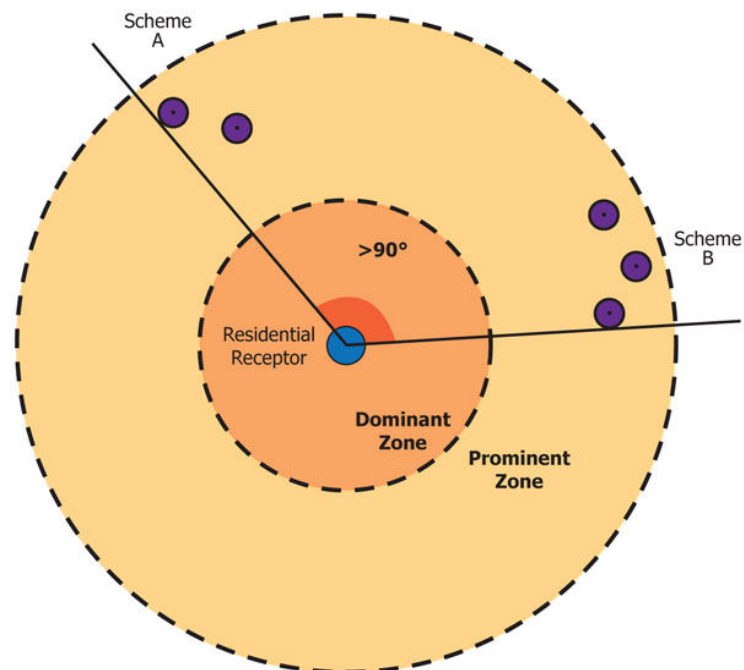
- 4.31 Proposals for wind turbine development where there is an overlap of Prominent Zones are unlikely to be acceptable in cumulative visual terms unless local factors substantially counteract any significant cumulative effects. An exception (and subject to meeting other criteria) may be where a proposed turbine or group are designed as a logical extension of an existing group using turbines of similar size and design.
- 4.32 Proposals for wind turbine development where there is an overlap of Conspicuous Zones cumulative effects will need to be carefully considered with regard the cumulative effect. Any significant impacts should be included in the overall significance of effect and these should be considered in turn by the decision maker in carrying out the planning balance.
- 4.33 Proposals should avoid situations where cumulative effects on residential locations would result in more than 90° of the field of view from any part of a property (including the garden) being occupied by wind turbines within the Prominent Zone of the turbines. The angle should

be measured as the aggregate arc (to outer blades) of all turbines visible from the property and extend to a distance equivalent to the Prominent Zone for each turbine. The calculation should include any single turbines or groups of turbines and the Prominent Zone distance measured from the façade/s of the property facing the turbines, (see Sketches 01 and 02 below). Intervening local screening may mitigate the cumulative effects and these moderating factors should be considered on a case by case basis. Proposed WTD within the Dominant Zones should be subject to more detailed evaluation in respect of the potential effects on residential amenity in addition to any cumulative effects within and beyond the Dominant Zone.

Sketch 01 (Not to Scale)
Within guideline for cumulative visual effect

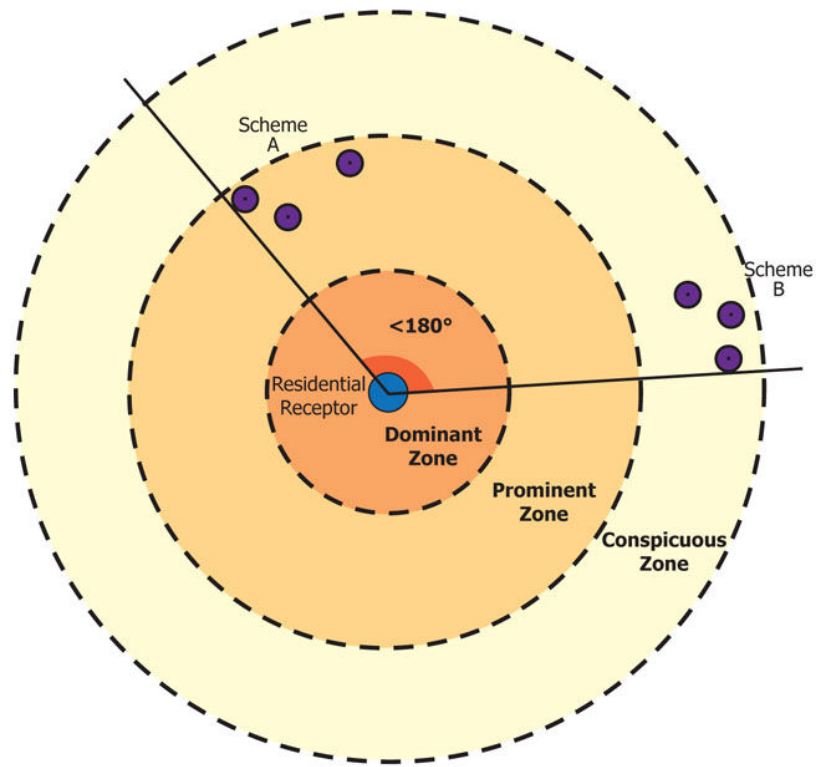


Sketch 02 (Not to Scale)
Outside guideline for cumulative visual effect

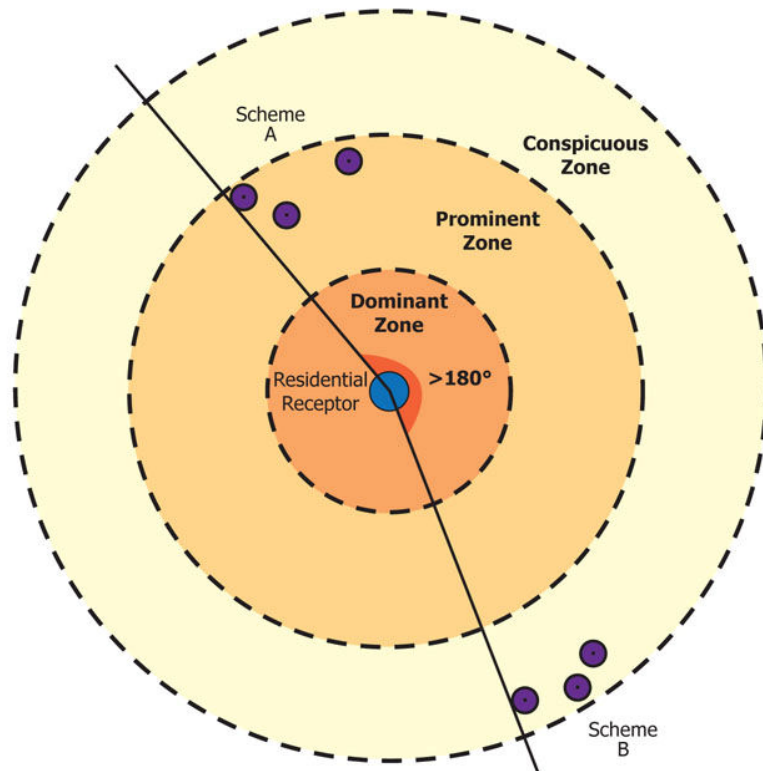


- 4.34 Cumulative effects on residential locations should avoid situations where more than 180° of the field of view from any part of a property (including the garden) is occupied by wind turbines within either the Prominent or the Conspicuous Zone of the turbines. The angle should be measured as the aggregate arc (to outer blades) of all turbines visible from the property and extend to distance equivalent to the Prominent Zone for each turbine. The calculation should include any single turbines or groups of turbines and the zone distance should be measured from the façade/s of the property facing the turbines (see Sketches 03 and 04 below). Intervening local screening may mitigate the cumulative effects and these moderating factors should be considered on a case by case basis. Again proposed WTD within the Dominant Zones should be subject to more detailed evaluation in respect of the potential effects on residential amenity in addition to any cumulative effects within and beyond the Dominant Zone.

Sketch 03 (Not to Scale)
Within guideline for cumulative visual effect



Sketch 04 (Not to Scale)
Outside guideline for cumulative visual effect



- 4.35 Proposals for wind turbine development should be considered in relation to the sequential visibility of turbine development when experienced along all classes of public highways, railway lines and recreational routes. Cumulative visual assessment should be based on factors including the magnitude of the change, sensitivity of viewer, likely extent and duration of the impact and character of the route including screening and impacts on viewpoints along the route. For more guidance and the level of information required see Section 5.

Mitigation of cumulative effects

- 4.36 All turbines within a group should ideally be of the same appearance and size to create visual harmony. This will apply to 'extension' of existing sites or proposals which are visually read as part of an existing group.
- 4.37 Mitigation including landscape proposals, enhancement of existing features of biodiversity interest, and the creation of habitats within the site (as NPPF para 118) should be included as part of any application. This should be within the red line or blue line of applications. Off-site planting should also be considered where practical, in order to mitigate visual impacts over a wider area. This could be achieved via a legal agreement or through a Community Trust. Such proposals should be in keeping with the landscape character and strategy for landscape management and provide a legacy to the local environment during and beyond the life of the scheme.

5 GUIDANCE TO APPLICANTS FOR UNDERTAKING CUMULATIVE LANDSCAPE AND VISUAL IMPACTS AND HDC FOR ASSESSING APPLICATIONS

- 5.1 The criteria and guidance set out in Section 4 above should initially be applied at the Pre Application, Screening and Scoping Opinion stages, and then in greater detail if the scheme progresses to a full Planning Application and supporting Environmental Statement.
- 5.2 The requirement for, and geographical extent of, a cumulative assessment shall be established at the pre application stage and agreed as part of the scoping process. This should include identification of all the relevant schemes to be considered and the radius for the cumulative assessment to be used. Schemes that are either constructed, approved, or have been formally registered as an application will normally form the basis of schemes to be assessed. For schemes with turbines at 100m+ this may be required to extend to up to 30km radius.
- 5.3 The cumulative landscape and visual assessments will need to be reviewed as part of the decision making process, alongside the full revised SPD and the contents of the planning application and EIA including other parts of the LVIA sections of the ES.
- 5.4 Environmental Statements should provide detailed assessments of cumulative landscape and visual impacts for the particular scheme following the approach as set out in Section 5 of PPS 22 Companion Guide, SNH report 'Assessing the cumulative impact of onshore wind energy developments' (SNH) March 2012, and the latest version (3rd edition) of the "Guidelines for Landscape and Visual Impact Assessment," Landscape Institute and IEMA (April 2013). Environmental Statements (usually in their LVIA section) should also consider and address the relevant further information and guidance criteria listed in the Wind Power SPD (or successor documents) for each LCA in the district.
- 5.5 Section 5 of the PPS 22 Companion Guide provides guidance on the assessment of landscape and visual impact issues relating to individual development proposals, and also cumulative effects as set out below.

5.21 Several areas in England are experiencing much interest from renewable energy developers and cumulative effects have become a factor in the determination of applications.

5.22 Cumulative landscape effects and visual effects should be considered separately. The former refers to effects of a proposed development on the landscape fabric, character and quality and so concerns the degree to which renewable energy development becomes a significant or defining characteristic of the landscape. Cumulative visual effects concern the

degree to which renewable energy development becomes a feature in particular views (or sequences of views), and the effect this has upon the people experiencing those views.

5.23 Cumulative effects may arise where two or more of the same type of renewable energy development are visible from the same point, or are visible shortly after each other along the same journey. Hence, it should not be assumed that, just because no other sites are visible from the proposed development site, the proposal will not create any cumulative effects

5.24 Cumulative impact assessments undertaken to date in the UK relate mainly to wind farms, and have generally been concentrated in Scotland and Wales. Bodies such as Scottish Natural Heritage have developed considerable experience in dealing with these issues and have prepared several volumes of good practice guidance for their own and wider use. In England, the following key points (derived from the Scottish guidance) may assist in assessing cumulative effects:

- a base plan of all existing windfarms, consented developments and applications received should be produced, showing all such schemes within a defined radius of the centre of the proposal under consideration;*
- for those existing or proposed windfarms within a defined radius of the proposal under consideration, a plan showing cumulative zones of visual influence (ZVIs) should be prepared. This plan should clearly identify the ZVI of each windfarm, and identify those areas from where one or more windfarms are likely to be seen;*
- the base plan and plan of cumulative ZVIs should reflect local circumstances – for example, the areas covered should take into account the extent to which factors such as the topography and the likely visibility of proposals in prevailing meteorological conditions may vary;*
- the map of cumulative ZVIs should be used to identify appropriate locations for visual impact studies. These will need to include locations for simultaneous visibility assessments, where two or more schemes are visible from a fixed viewpoint without the need for an observer to turn their head, and repetitive visibility assessments, where the observer is able to see two or more schemes but only if they turn around;*
- sequential effects on visibility occur when an observer moves through a landscape and sees two or more schemes. Common routes through a landscape (e.g. major roads; long distance paths or cycle routes) should be identified, as 'journey scenarios' appropriate for assessment;*

- *photomontages should be prepared showing all existing and consented turbines, and those for which planning applications have been submitted, in addition to the proposal under consideration. The viewpoints used should be those identified using the maps of cumulative ZVIs. The photomontages should be annotated to include the dimensions of the existing turbines, the distance from the viewpoint to the different schemes, the arc of view and the format and focal length of the camera used; and,*

- *at the most detailed level, description and assessment of cumulative effects may include the following landscape issues: scale of development in relation to landscape character or designations; sense of distance; existing focal points in the landscape; skylining (where additional development along a skyline appears disproportionately dominant); sense of remoteness or wildness*

APPENDIX 1

Examples of Approaches to Cumulative Effects by Local Authorities

East Durham Limestone and Tees Plan - North East Regional Assembly (Arup 2008)

- A1.1 This uses scenarios of potential development for cumulative landscape impacts. While the scenario approach is supported by SNH in their 2102 guidance it is not favoured as it can be seen as giving a potential amber/green light to the selected scenarios locations. The study also uses some of Fenland DC approach on Cumulative Visual effects such as percentage fields of view occupied by development from settlement and individual properties.

Rugby: Landscape Capacity Study for Wind Energy - White consultants (2011)

- A1.2 This study also uses the scenario approach to including a range of options of different scales of WTD in different areas within the district to assess the likely effects. While, this may be a useful applied theoretical approach it may seem to indicate more suitable sites and while useful internally may be less helpful in the public realm due to the conclusion drawn and preference inferred as to suitability on certain sites and scenarios. This may disadvantage other potential schemes not included as a selected scenario.

South Pennines – Julie Martin Associates (2010)

- A1.3 This includes some useful principles. It suggests different spacing of wind turbine schemes based on the LCA type and its relative sensitivity. These vary from 6-12km for large schemes or 3-5km if an LCA or site is more appropriate. This reflects the same principal included in the Ove Arup Report "Placing Renewables in the East of England."

Perth and Kinross

- A1.4 Indicates a requirement for a 40km separation between wind turbine developments unless they can be shown to not have significant adverse effects. This appears to be potentially be a rather restrictive an approach unless supported by evidence of the sensitivity of the landscape character areas involved.

Central Beds Draft SPD (2012/13)

- A1.5 This identifies 5km as the distance of likely greatest cumulative effect. It states that the scale of the landscape in Central Bedfordshire would be unlikely to successfully integrate two schemes within 10-15km of each other. This authority shares NCA 88 (Bedfordshire and

Cambridgeshire Claylands) with HDC. It appears that the Draft SPD sets a lower threshold of adverse cumulative harm than HDC.

Fenland DC – Wind Turbine Guidance (2009)

- A1.6 This study was produced for a local authority that was beginning to experience some concerns over cumulative impacts. The report covers a wide range of criteria including some for cumulative landscape and visual effects. The study was subject to public consultation and forms part of the Local Plan evidence base. The study has been tested at Public Inquiry in the context of planning applications for WTD and was afforded 'substantial weight' in the Inspectors report for the Burnt Housed Farm and Floods Ferry appeals (APP /D0515/A/10/2123739 and APP /D0515/A/10/2131194) the latter scheme being dismissed on the basis of cumulative visual effects. The study includes thresholds for acceptable effects on landscape character to assess prominent and conspicuous effects (2km and 5km distances) and thresholds for residential angles of view from cumulative visual effects. This authority shares NCA 46 (The Fens) with HDC.

Aberdeen (2005)

- A1.7 This study uses the 2km and 5km distances to represent the likely prominent and conspicuous zones of visual effect on the area around proposed turbines as set out in SNH's document PAN 45.

South Lanarkshire - Ironside Farrar (2010)

- A1.8 This study describes different types of cumulative impact rather than setting specific limits or thresholds and therefore would focus more on the effects of a specific application.

Angus Wind Farms Assessment - Ironside Farrar (2008)

- A1.9 This study includes reference to 'sacrificial areas' as the location to concentrate turbines. This appears to be an approach that had also be used in other parts of Europe. The suitability of this approach in other areas would depend on the character of the landscape involved and the presence of other constraints including the presence and number of receptors.

Examples of Inspector Decisions

Introduction

- A2.1 All cases should be judged on their own merits and the circumstances that exist specific to each site, so it is sometimes difficult to see complete consistency in these various decisions. However, the following case studies set out aspects of decisions made by inspectors and the Secretary of State that could be helpful in informing principles and criteria for future decision making in relation to cumulative effects. This approach to 'benchmarking' from other comparable schemes is supported by National Policy Statements EN1 and EN3.

Burnthouse Farm and Flood's Ferry Farm

APP/D0515/A/10/2123739 and APP/D0515/A/10/2131194

Inspector's Decision (26 April 2011)

- A2.2 The inspectors report allowed the two appeals one for 3 wind turbines of 100m (to blade tip) at Burnthouse Farm and 9 wind turbines of 110.5m height (to blade tip) at Flood's Ferry Farm. However, the approval of the Flood's Ferry development was over turned by the Secretary of State and he dismissed the appeal. One of the main issues considered was the effect on landscape character and the visual effects on the local receptors, with particular reference to cumulative effects. Despite the identification of significant cumulative and adverse impacts, this was weighed in the balance with the need to meet national targets for renewable energy and the capacity of the Drained Fen landscape within Fenland District as being suitable for wind farms. The main wind turbine developments considered for cumulative effects were: the two wind farm developments of Burnthouse Farm and Flood's Ferry Farm, which at their closest would be approximately 1.3kms apart; the existing wind turbines at Ransonmoor (approximately 2.6kms apart from Flood's Ferry Farm and approximately 4kms apart from Burnthouse Farm); the proposed Boardinghouse Wind Farm (approximately 2.3kms apart from Flood's Ferry Farm and approximately 3.8kms apart from Burnthouse Farm); and the existing Glassmoor Wind Farm (approximately 6.6kms apart from Flood's Ferry Farm and approximately 4.9kms apart from Burnthouse Farm). The key aspects of the decision making are set out below.

- A2.3 The need to establish whether cumulative visual and landscape impacts would be sufficient that they would cause harm to the public interest, as opposed to the EIA approach of determining whether the proposal would cause significant cumulative impact.
- A2.4 Challenge to the assumption that if the proposals result in a big change, that these should be regarded as adverse impacts.
- A2.5 Significant landscape impacts would occur at a local scale level as a result of the cumulative effect of existing and the proposed schemes.
- A2.6 The proposed Flood Ferry Farm wind turbines would be seen successively and sequentially with the wind turbines at Ransonmoor. The proposed wind turbines would be approximately 2.6kms and more away from the wind turbines at Ransonmoor. This was considered sufficient for the inspector to conclude that this would contribute substantially to an environment in which wind turbines would seem to surround and encroach, creating significant adverse cumulative visual impacts.
- A2.7 At a visual receptor location just beyond 2km, the successive or sequential effect of the two wind farms was also considered to create a significant and adverse cumulative impact.
- A2.8 Burnthouse Farm and Flood's Ferry Farm wind turbines should still be regarded as being prominent, despite being set within a wide and open landscape with big skies.
- A2.9 The proximity of the proposed Flood's Ferry Farm wind turbines to the presence of existing and other proposed wind turbines was sufficient to be considered as having materially harmful cumulative visual effects.

Secretary of State's Decision (6 July 2011)

- A2.10 The Secretary of State confirmed that it was relevant to consider whether any cumulative visual and landscape impacts would be sufficient to cause harm to the public interest.
- A2.11 Whilst the proposed developments would have a significant landscape impact at a local level, the Secretary of State concluded that cumulative landscape impact did not constitute a reason for refusing either of the appeals.
- A2.12 The Secretary of State agreed with the Inspector that the Flood's Ferry Farm proposal in combination with other schemes would create an adverse cumulative visual impact over a sizeable area and gave significant weight to the principle material harm this would give rise to on the surrounding area. This weight was such that it caused the Secretary of State to overturn the Inspector's decision and dismiss the Floods Ferry proposal.

General Principles of Application

A2.13 At distances of 1.3kms to 2.6kms between WTDs of c. 100-110m (to blade tip) despite being in a landscape that has some inherent capacity for WTD, cumulative effects are likely to result in unacceptable landscape and visual harm.

Monkwith Wind Farm, Roos, East Yorks

APP/E2001/A/10/2130670

Inspector's Decision (7 January 2011)

- A2.14 The inspector dismissed the appeal on the basis of harm to landscape and visual amenity resulting from the cumulative effects of the proposed development when seen in the context of three other permitted wind farms. The landscape character of the proposed wind turbines in Holderness is typically open comprising relatively large scale agricultural farmland with low hedges and few trees. There are several settlements and isolated farms or dwellings with the closest properties being approximately 700 to 800m from the closest proposed wind turbine. The three approved wind farms included: Burton Pidsea (3 turbines at 135m height to blade tip); Tedder Hill (3 turbines at 111m height to blade tip); and Sunderland Farm, Roos (9 turbines at 126.5m height to blade tip).
- A2.15 The consented Roos (Sunderland Farm) Wind Farm is located centrally between the other two wind farms approximately 2.2kms and 2.3kms, respectively, to the nearest wind turbines and was successfully appealed at the time, following the inspector's decision that the proposals would not result in an unacceptable 'wind farm landscape' but would form an acceptable 'landscape with wind farms'.
- A2.16 Monkwith Wind Farm was proposed to the north-east of these linear arranged wind farms with the nearest wind turbines separated by a distance of approximately: 5.8kms to Burton Pidsea; 2.4kms to Tedder Hill; and 3.7kms to Roos (Sunderland Farm).
- A2.17 The Inspector considered that a significant cumulative effect would occur with the addition of a fourth wind farm in relatively close proximity to the existing three wind farms and would be a greater effect than 'reinforcement' but less than a 'transformative' influence. The decision was also influenced by the incursion of the wind farm sub-type into a landscape character type that is narrow, open and exposed, higher than the adjacent landscape character type and more undulating and that was less affected by previous wind farm applications.
- A2.18 The inspector considered that the addition of the proposed 3 turbines to the approved 15 turbines would, from certain locations, extend the cumulative effects over a significantly larger area. The inspector determined that cumulative visual effects experienced sequentially over time, by moving within the effected landscape, would not necessarily be of any greater

influence to that experienced in one fixed location. It was considered that the relatively close proximity of the four wind farms would create cumulative harm in a confined localised context as well as over a wider area as a repeated visual effect that would dominate the receptor's experience. However in contrast, the inspector considered this not to be a sufficiently high cumulative effect to create an overbearing or overwhelming impact on residential amenity.

General Principles of Application

- A2.19 A small number of wind farms at a distance of 2.2kms to 2.3kms apart set within an open, relatively large scaled agricultural landscape with limited enclosure potentially would be considered as forming a 'landscape with wind farms'. In this context this was not considered to result in unacceptable harm. However, additional wind farms at a similar distance or slightly greater, where this also affects a relatively more sensitive landscape character with limited influence from wind farm development, may be considered as an unacceptable harm. Sequential visual effects can also contribute to the cumulative harm from receptors.

Nun Wood, Beds, Bucks and Northants

[APP/K0235/A/11/2149434](#), [APP/H2835/A/11/2149437](#) & [AAP/Y0435/A/10/2140401](#)

Inspector's Decision (15 November 2011)

- A2.20 Three appeals were considered for a single windfarm development for the erection of 12 wind turbines 125m high (to blade tip) near Bozeat, which straddled three separate districts requiring three separate planning applications. The inspector allowed the appeals and granted permission for the proposed development. The decision was challenged and the Inspectorate decided not to defend the decision. A new appeal is to be heard in June 2013. The main issues from the 2011 appeal related to effects on landscape and visual amenity. Cumulative effects were also addressed particularly in conjunction with the existing wind farm at Petsoe End to the south where the closest wind turbines would be approximately 6kms from the Nun Wood proposal. The inspector considered that there was sufficient visual separation of the two wind farms not to result in a 'wind farm landscape' being created. He identified that at a distance of approximately 3km the visual receptor would be able to recognise a clear and distinct separation. From approximately 6km there would be many wind turbines visible from some locations, and of sufficient number to create significant cumulative visual effects, but not sufficiently harmful to warrant refusal.
- A2.21 The wind turbines were proposed to be located in three different landscape character areas, including: a plateau landscape of rolling and gently sloping landform, medium scale arable and pastoral farmland, enclosed by woodland and hedgerows; high elevated and undulating

landform, open fields and limited woodland cover, but also with some enclosure; and an elevated, undulating, large scaled farmland with some woodland. The range of LCAs was in part a function of the site being at the junction of three separate landscape character studies.

General Principles of Application

- A2.22 A separation of 6kms between two wind farms (both at 125m height) was not seen as creating unacceptable cumulative harm in this context, despite the potential for significant cumulative effects having been identified.
- A2.23 A distance of 6kms apart in a relatively elevated landscape of undulating or rolling farmland with some enclosure, would be sufficiently distant not to create a 'wind farm landscape' from the two schemes.

Spaldington, East Yorks

APP/E2001/A/10/2137617 & APP/E2001/A/10/2139965

Inspector's Decision (29 September 2011)

- A2.24 The conjoined inquiry considered two appeals for two separate refused planning applications for wind farms. Spaldington Airfield scheme incorporating five wind turbines of 126m height (to blade tip) was allowed and planning permission granted, whilst the Spaldington Common (Ivy House Farm) scheme that proposed seven wind turbines of 126.5m height (to blade tip) was dismissed on the basis of unacceptable harm to living conditions, both in terms of visual dominance and noise disturbance. The closest distance of the nearest turbines of the two proposed developments was approximately 2kms.
- A2.25 The main issues were based on the individual and cumulative effects on various factors, including the visual impact from residential properties, landscape character and public views.
- A2.26 The parties agreed to apply the approach taken to visual amenity effects on residential properties used at Enifer Downs inquiry (APP/X2220/A/08/2071880) and also supported by the Secretary of State at Burnthouse Farm / Floods Ferry conjoined inquiry (see above). This is colloquially known as the 'Lavender Test' and considers unacceptable harm on residential amenity which stated '*when turbines are present in such number, size and proximity that they represent an unpleasantly overwhelming and unavoidable presence in main views from a house or garden, there is every likelihood that the property concerned would come to be widely regarded as unattractive and thus unsatisfactory (but not necessarily uninhabitable) place to live. It is not in the public interest to create such living conditions where they did not exist before.*'

- A2.27 Whilst the inspector considered there to be significant harm to views on residential properties that would have occurred as a result of the Common scheme, the cumulative effect of the two schemes (visual degree of separation varying between 2.8 to 3.8kms), was deemed not to create any additional significant and unacceptable impacts on residential amenity. The settlement of Spaldington lies centrally between the two proposed wind farms, with inspector recognising that this could create the impression of being situated within a wind farm. However, on reviewing the evidence, he felt that there were limited circumstances where the two developments would be experienced together.
- A2.28 Other wind farms were considered for cumulative effect in the Environmental Statements for the two schemes, the closest of which were as follows: Sixpenny Wood Wind farm (proposed at the time of the inquiry at approximately 5kms to the nearest Spaldington Common turbine and approximately 6.4kms to the nearest Spaldington Airfield turbine); the operational Loftsome Bridge Wind Farm (approximately 7.5kms to the nearest Spaldington Common turbine and approximately 5.3kms to the nearest Spaldington Airfield turbine); and Rusholme Wind Farm (consented at the time of the inquiry at approximately 8.2kms to the nearest Spaldington Common turbine and approximately 7kms to the nearest Spaldington Airfield turbine). None of these wind farms were referred to by the inspector in relationship to cumulative effects on landscape and visual amenity.
- A2.29 Both developments were proposed in a large scale and low lying almost most flat landscape with no landscape designations.
- A2.30 The inspector considered that the greatest visual effects occurred within 2 to 3kms of either site. The context of the landscape character in which the wind farms were being proposed i.e. a large scaled landscape and expansive skies formed an important consideration in concluding the landscape's ability to accommodate the proposed developments either individually or cumulatively and for the key characteristics of its large scale, openness and flat topography to remain the most dominant features. Consequently, the proposals could be considered as forming a 'landscape with wind turbines' rather than a 'wind farm landscape' and whilst resulting in significant change to the character of the local landscape, would not result in unacceptable harm.
- A2.31 With regard to public visual impact, in coming to his conclusion, the inspector considered occupants of a car and pedestrians to be of equally high sensitivity. However, whilst the cumulative effect was considered to be significant, the proposed developments would not be sufficiently unacceptable as to justify dismissal.

General Principles of Application

- A2.32 A separation of 2kms between wind farms was considered to be acceptable in relation to views from residential properties. However, it is likely that at least in part this was based on local variations including screening and that a different outcome may have occurred with different local circumstances.
- A2.33 Wind farms separated by 5kms or more apart in this landscape character are unlikely to be considered as leading to significant cumulative landscape and visual impacts based on the schemes present at the time of the decision.

Chiplow (Bagthorpe) and Jack's Lane (Stanhoe), Norfolk

APP/V2635/A/11/2154590 & APP/V2635/A/11/2158966

Inspector's Decision (24 May 2012)

- A2.36 Two appeals heard by the inspector were for five wind turbines of 100m (to blade tip) at the Chiplow site and the erection of six wind turbines of 126.5m (to blade tip) at the Jack's Lane site. Both appeals were allowed and planning permission granted.
- A2.37 The main issues related to five aspects which included the individual and cumulative effects on landscape and views.
- A2.38 The inspector referred to the landscape study produced by Land Use Consultants in 2003 that provides guidance on the capacity of the landscape to accommodate wind turbine development and inform choices about the location of such developments. In particular, whilst the study fell short of defining suitable areas, the inspector considered it useful to the decision making process that the study defined the criteria to be employed and the size of turbines that would be appropriate within different character areas.
- A2.39 The Jack's Lane turbines were proposed within a Plateau Farmland landscape character area and the Chiplow turbines in a Rolling Open Farmland landscape character areas. The Plateau Farmland landscape displays a strikingly flat landform, wide open skies and large arable fields, with long distance panoramic views. The Rolling Open Farmland is a medium to large scale landscape with strong sense of openness, with wide open skies and medium to large scaled arable fields over a gently rising and falling landform. Both areas were identified in the LUC study as having a high capacity to accommodate turbine groups of two to twelve, the former having a 'limited scope' to accommodate cumulative wind turbine developments and the latter having 'scope' for cumulative development. The inspector highlighted the tension that exists within the LUC study resulting from its recommendations to have wind turbine groups sufficiently distanced from settlements to prevent 'a feeling of dominance' whilst avoiding

wind turbines in locations where there is a strong sense of remoteness. Nevertheless, the inspector identified the value of providing such strategic studies in guiding development, when there was a clear logical approach applied to landscape capacity and group sizes.

- A2.40 Both parties agreed that there would be cumulative landscape and visual effects. The proposed wind farms would be typically experienced as visually distinct and well separated developments about 2.5kms apart. 2.5kms was also used as the basis of determining the extent to which significant impact on the landscape would occur for individual wind farm impacts. In some longer distance views, the wind farms would potentially be seen closer together, but with limited additional effect to that experienced as a single development. The most significant cumulative effect was identified between the two developments, where both would be experienced together from a small number of viewpoints. However, they would not be seen together in the same visual context and only occupy narrow angles of view. The inspector considered that at no point would the sequential effect give the viewer the sense that the view was dominated by both groups of wind turbines. The separation distance of the two wind farms was sufficient not to be considered to form a 'single windfarm landscape type'

General Principles of Application

- A2.41 The benefit to Inspectors for local planning authorities in preparing strategic studies which define the number, size and location of wind turbines that can be accommodated within any given landscape character type/area and the criteria to be used in assessing effects.
- A2.42 Wind turbines of between 100m to 126.5m to blade tip height set at 2.5kms apart or more within open, flat or gently rolling landscape, with open and expansive outlooks could be considered acceptable. Less than 2.5kms apart, acceptability would significantly depend on local characteristics and features and the extent to which the wind turbines of different schemes would be seen together or sequentially experienced.

Bartmoor Wind Farm, Moorsyde Wind Farm and Toft Hill Wind Farm

[APP/2935/A/08/2078347](#), [APP/2935/A/08/2079520](#) & [APP/2935/A/08/2077474](#)

Inspector's Decision (19 October 2009)

- A2.45 The inquiry considered three appeals for separate wind farm proposals within a similar locality. The Bartmoor development proposed six turbines at a height of 110.5m (to blade tip), the Moorsyde Wind Farm proposed seven wind turbines at a height of 110m (to blade tip), and the Toft Hill development proposed seven wind turbines at a height of 122m (to blade

tip). The appeal for Barmoor was allowed and planning permission granted, whilst Moorsyde Wind Farm and Toft Hill appeals were dismissed.

- A2.46 One of the main issues common to all three appeals was considered to be cumulative landscape and visual effects of the proposed wind farms. The inspector predominantly relied on guidance provided by the Scottish Natural Heritage's 'Cumulative Effect on Windfarms' and the Regional Spatial Strategy policy 41 which identified the South and West Berwick-upon-Tweed Broad Area of Least Constraint (BALC) as having the capacity to accommodate wind energy development of up to 20-25 turbines. This defines the principle of a threshold beyond which the presence of wind farms in a given area become unacceptable. As wind farms start to coalesce as they become located closer to each other, a point is reached when they become 'perceived as a key landscape characteristic'.
- A2.47 In addition to the three proposed wind farm schemes, the existing wind farm at Black Hill and the following permitted wind turbine developments were considered: Drone Hill, Border Precision, Wandylaw and Middlemoor. The further wind farm proposal of West Ancroft was considered, which at the time of the inquiry had been validated as a planning application but yet to be determined. The inspector considered this to be a critical inclusion, with the resulting effect of all four wind farms proposals creating an unacceptable level of harm as cumulative effect on the landscape and would exceed the limit of 20-25 turbines provided as the guided limit for wind turbines for the BALC. The inspector judged that this would also occur with the specific combination of the three wind farms of Barmoor, Moorsyde and West Ancroft. In both cases the inspector considered the proposed combinations would have exceeded a 'threshold of unacceptable change' and created a 'wind farm landscape'.
- A2.48 The inspector also judged that the distance between the wind farms was sufficient in the triple combination of Barmoor, Moorsyde and Toft Hill and within each double combination that the 'threshold of unacceptable change' would not be passed and predominantly could be considered as being a 'landscape with occasional wind farms'. The only exception was the double combination of Moorsyde and West Ancroft, which would be so close as to give the impression of a single wind farm of fifteen turbines and form a sufficient cumulative effect as to have exceeded the 'threshold of unacceptable change'.
- A2.49 Cumulative visual effects would similarly be affected with: the four wind farm combination; the triple combination of Moorsyde, Toft Hill and West Ancroft; and the double combination of Moorsyde and West Ancroft would create an unacceptable change. All other combinations were judged not to create an unacceptable visual effect.

Secretary of State's Decision (20 January 2010)

- A2.50 The Secretary of State supported the inspector's conclusions, other than specific aspects not relating to cumulative landscape and visual effects, and agreed with her recommendations to allow the appeal for Barmoor and dismiss the appeals for Moorsyde and Toft Hill.

Land at Hill Farm, Tallentire

APP/G0908/A/10/2131842

Inspector's Decision (4 February 2011)

- A2.51 The appeal was allowed and permission granted for the erection of 6 wind turbines of 100m height (to blade tip) on a site near Cockermouth. The individual and cumulative effect of the proposed wind turbines on the character and appearance of the area was one of two main issues covered by the Inspector's Decision.
- A2.52 The inquiry highlighted that there had been a number of windfarm developments that were operational and had been consented, particularly in the region around Workington. The effect of these wind farms is accentuated by a constrained area of search, due to the presence of the Lake District National Park and the Solway Coast AONB. This has created a linear arrangement of wind farms running north-eastwards to Carlisle, with the proposed Tallentire wind farm filling a gap between wind farms around Workington and the Wharrels Hill wind farm. However, the inspector considered there was only a perception of over-concentration, which in reality was not sufficiently evident on the ground. He noted that whilst multiple wind farm developments would be visible to a varying degree from many locations, the landscape remained the dominant feature and could still be described as a 'landscape with wind farms' rather than a 'wind farm landscape'.
- A2.53 The distance of separation of the wind farms within a transitional landscape between the limestone highlands and lowland, composed of ridge and valley and of medium to large scale, was sufficient that sequential views did not become unacceptably dominated by wind turbines. The distance between existing and consented wind turbines and the proposed Tallentire wind farm at their closest are as follows: around Workington to the south-west (Flimby 3 wind turbines approximately 7.4kms apart; Siddick, Oldside and Vordian 18 wind turbines approximately 10.5kms apart; and Winscales and Winscales Moor 18 wind turbines approximately 10.5kms apart); to the east (Wharrels Hill 8 wind turbines approximately 4.8kms apart; and High Pow 3 wind turbines 13kms apart); to the north (Hellrigg 4 wind turbines approximately 13kms apart); and offshore to the west (Robin Rigg 60 wind turbines 19.5kms apart).

General Principles of Application

- A2.54 Despite the number of operational and consented wind farms, so long as there is sufficient distance between the wind farms and actual experience on the ground, cumulative effects will not always be unacceptable to landscape character, so long as it can be demonstrated that the other key characteristics of the landscape remain as the dominant features and it does not become a wind farm landscape.

- A2.55 The location and number of wind turbines illustrated on a plan does not necessarily mean there is an over-concentration and that the most important aspect is the experience evidenced in reality.
- A2.56 Distances of 7.4kms, 10.5kms and 13kms in an open, medium to large scale landscape of ridge and valley landform could in this context be acceptable.

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Glossary

*Conservation Area** – Areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.

Cumulative impact – The combined effect of all developments when taken together, both present and those in the future.

Fall over distance – The height of the turbine to the tip of the blade. Also known as the topple height.

Intervisibility – The extent to which one area can see another and vice versa

*Landscape Capacity*** – The degree to which a particular landscape character type or area is able to accommodate change without unacceptable adverse effects on its character. Capacity is likely to vary according to the type and nature of change being proposed.

*Landscape Character*** – The distinct and recognizable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.

Landscape Character Area – A unique geographic area with a consistent character and identity, defined by geology, landform, soils, vegetation, landuse, settlement and field pattern.

*Landscape Character Assessment**** – An umbrella term for description, classification and analysis of landscape.

*Landscape Character Type*** – A landscape type will have broadly similar patterns of geology, landform, soils, vegetation, landuse, settlement and field pattern discernable in maps and field survey records.

*Landscape Quality*** – About the physical state of the landscape and its intactness, from visual, functional and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.

*Landscape Sensitivity*** – The extent to which a landscape can accept change of a particular type and scale without adverse effects on its character.

*Landscape Value*** – The relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special qualities including perceptual aspects such as scenic beauty, tranquillity or wilderness, cultural associations or other conservation issues.

*Listed Building** – A building of special architectural or historic interest. Listed buildings are graded I, II* or II with grade I being the highest. Listing includes the interior as well as the exterior of the building, and any buildings or permanent structures (e.g. wells within its curtilage). English Heritage is responsible for designating buildings for listing in England.

Microgeneration – Small scale production of heat and/or electricity from low carbon sources.

*Mitigation*** – Measures, including any process, activity or design to avoid, reduce, remedy or compensate for adverse landscape and visual impacts of a development project.

Planning Advice Note (PAN) – Scottish planning document providing advice on good practice and other relevant information.

*Ramsar Site** – Sites designated under the European Ramsar Convention to protect wetlands that are of international importance, particularly as waterfowl habitats.

*Registered Park and Garden** – A park or garden of special historic interest. Graded I (highest quality), II* or II. Designated by English Heritage.

*Renewable Energy** – Renewable energy is energy flows that occur naturally and repeatedly in the environment, for example from the wind, water flow, tides or the sun.

*Scheduled Monument** – Nationally important monuments usually archaeological remains, that enjoy greater protection against inappropriate development through the Ancient Monuments and Archaeological Areas Act 1979.

Shadow flicker – Under certain combinations of geographical position and time of day, the sun may pass behind the rotors of a wind turbine and cast a shadow over neighbouring properties. When the blades rotate, the shadow flicks on and off.

*Site of Special Scientific Interest (SSSI)** – A site identified under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) as an area of special interest by reason of any of its flora, fauna, geological or physiographical features

*Special Areas of Conservation (SAC)** - A site designated under the European Community Habitats Directive, to protect internationally important natural habitats and species.

*Special Protection Area (SPA)** – Sites classified under the European Community Directive on Wild Birds to protect internationally important bird species.

*Supplementary Planning Document (SPD)** – A Supplementary Planning Document is a Local Development Document that may cover a range of issues, thematic or site specific, and provides further detail of policies and proposals in a 'parent' Development Plan Document.

Threshold – A specified level beyond which impacts are likely to be unacceptable.

Typology – The classification of items into groups to allow their assessment.

Zone of Theoretical Visibility (ZTV) – Also known as a Zone of Visual Influence (ZVI), Visual Envelope Map (VEM) and Viewshed. This represents the area over which a development can theoretically be seen, based on digital terrain data.

* = as defined in the Glossary of Planning Terms on the Planning Portal website

** = as defined in the Glossary section of Guidelines for Landscape and Visual Impact Assessment 2nd edition, The Landscape Institute and Institute for Environmental Management and Assessment, 2002

